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April 2, 2021

VIA ELECTRONIC FILING

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Re: Docket No. UM 1710
In the Matter of Idaho Power Company's Request for Cost-Effectiveness Exceptions for Specific Demand-Side Management Measures and Programs – 2020 Demand-Side Management ("DSM") Annual Report

Attention Filing Center:

Public Utility Commission of Oregon Order No. 15-200 in the above-mentioned docket states that Idaho Power Company ("Idaho Power" or "Company") is to electronically file the Company's DSM annual report in years that Idaho Power does not file for a cost-effectiveness exception request. Although Idaho Power did have a cost-effectiveness exceptions request in 2020, the Company is filing the attached *2020 Demand-Side Management Annual Report*, including Supplements 1 and 2 as an informational copy. Located in Supplement 2 on page 31 are links to the Northwest Energy Efficiency Alliance ("NEEA") reports. Due to the file size, file arrangement, and supplemental nature of the NEEA reports, it is necessary to access the reports through the hyperlinks in Supplement 2.

The *2020 Demand-Side Management Annual Report*, its supplements, and the NEEA links are also available on Idaho Power's website via the following link: https://www.idahopower.com/energy-environment/ways-to-save/energy-efficiency-program-reports/.

If you have any questions regarding this filing, please contact Regulatory Analyst Zack Thompson at (208) 388-2982 or zthompson@idahopower.com.

Sincerely,

Lisa D. Nordstrom

Lisa D. Nordstrom

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Enclosures

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MARCH 15 • 2021



2020 ANNUAL REPORT

DEMAND-SIDE MANAGEMENT

A VIEW
FROM ABOVE

SAFE HARBOR STATEMENT

This document may contain forward-looking statements, and it is important to note that the future results could differ materially from those discussed. A full discussion of the factors that could cause future results to differ materially can be found in Idaho Power's filings with the Securities and Exchange Commission.

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EXECUTIVE SUMMARY

Idaho Power, through its energy efficiency programs, its customer education programs, and its focus on the customer experience, fully supports energy efficiency and demand response and encourages its customers to use energy wisely.

Idaho Power's portfolio of energy efficiency program savings remained strong in 2020 with the second highest savings since the Idaho Energy Efficiency Rider (Idaho Rider) began in 2002. This was accomplished even though many programs were affected by COVID-19 restrictions. The 2020 savings of 196,809 megawatt-hour (MWh), including the estimated savings from the Northwest Energy Efficiency Alliance (NEEA), decreased by 6,493 MWh compared to the 2019 savings of 203,302 MWh—a 3% year-over-year decrease. The savings from Idaho Power's energy efficiency programs alone, excluding NEEA savings, was 180,818 MWh in 2020 and 184,934 MWh in 2019—a 2% year-over-year decrease. The 2020 savings represent enough energy to power almost 17,000 average homes in Idaho Power's service area for one year.

In 2020, the company's energy efficiency portfolio was cost effective from both the total resource cost (TRC) test and the utility cost test (UCT) perspectives with ratios of 2.08 and 2.71, respectively. The portfolio was also cost-effective from the participant cost test (PCT) ratio, which was 2.45.

Idaho Power successfully operated all three of its demand response programs in 2020. The total demand response capacity from the company's programs was 366 megawatts (MW) with actual load reduction of 336 MW. Energy efficiency and demand response are important aspects of Idaho Power's resource planning process and were included in the 2019 IRP.

Total expenditures from all funding sources of demand-side management (DSM) activities were $50.6 million in 2020—$40.4 million from the Idaho Rider, $8.4 million from Idaho Power base rates, and $1.8 million from the Oregon Rider. DSM program funding comes from the Idaho and Oregon Riders, Idaho Power base rates, and the annual power cost adjustment (PCA).

Idaho Power transitioned the Home Energy Report Pilot into a full program in June of 2020. On average, program participants are providing statistically significant savings at between 50 to 363 kWh fewer kWh annually per home than their control group counterparts. When viewed in aggregate, the estimated savings for all program participants was 10,428 MWh in 2020.

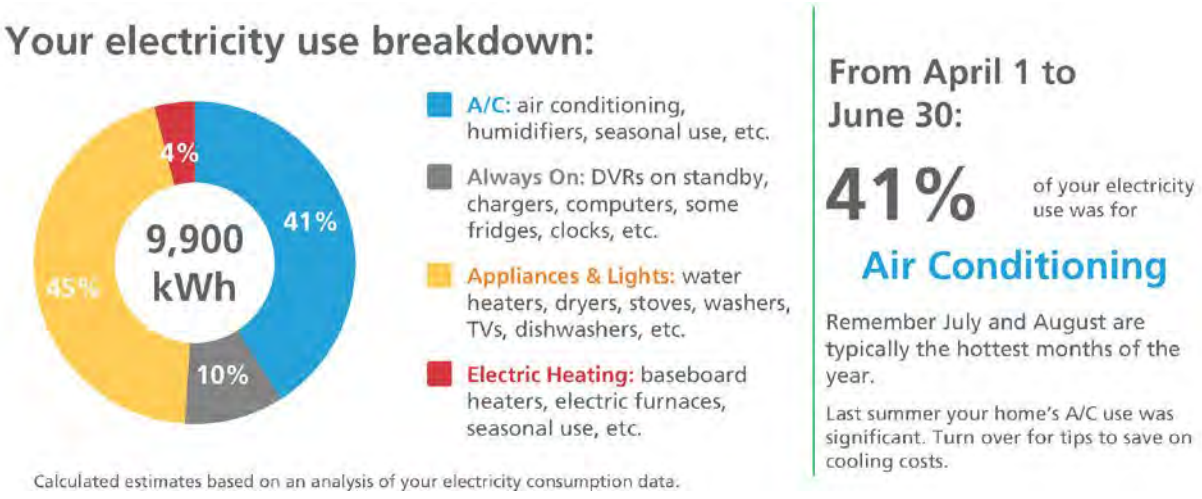


Figure 1. A portion of the Home Energy Report (HER) customers receive

Another way Idaho Power educated residential customers on energy savings related to energy-efficient behavior was to produce an *Energy Efficiency Guide* in 2020 with information on energy efficiency equipment and ways to use energy wisely. This guide was distributed in April primarily as an insert in 20 local newspapers. In 2020, despite the pandemic challenges, Idaho Power's education and outreach energy advisors (EOEA) delivered over 300 presentations with energy-savings messages to audiences of all ages.

In 2020, the Integrated Design Lab (IDL) scheduled 20 technical training lunches which were conducted virtually due to COVID-19 restrictions. Ten sessions were coordinated directly with architecture and engineering firms and organizations and ten were available to the public; a total of 366 architects, engineers, designers, project managers, and others attended.

The IDL also maintains an Energy Resource Library (ERL) with tools for measuring and monitoring energy use and provides training on how to use them. The library includes over 900 individual pieces of equipment, adding 34 new tools in 2020.

Idaho Power continued to provide training to its commercial and industrial customers in 2020, delivering equivalent of 5 full days of technical training over 12 virtual sessions.

Idaho Power provided five irrigation workshops and participated in two additional vendor hosted workshops promoting irrigation system efficiency. The company also participated in, and had an exhibit at, four agricultural trade shows prior to COVID-19 restrictions. The trade shows were the Idaho Irrigation Equipment Association Winter Show, Eastern Idaho Agriculture Expo, Western Idaho Agriculture Expo, and the Agri Action Ag Show.

The company promotes significant customer educational, outreach and awareness activities, promotion of codes and standards, and marketing efforts that are not quantified or claimed as part of Idaho Power's annual DSM savings, but are likely to result in energy savings experienced by the customer and accruing to Idaho Power's electric system over time.

This *Demand-Side Management 2020 Annual Report* provides a review of the company's DSM activities and finances throughout 2020 and outlines Idaho Power's plans for future DSM activities. This report satisfies the reporting requirements set out in Idaho Public Utilities Commission's (IPUC) Order Nos. 29026 and 29419. Idaho Power will provide a copy of the report to the Public Utility Commission of Oregon (OPUC) under Oregon Docket UM 1710.

INTRODUCTION

Idaho Power, through its energy efficiency programs, customer education programs, and focus on the customer experience, fully supports energy efficiency and demand response and encourages its customers to use energy wisely.

In 2020, Idaho Power continued to pursue all cost-effective energy efficiency across its service area. Idaho Power focuses on the customer experience when providing information and programs that ensure customers have opportunities to learn about their energy use, how to use energy wisely, and how to participate in programs. This year was challenging due to COVID-19. However where possible, Idaho Power modified DSM activity to prioritize the safety of customers, contractors, and Idaho Power staff, while still balancing opportunities to maintain program performance. Idaho Power also worked with its Energy Efficiency Advisory Group (EEAG) to adjust programs impacted by COVID-19 and to identify opportunities for increased effectiveness in program delivery and marketing. Much of the company's customer in-home or on-location work was suspended in the early months of the pandemic. The company transitioned to virtual meetings, and leveraged technology to maintain participation. As state health and safety-guidelines were developed, some on-location work was able to resume at various businesses. The tables below summarize the status of individual programs and how they were affected by COVID-19 protocols.

Table 1. Impact of COVID-19 on residential programs

Programs	Status
A/C Cool Credit	Idaho Power reduced cycling %
Easy Savings: Low-Income Energy Efficiency Education	In-home work suspended
Energy Efficient Lighting	Program not affected
Energy House Calls	In-home work suspended
Energy-Saving Kits	Program not affected
Heating & Cooling Efficiency Program	Verifications conducted over the phone
Home Energy Audit Program	In-home work suspended
Home Energy Reports Program	Program not affected
Multifamily Energy Savings Program	In-home work suspended
Oregon Residential Weatherization	Audits resumed with customer approval
Rebate Advantage	Program not affected
Residential New Construction Program	Program not affected
Shade Tree Project	Public events postponed
Simple Steps, Smart Savings™	Program not affected
Student Energy Efficiency Kits (SEEK)	Program affected by school attendance & closures
Weatherization Assistance for Qualified Customers (WAQC)	State agencies resumed work early summer
Weatherization Solutions for Eligible Customers	In-home work suspended
Welcome Kits	Program not affected

Table 2. Impact of COVID-19 on commercial, industrial, and irrigation programs

Programs	Status
Commercial and Industrial (C&I) Custom Projects	On-location work affected
New Construction	Some on-location work affected
Retrofits	On-location work affected
Commercial Energy-Savings Kits	Program affected by small business closures
Flex Peak Program	Program affected by customer's ability to participate
Oregon Commercial Audits	On-location work suspended March-November
Small Business Direct Install	On-location work suspended March-October
Irrigation Efficiency Rewards—Custom	On-location work affected
Irrigation Efficiency Rewards—Menu	Program not affected
Irrigation Peak Rewards	Electrician work affected

This report focuses on Idaho Power's demand-side management (DSM) activities and results for 2020 and previews planned activities for 2021. The appendices provide detailed information on the company's DSM activities and detailed financial information for 2020. *Supplement 1: Cost-Effectiveness* provides detailed cost-effectiveness data and *Supplement 2: Evaluation* provides copies of Idaho Power's evaluations, reports, and research conducted in 2020.

Idaho Power's main objectives for DSM programs are to achieve prudent, cost-effective energy efficiency savings and to provide useful and cost-effective demand response programs as determined by the Integrated Resource Plan (IRP) planning process. Idaho Power strives to offer customers valuable programs and information to help them wisely manage their energy use.

The company achieves energy and demand savings objectives in both its Idaho and Oregon service areas through the careful management of current programs, the offering of new cost-effective programs, and through customer outreach and education. Idaho Power has been locally operated since 1916 and serves more than 585,000 customers throughout a 24,000-square-mile area in southern Idaho and eastern Oregon.



Figure 2. Idaho Power service area map

Idaho Power's energy efficiency programs are available to all customer sectors in Idaho Power's service area and focus on reducing energy use by identifying homes, buildings, equipment, or components for which an energy efficient design, replacement, or repair can achieve energy savings. Some energy efficiency programs include behavioral components. For example, the Residential Energy Efficiency Education Initiative (REEEI), the seasonal contests, the School Cohort, Water and Wastewater Cohorts, and the HER Program all are primarily focused on behavioral energy savings.

Savings from energy efficiency programs are measured in terms of energy savings on a kilowatt hour (kWh) or megawatt-hour (MWh) basis. These programs usually supply energy savings throughout the year at different times depending on the energy efficiency measure. Idaho Power shapes these savings based on the end use to estimate energy reduction at specific times of the day and year. The company's energy efficiency offerings include programs in residential and commercial new construction (lost opportunity savings); residential and commercial retrofit applications; and irrigation and industrial system improvement or replacement. Idaho Power's incentives are offered to its irrigation, industrial, large-commercial, small business, government, and school customers to promote a wide range of energy-saving projects.

Energy efficiency and demand response funding comes from Idaho Power base rates, the Idaho and Oregon Energy Efficiency Riders (Rider), and the annual power cost adjustment (PCA) in Idaho. Idaho incentives for the company's demand response programs are recovered through base rates and the annual PCA, while Oregon demand response incentives are funded through the Oregon Rider. Total expenditures on DSM-related activities from all funding sources were $50.6 million in 2020 (Figure 3).

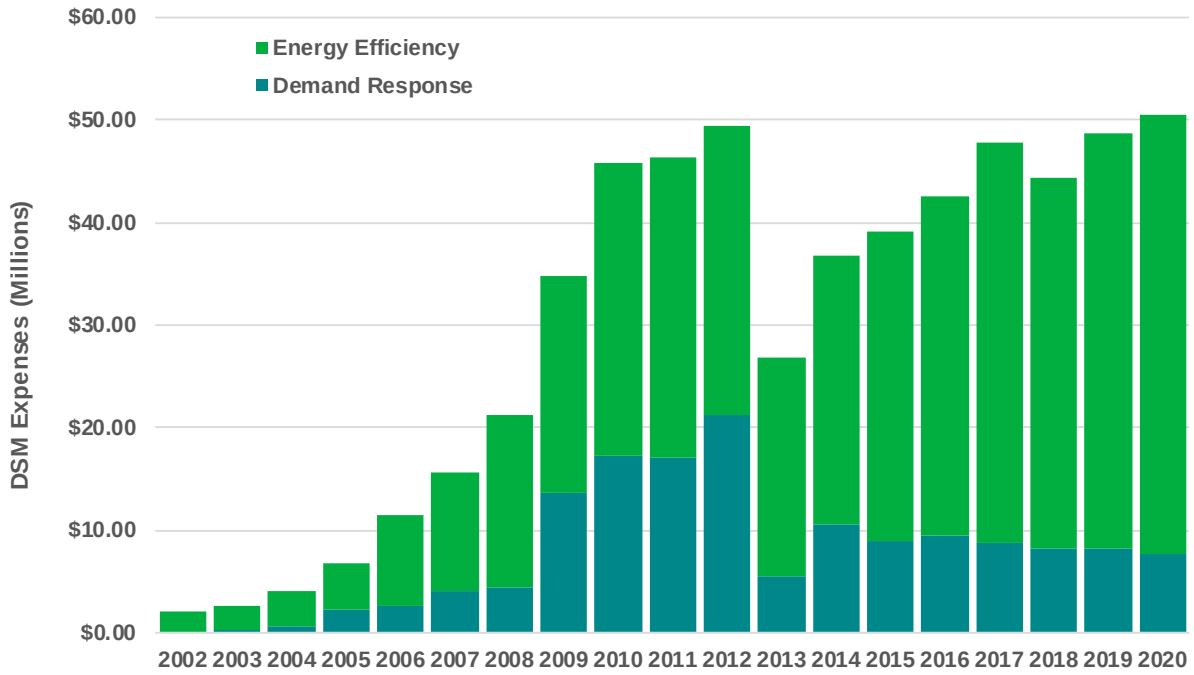


Figure 3. DSM expense history by program type, 2002–2020 (millions [$])

Idaho Power started its modern demand response programs in 2002, and now has over 11% of its all-time peak load available to respond to a peak load event during the summer. The goal of demand response at Idaho Power is to minimize or delay the need to build new supply-side peaking resources. The company estimates future capacity needs through the IRP planning process and plans resources to

mitigate predicted system deficits. Demand response program results are measured by the amount of demand reduction, in (MW), achieved by the company during the summer peak time.

DSM Program Performance

Idaho Power's portfolio of energy efficiency program savings remained strong in 2020 with the second highest savings since the Idaho Rider began in 2002. The 2020 total savings of 196,809 MWh including the estimated savings from the Northwest Energy Efficiency Alliance (NEEA), decreased by only 6,493 MWh compared to the 2019 savings of 203,302 MWh—a 3% year-over-year decrease. The 2020 savings represent enough energy to power over 17,000 average homes in Idaho Power's service area for one year. The savings from Idaho Power's energy efficiency programs alone, excluding NEEA savings, were 180,818 MWh in 2020 and 184,934 MWh in 2019—a 2% year-over-year decrease (Figure 4). Idaho Power invests significant resources to maintain and improve its energy efficiency and demand response programs and was able to achieve near record savings even with extensive disruptions to many programs due to COVID-19 protocols.

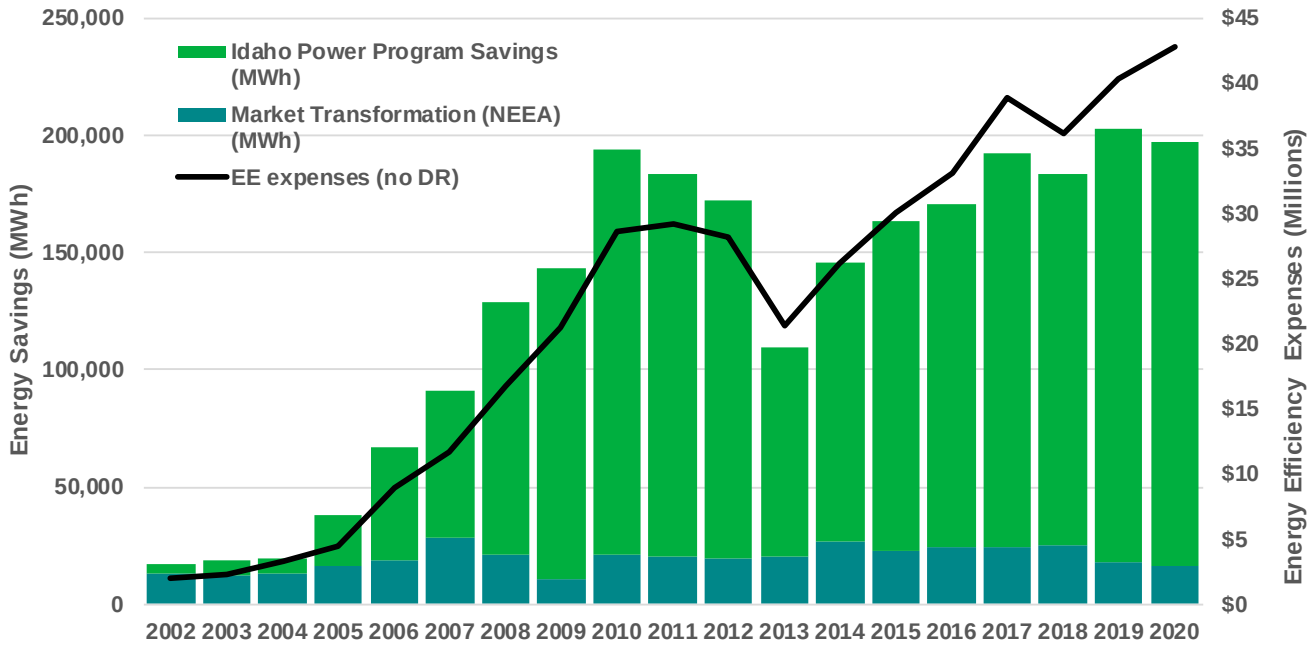


Figure 4. Annual energy savings and energy efficiency program expenses, 2002–2020 (MWh and millions [$])

The 2020 savings results consisted of 37,302 MWh from the residential sector, 130,633 MWh from the commercial/industrial sector, and 12,884 MWh from the irrigation sector. The C&I sector programs contributed 72% of the direct program savings. In the residential sector, lighting continued to significantly contribute to program savings with the Energy Efficient Lighting program contributing 37% of the residential savings and Energy Efficient Lighting combined with Educational Distributions contributing 63% of residential savings. See tables 1 and 2 for a complete list of programs and sector-level savings.

Demand Response

In summer 2020, Idaho Power had a combined maximum actual non-coincidental load reduction from all three programs of 336 MW at the generation level. The amount of capacity available for demand response varies based on weather, time of year, and how programs are used and managed. The 2020

capacity of demand response programs was 366 MW (Figure 5). The demand response capacity is calculated using the total enrolled MW from participants with an expected maximum realization rate for those participants. This maximum realization rate is not always achieved for every program in any given year. The maximum capacity for the Irrigation Peak Rewards program is based on the maximum reduction possible during the hours within the program season. For the Flex Peak Program, the maximum capacity is the maximum nominated amount of load reduction. For the A/C Cool Credit program, the capacity is calculated based on the number of active participants multiplied by maximum per-unit reduction ever achieved.

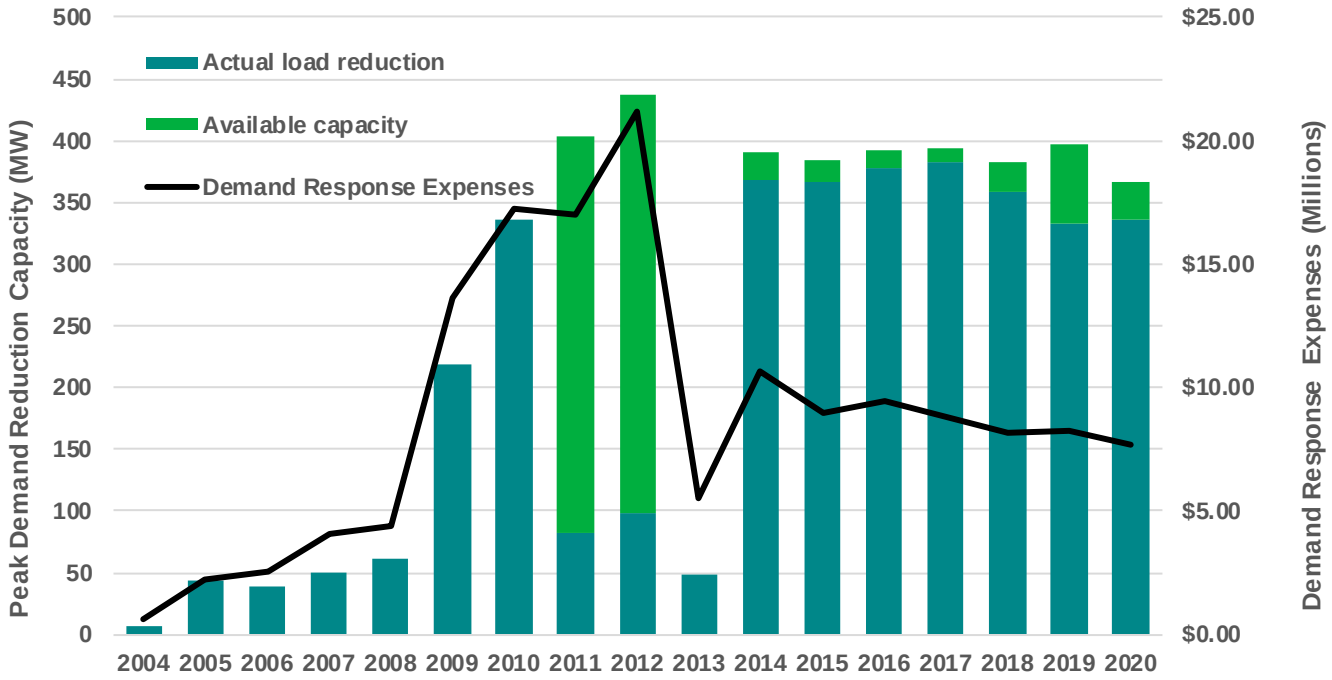


Figure 5. Peak demand-reduction capacity and demand response expenses, 2004–2020 (MW and millions [$])

Under the terms of the Idaho Public Utilities Commission (IPUC) Order No. 32923 and Public Utility Commission of Oregon (OPUC) Order No. 13-482, the company has continued to maintain these programs and use them at least three times per season. During the IRP process, the company analyzes if and when expanded demand response capacity will be needed to avoid system peak deficiencies.

Energy Efficiency

Table 3. DSM programs by sector, operational type, and location, 2020

Program by Sector	Operational Type	State
Residential		
A/C Cool Credit	Demand Response	ID/OR
Easy Savings: Low-Income Energy Efficiency Education	Energy Efficiency	ID
Educational Distributions	Energy Efficiency	ID/OR
Home Energy Report Program	Energy Efficiency	ID
Energy Efficient Lighting	Energy Efficiency	ID/OR
Energy House Calls	Energy Efficiency	ID/OR
Heating & Cooling Efficiency Program	Energy Efficiency	ID/OR
Home Energy Audit Program	Energy Efficiency	ID
Multifamily Energy Savings Program	Energy Efficiency	ID/OR
Oregon Residential Weatherization	Energy Efficiency	OR
Rebate Advantage	Energy Efficiency	ID/OR
Residential New Construction Pilot Program	Energy Efficiency	ID/OR
Shade Tree Project	Energy Efficiency	ID
Simple Steps, Smart Savings™	Energy Efficiency	ID/OR
Weatherization Assistance for Qualified Customers	Energy Efficiency	ID/OR
Weatherization Solutions for Eligible Customers	Energy Efficiency	ID
Commercial/Industrial		
Commercial and Industrial Energy Efficiency Program		
Custom Projects	Energy Efficiency	ID/OR
Green Motors—Industrial	Energy Efficiency	ID/OR
New Construction	Energy Efficiency	ID/OR
Retrofits	Energy Efficiency	ID/OR
Commercial Energy-Saving Kits	Energy Efficiency	ID/OR
Flex Peak Program	Demand Response	ID/OR
Oregon Commercial Audits	Energy Efficiency	OR
Small Business Direct Install	Energy Efficiency	ID/OR
Irrigation		
Irrigation Efficiency Rewards	Energy Efficiency	ID/OR
Green Motors—Irrigation	Energy Efficiency	ID/OR
Irrigation Peak Rewards	Demand Response	ID/OR
All Sectors		
Northwest Energy Efficiency Alliance	Market Transformation	ID/OR

Table 4. DSM programs by sector summary and energy usage/savings/demand reduction, 2020

	Energy Efficiency Program Impacts [a]			Idaho Power System Sales		
	Program Expenses	Energy Savings (MWh)	Peak-Load Reduction (MW)[b]	Sector Total (MWh)	Percentage of Energy Usage	Year-End Number of Customers
Residential	$ 8,937,132	37,302		5,414,951	37%	491,229
Commercial/Industrial	24,474,163	130,633		7,364,382	50%	74,533
Irrigation	3,401,673	12,884		1,987,418	13%	20,309
Market Transformation	2,789,210	15,991				
Demand Response	7,714,912	n/a	336			
Direct Overhead/ Other Programs	3,239,213	n/a				
Total Direct Program Expenses	**$ 50,556,303**	**196,809**	**336**	**14,786,751**	**100%**	**586,071**

[a] Energy, average energy, and expense data have been rounded to the nearest whole unit, which may result in minor rounding differences.

[b] Includes 9.7% peak line loss assumptions.

Customer Education

Idaho Power produced one *Energy Efficiency Guide* in 2020 and distributed it in April primarily as an insert in 20 local newspapers. Because of COVID-19, Idaho Power increased digital communication efforts to bring a variety of energy and money-saving tips to customers. Idaho Power also distributed 2,424 copies of *30 Simple Things You Can Do to Save Energy* booklet directly to customers. Prior to COVID-19 shutdowns, Idaho Power participated in the Idaho Remodeling and Design Show, Smart Women, Smart Money and the Canyon County winter home show. In 2020, despite the pandemic challenges, Idaho Power's EOEAs delivered over 300 presentations with energy-savings messages to audiences of all ages.

Idaho Power supports the Integrated Design Lab (IDL), which conducted Lunch & Learn sessions to educate architects, engineers, and other design and construction professionals about various energy efficiency topics. In 2020, the IDL scheduled 20 technical virtual technical training sessions and 366 architects, engineers, designers, project managers, and other interested parties attended. Also, IDL hosted six virtual monthly Building Simulation Users Group (BSUG) sessions with 105 professionals attending.

The IDL also maintains an Energy Resource Library (ERL) with tools for measuring and monitoring energy use and provides training on how to use them. The ERL includes over 900 individual pieces of equipment, with 34 new tools added in 2020.

Idaho Power continued to provide training to its commercial and industrial customers in 2020, delivering five total full-time days over the course of 12 days of technical classroom-based, live, online training sessions to 179 unique logins. Due to the virtual nature of the course delivery, in some cases there were multiple attendees at a single login location.

In 2020, Idaho Power provided five irrigation workshops and participated in two additional vendor hosted workshops promoting irrigation system efficiency. The company also participated in and had an exhibit at four agricultural trade shows prior to COVID-19 restrictions, the Idaho Irrigation Equipment Association Winter Show, Eastern Idaho Agriculture Expo, Western Idaho Agriculture Expo, and the Agri Action Ag Show.

Surveying Customer Satisfaction

Relationship surveys measure the satisfaction of several aspects of a customer's relationship with Idaho Power, including energy efficiency, at a very high level. However, the surveys are not intended to measure all aspects of the energy efficiency programs.

The 2020 results of Idaho Power's customer relationship survey showed near-record overall customer satisfaction. Sixty-six percent of customers indicated their needs were met or exceeded by Idaho Power encouraging energy efficiency among its customers. Figure 6 depicts the percentage of customers who indicated Idaho Power met or exceeded their needs concerning the energy efficiency efforts it encouraged each year since 2010.

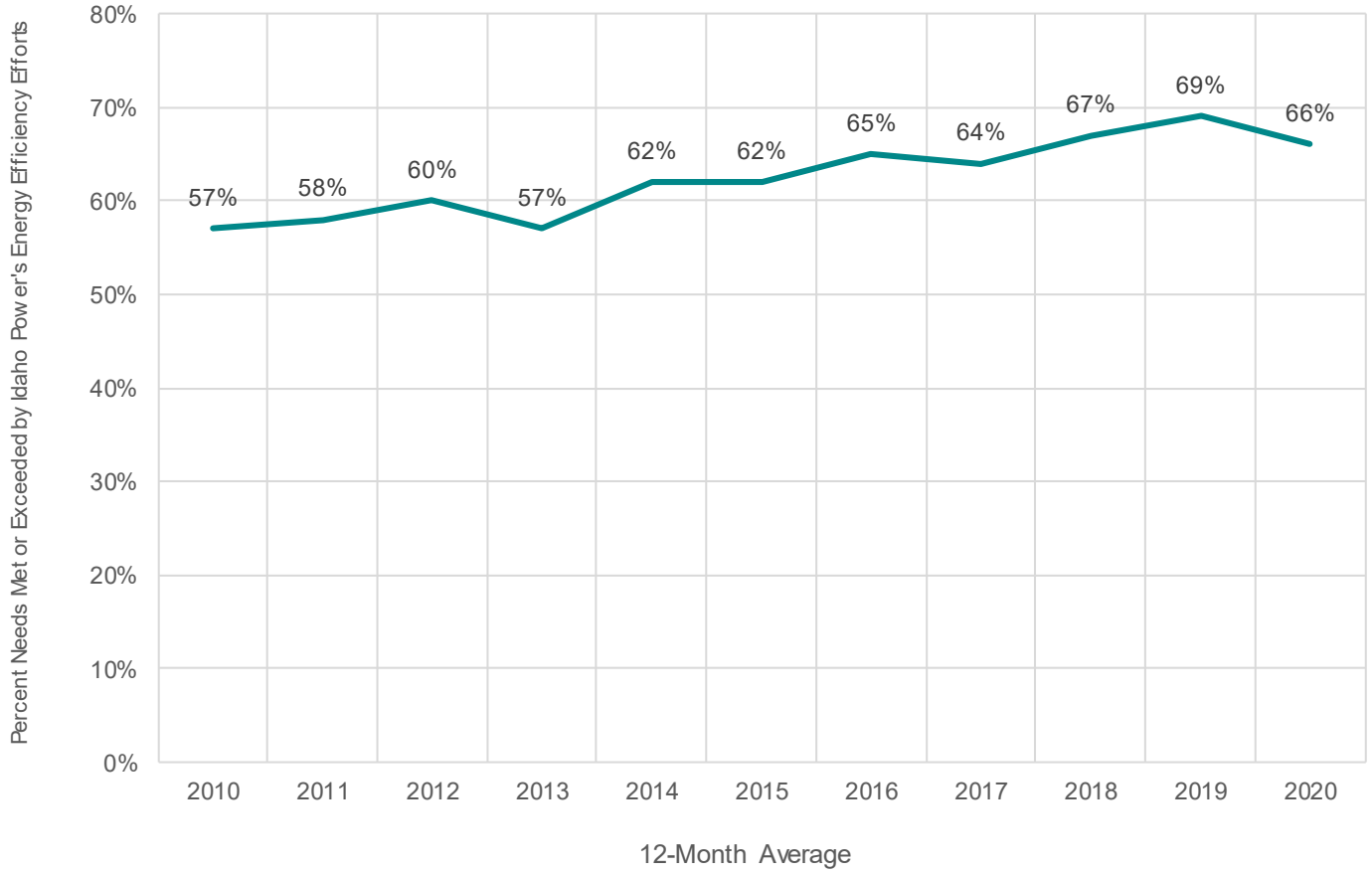


Figure 6. Customers' needs "met" or "exceeded" (%), 2010–2020

The 2020 survey also asked three questions related to Idaho Power's energy efficiency programs: 1) Have you participated in any of Idaho Power's energy efficiency programs? 2) Which energy efficiency program did you participate in? and 3) Overall, how satisfied are you with the energy efficiency program? In 2020, 44% of the survey respondents across all sectors indicated they participated in at least one Idaho Power energy efficiency program, and 92% were "very" or "somewhat" satisfied with the program they participated in.

Results for the sector-level, program-level, and marketing-related customer satisfaction surveys can be found later in this report.

Program Evaluation Approach

Idaho Power considers program evaluation an essential component of its DSM operational activities. The company uses third-party contractors to conduct impact, process, and other evaluations on a scheduled and as-required basis. In some cases, research and analyses are conducted internally and managed by Idaho Power's Research and Analysis team within the Customer Relations and Energy Efficiency (CR&EE) department. Third-party contracts are generally awarded using a competitive-bid process managed by Idaho Power's Corporate Services department.

Idaho Power uses industry-standard protocols for its internal and external evaluation efforts, including the National Action Plan for Energy Efficiency—Model Energy Efficiency Program Impact Evaluation Guide, the California Evaluation Framework, the International Performance Measurement and Verification Protocol (IPMVP), the Database for Energy Efficiency Resources, and the Regional Technical Forum's (RTF) evaluation protocols.

The company also supports regional and national studies to promote the ongoing cost-effectiveness of programs, the validation of energy savings and demand reduction, and the efficient management of its programs. Idaho Power considers primary and secondary research, cost-effectiveness analyses, potential assessments, and impact and process evaluations to be important resources in providing accurate and transparent program-savings estimates. Idaho Power uses recommendations and findings from evaluations and research to continuously refine its DSM programs.

For a summary of evaluation results, recommendations, and responses, see each program section. For copies of 2020 program evaluation reports and the evaluation schedule, see *Supplement 2: Evaluation*.

Cost-Effectiveness Goals

Idaho Power considers cost-effectiveness of primary importance in the design, implementation, and tracking of energy efficiency and demand response programs. Prior to the actual implementation, Idaho Power performs a cost-effectiveness analysis to assess whether a potential program design or measure will be cost-effective. Incorporated in these models are inputs from various sources that use the most current and reliable information available.

Idaho Power's goal is for all programs to have benefit/cost (B/C) ratios greater than one for the total resource cost (TRC) test, utility cost test (UCT), and participant cost test (PCT) at the program and measure level where appropriate. Each cost-effectiveness test provides a different perspective, and Idaho Power believes each test adds value when evaluating program performance. In 2020, Idaho Power began transitioning to using the UCT as the primary cost-effectiveness test for energy efficiency resource planning as directed by the IPUC in Order No. 34503. The company plans to continue to calculate the TRC test and PCT because each perspective can help inform the company and stakeholders about a particular program's or measure's effectiveness. Additionally, programs and measures offered in Oregon must still use the TRC test as the primary cost-effectiveness test as directed by the OPUC in Order No. 94-590

There are many assumptions when calculating the cost-effectiveness of a given program or measure. Savings can vary based on a variety factors, such as participation levels or the participants' locations. For instance, heat pumps installed in the Boise area will have less savings than heat pumps installed in the McCall area. If program participation and savings increase, fixed costs, such as labor and marketing, are distributed more broadly, and the program cost-effectiveness increases.

When an existing program or measure is shown not to be cost-effective, Idaho Power works with the EEAG to obtain input before making its determination on continuing, discontinuing, or modifying an offering. The company must demonstrate why a non-cost-effective measure or program continues to be offered and communicate the steps the company plans to take to improve cost-effectiveness. This aligns with the expectations of the IPUC and OPUC.

As part of the public workshops on Case No. IPC-E-13-14, Idaho Power and other stakeholders agreed on a new methodology for valuing demand response. The settlement agreement, as approved in IPUC Order No. 32923 and OPUC Order No. 13-482, defined the annual cost of operating the three demand response programs for the maximum allowable 60 hours to be no more than $16.7 million. The annual value calculation will be updated with each IRP based on changes that include, but are not limited to, need, capital cost, or financial assumptions. This amount was reevaluated in the 2015, 2017, and 2019 (amended) IRPs to be $18.5, $19.8, and $19.6 million, respectively.

This value is the levelized annual cost of a 170-MW deferred resource over a 20-year life. The demand response value calculation will include this value even in years when the IRP shows no peak-hour capacity deficits. In 2020, the cost of operating the three demand response programs was $7.7 million. Idaho Power estimates that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $10.9 million and would have remained cost-effective.

Details on the cost-effectiveness assumptions and data are included in *Supplement 1: Cost-Effectiveness*.

Energy Efficiency Advisory Group

Formed in 2002, EEAG provides input on enhancing existing DSM programs and on implementing energy efficiency programs. Currently, EEAG consists of 13 members from Idaho Power's service area and the northwest. Members represent a cross-section of customers from the residential, industrial, commercial, and irrigation sectors, and technical experts, as well as individuals representing low-income households, environmental organizations, state agencies, county and city governments, public utility commissions, and Idaho Power.

EEAG meets quarterly and, when necessary, Idaho Power facilitates additional conference calls and/or webinars to address special topics. In 2020, four EEAG meetings and two webinars were held. The meetings were on February 13, May 6, August 5, and November 12 and the webinars were on April 28 and October 8. EEAG meetings are generally open to the public and attract a diverse audience. Idaho Power appreciates the input from the group and acknowledges the commitment of time and resources the individual members give to participate in EEAG meetings and activities.

During these meetings, Idaho Power discussed new energy efficiency program ideas and new measure proposals, marketing methods, and specific measure details. The company provided the status of energy efficiency expenses and Idaho and Oregon Rider funding, gave updates of ongoing programs and projects, and supplied general information on DSM issues and other important issues occurring in the region. Experts were invited to speak about program evaluations and research.

Idaho Power relies on input from EEAG to provide a customer and public-interest view of energy efficiency and demand response. Additionally, Idaho Power regularly provides updates on current and future cost-effectiveness of energy efficiency programs and how changes in the IRP will impact DSM alternate costs, which Idaho Power uses in calculating cost-effectiveness. In the meetings, Idaho Power frequently requests input and feedback from EEAG members on several topics, including programmatic changes, marketing tactics, and incentive levels. EEAG often recommends presentation ideas for future meetings.

Throughout 2020, Idaho Power relied on input from EEAG on the following important topics. For complete meeting notes, see *Supplement 2: Evaluation*.

COVID-19 Impacts

The COVID-19 pandemic had broad impacts to the company's energy efficiency efforts. Idaho Power worked diligently to seek new ways to maintain activity while prioritizing the safety of customers, contractors, EEAG members, and employees. After the February quarterly EEAG meeting, the company transitioned to virtual meetings, and worked closely with members to use technology to maintain participation.

Starting with the May 6 EEAG meeting, Idaho Power provided a COVID-19 program status to summarize which programs are or are not affected by COVID-19 protocols. Much of the company's in-home or on-location work was suspended in the early months of the pandemic, but as state safety-guidelines were developed, some work on-location resumed at various businesses. In the early summer, state agencies resumed work for the Idaho and Oregon WAQC programs. The company took the opportunity to transition workshops, trainings, and some Commercial & Industrial inspections to a virtual format. This change helped successfully maintain participation, and EEAG feedback was positive. After consulting EEAG on the market feedback surrounding incentives and opportunities to increase participation when safe to resume activity, Idaho Power increased incentives in the C&I Energy Efficiency program for the professional assistance incentives (PAI) within the New Construction option and lighting incentives in the Retrofits option. This helped drive additional participation in the second half of 2020.

At the meetings, Idaho Power shared how it was using its various marketing channels to help customers understand operational changes due to COVID-19 restrictions. For example, the company quickly added webpage alerts to explain program availability and guided customers to new participation opportunities, including online training, as early as the April *Energy@Work* newsletter.

As the pandemic continued in 2020, the company shared how it updated marketing material to provide energy efficiency tips for customers who may be spending more time at home, and how it successfully marketed virtual training sessions resulting in high trade ally participation.

WAQC and Weatherization Solutions for Eligible Customers

Idaho Power held a webinar October 2020, to review the results of the third-party energy savings billing analysis completed for the Weatherization Assistance for Qualified Customers and Weatherization Solutions for Eligible Customers programs. EEAG members asked questions about the types of homes weatherized, as well as the types of equipment in homes such as heat pumps or air conditioning (A/C) units. After sharing the results of the billing analysis, the company highlighted that future program cost-effectiveness would be impacted by incorporating the new energy savings assumptions. Idaho Power opened the discussion to explore ways to improve program cost-effectiveness and provided three potential ideas, one EEAG member noted that there is potential to explore using measure lists to improve program cost-effectiveness. EEAG members had additional questions on the types of measures installed and the other funding sources for the programs and how they are leveraged. A more in-depth review of the two programs will be delivered to EEAG in the first quarter of 2021, incorporating discussion about a new billing tool which may improve program cost-effectiveness.

Educational Distributions

Idaho Power incorporated new lighting energy savings assumptions from the RTF in evaluation of its three education distribution offerings, Welcome Kits, SEEK, and Energy-Savings Kits, and found that claimed savings had significantly decreased. The company shared the program impacts at the August EEAG meeting and advised that the Welcome Kits would no longer be cost-effective with the new

savings assumptions, but Idaho Power was evaluating opportunities to offer the kit in a different format. An EEAG member suggested the company continue to evaluate delivery methods that may keep energy savings high. Because the ESKs would no longer be cost-effective and the offering was reaching market saturation, Idaho Power proposed to sunset the program by year-end 2020 while it was still cost-effective. The company requested EEAG feedback on ideas for the final marketing push suggesting a "last chance" tactic. During the November 2020, EEAG meeting, Idaho Power shared it had run three marketing campaigns for the ESKs and incorporated the last chance messaging. The customer response-rate was positive, with kit distribution of 17,000 since the August update. The company also shared it was posting the number of kits remaining on the order portal in an effort to help drive final participation.

Simple Steps, Smart Savings™

The August EEAG meeting included a discussion on the Energy Efficient Lighting and Simple Steps, Smart Savings™ program which are a subset of the Simple Steps, Smart Savings™ program administered by Bonneville Power Administration (BPA). BPA planned to sunset the regional program on September 30, 2020, resulting in the company discontinuing its retail buy-down programs on the same date. The company explained that it was exploring an alternative program focusing on energy savings related to lighting. EEAG members asked questions about the cost-effectiveness of a local program versus the BPA regional program and one was glad that Idaho Power was pursuing a possible replacement. At the November EEAG meeting, Idaho Power updated members about an Energy Trust of Oregon (ETO) analysis of a lighting retail buy-down offering. ETO found that the LED market is less transformed at certain retailers. While some retailers almost exclusively offer LEDs on their shelves, certain retailers continue to stock a high proportion of less-efficient bulbs, and customers are more likely to purchase these less-efficient bulbs. By continuing the buy-down offering for LEDs at these retailers, ETO found there was more potential to claim energy savings. When the company asked for EEAG feedback on continuing to explore a buy-down option for a portion of the retail market, a member complimented the company and thought this was a smart way to manage this transition.

Future Plans for DSM Programs

Idaho Power will continue to pursue all prudent cost-effective energy efficiency and the amount of demand response based on the demand response settlement agreement approved in IPUC Order No. 32923 and OPUC Order No. 13-482. The forecasted levels of energy efficiency and demand response are determined by Idaho Power's biennial IRP planning process. The IRP is developed in a public process that details Idaho Power's strategy for economically maintaining the adequacy of its power system into the future.

In 2019, the IPUC issued Order No. 34503 directing Idaho Power to use the UCT for energy efficiency resource planning. In 2020, the company contracted with a third party to develop a new energy efficiency potential study, and Idaho Power also updated its third-party Commercial/Industrial Technical Reference Manual (TRM) to take into account the International Energy Conservation Code (IECC) 2018 energy codes expected to be in effect January 1, 2021.

The company continuously searches for new measures for its programs through a membership in E Source, contacts with other utilities, participation in the NEEA Regional Emerging Technology Advisory Committee (RETAC), and from the RTF. Idaho Power representatives also attend national conferences and participate in webinars hosted by organizations interested in advancing energy efficiency savings.

Idaho Power will continue to work in consultation with EEAG to expand or modify its energy efficiency portfolio. Future plans for individual programs are included under each programs' 2020 Program and Marketing Strategies section.

Throughout 2019, Idaho Power monitored the government's activities in relation to the next phase of the Energy Independence and Security Act (EISA) and considered how policy changes would affect the company's Energy Efficient Lighting program and several other predominately residential programs. Signed by President Bush in 2007, EISA called for energy reduction goals "to move the United States toward greater energy independence and security." Title III of the act contained standards for 10 residential appliances and lighting.

The initial 25% greater efficiency goal for general service lightbulbs was phased in between 2012 through 2014. In 2017, the definition of general service was expanded to include A-lamp (pear-shaped bulbs), reflector, candelabra, three-way, and other specialty bulbs. By 2020, all general service lightbulbs were to provide 45 lumens per watt, which is approximately 65% more efficient than the original, pre-EISA incandescent lightbulb. In September 2019, the US Department of Energy (DOE) determined the general service definition did not need to be amended to include bulbs other than the A-lamp and withdrew the 2017 regulation expanding the definition. In December 2019, the DOE's final determination on the EISA 2020 lighting standards eliminated the 45-lumen-per-watt requirement for all residential general service incandescent lightbulbs.

Anticipating the increased standards that were scheduled to go into effect January 1, 2020, Idaho Power considered phasing out its programs that included energy-efficient screw-in bulbs. After the DOE's final determination announcement eliminated this increase in standards, Idaho Power decided to continue these offerings in lighting.

The company uses a third-party vendor in association with BPA for the Energy Efficiency Lighting and Simple Steps, Smart Savings™ programs, which helps the company realize lower administrative costs. BPA's program is called Simple Steps, Smart Savings™ (Simple Steps). Despite the DOE's final determination to eliminate the 45-lumen-per-watt requirement for incandescent lightbulbs, BPA planned to discontinue its Simple Steps program at the end of its 2020 federal fiscal year, September 30, 2020. According to BPA, "…the residential lighting market has transformed; high-efficiency lamps are becoming the norm rather than the exception." Due to reductions, then ultimate removal of claimed energy savings assumptions for high-efficiency showerheads by the RTF, the appliance buy-down portion of BPA's Simple Steps program would also no longer be cost-effective after 2020. Idaho Power committed to offering the Simple Steps program to customers until BPA discontinued its program. In advance of the discontinuation date, the company evaluated opportunities for an alternative program that offers energy-efficient screw-in bulbs.

In 2021, Idaho Power will continue to enhance its marketing and outreach efforts as described in the Marketing section of this report and within each program section. Idaho Power will continue to work with NEEA on its market transformation activities during its 2020–2024 funding cycle.

The company will complete its evaluation, measurement, and verification (EM&V) projects included in the evaluation plan in *Supplement 2: Evaluation*.

DSM Annual Report Structure

The *Demand-Side Management 2020 Annual Report* consists of this main document and two supplements.

The main document contains the following sections related to 2020 DSM activities: 1) program activities by customer sector (residential, commercial/industrial, and irrigation) including marketing efforts, cost-effectiveness analysis, customer satisfaction survey results, and evaluation recommendations and responses for each program; 2) other program and activity details, including market transformation; and 3) four appendices of data related to payments, funding, and program-level costs and savings. Where appropriate, plans for 2021 are also discussed.

Supplement 1: Cost-Effectiveness describes the standard cost-effectiveness tests for Idaho Power programs and reports current-year program-level and summary cost-effectiveness and expenses by funding source and cost category.

Supplement 2: Evaluation includes an evaluation and research summary, an evaluation plan, EEAG meeting notes, links to NEEA evaluations, and copies of IDL reports, research and survey reports, evaluation reports, and other reports.

2020 DSM PROGRAM ACTIVITY

DSM Expenditures

Funding for DSM programs in 2020 came from several sources. The Idaho and Oregon Rider funds are collected directly from customers on their monthly bills. The 2020 Idaho Rider was 2.75% of base revenues. The 2020 Oregon Rider was 4% of base rate revenues. Additionally, Idaho demand response program incentives were funded through base rates and the annual PCA mechanism. DSM expenses not funded through the Rider are included as part of Idaho Power's ongoing operation and maintenance (O&M) costs.

Table 5 shows the total expenditures funded by the Idaho and Oregon riders and Idaho Power base rates resulting in Idaho Power's total DSM expenditures of $50,556,303. The non-rider funding category includes the company's demand response incentives in Idaho, Weatherization Assistance for Qualified Customers (WAQC) expenses, and O&M costs.

Table 5. 2020 funding source and energy savings

Funding Source	Expenses	MWh Savings
Idaho Rider	$40,409,911	190,009
Oregon Rider	1,786,954	6,571
Idaho Power Base Rates	8,359,437	229
Total	**$50,556,303** [a]	**196,809**

[a] Totals may not sum due to rounding.

Table 6 and Figure 7 indicate 2020 DSM program expenditures by category. While the Incentive Expense category illustrates the amount paid directly to customers for their participation in an energy efficiency or demand response program, the other categories include items or services that directly benefited customers. The majority of the expenses in the Materials & Equipment category includes the following items: Energy-Savings Kits (ESK), Welcome Kits, SEEK, Educational Distributions Giveaways, and Commercial Energy-Savings Kits that were distributed to customers ($2,254,279) direct-install weatherization measures ($33,700). The expenses in the Other Expense category include marketing ($1,236,416), Custom Projects energy audits ($221,070), program evaluation ($93,097), and program training ($77,784). The Purchased Services category includes payments made to NEEA ($2,789,210) and third-party contractors who help deliver Idaho Power's programs.

Table 6. 2020 DSM program expenditures by category

Program Expenditure Category	Total	% of Total
Incentive Expense	$31,823,660	63%
Labor/Administrative Expense	3,971,391	8%
Materials & Equipment	2,309,425	5%
Other Expense	1,680,329	3%
Purchased Services	10,771,499	21%
Total	**$50,556,303** [a]	**100%**

[a] Dollars been rounded to the nearest whole unit, which may result in minor rounding differences.

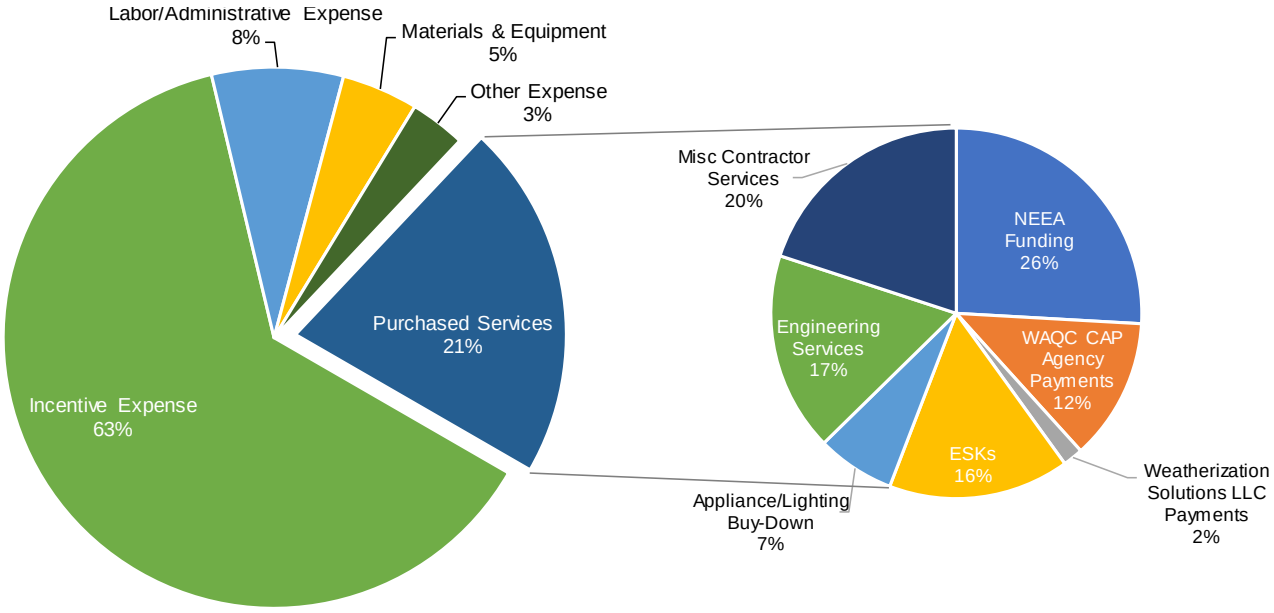


Figure 7. 2020 DSM program expenditures by category

Table 7. 2020 DSM program incentive totals by program type and sector

Program Type—Sector	Total	% of Total
DR[a]—Residential	$336,410	1.1%
DR—Commercial/Industrial	$450,450	1.4%
DR—Irrigation	$6,124,937	19.2%
EE[b]—Residential	$1,765,985	5.5%
EE—Commercial/Industrial	$20,177,062	63.4%
EE—Irrigation	$2,968,817	9.3%
Total	**$31,823,660** [c]	**100.0%**

[a] DR = demand response
[b] EE = energy efficiency
[c] Dollars been rounded to the nearest whole unit, which may result in minor rounding differences.

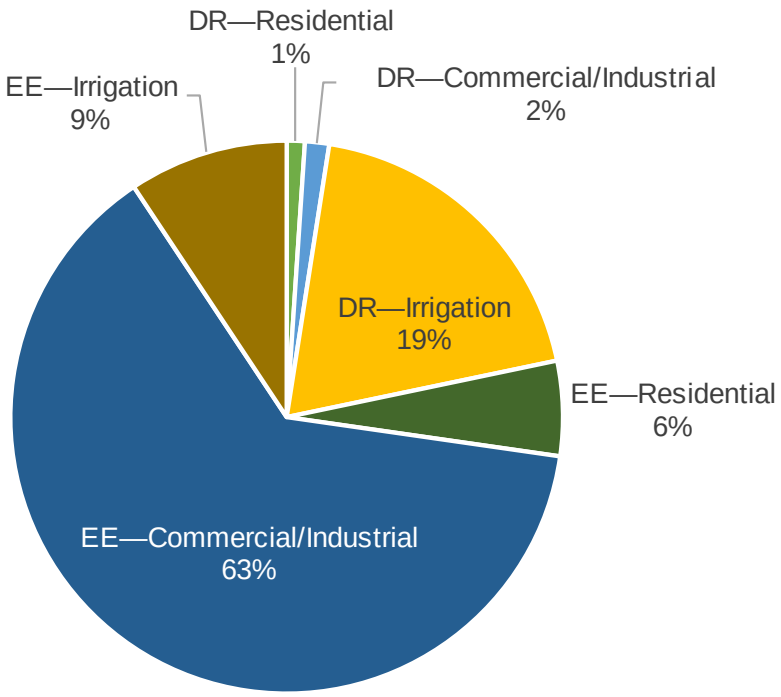


Figure 8. Percent of DSM program incentive expenses by program type and sector, 2020

Marketing

Idaho Power used multi-channel marketing and public relations (PR) strategies in 2020 to improve communication and increase energy efficiency program awareness among its customers. The company uses a wide variety of media and marketing; owned media (social, website, and newsletters) and paid media (advertising and sponsorships), which allow Idaho Power to control the content. Earned unpaid media (news coverage, Idaho Power's *News Briefs* sent to reporters, third-party publications, and television news appearances) gives Idaho Power access to a broader audience through alternative channels that help establish credibility and brand trust. Though the company has less control with earned unpaid media, the value is established through the third-party endorsement.

Idaho Power marketing staff networks with organizations across the region and industry to ensure it is informed about current and future marketing trends and successes. Idaho Power continued to work with NEEA to coordinate, collaborate, and facilitate marketing for all sectors. To build marketing networks and to learn what works in other regions, Idaho Power staff virtually attended a variety of conferences and webinars throughout the year, such as the E Source Utility Marketing Executive Council and Forum in September.

The following describes a selection of the methods, approaches, and strategies used by Idaho Power to engage customers regarding energy efficiency, along with their results. See the respective sector overviews and programs sections later in this report for the company's marketing efforts specific to those areas.

Social Media

Approximately 18% of the company's total social media content promoted energy efficiency in 2020. Idaho Power regularly posted messages encouraging energy efficiency behaviors, program enrollment, and customer engagement on Facebook, Twitter, YouTube, and LinkedIn. Because of the need to use social media for COVID-19 related customer communication, the percentage of content related to

energy efficiency dipped slightly from previous years. Social media content also showcased local businesses and organizations that have benefitted from Idaho Power energy efficiency efforts. Idaho Power engaged with customers that posted their own social media content about Idaho Power programs, such as Energy-Saving Kits. Idaho Power's Facebook page hosted two customer sweepstakes giveaways encouraging customers to enter by leaving a comment about how they save energy in the summer or fall.

In 2020, Idaho Power social channels focused on sharing energy efficiency tips that made sense for customers spending more time at home. Graphics were updated to be more engaging and representative of behavior changes customers could make without spending any money or leaving the house. Tips were also provided to help businesses save energy while operating with fewer employees or with reduced working hours. When timely and appropriate, past *#TipTuesday* content was repurposed and shared, as well.

Idaho Power's Facebook followers increased 8.6% in 2020, from 20,982 at the end of 2019 to 22,800 at the end of 2020. Facebook remains the company's priority channel for engaging directly with customers and was the main platform in 2020 for focusing on COVID-19 safety messages, energy assistance for customers, crisis communications, energy efficiency tips and program offerings, and helping customers with account-related issues through private messages.

Idaho Power uses Twitter to communicate about media items, large outages, company news, and energy efficiency. COVID-19 messaging was also shared on the platform in 2020. Idaho Power's Twitter followers increased 3.5% in 2020, from 6,000 followers to 6,210.

Idaho Power again saw a favorable increase in followers on LinkedIn with 1,992 new followers in 2020. LinkedIn is an effective channel for engaging business and commercial customers in energy efficiency, as well as positioning the company as a good corporate citizen, clean energy leader, and employer of choice.

Website

Idaho Power tracked the number of page views to the main energy efficiency pages—also known as landing pages—from external users on the company's website. In 2020, the company's energy efficiency homepage received 6,542 page views, the residential landing page received 192,307 views, and the business and irrigation landing pages received 12,288. Idaho Power uses Google Analytics to analyze web activity. Google's definition of page views is the total number of pages viewed, with repeated views of a single page by one user counted as a new view.

Public Relations

Idaho Power's PR staff supported energy efficiency programs and activities through these channels: videos telling energy efficiency success stories; *Connections*, a monthly customer newsletter distributed in monthly bills and available online; *News Briefs*, a weekly email of interesting news items sent to all media in the company's service area; pitching and participating in news stories; energy efficiency TV segments in two markets (KTVB in Boise and KMVT in Twin Falls); energy efficiency radio segments; news releases; and public events (such as incentive check presentations).

In 2020, the January and July issues of *Connections* were devoted to energy efficiency. The January issue included a variety of ideas for energy-saving resolutions, such as how to save energy with a pressure cooker, and information about the heat pump water heater (HPWH) incentive. The July edition highlighted, how to save energy during the summer months, how to learn more about energy efficiency with fun at-home activities, and the energy efficiency success story of the Idaho Humane Society.

Idaho Power produced new energy efficiency success story videos in 2020 highlighting the energy efficiency efforts of Sun Valley Resort and the Idaho Humane Society. Combined, the videos received 782 views on YouTube and an additional 5,717 views on Facebook.

The energy efficiency television segments that aired on stations in Boise and Twin Falls continued to receive positive feedback but were limited in 2020 due to COVID-19 restricting guests at television stations. Topics included smart thermostats, energy-efficient kitchen tips, and ways to beat the summer heat. Idaho Power also did a segment on two Pocatello area radio stations about energy efficient holiday cooking.

Media outreach efforts resulted in a variety of earned media coverage focused on energy efficiency. Energy efficiency topics were pitched in *News Briefs* throughout the year, and the company earned media coverage in multiple markets spanning print, TV, and radio. Some of the most popular story topics included winter and summer savings tips, phantom load, and the smart thermostat incentive.

2021 Marketing Activities

In 2021, the Idaho Power marketing department plans to introduce new strategies to expand the reach and visibility of the company's energy efficiency ads.

The marketing team will update the Residential Energy Efficiency Awareness Campaign and consider running it on new digital channels. Idaho Power will update the look and messaging of the company's advertising at the Boise Airport. Additionally, the company will continue to update collateral and displays as needed for irrigation programs and various sector trade shows (many of which will be virtual). See the sector overview sections for more specific marketing plans for the future.

Cost-Effectiveness Results

Table 8. Cost-effectiveness summary by energy efficiency program

Program/Sector	UCT	TRC	Ratepayer Impact Measure (RIM)	PCT
Educational Distributions	1.45	2.19	0.45	N/A
Energy Efficient Lighting	4.56	4.20	0.54	7.77
Energy House Calls	0.63	0.77	0.29	N/A
Heating & Cooling Efficiency Program	1.66	0.81	0.45	1.46
Multifamily Energy Savings Program	0.14	0.28	0.11	N/A
Rebate Advantage	1.69	0.98	0.39	2.17
Residential New Construction Pilot Program	1.54	1.20	0.45	2.26
Shade Tree Project*	N/A	N/A	N/A	N/A
Simple Steps, Smart Savings™	0.78	3.24	0.36	13.23
Weatherization Assistance for Qualified Customers	0.20	0.33	0.14	N/A
Weatherization Solutions for Eligible Customers	0.13	0.23	0.10	N/A
Residential Energy Efficiency Sector	**1.64**	**1.91**	**0.45**	**6.41**
Commercial and Industrial Energy Efficiency Program				
Custom Projects	3.26	1.61	1.06	1.42
New Construction	3.40	2.63	0.80	3.14
Retrofits	3.25	1.35	0.79	1.56
Commercial Energy-Saving Kits	1.24	2.38	0.56	N/A
Small Business Direct Install	1.04	1.61	0.53	N/A
Commercial/Industrial Energy Efficiency Sector **	**3.18**	**1.62**	**0.97**	**1.58**
Irrigation Efficiency Rewards	4.00	4.09	1.18	3.96

Program/Sector	UCT	TRC	Ratepayer Impact Measure (RIM)	PCT
Irrigation Energy Efficiency Sector * **	**4.01**	**4.09**	**1.18**	**3.96**
Energy Efficiency Portfolio	**2.71**	**2.08**	**0.83**	**2.45**

* Shade Tree Project tree distributions were suspended in 2020 due to COVID-19, no newly planted trees in 2020 to report energy savings.
** Commercial/Industrial Energy Efficiency Sector cost-effectiveness ratios include savings and participant costs from Green Motors Rewinds.
*** Irrigation Energy Efficiency Sector cost-effectiveness ratios include savings and participant costs from Green Motors Rewinds.

Details on the cost-effectiveness assumptions and data are included in *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction Surveys

Idaho Power does not separately survey most energy efficiency program participants each year. This is primarily due to concerns about over surveying program participants and because the measures and specifics of most program designs do not change annually. To ensure meaningful research in the future, Idaho Power conducts program research periodically (every two to three years), unless programs have been changed significantly. Throughout 2020, Idaho Power administered several surveys regarding energy efficiency programs to measure customer satisfaction. Some surveys were administered by a third-party contractor; other surveys were administered by Idaho Power either through traditional paper or electronic surveys or through the company's online panel—Empowered Community. Results of these studies are included in *Supplement 2: Evaluation*.

The sector-level results of the *2020 Burke Customer Relationship Survey* are available in the Residential, Commercial and Industrial, and Irrigation sector overview sections of this report.

Evaluations

In 2020, Idaho Power contracted with ADM Associates, DNV GL and Tetra Tech to conduct program evaluations for the Educational Distributions (impact and process, DNV GL), the HER Program (process, DNV GL), Irrigation Efficiency Rewards (impact and process, Tetra Tech), and Rebate Advantage (impact, ADM Associates) programs. Nexant conducted a joint billing analysis for the WAQC and Weatherization Solutions for Eligible Customers programs. Idaho Power also contracted Tetra Tech to conduct a process evaluation on the Small Business Direct Install (SBDI) program. The start of the evaluation has been delayed until the second quarter of 2021 to allow time for more installs to be completed after on-site program activity was suspended in early 2020 due to the COVID-19 pandemic. DNV GL started the HER process evaluation alongside the Educational Distributions evaluation. However, due to some late findings, additional analysis was required to complete the evaluation. The HER evaluation will be completed in April 2021 and will be included in the 2021 annual report.

Franklin Energy conducted a program summary analysis for residential ESKs as well as SEEK. Aclara conducted a savings analysis for the HER Program. AM Conservation conducted a program summary analysis for Commercial Energy-Savings Kits. Idaho Power conducted internal analyses of the 2020 demand response events for Irrigation Peak Rewards, Flex Peak, and A/C Cool Credit programs.

A summary of each of these evaluations is available in the respective program sections. An evaluation schedule and the final reports from evaluations and research completed in 2020 are provided in *Supplement 2: Evaluation*.

Residential Sector Overview

In 2020, Idaho Power's Residential sector consisted of 484,433 customers averaged throughout the year; Idaho customers numbered 470,804 and eastern Oregon had 13,629. In 2020, the number of Residential sector customers increased by 13,135, an increase of 2.8% from 2019. The Residential sector represented 36.7% of Idaho Power's actual total electricity usage and 46.3% of overall revenue in 2020.

Table 9 shows a summary of 2020 participants, costs, and savings from the residential energy efficiency programs.

Table 9. Residential sector program summary, 2020

Program	Participants		Total Cost Utility	Total Cost Resource	Savings Annual Energy (kWh)	Savings Peak Demand (MW)
Demand Response						
A/C Cool Credit	22,536	homes	$ 765,020	$ 765,020		19
Total			**$ 765,020**	**$ 765,020**		**19**
Energy Efficiency						
Easy Savings: Low-Income Energy Efficiency Education	155	HVAC tune-ups	$ 9,503	$ 9,503	10,628	
Educational Distributions	97,228	kits/giveaways	3,106,820	3,106,820	9,481,801	
Energy Efficient Lighting	1,148,061	lightbulbs	1,667,159	3,065,781	13,942,202	
Energy House Calls	51	homes	46,352	46,352	56,944	
Heating & Cooling Efficiency Program	1,019	projects	606,559	1,911,792	1,839,068	
Home Energy Audit	97	audits	130,546	142,649	31,938	
Home Energy Report Program	127,138	treatment size	899,203	899,203	10,427,940	
Multifamily Energy Savings Program	33	units	89,829	89,829	28,041	
Oregon Residential Weatherization	0	audits/projects	5,313	5,313	0	
Rebate Advantage	116	homes	180,422	437,263	366,678	
Residential New Construction Pilot Program	248	homes	473,504	865,989	649,522	
Shade Tree Project*	0	trees	28,490	28,490	52,662	
Simple Steps, Smart Savings™	6,894	appliances/ showerheads	99,141	98,629	148,404	
Weatherization Assistance for Qualified Customers	115	homes/non-profits	1,385,577	1,728,293	218,611	
Weatherization Solutions for Eligible Customers	27	homes	208,715	208,715	47,360	
Total			**$ 8,937,132**	**$12,644,620**	**37,301,800**	

Notes:
*Shade Tree Project tree distributions were suspended in 2020 due to COVID-19, no newly planted trees in 2020 to report energy savings; listed savings are from prior-year trees increasing in size.
See Appendix 3 for notes on methodology and column definitions.
Totals may not add up due to rounding.

Energy Efficiency Programs

Easy Savings: Low-Income Energy Efficiency Education

A program offering coupons to income-qualified customers for HVAC tune-ups and one-on-one energy savings education.

Educational Distributions

A multifaceted approach to educating residential customers about their energy consumption: giving away various efficient products, engaging elementary students with in-class and at-home activities, and providing *Home Energy Reports* to help customers understand their energy use.

Energy Efficient Lighting

A BPA-sponsored program to buy down the cost of energy-efficient lighting products. Though discontinued in 2020 by BPA, Idaho Power is researching ways to offer lighting incentives to a wider range of customers.

Energy House Calls

A program designed specifically for manufactured homeowners to test and seal ducting and to offer energy-efficient products designed to reduce energy costs.

Heating and Cooling Efficiency Program

Providing incentives to customers and builders who upgrade existing homes or build new ones using energy efficient heating and cooling equipment and services.

Home Energy Audit

Similar to Energy House Calls, Idaho customers living in multi-family homes with discrete meters or in single-family homes pay a reduced price for an energy audit to identify areas of concern. Participants may also receive energy-efficient products for no additional cost.

Multifamily Energy Savings Program

A program offering renters in multi-family buildings energy-efficient products designed to reduce energy use and power costs.

Oregon Residential Weatherization

No-cost energy audits for Oregon customers who heat with electricity.

Rebate Advantage

Financial incentives for customers who buy energy-efficient manufactured homes and the people who sell them.

Residential New Construction Program

Idaho Power offers builders a cash incentive to construct energy-efficient, above code, single-family, all-electric homes that use heat pump technology for its Idaho customers.

Shade Tree Project

A tree giveaway program for Idaho customers. To maximize summer energy savings, Idaho Power provides participants with a variety of resources to encourage successful tree growth.

Simple Steps Smart Savings™

Like Energy Efficient Lighting, this BPA-sponsored program was discontinued in 2020. Idaho Power is researching ways to provide a replacement program to encourage customers to purchase qualified energy-efficient appliances.

Weatherization Assistance for Qualified Customers and Weatherization Solutions for Eligible Customers

Energy-efficient products, services, and education for customers who meet income requirements and heat with electricity.

Demand Response Program

A/C Cool Credit

A program that gives residential customers a credit for allowing Idaho Power to cycle their A/C units during high-energy demand in the summer.

Marketing

Idaho Power ran a multi-faceted advertising campaign in the spring (April and May) and fall (October and November) to raise and maintain awareness of the company's energy efficiency programs for residential customers and to demonstrate that saving energy does not have to be challenging. The campaign used radio, television, newspaper advertisements (ads), digital ads, and Facebook ads and boosted posts aimed at a variety of customer demographics across the service area. New in 2020, the company added Spanish network television ads and two seasonally relevant contests: Backyard BBQ Summer Giveaway and Crisp and Cozy Fall Giveaway.

Described below are Idaho Power's marketing efforts to promote energy-saving tips and the company's energy efficiency programs, along with resulting data. Marketing tactics related to a specific sector or program are detailed in those respective sections later in this report.

Email

Idaho Power continued its effort with email communication in 2020. The company emails only those customers who have supplied their addresses for other business purposes (signing up for paperless billing, for example). Energy efficiency promotional emails included heating and cooling tips, summer and winter contest promotion, and various program promotions (detailed information can be found in respective program sections).

Digital

During the Spring campaign, web users were exposed to 1,834,342 display ads (image ads embedded on a website) based on their demographics, related to online articles they viewed, or their use of a particular mobile web page or app. Users clicked the ads 3,864 times, resulting in a click-through rate of 0.21%. In the fall, the display ads received 3,287,312 impressions and 1,645 clicks, resulting in a click-through rate of 0.05%.

Idaho Power began using Google search ads in 2018. When people search for terms related to energy efficiency, energy efficiency programs, and individual program measures, the company's ads appear and drive them to the appropriate energy efficiency web page. These ads received 2,512,351 impressions and 169,836 clicks throughout the year.

Television

Idaho Power used network television, Hulu, and YouTube advertising for the spring and fall campaign. The company also used over-the-top (OTT) media. OTT is a type of streaming media that delivers content to customers watching a certain online show. Most OTT providers have their own app or website and are streamed through devices like Rokus or Amazon Fire TVs. The network television

campaign focused on primetime and news programming that reaches the highest percentage of the target market: adults age 25 to 64.

During the spring campaign, an ad ran 1,609 times in the Boise, Pocatello, and Twin Falls media markets on network television. The ad reached 68% of the Boise target audience (which also reached Malheur County in Oregon), 66% of the Twin Falls target audience, and 44% of the Pocatello target audience. The targeted customers saw the ad 7.1 times in Boise, 9.5 times in Twin Falls, and 6.7 times in Pocatello. Hulu ads delivered 622,036 completions, meaning the ad was viewed in its entirety. OTT ads delivered 430,297 impressions with a 95.5% video completion rate. New in the 2020 Spring Campaign was the addition of Spanish network television ads. The Boise target audience saw 124 paid spots and the Pocatello market saw 51 spots. Spanish TV ads ran during the Fall Campaign as well; the Boise target audience saw 210 paid spots and the Pocatello audience saw 98 spots. Ad reach and frequency information is not available for Spanish stations.

During the fall campaign, the TV spot ran 1,551 times in the Boise, Pocatello, and Twin Falls media markets. The ads reached 79.9% of the Boise target audience, 99.4% of the Twin Falls target audience, and 36.6% of the Pocatello target audience. The targeted customers saw the ad 8.2 times in Boise, 9.7 times in Twin Falls, and 5.2 times in Pocatello. Hulu ads received 577,916 completions, and YouTube video ads delivered 1,567,032 impressions and 4,496 clicks. OTT ads delivered 416,118 impressions with a 97.4% video completion rate.

Idaho Power also sponsored commercials on Idaho Public Television in Boise, Pocatello, and Twin Falls markets that ran a total of 192 times.

Radio

As part of its spring and fall campaign, Idaho Power ran 30-second radio spots on major commercial radio stations in the service area. To obtain optimal reach, the spots ran on a variety of station formats, including classic rock, news/talk, country, adult alternative, adult contemporary, and classic hits. The message was targeted toward adults age 25 to 64 throughout Idaho Power's service area.

Results of the spots are provided for the three major markets: Boise, Pocatello, and Twin Falls. During the spring campaign, Idaho Power ran 2,493 English radio spots. These spots reached 72.7% of the target audience in Boise, 57.6% in Pocatello, and 84.8% in Twin Falls. The target audience in Boise was exposed to the ad 6 times, 7.5 times in Pocatello, and 10.9 times in Twin Falls. During the fall campaign, the company ran 4,799 English radio spots. These spots reached 81.6% of the target audience in Boise, 64.5% of the target audience in Pocatello, and 77.1% of the target audience in Twin Falls. The target audience was exposed to the message 10.2 times in Boise, 8 times in Pocatello, and 9.6 times in Twin Falls during the fall campaign.

In spring, Idaho Power also ran 384 ads on Spanish-speaking radio stations and 308 National Public Radio (NPR) ads in the service area targeting adults age 25 to 54. The fall campaign included 369 Spanish ads and 270 NPR ads.

Idaho Power ran 30-second spots with accompanying visual banner ads on Pandora internet radio, which is accessed by mobile and web-based devices. In the spring, records show 452,008 impressions and 215 clicks to the Idaho Power residential energy efficiency web page. The fall ads yielded 451,813 impressions and 175 clicks.

Print

As part of the campaign, print advertising ran in the major daily and select weekly newspapers throughout the service area. The company also ran ads in the Idaho Shakespeare Festival program, *Territory Magazine*, *Idaho Magazine*, Broadway in Boise program, *Boise and Meridian Lifestyle*

Magazine, *IdaHome Magazine*, *Mirada Magazine* (Spanish), and *Sun Valley Magazine*. As part of the print campaign, digital "homepage takeover" ads were featured on KTVB.com, idahopress.com and idahostatesman.com. Homepage takeover ads fill a homepage with ads from one company for a specific timeframe. The spring ads highlighted individual energy efficiency program options and tips, such as adjusting your thermostat and the benefits of planting a shade tree.

In 2020, Idaho Power updated the program information in a spiral-bound guide outlining each of the residential energy efficiency programs, tips, and resources. The updated guide will be included in the 2021 Welcome Kits. The previous edition of the guide was included in 2020 Welcome Kits, provided to Weatherization Assistance customers, and shared with customers who attended events Idaho Power participated in prior to the COVID-19 restrictions.

Social Media

Idaho Power's Facebook ads received 215,224 total impressions, 8,420 engagements, and 598 link clicks during the spring energy efficiency campaign. During the fall campaign, Facebook ads and boosts received 150,500 total impressions, 6,566 engagements, and 5,900 link clicks. Idaho Power tried two different ad placement tactics in 2020. In the spring, four ads were placed individually: one every two weeks. The fall campaign allowed Facebook to automatically alternate between four different ads over a two-month period. Facebook gave higher priority to the ads that performed better with the targeted audience. This tactic resulted in many more link clicks than in the spring, but fewer total impressions and engagements. Because link clicks represent conversions, this technique is more effective at driving customers to our website than previous techniques and will be used again in 2021.

Throughout the year, Idaho Power used Facebook and Twitter posts and boosted Facebook posts for various programs.

Out-of-Home

In 2020, Idaho Power participated in several new tactics referred to as out-of-home advertising. Out-of-home advertising attempts to reach customers when they are outside of their homes. The tactics were a way to continually maintain energy efficiency program awareness through the year. Tactics included full-side bus wraps on three ValleyRide buses in the Treasure Valley Area that yielded 11,076,912 impressions. Impressions during the year most likely varied due to more customers working from home during COVID-19 restrictions. A quarter wrap also ran on one Pocatello Regional Transit bus in the Eastern Region. A billboard was used in the Homedale area from March through December, which was viewable by 6,900 vehicles per day. The company participated in an Idaho Steelheads sponsorship at CenturyLink Arena in Boise January through March where 91,412 attendees watched a variety of programs, including 16 Steelheads hockey games.

The company sponsored a 4- by 8-foot sign July through December promoting energy efficiency in the College of Southern Idaho (CSI) gym that has a capacity of 2,300. CSI held various events in the gym throughout the year including sporting events, dance competitions, etc. Undoubtedly the sign saw fewer impressions because of COVID-19 restrictions but it is still a very cost-effective tactic to reach customers in the Twin Falls area.

Public Relations

Many of the company's PR activities focused on the residential sector. Energy-saving tips videos, TV and radio segments, news releases, and *Connections* newsletter articles often aim to promote incentive programs and/or educate customers about behavioral or product changes they can make to save energy in their homes. Idaho Power also promoted the Crisp and Cozy Fall Giveaway in *News Briefs*.

See the Program Activity section and the Commercial and Industrial Sector Overview for more 2020 PR activities.

Empowered Community

In 2015, Idaho Power created the Empowered Community, an online community of residential customers, to measure customer perceptions on a variety of company-related topics, including energy efficiency. The community has over 2,100 actively engaged members from across Idaho Power's service area. Idaho Power typically sends one survey per month to active members but in 2020, fewer surveys were conducted out of respect to members and issues associated with COVID-19. In 2020, Idaho Power included seven energy efficiency messages with survey invitations to members resulting in almost 12,400 touchpoints.

Recruitment for the Empowered Community is conducted on an annual basis to refresh the membership each year. Throughout February and March 2020, various types of recruitment were conducted with residential customers including bill inserts, messages on paperless billing emails, pop-up ads on My Account, direct emails, and social media posts. In 2020, 595 new members were added to Empowered Community.

Seasonal Sweepstakes

In 2020, Idaho Power ran two seasonally focused energy efficiency sweepstakes—the Backyard BBQ Summer Giveaway in August and the Crisp and Cozy Fall Giveaway in November.

Both sweepstakes aimed to maintain awareness about energy efficiency and the impact a small change can make.

The summer sweepstakes ran July 24 through August 2 and received 7,316 entries. Customers were asked to comment—through social media or on the Idaho Power website—with a way they saved energy during the hot summer months. In return, participants were entered to win a package of energy-efficient goodies for the backyard. The sweepstakes was promoted with email messaging to 184,146 customers, and social media posts reached 2,363 customers, receiving 617 post engagements (likes, comments, shares). The sweepstakes was also promoted on idahopower.com, through a pop-up ad on the My Account homepage.

The fall sweepstakes ran November 13-22 and received 7,190 entries. Customers were asked to comment—through social media or on the Idaho Power website—with a way they saved energy during the cold months. In return, participants were entered to win one of five toaster oven/air fryer combo units. The sweepstakes was promoted with email messaging to 210,592 customers, and paid social media posts reached 38,566 customers, receiving 2,879 post engagements. The sweepstakes was also promoted through a pop-up ad in the company's My Account homepage. It was featured in a *News Briefs* to media outlets and was promoted on idahopower.com.

Customer Satisfaction

Idaho Power conducts the Burke Customer Relationship Survey each year. In 2020, 61% of residential survey respondents indicated Idaho Power is meeting or exceeding their needs with information on how to use energy wisely and efficiently.

Sixty-three percent of residential respondents indicated Idaho Power is meeting or exceeding their needs by encouraging energy efficiency with its customers. Fifty-two percent of Idaho Power residential customers surveyed indicated the company is meeting or exceeding their needs in offering energy efficiency programs, and 41% of the residential survey respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of the residential survey respondents who have

participated in at least one Idaho Power energy efficiency program, 89% are “very” or “somewhat” satisfied with the program.

Based on surveys conducted in 2020, Idaho Power ranked second out of 16 utilities included in the west region midsize segment of the *J.D. Power and Associates 2020 Electric Utility Residential Customer Satisfaction Study*. Sixty-nine percent of the residential respondents in this study indicated they were aware of Idaho Power’s energy efficiency programs, and on an overall basis, those customers were more satisfied with Idaho Power than customers who are unaware of the programs. Idaho Power customer awareness of energy efficiency programs is among the highest in the nation.

See the individual programs for program-specific customer satisfaction survey results.

Field Staff Activities

Idaho Power’s residential and commercial energy advisors and EOEAs started 2020 with in-person meetings and events to promote energy efficiency programs and offerings with customers. When COVID-19 restrictions were implemented in mid-March, company staff pivoted away from these face-to-face interactions. Idaho Power’s attendance at large, legacy community events such as home and garden shows, remodeling shows, science, technology, engineering, and mathematics (STEM) nights, science fairs, back to school nights, etc., was not an option, as many of these events were postponed or canceled.

Instead, energy advisors used phone, email, mail, text and virtual presentations to stay connected with customers. The energy advisors conducted a callout campaign to residential customers to promote ESKs and created giveaway bags for senior centers that included energy-efficient measures and gifts: a LED lamp, nightlight, energy efficiency information, puzzles, and games. Energy advisors delivered these items while social distancing and wearing masks to keep everyone safe.

Though much of 2020 was spent developing alternative methods for customer interaction, the changes also allowed the company to offer more training and development sessions for energy advisors to expand their knowledge, skills, and abilities about energy efficiency programs, measures, and technologies. Topics included: lighting, building envelope, HVAC, and refrigeration.

A/C Cool Credit

		2020	2019
Participation and Savings			
	Participants (homes)	22,536	23,802
	Energy Savings (kWh)	n/a	n/a
	Demand Reduction (MW)	19	24
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$405,402	$495,703
	Oregon Energy Efficiency Rider	$25,200	$30,762
	Idaho Power Funds	$334,418	$351,200
	Total Program Costs—All Sources	$765,020	$877,665
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	n/a	n/a
	Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	n/a
	Total Resource Benefit/Cost Ratio	n/a	n/a

Description

Originating in 2003, A/C Cool Credit is a voluntary, dispatchable demand response program for residential customers in Idaho and Oregon. Using communication hardware and software, Idaho Power cycles participants' central A/C units or heat pumps off and on via a direct load control device installed on the A/C unit. This program enables Idaho Power to reduce system capacity needs during times when summer peak load is high.

Customers' A/C units are controlled using switches that communicate by powerline carrier (PLC) using the same system utilized by Idaho Power's automated metering system (AMI). The switch is installed on each participating customer's A/C unit and allows Idaho Power to control the unit during a cycling event.

The cycling rate is the percentage of an hour the A/C unit will be turned off by the switch. For instance, with a 50% cycling rate, the switch will cycle the A/C unit off for about 30 (nonconsecutive) minutes of each hour. Idaho Power tracks the communication levels to validate whether the signal reaches the switches. Switch communication may be interrupted for a variety of reasons: the switch may be disconnected, an A/C unit may not be powered on, the switch may be defective, or the participant's household wiring may prevent communication. Sometimes it is difficult for the company to detect why the switch is not communicating.

These are the program event guidelines:

- June 15 through August 15 (excluding weekends and July 4)
- Up to four hours per day
- A maximum of 60 hours per season
- At least three events per season

At the end of the season, Idaho Power or a third-party evaluates the events to determine peak demand savings.

Program Activities

In 2020, about 22,500 customers participated in the program, with approximately 262 in Oregon, and 22,274 Idaho. Three cycling events occurred, and all were successfully deployed (Table 10). The cycling rate was 50% and the communication level exceeded 90% for each event. With a greater number of residents being at home due to the COVID-19 pandemic, the company wanted to minimize the impact of A/C cycling and to mitigate the potential for participation dropouts, so the cycling percentage was reduced from the typical 55% to 50%. The incentive remained $15 per season, paid as a $5 bill credit on the July, August, and September bills.

Table 10. A/C Cool Credit demand response event details

Event Details	Thursday, July 16	Thursday, July 30	Wednesday, August 5
Event time	4–7 p.m.	4–7 p.m.	4–7 p.m.
Average temperature	93°F	103°F	98°F
Maximum load reduction (MW)	15.57	19.39	12.38

Throughout 2020, Idaho Power continued site visits to check switches and equipment to improve communication levels. However, due to COVID-19 restrictions, the company temporarily suspended site visits in March 2020. In mid-May, visits resumed with these restrictions: limiting site visits to the Treasure Valley area, calling each customer before the visit to explain process and safety measures, and not visiting any site where the customer was uncomfortable with the process. While at the site, contractors wore masks, maintained a 6 ft social distance from customers, and performed enhanced disinfecting activities. Due to these protocols to ensure safety as a result of COVID-19, not all device checks were completed. The company will continue work to ensure devices participating in the program are communicating on an ongoing basis.

Idaho Power printed new informational stickers that were placed on devices during site visits. The sticker provides a safety warning and toll-free number customers can call with questions.

Marketing Activities

Per the settlement agreement reached in Idaho Case No. IPC-E-13-14 and Oregon Case UM 1653, Idaho Power did not actively market the A/C Cool Credit program in 2020.

Before the cycling season began, Idaho Power sent current participants a postcard to remind them of the program specifics. Idaho Power also attempted to recruit customers who had moved into a home that already had a load control device installed and previous participants who changed residences to a location that may or may not have a load control device installed. The company used postcards, phone calls, direct-mail letters, and home visits (leaving door hangers for those not home) to recruit these customers. Participating customers received a thank you and a credit reminder message on their summer bills. At the end of the summer, a thank you postcard was sent to program participants.

Cost-Effectiveness

Idaho Power determines cost-effectiveness for its demand response program under the terms of IPUC Order No. 32923 and OPUC Order No. 13-482. Under the terms of the orders and the settlement, all Idaho Power's demand response programs were cost-effective for 2020.

The A/C Cool Credit program was dispatched for three events (totaling nine event hours) and achieved a maximum demand reduction of 19.4 MW. The total expense for 2020 was $765,020 and would have remained the same if the program was fully used for 60 hours because there is no variable incentive paid for events beyond the three required events.

A complete description of Idaho Power cost-effectiveness of its demand response programs is included in *Supplement 1: Cost-Effectiveness*.

Evaluations

In 2020, Idaho Power performed an internal review to evaluate the demand reduction over the course of the three event days. The demand reduction was calculated by comparing the actual average load for participating customers on each of the three event days to the corresponding baseline. The baseline is estimated by averaging the three non-event weekdays with the highest usage, out of the 10 non-event weekdays prior to an event. The baseline is then adjusted to match the event day in the hour before the start of the event.

The second event on July 30 achieved the highest peak demand reduction of 0.86 kW per participant for a total peak reduction of 19.4 MW with line losses.

For 2020, the maximum potential capacity of the program was calculated to be 31.4 MW. This is based on 1.4 kW per participant which the company has achieved in the past with 65% cycling on a very hot day.

The complete report is available in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

Idaho Power does not anticipate any program changes in 2021, though it will conduct site visits with the restrictions detailed above, as necessary.

Per the terms of the above-mentioned settlement agreements, Idaho Power will not actively market the A/C Cool Credit program to solicit new participants but will accept them upon request, regardless of whether they previously participated. The company will continue to recruit previous participants who have moved, as well as new customers moving into homes that already have a load-control device installed.

Easy Savings: Low-Income Energy Efficiency Education

		2020	2019
Participation and Savings			
	Participants (coupons)	155	430
	Energy Savings (kWh)	10,628	45,150
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$0	$0
	Oregon Energy Efficiency Rider	$0	$0
	Idaho Power Funds	$9,503	$145,494
	Total Program Costs—All Sources*	$9,503	$145,494
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.299	$0.885
	Total Resource Levelized Cost ($/kWh)	$0.299	$0.885
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	n/a
	Total Resource Benefit/Cost Ratio	n/a	n/a

* Total Program Costs are by calendar year; allotments provided to CAP agencies the beginning of LIHEAP's fiscal year each October. Program and monetary allotment moving to a calendar year in 2021.

Description

As a result of IPUC Case No. IPC-E-08-10 and Order Nos. 30722 and 30754, Idaho Power committed to fund energy efficiency education for low-income customers and provide $125,000 to Community Action Partnership (CAP) agencies in its service area annually, on a prorated basis. These orders specified that Idaho Power provide educational information to Idaho customers who heat their homes with electricity.

From 2009 to 2017, using CAP agency personnel, the program distributed ESKs and corresponding educational materials to participants of the Low Income Home Energy Assistance Program (LIHEAP) who heat their homes with electricity. In 2017, with input from a planning committee consisting of representatives from Community Action Partnership Association of Idaho (CAPAI), CAP Agencies, and the IPUC, Idaho Power discontinued kit distribution and offered a pilot incentive: a coupon for a free electric HVAC tune-up and one-on-one education with the goal of helping low income customers learn ways to reduce their energy costs and have a maintained HVAC system.

To provide services for the program, regional HVAC company owners sign contractor guidelines and acknowledge the two-fold goal of the program—customer education and equipment tune-up. During the customer visit, HVAC contractors perform the tune-up and teach residents how to change furnace filters. They also explain how regular maintenance improves overall performance and answer questions about the specific heating equipment and ways to save energy. The contractor leaves behind a customer satisfaction survey that can be mailed to CAPAI or completed online. Respondents are entered into a drawing for a gift card.

Program Activities

Coupons were redeemed by customers for electric heating system tune-ups, with all coupon redemptions occurring by end of calendar 2019. Of the $125,000 Idaho Power allotted to CAP agencies for this program, 30% or $37,500 was provided for CAP agency administration of the program. Approximately $57,965 was paid to HVAC contractors for their service, both costs were recognized as part of calendar

2019 activity. The cost per coupon averaged just over $373. The 2020 allotment was provided to the CAP agencies in late 2019 since the program followed the LIHEAP fiscal year of October 1 through September 30. No additional money was sent in 2020 and the only actual costs assigned to the program were in administrative labor. Historically, next year's allotment would have been provided in late 2020; however, due to Idaho Power and the CAP agencies moving the program to a calendar year, the allotment will be provided in early 2021.

In March 2020, due to the COVID-19 restrictions, in-home program activity was suspended in order to help keep contractors and customers safe. As a result, fewer coupons were redeemed in 2020 as compared to previous years. The funds that were not used to pay for redeemed coupons in 2020 will pay for additional tune-up coupons in 2021, when contractors start providing services for Idaho Power energy efficiency programs.

The planning committee found the original $300 maximum per coupon was frequently inadequate to address the costs associated with minor tuning and/or repairing of the heating systems and time to visit with customers. In 2019, the planning committee increased the coupon maximum to $600 and this amount was increased to $700 during 2020. This allowed contractors to spend extra time with customers and to travel further to rural areas. With the additional funds available per coupon, contractors agreed to give each customer 12 furnace filters.

Marketing Activities

The Easy Savings program is included under "Savings For Your Home" on the Idaho Power website in the "Income Qualified Customers" section.

Cost-Effectiveness

Because the Easy Savings program is primarily an educational and marketing program, the company does not apply traditional cost-effectiveness tests to it.

The Easy Savings HVAC coupon claimed 68.57 kWh of annual savings for each qualifying customer. The savings value is based on a simple average of the single-family and manufactured home-tune ups from the 2018 energy efficiency potential study. In 2021, the program will claim 68.01 kWh in savings from the 2020 energy efficiency potential study.

2021 Program and Marketing Strategies

The planning committee and participating regional HVAC contractors agreed to continue the Easy Savings program and to keep the maximum dollar amount available to contractors per customer visit at $700 when 12 filters are left with customer. This allows the HVAC contractor to make minor repairs to furnaces, air conditioners, and heat pumps while providing reimbursed time with the customer to review educational information.

Coupons for the 2021 program season will be distributed once services are safe to resume. CAP agencies will also receive helpful energy efficiency education materials to provide to regional HVAC contractors to share with customers.

Educational Distributions

	2020	2019
Participation and Savings		
Participants (kits/giveaways)*	97,228	95,528
Energy Savings (kWh) **	19,909,741	19,250,220
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	3,912,564	$2,989,184
Oregon Energy Efficiency Rider	$91,912	$91,688
Idaho Power Funds	$1,547	$0
Total Program Costs—All Sources	$4,006,023	$3,080,873
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.037	$0.021
Total Resource Levelized Cost ($/kWh)	$0.037	$0.021
Benefit/Cost Ratios* **		
Utility Benefit/Cost Ratio	1.45	2.06
Total Resource Benefit/Cost Ratio	2.19	3.32

*Participant counts do not include 2019 HER Pilot Program treatment size of 24,976, and 2020 HER program expansion treatment size of 127,138.

**2019 savings include HER Pilot Program savings for August 1, 2018–December 31, 2019. Savings in 2020 and forward are based on a calendar year.

***2020 cost-effectiveness ratios include evaluation. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 1.48 and 2.23, respectively.

Description

Designated as a specific program in 2015, the Educational Distributions effort is administered through the REEEI and seeks to use low-cost and no-cost channels to deliver energy efficiency items with energy savings directly to customers. As with the initiative, the goal for these distributions is to drive behavior change and create awareness of, and demand for, energy efficiency programs in Idaho Power's service area.

Idaho Power selects items for distribution if the initial analysis indicates the measure is either currently cost-effective or expected to be cost-effective. Typically, selected items have additional benefits beyond traditional energy savings, such as educating customers about energy efficiency, expediting the opportunity for customers to experience newer technology, or allowing Idaho Power to gather data or validate potential energy savings resulting from behavior change.

Idaho Power recognizes the need to educate and guide customers to promote behavior change and awareness and will plan program activities accordingly. Items may be distributed at events and presentations, through direct-mail, or during home visits conducted by energy advisors.

Energy-Saving Kits

To make it easier for families to manage energy use, Idaho Power works with a kit vendor to offer two versions of its free ESKs: one for homes with electric water heaters and one for homes with alternate-source water heaters. Customers enroll at idahopower.com/save2day, by calling 800-465-6045, or by returning a postcard. A kit is sent directly to the customer's home.

Each ESK contains nine LED lightbulbs (six 800-lumen lightbulbs and three 480-lumen lightbulbs), a digital thermometer (to check refrigerator, freezer, and water temperatures), a shower timer, a water

flow-rate test bag, an LED nightlight, and educational materials. In addition, the kit for homes with electric water heaters contains a high-efficiency showerhead with a thermostatic shower valve (TSV) and three faucet aerators—one for the kitchen and two for bathrooms.

Energy-Saving Kits as Giveaways

Idaho Power offers ESKs as giveaways, in limited quantities, at presentations and small events to garner additional interest in energy efficiency and to encourage immediate action and behavior change. In these circumstances, Idaho Power cannot confirm the source of water heating in the recipient's home or whether the recipient has already received a kit. Therefore, the company gives away the more basic version of the kit for homes with alternate-source water heaters; energy savings is garnered from lighting changes and not dependent on the source of water heat.

Home Energy Report Program

Idaho Power works with two third-party contractors to deliver the HER Program. The objective of the HER Program is to encourage customer engagement in regard to electricity use in order to produce average annual behavioral savings of 1 to 3%. Secondary objectives are to maintain or increase customer satisfaction and to encourage engagement with energy use, including online tools and participation in other energy efficiency programs.

The periodic reports provide customers with information about how their homes' energy use compares with similar homes. The *Home Energy Reports* also give a breakdown of household energy use and offer suggestions to help customers change their energy-related behaviors. The program contractor estimates energy savings that result from customers receiving the report by completing a statistical comparison of the energy use of the report recipients against the energy use of a similar control group.

LED Lightbulbs as Giveaways

Giving away LED lightbulbs is an effective way to connect Idaho Power with its customers and begin productive conversations around energy efficiency. Idaho Power field staff and energy efficiency program specialists seek opportunities to educate customers about LEDs, and to offer customers a free lightbulb to use immediately in their own homes.

LED Nightlights as Giveaways

Nightlights are a popular giveaway item with Idaho Power customers and provide another opportunity to share information about energy efficient LED technology and safe, energy efficient ways to provide nighttime lighting. Energy advisors are encouraged to use nightlights as a bridge to these discussions.

Student Energy Efficiency Kit Program

The Student Energy Efficiency Kit (SEEK) program provides fourth- to sixth-grade students in schools in Idaho Power's service area with quality, age appropriate instruction regarding the wise use of electricity. Each child who participates receives an energy efficiency kit. The products in the kit are selected specifically to encourage energy savings at home and engage families in activities that support and reinforce the concepts taught at school.

Once a class enrolls in the program, teachers receive curriculum and supporting materials. Students receive classroom study materials, a workbook, and a take home kit containing the following:

- Three LED lightbulbs
- A high-efficiency showerhead
- An LED nightlight
- A furnace filter alarm

- A digital thermometer for measuring water and refrigerator/freezer temperatures
- A water flow-rate test bag
- A shower timer

At the conclusion of the program, students and teachers return feedback to Idaho Power's vendor indicating how the program was received and which measures were installed. The vendor uses this feedback to provide a comprehensive program summary report showing program results and savings.

Unlike most residential programs offered by Idaho Power, SEEK results are reported on a school year basis, not by calendar year.

Welcome Kits

Idaho Power uses a vendor to mail Welcome Kits to brand new customers between 35 and 45 days after electric service begins at their residence. Each kit contains four LED lightbulbs, a nightlight, a greeting card, and a small flipbook containing energy-saving tips and information about Idaho Power's energy efficiency programs. The kits are intended to encourage first-time customers to adopt energy-efficient behaviors early in their new homes.

Program Activities

Energy-Saving Kits

In 2020, 39,667 kits were shipped to customer homes: 16,378 kits to homes with electric water heaters and 23,289 kits to homes with either alternate-source water heaters or those that had previously received a kit under a different account owner. The kits for homes with electric water heaters continued to include an integrated high-efficiency showerhead with a TSV. TSVs reduce the behavioral waste caused by letting the water run unchecked while it warms up. With a TSV, water flow is automatically reduced to a trickle when the water reaches 95°F, sending a signal that the water is ready. Once ready, the customer simply pulls a toggle string to resume normal water flow.

Kits were distributed to all geographic regions within Idaho Power's service area: 38,571 to Idaho residences and 1,096 to Oregon.

Since program inception in June of 2016, Idaho Power customers have requested over 200,000 kits—representing just under a 50% saturation rate. In the past two years, organic participation has waned with almost all new sign-ups driven by the vendor's marketing efforts. After reviewing the future of lighting savings, the company proposed sunsetting the program in December of 2020. With EEAG's support, the program was officially closed on December 11, 2020 when the kit inventory at the warehouse was expended.

Energy-Saving Kits as Giveaways

Face-to-face events, presentations, and field staff interactions across Idaho Power's three regions were significantly curtailed as the company worked to safely comply with Idaho's COVID-19 guidelines. Even so, field staff found safe ways to deliver 100 kits to customers expressing the need for greater energy efficiency at home. Due to changes in cost-effectiveness and the sunsetting of the ESK program, these kits will not be available as a giveaway item in 2021.

Home Energy Report Program

Idaho Power, in collaboration with its contractors, transitioned the HER Pilot into a full-bodied program in June 2020.

The lessons learned from the pilot were applied and a new group of 106,941 treatment customers and a corresponding control group was formed. The new HER Program participants received a welcome letter and introductory report in early June, followed by regular bi-monthly reports in August, October, and December.

In addition, 20,197 of the previous pilot participants continued to receive quarterly reports in February, May, August, and November.

As with the pilot, the expansion was designed based on standard randomized control trial (RCT) methodology with treatment and control groups sized appropriately to detect statistically significant savings at or above 1.2% and allowing for approximately 15% attrition per year.

The savings results for the continuing participants that were in the pilot showed statistically significant estimated energy savings for the year to range from between 1.25% and 3.25%. In keeping with the company's commitment to optimize the savings and apply lessons learned, the lowest year-round users were removed from the treatment group prior to the expansion. The aggregate savings for continuing participants was 5,299 MWh across all groups. Between June 1 and December 31, the expansion participants used an average of 50.6 fewer kWh per home than their control group counterparts—a savings of 0.56%. The smaller saving percentage was expected for the expansion group as it generally takes about 6 months to ramp up savings. When viewed in aggregate, the estimated savings for all program participants was about 0.74% below their respective control groups, for a total of 10,428 MWh. On average, program participants are providing statistically significant savings at between 50 to 363 kWh annually per home.

Idaho Power's customer solutions advisors responded to 1,087 HER Program-related phone calls during the year. Given that 488,802 reports were delivered, this represents a call-rate of just under 0.22%. The participant-driven opt-out rate in in 2020 was 0.12%—significantly lower than the industry average of 1%. Overall attrition in 2020 was 9.4% (includes opt-outs, move-outs, etc.). No customer satisfaction survey was fielded in 2020; however, a process evaluation was conducted.

LED Lightbulbs as Giveaways

In 2020, Idaho Power energy advisors delivered educational messages and LEDs to attendees at the Idaho Remodeling & Design Show, the Canyon Home & Garden Show and several Lunch & Learns for local employers. Throughout the summer, the EOEAs worked closely with the senior centers to establish drive-through LED giveaway events. At these events, 3,550 LEDs were innovatively packaged with educational materials, energy-related activities, and well-wishes and given to seniors in the service area. In the fall, the EOEAs executed a second outreach effort, giving away LEDs and marketing virtual educational presentations in an effort to establish new connections with junior high and high school teachers.

By the end of the year, Idaho Power employees had safely delivered a brief energy efficiency message and distributed 10,250 lightbulbs directly to customers.

LED Nightlights as Giveaways

Early in 2020, the company approached EEAG to gain support for adopting nightlights as the newest educational distribution item. Although these devices are highly sought after by customers and have been a part of the kit programs for some time, the company had not previously claimed related savings. EEAG suggested the company should claim savings and that nightlights carry a visible statement "Uses LED technology." In addition, Idaho Power created an educational card that was developed to accompany the nightlights to further the conversation around energy efficient lighting practices.

By year-end, Idaho Power staff and energy advisors had distributed 4,965 nightlights along with an educational message.

Student Energy Efficiency Kit Program

During the 2019 to 2020 school year, recruiting activities for SEEK transitioned to the vendor, Franklin Energy. Idaho Power EOEAs continued to promote the program during their school visits and interactions with fourth to sixth grade teachers. Due to COVID-19 school closures early in 2020, the vendor stopped shipping program materials to schools in mid-March. By then, a number of teachers had received materials, but had not yet completed the program. The EOEAs made multiple personal contacts to offer support, to offer virtual delivery options, and to determine the status and plans for the remaining school year. Overall, the result of COVID-19 school closures was lower participation levels for the full school year and fewer student surveys returned. Despite COVID-19 related challenges during the winter/spring semester, Franklin Energy delivered 9,800 kits to 361 classrooms in 135 schools within Idaho Power's service area. This resulted in 1,880 MWh of savings.

Welcome Kits

Idaho Power continued to contract with a third-party vendor, Tinker Programs, to distribute a smaller energy efficiency kit for the company's brand-new customers. At the onset of 2020, materials included in the kit box were visually updated to align with current marketing materials. Although adjustments in kit contents were considered, the cost-savings did not justify making a change at that time.

The company sent nearly 32,500 Welcome Kits to customers in 2020—a slight increase over the quantity delivered in 2018 and 2019.

Idaho Power continues to receive positive customer feedback indicating these kits are well-received.

Marketing Activities

Energy-Saving Kits

Marketing efforts included two direct-mail campaigns from the kit vendor: one to about 221,300 customers in July and the final postcard, which utilized "last chance" language, to 10,000 customers in November. The July mailer was divided into two mailings: one for ordering kits online and the other for returning an order card by mail (known as a business reply card, or BRC). The conversion rate for direct-mailers declined from 18 to 20% in previous years to about 12.5% in 2020 due to the fact that most eligible customers had already received one or more invitations to participate.



Figure 9. Post card offering last chance to get a free ESK

Idaho Power sent ESK marketing emails to customers for the first time in April and October 2020. In April, an initial email was sent to 63,328 customers who hadn't yet ordered their kits. The initial email was then followed up with a remarketing email to those who didn't open the first email. The April remarketing email was sent a week later to 52,934 of the initial customers. This effort resulted in 7,141 customer visits to the ESK website, with 4,542 customers submitting an order. The initial October email, which used last-chance language, was sent to 114,604 customers with a follow-up remarketing email sent to 108,180 of those customers, resulting in 17,365 click throughs to the website and 10,445 kit orders. Accounting for approximately 15,000 new kit orders, the use of email marketing was an overwhelming success, especially considering it is a low-cost tactic.

Due to COVID-19, employees were not able to showcase ESKs at as many trade shows or other community events in 2020. But the kits continued to be popular items of discussion on Idaho Power's social media channels, with customers posting and writing comments thanking Idaho Power for the kit, encouraging friends and strangers to order their own, and asking questions about the ability to order more. Customers sharing how much they like and appreciate the kits is a strong marketing tool for Idaho Power.



Figure 10. Customer post thanking Idaho Power for the free ESK

As the program wrapped up, Idaho Power used last-chance language on social media to encourage customers to order their kits before they were gone.

The kit was promoted to recipients of the *Home Energy Reports* in February/March (to those who hadn't already received a kit).

Energy-Saving Kits as Giveaways

Idaho Power field staff educated customers about energy efficiency by offering a free ESK with educational items and LED lightbulbs to get them started and on their way to saving energy.

Home Energy Report Program

Because the HER Program is based on the randomized control trial methodology, the reports cannot be requested by customers, therefore the program is not marketed. The periodic reports were, however, used to cross-market Idaho Power's other energy efficiency programs, with care taken to promote only those programs and offerings compatible with safety during the pandemic. My Account alerts and online activities received special callouts in 2020.

LED Lightbulbs as Giveaways

In 2020, as Idaho Power field activities paused for COVID-19 safety, staff and energy efficiency program specialists looked for new opportunities to safely distribute LEDs and educate customers. In the absence of one-on-one educational conversations between employees and customers at events, new educational activities and bookmarks were created to accompany the LEDs and to reinforce key concepts.

LED Nightlights as Giveaways

New in 2020, EOEAs also distributed LED nightlights, complete with a new educational card to help promote its efficiency and cost-savings. The majority of the 2020 distributions were to seniors across the service area—with an emphasis on rural communities.

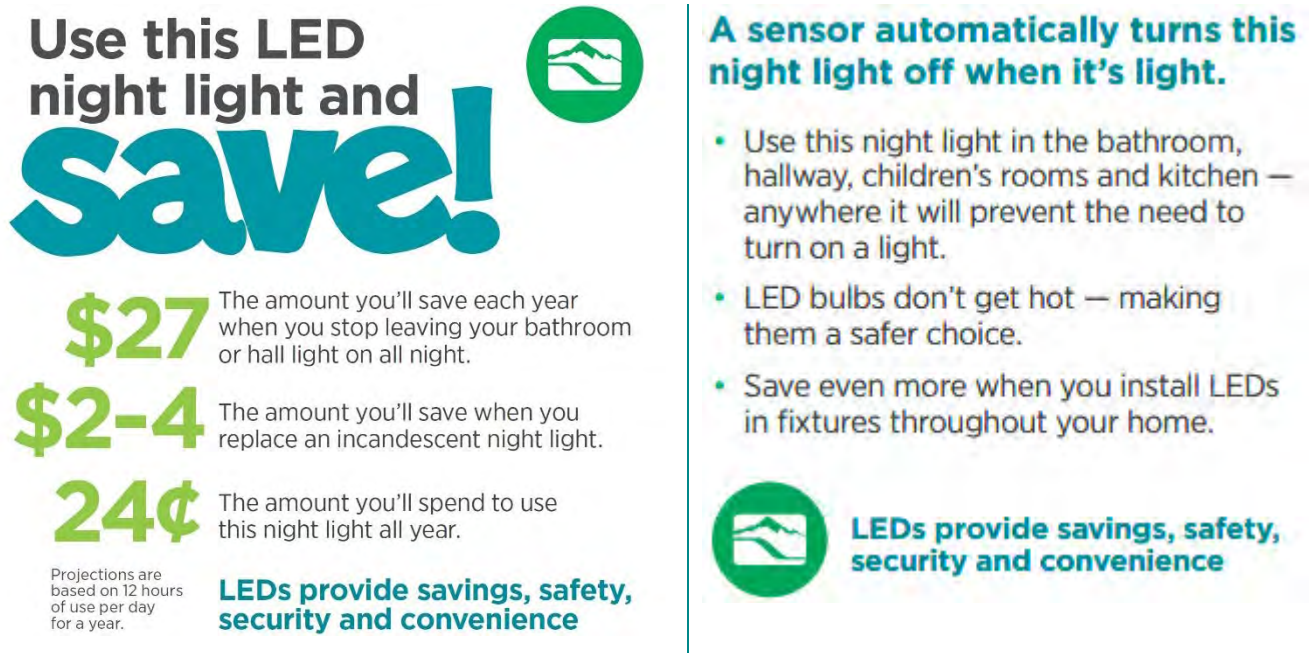


Figure 11. LED nightlight education card

Student Energy Efficiency Kit Program

During the 2019-2020 school year, Franklin Energy staff handled most of the marketing and recruitment of teachers via email and phone calls to the eligible schools. Idaho Power EOEAs continued to promote the program through the *Community Education Guide* and in conversations with teachers throughout the year.

Welcome Kits

The Welcome Kits are not requested by customers; therefore, they are not marketed. Instead, each week Idaho Power sends a list of new customers to the vendor to fulfill the order. However, the kits are used

to cross-market other programs through the inclusion of a small flipbook containing energy-saving tips and information about Idaho Power's energy efficiency programs.

Cost-Effectiveness

In situations where Idaho Power managed energy efficiency education and distribution through existing channels, the cost effectiveness calculations were based on the actual cost of the items. Conversely, if outside vendors were used to assist with distribution, the cost effectiveness calculations included all vendor-related charges.

The UCT and TRC for the program is 1.45 and 2.19 respectively. If the amount incurred for the 2020 evaluation was removed from the program's cost-effectiveness, the UCT would be 1.48 while the TRC would be 2.23.

Energy-Saving Kits

The RTF provides mail-by-request deemed savings for LED lightbulbs, faucet aerators, and the integrated high-efficiency showerheads with a TSV. The RTF mail-by-request deemed savings values are discounted to reflect the potential that not all the kit items may be installed. The LED lightbulbs each have a deemed savings value of 6.97 kWh per year. The by-request faucet aerator savings are 36.84 kWh when installed in a kitchen and 22.08 kWh when installed in the bathroom. For the integrated 1.75 gallon per minute (gpm) low-flow showerhead with TSV, the RTF assumes an installation rate of 90%. Based on Idaho Power's follow-up survey results, it appears the installation rate is approximately 57%. For 2020, the Idaho Power adjusted the savings to be 114.72 kWh annually.

Historically, Idaho Power did not claim the savings for the nightlights included in the ESK. After discussing the potential of claiming nightlight savings with EEAG, Idaho Power requested that the nightlight savings associated with the kits be researched as part of the 2020 evaluation. After surveying customers, the evaluator calculated that Idaho Power could claim 12 kWh per nightlight.

The annual savings for an ESK for a home with an electric water heater is approximately 270 kWh. The annual savings for a kit for a home with a non-electric water heater is approximately 75 kWh.

Energy-Saving Kits as Giveaways

The giveaway kits contain the same measures as the non-electric ESK. For the nine LED lightbulbs included in the kit, Idaho Power used the RTF's giveaway deemed savings value of 6.97 kWh per bulb. The annual savings for each giveaway kit is approximately 75 kWh.

Home Energy Report Program

HER Program savings are calculated by the program implementers through an internal evaluation. Savings for the 2020 program year are calculated at 10,427,940 kWh. A net-to-gross (NTG) factor of 95% is applied at the measure cost-effectiveness level to account for potential double counting of savings. Double counting occurs when a customer participates in another energy efficiency program due to their participation in the HER Program. The offering was not cost-effective for 2020 largely due to the additional costs associated with the expansion of the program. Additionally, the savings associated with the expansion only reflect a partial year of savings and it generally takes six months to ramp up savings. It is anticipated that the program will be cost-effective in future years even while claiming a one-year savings life.

LED Lightbulbs and Nightlights as Giveaways

For the LED giveaways, Idaho Power used the giveaway deemed savings provided by the RTF. The RTF-deemed annual savings of 6.97 kWh includes assumptions regarding the installation rate,

efficiency levels of the existing lightbulb, and the location of the installation. For nightlights, Idaho Power used the DNV GL calculated savings of 12 kWh as explained in the ESKs cost-effectiveness section.

Student Energy Efficiency Kit Program

The cost-effectiveness analysis for the SEEK offering was based on the savings reported by the kit provider during the 2019 to 2020 school year. The kit provider calculated the annual savings based on information collected from the participants' home surveys and the installation rate of the kit items. Questions on the survey included the number of individuals in each home, water-heater fuel type, flow rate of old showerheads, and the wattage of any replaced lightbulbs. The response rate for the survey was approximately 31%. The survey gathers information on the efficiency level of the existing measure within the home and which measure was installed. The energy savings will vary for each household based on the measures offered within the kit, the number of items installed, and the existing measure that was replaced. Based on the feedback received from the 2019 to 2020 school year the savings for each kit was approximately 192 kWh annually per household on average, and the program saved 1,879,542 kWh annually. A copy of the report is included in *Supplement 2: Evaluation*.

Welcome Kits

For the four LED lightbulbs included in the kit, Idaho Power use the RTF's giveaway deemed savings value of 6.97 kWh per bulb. For the nightlight, Idaho Power used the DNV GL calculated savings of 12 kWh per nightlight as explained in the ESKs cost-effectiveness section. The annual savings for each kit is 39.88 kWh.

Evaluations

In 2020, Idaho Power contracted with DNV GL to conduct an impact and process evaluation on the Educational Distributions program and process evaluation for the HER Program. The Educational Distributions impact evaluation calculated an overall savings realization rate of 97% and a realization rate for the count of kits delivered of 100%. The savings realization rates for Welcome Kits, Energy-Saving Kits, and SEEK was 100%, 97%, and 97% respectively.

The evaluation found a well-run program with satisfactory processes and satisfied customers. A Welcome Kit participant survey was completed and concluded 12 kWh savings could be claimed for each nightlight included in the kits.

Idaho Power will consider any recommendations and responses will be reported in the *Demand-Side Management 2021 Annual Report*. See the complete analysis report in *Supplement 2: Evaluation*.

The HER Program process evaluation was started alongside the Educational Distributions evaluation. However, due to some late findings, additional analysis was required to complete the evaluation. The evaluation report will be completed in April 2021 and will be included in the 2021 annual report.

2021 Program and Marketing Strategies

Idaho Power conducted an impact and process evaluation for the Educational Distributions program and a process evaluation for the HER Program in 2020. Actionable recommendations were either implemented in 2020 or will be addressed in 2021 and discussed in the 2021 DSM Report.

Home Energy Report Program

Idaho Power will continue to deliver *Home Energy Reports* to active program participants on a quarterly schedule with reports arriving in February, May, August and November. Participants with usage tied to high A/C use or winter heating will receive seasonal reports in either May or November, as appropriate.

Idaho Power has committed to upgrading the software platform, which should provide opportunities to enhance the current *Home Energy Report* template and/or messaging. As new options become available, the company will actively assess them with an eye toward improving savings and enhancing the customer experience.

LED Nightlights as Giveaways

Nightlights will be the primary opportunity to garner savings in conjunction with educational discussions and customer conversations. Field staff will look for opportunities to discuss LED technology and savings, encourage in-home adoption of LED lighting, and promote the use of LED nightlights as an energy efficient, safe nighttime lighting option.

Student Energy Efficiency Kit Program

Idaho Power will continue to offer the SEEK program and plans to review the materials and pricing to ensure the program remains competitive in the marketplace.

The company will continue to leverage the positive relationships Idaho Power's EOEAs have within the schools to maintain program participation levels. Adjustments may be made in the marketing and delivery processes based on kit pricing and vendor recommendations and capabilities.

Welcome Kits

In 2021, due to new RTF savings for lightbulbs, the kits will no longer be cost-effective as a stand-alone item. However, Idaho Power will continue to offer Welcome Kits to first-time customers. The Welcome Kit will cross-promote other energy efficiency programs and encourage new customers to adopt energy efficient behaviors upon moving into their new homes, and their cost will be included as part of Idaho Power's energy efficiency promotion efforts. Idaho Power does plan to count what little savings that can be claimed from the items in the kits.

Other Educational Distributions

Idaho Power will continue to look for opportunities to engage customers with new technologies that stress the importance of energy-efficient behaviors at home. The company is currently exploring options that may provide some customers with access to items formerly available through the ESK Program.

Energy Efficient Lighting

		2020	2019
Participation and Savings			
	Participants (lightbulbs)	1,148,061	1,336,440
	Energy Savings (kWh)	13,942,202	16,245,551
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$1,603,129	$2,026,977
	Oregon Energy Efficiency Rider	$62,218	$99,285
	Idaho Power Funds	$1,812	$0
	Total Program Costs—All Sources	$1,667,159	$2,126,262
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.012	$0.011
	Total Resource Levelized Cost ($/kWh)	$0.022	$0.014
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	4.56	4.04
	Total Resource Benefit/Cost Ratio	4.20	5.17

Description

Idaho Power and other regional utilities participate in the BPA-sponsored Simple Steps, Smart Savings™ program, managed by a third-party contractor. Idaho Power promotes Simple Steps, Smart Savings™ offerings to customers in two areas: this Energy Efficient Lighting program and the appliance promotion program (see the Simple Steps, Smart Savings™ section of this report).

Initiated in 2002, the Energy Efficient Lighting program follows a markdown model that provides incentives directly to manufacturers or retailers, with discounted prices passed on to the customer at the point of purchase. The benefits of this model are low administration costs, better availability of products to the customer, and the ability to provide an incentive for specific products. The program goal is to help Idaho Power's residential customers afford more efficient lighting technology.

ENERGY STAR® lightbulbs are a more efficient alternative to standard incandescent and halogen incandescent lightbulbs. Lightbulbs come in a variety of wattages, colors, and styles, including lightbulbs for three-way lights and dimmable fixtures. ENERGY STAR® lightbulbs use 70 to 90% less energy and last 10 to 25 times longer than traditional incandescent lightbulbs.

Idaho Power pays the program contractor a fixed amount for each kWh of energy savings achieved. A portion of the funding Idaho Power provides is used to buy down the price of the product, and a portion is applied to program administration, marketing, and retailer promotions. Promotions include special product placement, additional discounts, and other retail merchandising tactics designed to increase sales.

In addition to managing the program's promotions, the program contractor is responsible for contracting with retailers and manufacturers, providing marketing materials at the point of purchase, and supporting and training retailers.

Program Activities

In 2020, LED lightbulbs comprised 93% of the program's sales for the year, a slight decrease from the 94% of lightbulb sales in 2019. LED fixtures comprised approximately 7% of overall program sales.

In 2020, through the BPA Simple Steps, Smart Savings™ program, Idaho Power worked with 13 participating retailers, representing 99 individual store locations in its service area. Of those participating retailers, 54% were large retailers and 46% were smaller grocery, drug, dollar and hardware stores. Many rural sales came from these smaller retailers that serve hard-to-reach customers. It is important to include a variety of store types across the Idaho Power service area to ensure all customers have access to the Simple Steps qualified products.

In 2019, BPA announced they would no longer sponsor the Simple Steps promotion after September 30, 2020. The decision to end the program was based on the lighting market transformation to high-efficiency lightbulbs. Idaho Power continued participation in the Simple Steps program until September 30.

Marketing Activities

In 2020, the program contractor promoted discounts with special product placement and signs. Due to COVID-19 restrictions and to ensure the safety of field staff and customers, the program contractor did not perform any lighting events in 2020. Monthly visits to check stock, point-of-purchase signs, and displays were suspended from March 26 to September 1, when field staff returned to stores to remove point-of-purchase information and to remind store staff and management that the program was ending.

In the first few months of 2020, at events where Idaho Power sponsored a booth and distributed LED lightbulbs, customers were informed about the importance of using energy-efficient lighting, the quality of LED lightbulbs, and the special pricing available for the qualified products.

The company continued to host an Energy Efficient Lighting program website and made available a *Change a Light* program brochure. The brochure is distributed at community events to help discuss energy-efficient lighting with customers and to help them select the right lightbulb for their needs. Several social media posts throughout the year also focused on energy-efficient lighting. Idaho Power recommended using ENERGY STAR® LED lightbulbs in its spring *Energy Efficiency Guide*; the January and July issues of *Connections*; and the March, September, and November *Home Energy Reports*.

The Simple Steps, Smart Savings™ program was removed from the Idaho Power website on September 30, 2020.

Cost-Effectiveness

In 2019, the Energy Efficient Lighting program provided 37% of all energy savings derived from residential energy efficiency customer programs and almost 8% of Idaho Power's direct program savings. Between 2019 and 2020, bulb sales and savings declined nearly 14% largely due to the sunsetting of the Simple Steps promotion by BPA on September 30, 2020.

In November 2018, the RTF updated and revisited the assumptions for LEDs to account for market changes due to the federal standards compliance. Because LEDs are naturally becoming a larger share of the market, the RTF updated the current practice market baseline for lightbulbs. Due to the timing of the RTF's update, BPA and the contractor implemented these savings in 2020 in the Simple Steps, Smart Savings™ promotion. The RTF LED workbook version 7.1 was the source of most lighting savings assumptions throughout Idaho Power's residential program offerings.

The annual savings for the most popular bulb type, the general-purpose lightbulb in the 250–1049 lumen range, decreased from 12 kWh to about 9 kWh. This bulb type made up almost 49% of the total bulbs sold in the program and approximately 37% of the total savings. Due to the decrease of per-unit savings and the sunsetting of the program, the total savings for this bulb type decreased by just over 2.9 million kWh between 2019 and 2020.

The second most popular bulb type is the reflector lightbulb in the 250–1049 lumen range, which is commonly used in recessed canned light fixtures. The RTF increased the per-bulb savings for this bulb type from 8 kWh to 11 kWh. These reflector bulbs made up almost 17% of the total lightbulbs sold in the program and nearly 16% of the total savings. Between 2019 and 2020, the 250–1049 lumen reflector lightbulb sales remained relatively steady. With the increase in deemed savings, the total savings for this bulb type increased approximately 437,000 kWh between 2019 and 2020.

The RTF reviewed and approved new savings for LEDs in September 2019 and again in September 2020. Idaho Power is monitoring how utilities in the region plan to incorporate the latest RTF numbers.

The UCT and TRC ratios for the program are 4.56 and 4.20 respectively.

For detailed cost-effectiveness assumptions, metrics, and sources, see *Supplement 1: Cost-Effectiveness*.

2021 Program and Marketing Strategies

Idaho Power is researching options for a new lighting buydown program similar to the Simple Steps program. The redesigned program would offer incentives at grocery, dollar, and mass merchant stores because studies have found a higher percentage of inefficient lighting products are currently sold through these retail chains. Additionally, these types of stores are typically in more rural areas. A redesigned program would allow additional Idaho Power customers to participate in a cost-effective, energy efficiency program.

Energy House Calls

		2020	2019
Participation and Savings			
	Participants (homes)	51	248
	Energy Savings (kWh)	56,944	309,154
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$40,492	$143,570
	Oregon Energy Efficiency Rider	$5,422	$18,324
	Idaho Power Funds	$438	$0
	Total Program Costs—All Sources	$46,352	$161,894
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.075	$0.039
	Total Resource Levelized Cost ($/kWh)	$0.075	$0.039
Benefit/Cost Ratios*			
	Utility Benefit/Cost Ratio	0.63	0.96
	Total Resource Benefit/Cost Ratio	0.77	1.30

*2019 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRCs would be 1.11 and 1.49, respectively.

Description

Initiated in 2002, the Energy House Calls program gives homeowners of electrically heated manufactured homes an opportunity to reduce electricity use by improving the home's efficiency. Specifically, this program provides free duct sealing and additional efficiency measures to Idaho Power customers living in Idaho or Oregon who use an electric furnace or heat pump. Participation is limited to one service call per residence for the lifetime of the program.

Services and products offered through the Energy House Calls program include duct testing and sealing according to Performance Tested Comfort System (PTCS) standards set and maintained by the BPA; installing up to eight LED lightbulbs; testing the temperature set on the water heater; installing water heater pipe covers when applicable; installing up to two low-flow showerheads, one bathroom faucet aerator, and one kitchen faucet aerator; and leaving two replacement furnace filters with installation instructions and energy efficiency educational materials appropriate for manufactured home occupants.

Idaho Power provides contractor contact information on its website and marketing materials. The customer schedules an appointment directly with one of the certified contractors in their region. The contractor verifies the customer's initial eligibility by testing the home to determine if it qualifies for duct sealing. Additionally, contractors have been instructed to install LED lightbulbs only in high-use areas of the home, to replace only incandescent lightbulbs, and to install bathroom aerators and showerheads only if the upgrade can be performed without causing damage to a customer's existing fixtures.

The actual energy savings and benefits realized by each customer depend on the measures installed and the repairs and/or adjustments made. Although participation in the program is free, a typical cost for a similar service call would be $400 to $600, depending on the complexity of the repair and the specific measures installed.

Program Activities

In response to COVID-19 restrictions and to ensure the safety of customers and contractors, no Energy House Calls visits were completed from March 16 through the end of 2020. Prior to March, 51 homes received products and/or services through this program, resulting in 56,944 kWh savings (Figure 12). In 2019, during the same period, 56 customers received products and or/services.

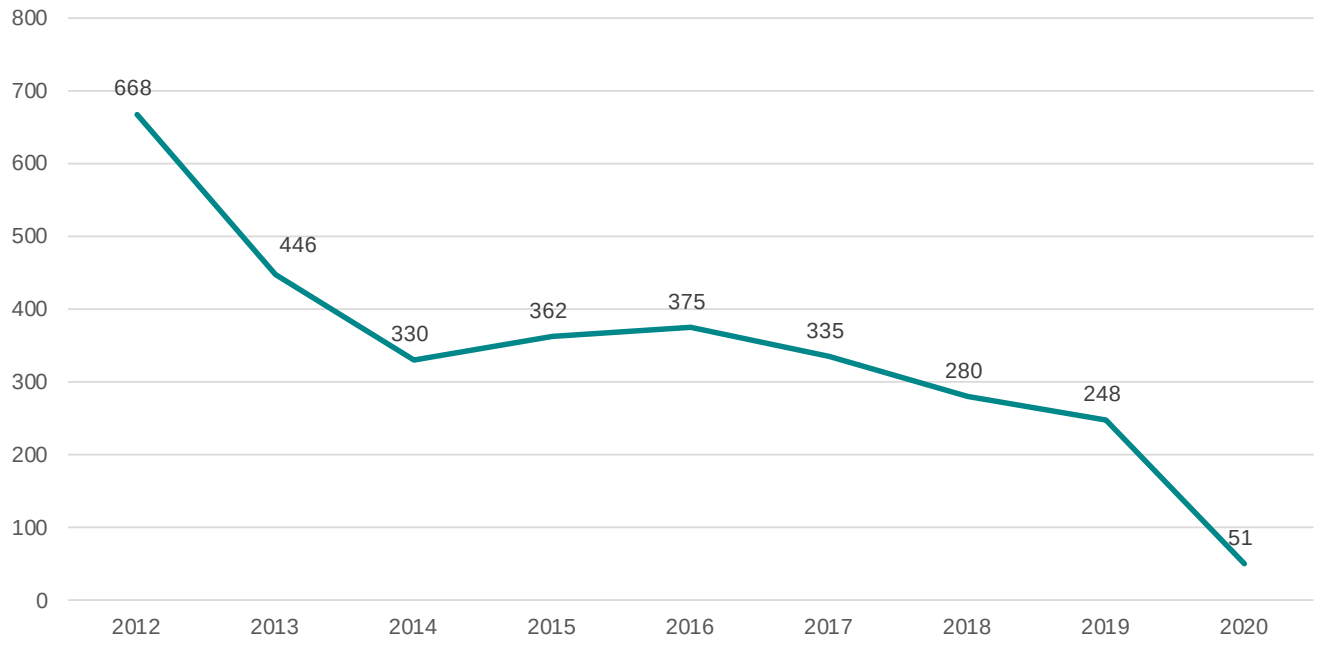


Figure 12. Participation in the Energy House Calls program, 2012–2020

Of the total participating homes, 57% were located in the Canyon–West Region, 18% were located in the Capital Region, and 25% were located in the South–East Region.

Findings from the impact evaluation performed in 2019 found that Idaho Power had been using heating zones based on cities rather than zip codes to determine PTCS duct-sealing savings. For 2020, Idaho Power applied the duct-sealing savings using the heating zones associated with the zip codes of the participants. It was also discovered that Idaho Power was using a per-faucet savings value for aerators rather than a household value. Idaho Power had already transitioned to the RTF-deemed savings in 2019 prior to receiving the evaluation, so the household value versus the per faucet aerator value is no longer an issue.

Duct-Sealing

Each year, a number of customers who apply for the Energy House Calls program cannot be served because their ducts do not require duct-sealing or cannot be sealed, for various reasons. These jobs are billed as a test-only job. On some homes, it is too difficult to seal the ducts, or the initial duct blaster test identifies the depressurization to be less than 150 cubic feet (ft) per minute (cfm), and duct-sealing is not needed. Additionally, if after sealing the duct work the contractor is unable to reduce leakage by 50%, the contractor will bill the job as a test-only job. Prior to 2015, these test-only jobs were not reported in the overall number of jobs completed for that year because they included no kWh savings. Because Idaho Power now offers direct-install measures in addition to the duct-sealing component, all homes are reported. While some homes may not have been duct-sealed, all would have had some of the direct-install measures included, which would allow Idaho Power to report kWh savings for those homes. Of the 51 homes that participated in 2020, five homes were serviced as test only.

If a home had a blower door and duct blaster test completed, and the contractor determined that only duct-sealing is necessary, it is billed as a test and seal. For a multi-section home with an x-over duct system (one that transfers heated or cooled air from one side to the other) that needs replaced in addition to the duct-sealing, it is charged as an x-over. When a home requires the existing belly-return system to be decommissioned and have a new return installed along with the duct sealing, it is billed as a complex system. A complex system that also requires the installation of a new x-over and duct sealing is billed as a complex system and x-over job.

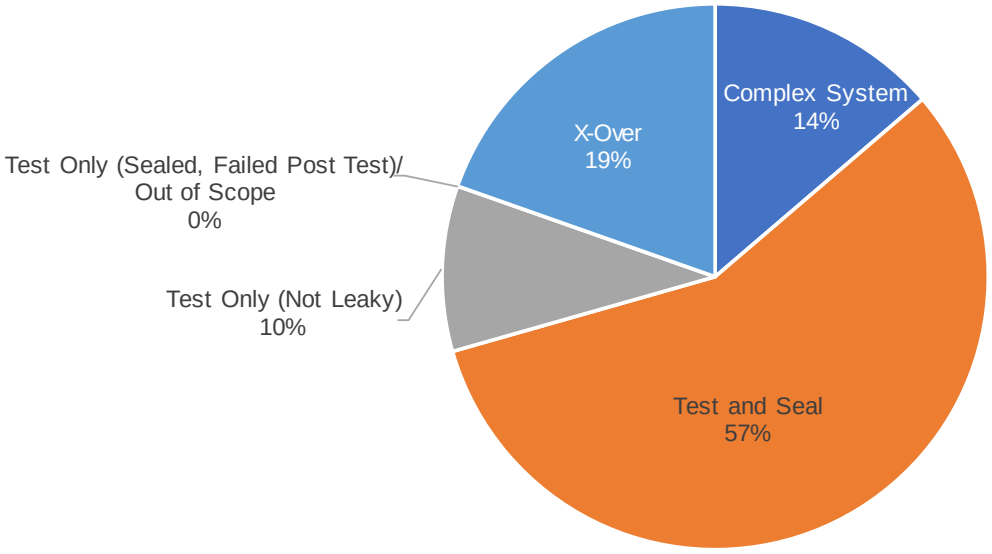


Figure 13. Energy House Calls participation by job type

Direct-Install Measures

In 2020, contractors installed 200 LED lightbulbs, 11 showerheads, six bathroom aerators, and nine kitchen aerators. Contractors noted that they've seen a decrease in direct-install measures, as customers have commented they have already installed the provided products after receiving free ESKs from Idaho Power. Of the 51 homes that participated in the program in 2020, 49% had received an ESK at some point in the past.

Marketing Activities

In February, Idaho Power sent a postcard to residents who lived in electrically heated manufactured homes that had not yet participated in the program. Written in English and Spanish, 9,010 postcards were delivered in February. In April, the company sent a bill insert to 309,763 residential customers in Idaho and Oregon. The bill insert was shared with the Rebate Advantage program. Customers who requested an Energy House Call visit after March 16, 2020, were added to a wait list and will be contacted to schedule a visit when COVID-19 restrictions are lifted.

To help alleviate any potential customer dissatisfaction, the company cancelled these scheduled program-related outreach efforts: the June Facebook ad and email, the July postcard, and the December bill insert. The December bill insert was replaced with one that provided DIY winter home energy efficiency tips applicable to all types of home or apartment owners or renters. Additionally, Idaho Power added an alert to the Energy House Calls webpage to let customers know of the suspension of in-home program work and the delay for scheduling home visits.

Cost-Effectiveness

In 2020, Idaho Power used the same RTF savings for duct-sealing and low-flow faucet aerators in manufactured homes as were used in 2019. Savings and a cost-effectiveness analysis for the other direct-install measures, low-flow showerheads and LED lightbulbs, were completed using updated deemed savings from the RTF.

The UCT and TRC ratios for the program are 0.63 and 0.77, respectively. The program's cost-effectiveness was impacted by the suspension of in-home visits due to COVID-19. The company will continue to monitor this program and will explore opportunities to further improve the program's cost-effectiveness in 2021.

For more detailed information about the cost effectiveness savings and assumptions, see *Supplement 1: Cost-Effectiveness*.

2021 Program and Marketing Strategies

Once COVID-19 safety protocols allow, Idaho Power will continue to provide free duct sealing and selected direct-install efficiency measures for all-electric manufactured/mobile homes in its service area as long as it remains cost-effective to do so. As always, the company will continue to explore additional cost-effective measures to add to the program.

Idaho Power will include program promotional materials in its bills, send direct-mail postcards and emails, and use social media and other proven marketing strategies to encourage customer participation. Contractors and energy advisors will also distribute program literature at appropriate events and presentations. Idaho Power will continue to provide Energy House Calls program postcards to CAP agencies for distribution to customers who need assistance but do not qualify to receive weatherization assistance through these agencies.

Heating & Cooling Efficiency Program

		2020	2019
Participation and Savings			
	Participants (projects)	1,019	681
	Energy Savings (kWh)	1,839,068	1,412,343
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$578,893	$478,560
	Oregon Energy Efficiency Rider	$23,978	$20,619
	Idaho Power Funds	$3,689	$0
	Total Program Costs—All Sources	$606,559	$499,179
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.033	$0.028
	Total Resource Levelized Cost ($/kWh)	$0.103	$0.084
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	1.66	1.56
	Total Resource Benefit/Cost Ratio	0.81	0.77

Description

Initiated in 2007, the objective of the Heating & Cooling Efficiency (H&CE) Program is to provide customers with energy-efficient options for space heating and cooling and water heating. The program provides incentives to residential customers, builders, and installation contractors in Idaho Power's service area for the purchase and proper installation of qualified heating and cooling equipment and services.

Measures, Conditions, and Incentives/Stipends for Existing Homes

- Ducted air-source heat pump:
  - The customer incentive for replacing an existing ducted air source heat pump with a new ducted air source heat pump is $250 for a minimum efficiency 8.5 heating seasonal performance factor (HSPF). A $50 stipend is paid to the participating contractor.
  - The customer incentive for replacing an existing oil or propane heating system with a new ducted air source heat pump is $400 for a minimum efficiency 8.5 HSPF. A $50 stipend is paid to the participating contractor. Participating homes must be located in areas where natural gas is unavailable.
  - The customer incentive for replacing an existing electric forced-air or zonal electric heating system with a new ducted air source heat pump is $800 for a minimum efficiency 8.5 HSPF. A $50 stipend is paid to the participating contractor.
- Ducted open-loop water-source heat pump:
  - The customer incentive for replacing an existing ducted air source heat pump with a new ducted open-loop water-source heat pump is $500 for a minimum efficiency 3.5 coefficient of performance (COP). A $50 stipend is paid to the participating contractor.
  - The customer incentive for replacing an existing electric forced-air or zonal electric, oil, or propane heating system with a new ducted open-loop water-source heat pump is $1,000 for a

minimum efficiency 3.5 COP. Participating homes with oil or propane heating systems must be located in areas where natural gas is unavailable. A $50 stipend is paid to the participating contractor.

- Ductless air source heat pump: The customer incentive for displacing a zonal electric heating system with a new ductless air source heat pump is $750.
- Duct sealing: The customer incentive for duct-sealing services performed in an existing home with an electric forced-air heating system or a heat pump is $350.
- Electronically commutated motor (ECM): The customer incentive for replacing a permanent split capacitor (PSC) air handler motor with an ECM in an existing home with oil or propane or natural gas forced-air heat, electric forced-air heat, or a heat pump is $50. A $150 incentive is paid to the licensed contractor.
- Evaporative cooler: The customer incentive for installing an evaporative cooler is $150.
- Heat pump water heater (HPWH): The customer incentive for installing a HPWH is $300.
- Smart thermostat: The customer incentive for a smart thermostat installed in an existing home with an electric forced-air furnace or a heat pump is $75.
- Whole house fan: The customer incentive for a whole-house fan (WHF) installed in an existing home with central A/C, zonal cooling, or a heat pump is $200.

Measures, Conditions, and Incentives/Stipends for New Homes

- Ducted air-source heat pump: The incentive for homeowners, property owners, or builders of new construction installing a ducted air source heat pump in a new home is $400 for a minimum efficiency 8.5 HSPF. A $50 stipend is paid to the participating contractor. Participating homes must be located in areas where natural gas is unavailable.
- Ducted open-loop water-source heat pump: The incentive for homeowners, property owners, or builders of new construction installing a ducted open-loop water-source heat pump in a new home is $1,000 for a minimum efficiency 3.5 COP. A $50 stipend is paid to the participating contractor. Participating homes must be located in areas where natural gas is unavailable.

Idaho Power requires licensed contractors to perform the installation services related to all of these measures, except evaporative coolers, HPWH, and smart thermostats. To qualify for the heat pump and duct-sealing incentive, an authorized participating contractor must perform the work. To be considered a participating contracting company, an employee from the contracting company must first complete Idaho Power's required training regarding program guidelines and technical information on HVAC equipment.

Honeywell, Inc., a third-party contractor, reviews and submits incentive applications for payment using a program database portal developed by Idaho Power. Honeywell also provides technical and program support to customers and contractors and performs on-site and off-site verifications.

Program Activities

In 2020, Idaho Power conducted research and activities to improve customer participation and satisfaction in the H&CE Program. An exercise, described as journey mapping, was completed by a dedicated team from multiple departments who met periodically for three months to challenge, discuss, and modify elements of the program in detail. The purpose of the exercise was to identify difficulties customers might experience when participating in the program. The primary elements identified for revision included website content and application forms. Idaho Power updated its website in 2020 and expects to complete revising the application forms in 2021.

Idaho Power relies, in part, on the RTF to determine the energy savings values it claims for the smart thermostat measure. However, when the RTF announced it would no longer support their savings calculations for the smart thermostat measure, Idaho Power and other stakeholders launched a regional Smart Thermostat Research Study to provide regional smart thermostat performance data to the RTF. The study began in November 2019 and will extend into 2021. Because of the regional study, the RTF extended the period it would support the savings estimates to December 31, 2021.

Idaho Power continued work to improve penetration in the ductless heat pump (DHP) market for homes heated with electric zonal systems. For example, Idaho Power and NEEA provided product and application training to HVAC contractors across the company's service area. The company offered six online training sessions in October and November 2020. Each was met with appreciation by the attendees.

The 2020 H&CE Program paid incentives are listed in Table 11.

Table 11. Quantity of H&CE Program incentives in 2020

Incentive Measure	Project Quantity
Ducted Air-Source Heat Pump	161
Open Loop Water-Source Heat Pump	6
Ductless Heat Pump	244
Evaporative Cooler	9
Whole-House Fan	129
Electronically Commutated Motor	51
Duct Sealing	1
Smart Thermostat	393
Heat Pump Water Heater	25

Honeywell performed random off-site verifications on 5% of the completed installations. This year, the verifications were performed via phone due to COVID-19 restrictions. These verifications confirmed the information submitted on the paperwork matched what was installed at customers' sites. Overall, the verifications results were favorable.

Supporting, developing, and expanding Idaho Power's authorized participating contractor network remained a key growth strategy for the program. In 2020, company representatives met with many prospective contractors to support this approach. As a result, Idaho Power added 13 new contractors to the program in 2020.

Marketing Activities

Idaho Power used multiple marketing methods for its H&CE Program in 2020, focusing efforts toward the hottest and coldest times of the year.

Idaho Power sent two program-related postcards to a targeted customer group that uses electric heat: 8,188 customers in February and 8,132 customers in September. The company mailed a bill insert to 321,081 residential customers in April and 365,038 residential customers in September.

In February, the company emailed information about the H&CE Program to approximately 197,000 residential customers. Over the next three days, the program web page received 5,543 unique page views, which is a large increase compared to the 376 total page views during the three days prior to the email.

In February and September, Idaho Power used an ad agency to send digital display ads to customers based on their internet browsing preferences. Using Google Analytics, the ad agency determined the ads resulted in 2,894,645 impressions and 8,508 clicks to the H&CE Program web page in February and 3,137,679 impressions and 10,327 web clicks in September. In addition to digital display ads, the company used remarketing ads in September targeting customers who had previously visited the H&CE Program web page. The ads resulted in 3,362 impressions with 50 clicks to the web page. A September Facebook ad resulted in 215,758 impressions and 1,766 click throughs to the H&CE Program web page.

Idaho Power used several social media posts throughout 2020 focused on tips related to home heating and cooling. DHPs were prominently featured in the company's overall energy efficiency campaign that ran in a variety of mass-media locations. Additionally, in February, a link from the company's website homepage directed customers to its smart thermostat web page and in September a link directed customers to the H&CE Program web page.

The company held a smart thermostat giveaway at the January *Idaho Remodeling & Design Show* and promoted the program on the trade show booth panels. Program information was also included in energy efficiency collateral mailed in the new customer Welcome Kits.

The company used several PR tactics to promote the program, including interviews touting smart thermostats on KTVB and KMVT in February. Smart thermostats were also promoted in a *News Brief* in January. A smart thermostat article was featured in the February edition of *Connections*. The summer edition of the *Energy Efficiency Guide* distributed through local newspapers featured articles on smart thermostats and HPWHs.

Additionally, the program specialist continued to distribute flyers, called tech sheets, to interested customers and contractors. The eight different flyers are especially beneficial as sales tools for contractors, for use at trade shows, and as mailers to customers without internet access who seek program and individual cash incentive information.

Cost-Effectiveness

The H&CE Program has a utility cost test of 1.66 and total resource cost test of 0.81. The increase in UCT and TRC over 2019 is largely due to the increase in participation in the program.

The savings assumptions for most measures including air source heat pumps, open-loop water-source heat pump, DHPs, and duct sealing remain unchanged from 2019. All measures within the program pass the UCT except for heat pump upgrades and smart thermostats. However, the measures would pass the UCT if administration costs were not included in the measure's cost-effectiveness. A handful of measures, such as DHPs and open-loop water-source heat pumps are not cost-effective from a TRC perspective. These measures and the program itself have cost-effectiveness exceptions with the OPUC under UM 1710.

In late 2019, the RTF updated the assumptions around heat pumps and recalibrated their model based on empirical data from evaluations and research throughout the northwest which resulted in a reduction of per unit savings. These savings will be applied to the program in 2021. At the same meeting, the RTF voted to deactivate the savings for the commissioning, controls, and sizing (CCS) of the heat pumps. The CCS savings are additive to the air-source heat pump conversion and upgrade measure and assumes the proper installation of the heat pumps based on BPA's PTCS standards. While the analysis suggests that there could be meaningful savings for utilities especially east of the Cascades, some utilities did not follow BPA's PTCS standards. In discussing the CCS savings with the program engineer, Idaho Power does follow the PTCS standards. Idaho Power plans to continue using the CCS savings in 2021 and will use the upcoming program evaluation as an opportunity to do further research on this measure.

In 2020, Idaho Power updated the savings for evaporative coolers. Previously, Idaho Power cited the evaporative coolers savings from past potential studies. After further research, it was determined that the savings were modeled on the replacement of an existing evaporative cooler. However, the program engineer believes the measure encourages the displacement of whole house existing mechanical cooling. Mechanical cooling is shut off during variable outdoor conditions where an evaporative cooler can cool the room. After researching available technical reference manuals (TRM), Idaho Power found the New Mexico TRM had a reasonable deemed savings value based on a variety of representative cities and their associated cooling degree days. As part of the 2021 program evaluation, Idaho Power plans to have the evaluators check the reasonableness of these values and provide an updated savings value based on Idaho Power climate zones.

In early 2021, RTF reviewed and updated the savings assumptions for HPWHs. While it is Idaho Power's position to freeze savings assumption during budgeting, the newest HPWH workbook includes savings for the Tier 4 HPWH. The Tier 3 models are slowly leaving the market and are being replaced with Tier 4 models. To begin claiming savings for these HPWHs, Idaho Power will need to adopt the newest workbook for 2021.

For detailed information about the cost-effectiveness savings, sources, calculations, and assumptions, see *Supplement 1: Cost-Effectiveness*.

2021 Program and Marketing Strategies

Idaho Power will contract with a third party to conduct process and impact program evaluations in 2021.

Idaho Power will continue to provide program training to existing and prospective contractors to assist them in meeting program requirements and furthering their product knowledge. Training sessions remain an important part of the program because they create opportunities to invite additional contractors into the program. The sessions also provide refresher training for contractors already participating in the program and help them increase their customers' participation while improving the contractors' work quality.

Developing the existing network of participating contractors remains a key strategy for the program. The performance of the program is substantially dependent on the contractors' abilities to promote and leverage the measures offered. Idaho Power's primary goal in 2021 is to develop contractors currently in the program while adding new contractors. To meet this objective, the program specialist will frequently interact with contractors in 2021 to discuss the program.

The 2021 marketing strategy will include bill inserts, direct-mail, social media, digital and search advertising, and email marketing to promote individual measures and the program as a whole.

Home Energy Audit

		2020	2019
Participation and Savings			
	Participants (homes)	97	421
	Energy Savings (kWh)	31,938	179,754
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$128,547	$230,786
	Oregon Energy Efficiency Rider	$0	$0
	Idaho Power Funds	$1,999	$0
	Total Program Costs—All Sources	$130,546	$230,786
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.448	$0.122
	Total Resource Levelized Cost ($/kWh)	$0.449	$0.150
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	n/a
	Total Resource Benefit/Cost Ratio	n/a	n/a

Description

Under the Home Energy Audit program, a certified, third-party home performance specialist conducts an in-home energy audit to identify areas of concern and provide specific recommendations to improve the efficiency, comfort, and health of the home. The audit includes a visual inspection of the crawlspace and attic, a health and safety inspection, and a blower door test to identify and locate air leaks. The home performance specialist collects information on types and quantities of appliances and lighting in each home, then determines which available measures are appropriate for the home. Homeowners and/or landlords approve all direct-install measures prior to installation, which could include the following:

- Up to 20 LED lightbulbs
- One high-efficiency showerhead
- Pipe insulation from the water heater to the home wall (approximately 3 ft)
- Tier 2 Advanced Power Strip

The home performance specialist collects energy-use data and records the quantity of measures installed during the audit using specialized software. After the audit, the auditor writes up the findings and recommendations, and the software creates a report for the customer.

To qualify for the Home Energy Audit program, a participant must live in Idaho and be the Idaho Power customer of record for the home. Renters must have prior written permission from the landlord. Single family site-built homes, duplexes, triplexes, and fourplexes qualify, though multi-family homes must have discrete heating units and meters for each unit. Manufactured homes, new construction, or buildings with more than four units do not qualify.

Interested customers fill out an application online. If they do not have access to a computer, or prefer talking directly to a person, Idaho Power accepts applications over the phone. Participants are assigned a home performance specialist based on geographical location to save travel time and expense.

Participating customers pay $99 (all-electric homes) or $149 (other homes: gas, propane, or other fuel sources) for the audit and installation of measures, with the remaining cost covered by the Home Energy Audit program. The difference in cost covers the additional testing necessary for homes that are not all-electric. These types of energy audits normally cost $300 or more, not including the select energy-saving measures, materials, and labor. The retail cost of the materials available to install in each home is approximately $145.

Each year, the quality assurance (QA) goal for the program is to inspect 5% of all audits.

Program Activities

Three home performance specialist companies served the program in 2020 and completed 97 energy audits. House size ranged from 528 square ft (ft^2) to 7,400 ft^2, with the average size of 2,314 ft^2. Houses were built from 1908 to 2019, with the average age of 40 years old.

Due to COVID-19 restrictions, Idaho Power suspended audits in mid-March 2020 through the end of the year. This greatly impacted the number of audits completed and associated savings. The company continued to accept enrollments and contacted customers to explain the delay.

Figure 14 depicts the program's reach across Idaho Power's service area, and Figure 15 depicts the space and water heating fuel types. Figure 16 indicates the total quantity of direct-install measures.

Because in-home activity was suspended most of the year, QAs were not performed.

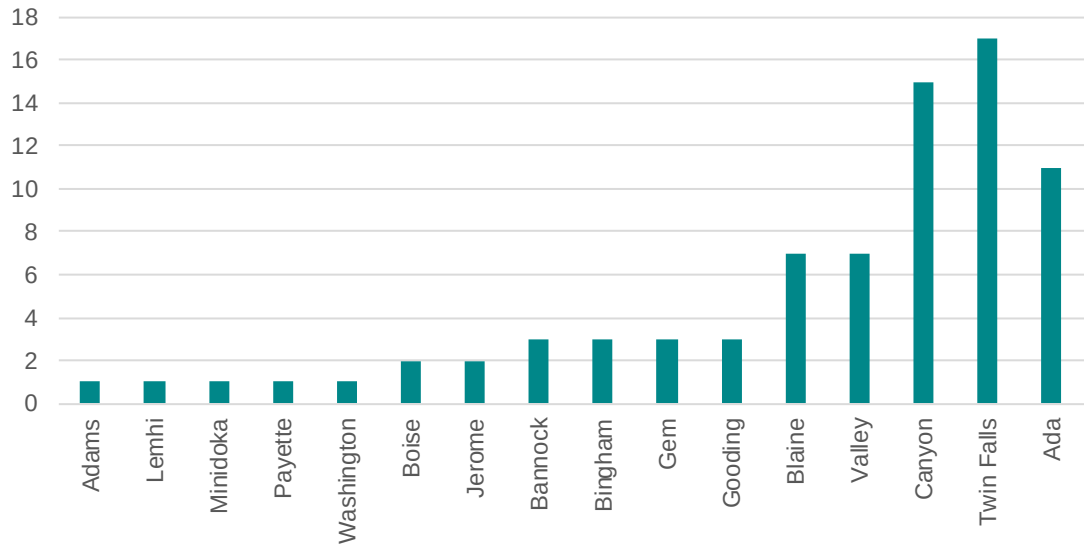


Figure 14. Home Energy Audit summary of participating homes, by county

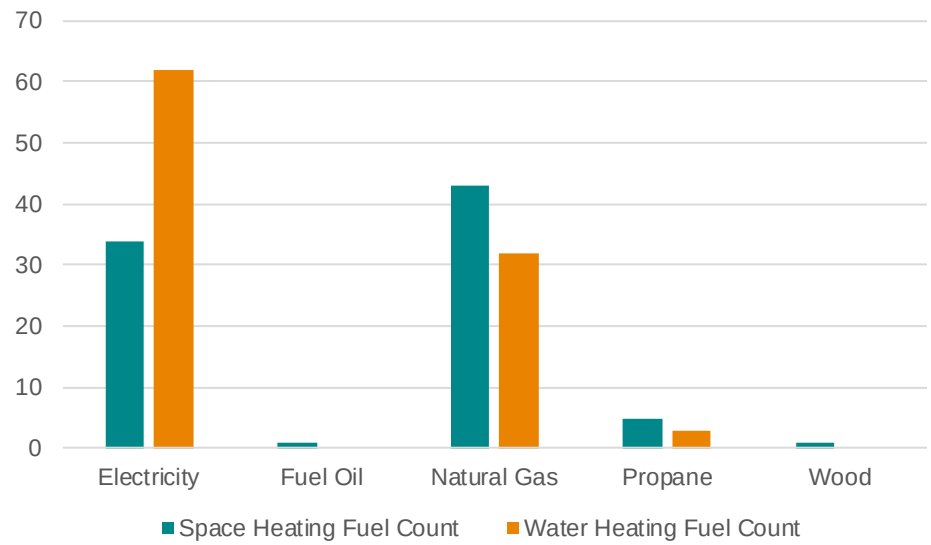


Figure 15. Home Energy Audit summary of space and water heating fuel types

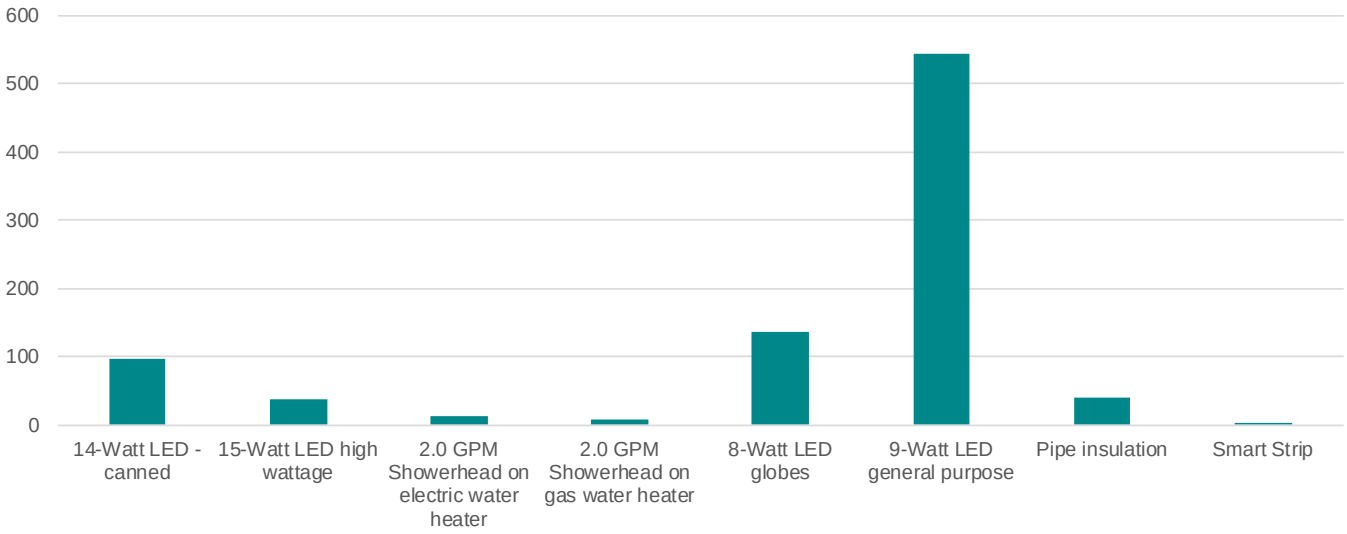


Figure 16. Number of Home Energy Audit measures installed in participating homes

Marketing Activities

In early 2020, Idaho Power recruited participants using small batches of direct mail letters to ensure customers who signed up were contacted within a short timeframe and to avoid a large backlog of work that could result in a poor customer experience. Due to COVID-19 restrictions, Idaho Power suspended this marketing effort in mid-March.

In November, Idaho Power collaborated with the University of Idaho's Valley County Extension Office to host a virtual energy efficiency workshop for customers in Valley county. The company sent letters and emails and used a Facebook post to invite residents to attend the evening workshop. Forty residents registered for the workshop, and twenty attended the well-received workshop. This is twice the number that attended last year's in-person event.

Attendees learned how to check their homes for efficiency, how to make some improvements, what incentives are available through Idaho Power, and how a professional energy assessment could help improve energy efficiency. The company conducted a random drawing to give away four LED

nightlights to attendees. A local energy advisor delivered the nightlights to customer's front porches while social distancing and wearing a mask. Customers expressed appreciation during the event for being able to have the workshop despite COVID-19 restrictions.

Idaho Power sent program-related bill inserts to 310,836 residential customers in March, 308,036 customers in July, 304,066 in September, and 296,947 customers in December. The company included new messaging to let customers know they would be signing up for a waitlist since auditors were unable to conduct in-person visits.

In February and March, targeted digital display ads ran on a variety of websites based on user demographics, search behavior, and other factors. The ads generated 940,774 impressions and a 0.22% click-through rate. In March, a Facebook post about the program was boosted, resulting in 4,785 impressions.

Customers who enrolled in the Home Energy Audit program throughout the year were asked where they heard about the program. Responses included the following: information in the mail, 39.1%; family member or friend, 8.27%; Idaho Power employee, 11.65%; social media, 3.01%; other, 37.97%.

Cost-Effectiveness

One of the goals of the Home Energy Audit program is to increase participants' understanding of how their home uses energy and to encourage their participation in Idaho Power's energy efficiency programs. Because the Home Energy Audit program is primarily an educational and marketing program, the company does not apply the traditional cost-effectiveness tests to the program.

For the items installed directly in the homes, Idaho Power used RTF savings for direct-install lightbulbs, which range from 16 to 46 kWh per year. This was a slight decrease over the 2019 lightbulb savings which ranged from 16 to 52 kWh per year.

In Idaho Power's *Energy Efficiency Potential Study*, it is estimated that pipe wraps save 78 kWh per year. Showerhead savings were updated in 2020 using the RTF version 4.3 workbook. Savings for both showerheads and pipe wrap were counted for homes with electric water heaters.

As recommended in a previous evaluation, non-energy benefits (NEB) have been determined for pipe wrap insulation and showerheads in homes with gas water heat. Idaho Power has calculated the gas and water savings for showerheads installed in gas water heat homes. While Idaho Power does not calculate a cost-effectiveness ratio for the Home Energy Audit program, those values have been included in the sector and portfolio cost-effectiveness. Idaho Power has also converted the 78 kWh of pipe wrap savings to 2.66 therms and those gas savings are included in the sector and portfolio cost-effectiveness.

2021 Program and Marketing Strategies

Once COVID-19 safety protocols allow for audits to resume, Idaho Power will continue recruiting participants through small batches of targeted direct-mailings, social media posts, advertising, and bill inserts. Additional digital advertising may be considered if the program needs to be strategically promoted in specific regions.

Multifamily Energy Savings Program

		2020	2019
Participation and Savings			
	Participants (projects [buildings])	33 [4]	457 [12]
	Energy Savings (kWh)	28,041	346,107
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$83,951	$115,560
	Oregon Energy Efficiency Rider*	$4,350	$15,745
	Idaho Power Funds	$1,528	$0
	Total Program Costs—All Sources	$89,829	$131,306
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.372	$0.036
	Total Resource Levelized Cost ($/kWh)	$0.372	$0.036
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	0.14	1.15
	Total Resource Benefit/Cost Ratio	0.28	2.34

* 2018 Idaho Rider charges of $13,264 were reversed and charged to the Oregon Rider in March 2019.

Description

The Multifamily Energy Savings Program provides for the direct installation of energy-saving products in multi-family dwellings with electrically heated water in Idaho and Oregon. These energy-saving products are installed by an insured contractor hired by Idaho Power at no cost to the property owner, manager, or tenant. Idaho Power defines a multi-family dwelling as a building consisting of five or more rental units. The products installed are: ENERGY STAR® LED lightbulbs, high-efficiency TSV showerheads, kitchen and bathroom faucet aerators, and water heater pipe insulation.

To ensure energy savings and eligibility, Idaho Power pre-approves each building and the contractor who will install the energy efficiency measures. Upon approval, the no-cost, direct installation is scheduled, and a tailored door hanger is placed on tenants' apartments to explain the schedule and process of the installation.

Program Activities

Due to COVID-19 restrictions, Idaho Power suspended in-home activity on March 16, 2020, and it remained suspended through the end of the year. This resulted in a substantial decrease both in the number of units completed and energy savings.

Prior to the suspension, the company completed four projects (33 apartments) in Idaho. No projects were completed in Oregon.

The company is still accepting applications and has identified apartment complex owners/managers who are interested in participating in the program. Once COVID-19 restrictions are lifted owners/managers will be contacted and installs will be scheduled.

Marketing Activities

Idaho Power continued to run three alternating, clickable ads on its Landlord/Property Manager Requests web page that linked users to the Multifamily Energy Savings Program web page.

A marketing video placed at the top of the Multifamily Energy Savings Program web page also continued to run in 2020. The video explains the eligibility requirements, the no-cost direct-install measures available to landlords/tenants, the installation process, and the potential for residents to save on their monthly bills and to be more comfortable in their homes. At the end of the video, company contact information is provided.

In January, Idaho Power placed a print ad promoting the program in the *Idaho Business Review's* special *Multifamily Residential* section. The ad featured updated imagery to match the refreshed look of the company's energy efficiency marketing collateral.

Idaho Power communicated with participants before and after installation. In addition to the pre-installation door hanger, the contractor left materials to explain the new energy efficiency measures and to provide contact information should the tenant have any questions. Lastly, customers were asked to participate in a survey, rating their satisfaction for installed measures and overall product and program satisfaction. The company uses these responses to help improve future marketing activities.

Cost-Effectiveness

The RTF provides deemed savings for direct-install LED lightbulbs, low-flow showerheads, and faucet aerators. The LED lightbulbs have a deemed savings value of 16.17 to 83.87 kWh per year depending on the type and lumens of the lightbulb and the location of the lightbulb installation. The integrated 1.75 gpm showerheads with TSV were installed in most apartments. These showerheads save 197.80 kWh per year. Faucet aerators installed in a kitchen have a deemed annual savings value of 43.94 kWh while faucet aerators installed in a bathroom save 47.88 kWh per year.

The UCT and TRC ratios for the program are 0.14 and 0.28, respectively. The program's cost-effectiveness was impacted by the suspension of in-home visits due to COVID-19. In an effort to improve the accuracy of the data being collected, Idaho Power has modified the installation worksheets to be used in 2021. The company worked with installers to ensure the collection of the additional information would not be a burden to them when the direct installs resume. The updated installation worksheets will help Idaho Power calculate the lighting savings for each project based on information around the existing lamp and the location of the installation rather than using a deemed savings value from the RTF.

For detailed cost-effectiveness assumptions, metrics, and sources, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction

Idaho Power included a satisfaction survey with the leave-behind materials in the 33 apartments. Both an online and mail-in option were offered but no surveys were returned in 2020.

2021 Program and Marketing Strategies

Idaho Power will resume pursuing energy-efficient direct-installation projects in multi-family dwellings throughout its service area when the program activities can be completed in a safe manner for both customers and contractors in consideration of COVID-19 protocols.

Once installations resume, Idaho Power will continue to use informative notifications, pre-installation door hangers, and post-installation informational marketing pieces, as well as survey cards for scheduled projects. The company will also advertise in industry publications to encourage property owner/manager engagement and increase program visibility.

Oregon Residential Weatherization

	2020	2019
Participation and Savings		
Participants (audits/projects)	0	8
Energy Savings (kWh)	0	2,069
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$0	$0
Oregon Energy Efficiency Rider	$5,313	$5,982
Idaho Power Funds	$0	$0
Total Program Costs—All Sources	$5,313	$5,982
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	n/a	n/a
Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	n/a	n/a
Total Resource Benefit/Cost Ratio	n/a	n/a

Description

Idaho Power offers free energy audits for electrically heated customer homes within the Oregon service area. This is a program required by Oregon Revised Statute (ORS) 469.633 and has been offered under Oregon Tariff Schedule 78 since 1980. Upon request, an energy audit contractor hired by Idaho Power visits the customer's home to perform a basic energy audit and to analyze it for energy efficiency opportunities. An estimate of costs and savings for recommended energy-efficient measures is given to the customer. Customers may choose either a cash incentive or a 6.5%-interest loan for a portion of the costs for weatherization measures.

Program Activities

Due to COVID-19 restrictions, Idaho Power suspended in-home activity on March 16, 2020, and it remained suspended through the end of 2020, which resulted in a reduction in program participation.

In 2020, two customers returned a card from the program brochure indicating interest in the program. Because the company received these cards after in-home activity had been suspended, these audits were not performed. The energy advisor notified these customers of the suspension and let them know they would receive a call as soon as in-home activity was reinstated.

Marketing Activities

In October, Idaho Power sent its Oregon residential customers an informational brochure about energy audits and home weatherization financing.

Cost-Effectiveness

The Oregon Residential Weatherization program is a statutory program described in Oregon Schedule 78, which includes a cost-effectiveness definition of this program. Pages three and four of Schedule 78 identify the measures determined to be cost-effective and the specified measure life cycles for each. This schedule also includes the cost-effective limit (CEL) for measure lives of seven, 15, 25, and 30 years.

2021 Program and Marketing Strategies

Once COVID-19 safety protocols allow in-home activity to resume, Idaho Power will market the program to customers with a bill insert/brochure.

Rebate Advantage

		2020	2019
Participation and Savings			
	Participants (participants)	116	109
	Energy Savings (kWh)	366,678	353,615
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$174,670	$148,220
	Oregon Energy Efficiency Rider	$4,897	$8,529
	Idaho Power Funds	$855	$0
	Total Program Costs—All Sources	$180,422	$156,748
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.031	$0.023
	Total Resource Levelized Cost ($/kWh)	$0.075	$0.052
Benefit/Cost Ratios*			
	Utility Benefit/Cost Ratio	1.69	1.82
	Total Resource Benefit/Cost Ratio	0.98	1.14

*2020 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 1.73 and 0.99, respectively.

Description

Initiated in 2003, the Rebate Advantage program helps Idaho Power customers in Idaho and Oregon with the initial costs associated with purchasing new, energy-efficient, ENERGY STAR® qualified manufactured homes. This enables the homebuyer to enjoy the long-term benefit of lower electric bills and greater comfort provided by the home. The program also provides an incentive to the sales consultants to encourage more sales of ENERGY STAR® qualified homes and more discussion of energy efficiency with their customers during the sales process.

In addition to offering financial incentives, the Rebate Advantage program educates manufactured home buyers and retailers about the benefits of owning energy-efficient models. The Northwest Energy-Efficient Manufactured Home Program™ (NEEM), a consortium of manufacturers and state energy offices in the Northwest, establishes quality control (QC) and energy efficiency specifications for qualified manufactured homes and tracks their production and on-site performance. NEEM adds the classification Eco-Rated ™ for homes that are produced by factories that have demonstrated a strong commitment to minimizing environmental impacts from the construction process.

In 2019, NEEM created the most stringent manufactured home energy standard in the country, the ENERGY STAR® with NEEM 2.0 specification, which was later renamed the ENERGY STAR® with NEEM+ certification. NEEM+ standards are engineered to save approximately 30% more energy than ENERGY STAR® standards. As a result, not only does NEEM+ deliver the highest possible energy savings, it delivers the highest level of overall comfort. These homes are built to specifications tailored to the Northwest climate.

Program Activities

In 2020, for each home sold, the residential customer incentive for this program was $1,000 and the sales staff incentive was $200. Idaho Power paid 116 incentives on new manufactured homes, which accounted for 366,678 annual kWh savings. This included 114 homes sited in Idaho and two sited in

Oregon. Of the 116 homes in the program, 32 were NEEM+, 79 were ENERGY STAR, and five were Eco-Rated.

Marketing Activities

Idaho Power continued to support manufactured home dealerships by providing them with updated program marketing collateral.

In April and December, Idaho Power promoted the Rebate Advantage program with a bill insert sent to 321,081 and 307,578 customers, respectively. The insert had information about the potential energy and cost savings and referred customers to the program website.

In October, the company garnered 15,056 impressions on social media with a Rebate Advantage program promotion.

Cost-Effectiveness

In 2020, Idaho Power used the same savings and assumptions source as were used in 2019. In May 2020, the RTF updated savings for new construction manufactured homes. First, RTF removed the savings designation for Eco-Rated™ certified homes. The Eco-Rated certification is a green home program that signifies the production facility the homes are produced in demonstrate a high commitment to managing the environmental impacts during the building process. However, the energy savings associated with these homes are the same as those built to ENERGY STAR standards; therefore, the RTF voted to combine the savings for Eco-Rated and ENERGY STAR manufactured homes. Secondly, the RTF removed the assumptions related to NEBs. The previous assumptions were based on the reduction of supplemental fuel use which they found no evidence of occurring. Finally, when other assumptions around heating system type, lighting, and other appliances were updated, the average annual savings per home declined by 10%. Idaho Power will begin using RTF workbook version 4.1 in 2021.

The UCT and TRC for the program is 1.69 and 0.98 respectively. If the amount incurred for the 2020 evaluation was removed from the program's cost-effectiveness, the UCT would be 1.73 while the TRC would be 0.99.

For detailed information for all measures within the Rebate Advantage program, see *Supplement 1: Cost-Effectiveness*.

Evaluation

In 2020, Idaho Power contracted with ADM Associates, Inc. to conduct an impact evaluation of 2019 reported savings. The evaluation determined that Idaho Power applied savings correctly and documented project information accurately. The impact evaluation reviewed the program database and conducted a desk review of sampled projects.

The evaluator calculated a realization rate of 100% for the 2019 program year and made no recommendations for future program changes. See the complete impact evaluation report in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

Idaho Power plans to explore the cost effectiveness of adding an incentive tier for the ENERGY STAR with NEEM+ certification homes to help promote the sales of these higher efficiency homes. In addition, NEEM will be exploring whether to end the Eco-Rated™ homes classification.

Idaho Power will continue to support manufactured home dealers by providing them with program materials. The company will also distribute a bill insert to Idaho and Oregon customers and explore digital advertising to promote the program to potential manufactured home buyers.

Residential New Construction Pilot Program

		2020	2019
Participation and Savings			
	Participants (participants)	248	322
	Energy Savings (kWh)	649,522	774,597
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$471,542	$534,118
	Oregon Energy Efficiency Rider	$0	$0
	Idaho Power Funds	$1,962	$0
	Total Program Costs—All Sources	$473,504	$534,118
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.044	$0.035
	Total Resource Levelized Cost ($/kWh)	$0.081	$0.092
Benefit/Cost Ratios*			
	Utility Benefit/Cost Ratio	1.54	1.58
	Total Resource Benefit/Cost Ratio	1.20	0.83

* 2019 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 1.66 and 0.85, respectively.

Description

The Residential New Construction Pilot Program launched in March 2018, replacing the ENERGY STAR® Homes Northwest Program. The Residential New Construction Pilot Program offers builders a cash incentive to build energy-efficient, single-family, all-electric homes that use heat pump technology in Idaho Power's Idaho service area. These homes must meet strict requirements that make them 10%, 15%, or 20% more energy efficient than homes built to standard state energy code.

The RTF and NEEA have created specific modeling requirements and program guidelines to ensure the program provides reliable energy savings for utilities across the northwest. These homes feature high performance HVAC systems, high-efficiency windows, increased insulation values, and tighter building shells to improve comfort and save energy. Idaho Power claims energy savings based on each home's individual modeled savings.

Builders must contract with a Residential Energy Services Network (RESNET)-certified rater to ensure the home design will meet program qualifications. The rater will work with the builder from the design stages through project completion; perform the required energy modeling using REM/Rate modeling software; perform site inspections and tests; and enter, maintain, and submit all required technical documentation in the REM/Rate modeling software and the AXIS database. This data is used to determine the energy savings and the percent above code information needed to certify the home. NEEA maintains the regional AXIS database.

Program Activities

In the first quarter of 2020, Idaho Power instituted a three-tier incentive structure for the Residential New Construction Pilot Program. Prior to that program update, a flat incentive of $1,500 was paid to all homes that achieved 20% above code or higher. Homes approved for the program prior to December 31, 2019 were grandfathered under the previous incentive structure.

The new tiered incentives are:

- 10 to 14.99% above code: $1,200 incentive
- 15 to 19.99% above code: $1,500 incentive
- 20% or more above code: $2,000 incentive

Idaho Power updated the application form so customers could easily fill it out and submit it online.

In 2020, the company paid incentives for 248 newly constructed energy-efficient homes in Idaho, and the homes accounted for 649,522 kWh of energy savings.

Idaho Power also reviewed the following recommendations from the 2019 impact evaluation:

- *Review the tracking database regularly to ensure that all parameters have reasonable and accurate values*. Idaho Power reviewed the database regularly before the evaluation and will continue to do so.
- *Clarify on the application form that builders with multiple units may submit only one application*. Idaho Power did not adopt this recommendation in 2020. Although it is not specifically written on the application, the program raters instruct their builders to fill out one application form and then list multiple homes on a separate sheet. Idaho Power is not aware of any situation where a builder has been confused. However, the next time the application is updated, Idaho Power will make this small update.
- *Modify the name of the application form PDF on the program website from "termsConditions.pdf" to something more specific*. Idaho Power adopted this recommendation and updated the PDF name to be more specific: IdahoPowerResNewConstApplication.pdf.
- Clearly document the sources for the program's baseline energy standards. The evaluator made this recommendation because they had a hard time obtaining information on the baseline heating systems (capacities, efficiencies, etc.) from the REM/Rate modeling software or AXIS database. Idaho Power is not able to change this because the software is provided from a third party. Upon speaking with the third-party software provider, the evaluator was able to attain the information they needed for their evaluation.
- *If the pilot becomes a fully-fledged program, add to the program marketing plan document to make it a true program handbook*. Idaho Power will add a complete program marketing plan document to the program handbook.
- *Ensure all hyperlinks on marketing materials work*. Idaho Power adopted this recommendation and checked all hyperlinks to ensure they were actively connected to the Residential New Construction webpage.
- *Track the number of clicks for digital ads*. Idaho Power already performs this recommendation.
- *Add content to program website*. The company regularly updates website content to keep it current and will consider adding success stories.
- *Add a URL to the program brochure that links builders with specific contact information for the raters*. Idaho Power has the RESNET-certified HERS rater contact info on the webpage. The webpage URL is listed on the program brochure.

Marketing Activities

Idaho Power maintained a strong presence in the building industry by supporting the Idaho Building Contractors Association (IBCA) and several of its local affiliates throughout the company's service area in 2020. The company participated in the IBCA Winter Board Meeting, but due to COVID-19 restrictions, the company was unable to participate in the IBCA Fall Board Meeting, the Building Contractors Association of Southwestern Idaho (BCASWI) builder's expo, the Snake River Valley

Building Contractors Association (SRVBCA) builder's expo, and the BCASWI and SRVBCA scholarship golf tournaments as in past years.

Idaho Power supported Parade of Homes events with full-page ads in the *Parade of Homes* magazines of the following BCAs: The Magic Valley Builders Association (MVBA), the BCASWI, the SRVBCA, and the Building Contractors Association of Southeast Idaho (BCASEI). A print ad appeared in the *Idaho Business Review's Residential Contractor's Special Edition* in June as well as the March issue of *Boise Lifestyle* and *Meridian Lifestyle* magazines that highlighted top home builders. A digital app ad and company listing was also included as part of the advertising package with the MVBA.

The company sent a bill insert to 309,554 Idaho customers in May to promote the program. The program brochure was updated to show the new tiered incentive rates.

Cost-Effectiveness

The savings for the 248 energy-modeled homes average 2,619 kWh per home depending on which efficiency upgrades were included to meet the tiered over code program requirement. This was an increase over the average energy-modeled savings of 2,389 kWh per home in 2019.

While savings are custom calculated for each of the 248 modeled homes, the incremental costs over a code-built home are difficult to determine. The RTF's single-family new construction workbook was used as a proxy for the incremental costs and NEBs.

The UCT and TRC ratios for the program are 1.54 and 1.20 respectively.

For more detailed information about the cost-effectiveness savings and assumptions, see *Supplement 1: Cost-Effectiveness*.

2021 Program and Marketing Strategies

Idaho Power plans to continue to promote this program to Idaho builders and new home buyers. These marketing efforts include ads in *Parade of Homes* magazines for the BCASWI, SRVBCA, MVBA, and the BCASEI. A bill insert is planned for spring 2021. The company also plans to continue supporting the general events and activities of the IBCA and its local affiliates. Social media and other advertising will be considered based on past effectiveness.

NEEA made the decision to stop sponsoring the regional utility performance path homes programs but will still maintain the regional AXIS database. Idaho Power will contract with Washington State University's Energy Program for the program file and field QAs beginning sometime in first quarter of 2021.

The 2020 Idaho Legislature adopted a more stringent energy code and, as a result, Idaho Residential Energy code will be moving up from the 2012 IECC with state specific amendments to the 2018 IECC with state-specific amendments in January of 2021.

Shade Tree Project

	2020	2019
Participation and Savings		
Participants (trees)	0	2,063
Energy Savings (kWh)*	52,662	35,727
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$27,652	$147,750
Oregon Energy Efficiency Rider	$0	$0
Idaho Power Funds	$838	$0
Total Program Costs—All Sources	$28,490	$147,750
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	n/a	$0.235
Total Resource Levelized Cost ($/kWh)	n/a	$0.235
Benefit/Cost Ratios**		
Utility Benefit/Cost Ratio	n/a	1.09
Total Resource Benefit/Cost Ratio	n/a	1.16

* Incremental savings for trees planted between 2013–2016 not claimed in previous years.

** No trees distributed in 2021 due to COVID-19 restrictions. Cost-effectiveness ratios have not been calculated.

Description

Idaho Power's Shade Tree Project operates in a small geographic area each spring and fall, offering no-cost shade trees to Idaho residential customers. Participants enroll using the online Energy-Saving Trees tool and pick up their tree at specific events. Unclaimed trees are donated to cities, schools, and other non-profit organizations.

Using the online enrollment tool, participants locate their home on a map, select from a list of available trees, and evaluate the potential energy savings associated with planting in different locations. During enrollment, participants learn how trees planted to the west and east save more energy over time than trees planted to the south and north.

Ensuring the tree is planted properly helps it grow to provide maximum energy savings. At the tree pickup events, participants receive additional education on where to plant trees for maximum energy savings and other tree care guidance from local experts. These local specialists include city arborists from participating municipalities, Idaho Power utility arborists, county master gardeners, and CSI horticulture students.

Each fall, Idaho Power sends participants from the previous two offerings a newsletter filled with reminders on proper tree care and links to resources, such as tree care classes and educational opportunities in the region. This newsletter was developed after the 2015 field audits identified common customer tree care questions and concerns.

According to the DOE, a well-placed shade tree can reduce energy used for summer cooling by 15% or more. Utility programs throughout the country report high customer satisfaction with shade tree programs and an enhanced public image for the utility related to sustainability and environmental stewardship. Other utilities report energy savings between 40 kWh per year (coastal climate, San Diego) and over 200 kWh per year (Phoenix) per tree planted.

To be successful, trees should be planted to maximize energy savings and ensure survivability. Two technological developments in urban forestry—the state sponsored Treasure Valley Urban Tree Canopy Assessment and the Arbor Day Foundation's Energy-Saving Trees tool—provide Idaho Power with the information to facilitate a shade tree project.

Program Activities

Idaho Power's first 2020 Shade Tree Project event was scheduled for late April. Due to COVID-19 restrictions and to ensure the safety of customers, employees, and volunteers, the spring event was cancelled. Because the pandemic remained ongoing in the fall, Idaho Power also cancelled the event scheduled to occur in October. The company researched alternative options for holding the Shade Tree Project events but determined those options couldn't be carried out consistent with COVID-19 safety protocols, or would have incurred additional costs, making the program not cost-effective. Customers were notified of the cancellation through the Shade Tree Project voicemail and an alert that was placed on the Idaho Power Shade Tree Project home page.

Marketing Activities

Because both spring and fall Shade Tree Project offerings were cancelled, the company made every effort to notify customers of the change and to communicate tree-related information. Idaho Power added a cancellation alert to its program homepage. The company also published shade tree-related content on its social media channels and shared content from the company's partners who were still able to provide trees locally, including the City of Boise's City of Trees Challenge. In November 2020, a newsletter was sent to last season's program participants. Instead of promoting the Shade Tree Project in *Home Energy Reports*, the reports featured general tips for planting shade trees.

Cost-Effectiveness

Due to COVID-19, Idaho Power's Shade Tree project events were canceled for 2020. Since no trees were distributed, the cost-effectiveness for the program has not been calculated since there is no savings benefit associated with the costs incurred in 2020. However, Idaho Power will report 52,662 kWh of savings for trees planted between 2013 and 2016. Unlike traditional energy savings measures in which the annual savings remain flat throughout the measure life and only first year savings are reported, for trees, the savings grow as the tree grows. The 52,662 kWh represents the incremental claimable annual savings not claimed in previous years.

For the Shade Tree Project, Idaho Power utilizes the Arbor Day Foundation's software, which calculates energy savings and other non-energy impacts based on tree species and orientation/distance from the home. This tool, i-Tree software, estimates these benefits for years five, 10, 15, and 20 after the tree planting year. However, the savings from the tool assumes each tree is planted as planned and does not take into account survivorship of the trees. Idaho Power contracted with DNV GL to develop a model to calculate average values per tree using the tool data and determined a realization rate based on the survival rate. The calculator was used to determine the 52,662 kWh of incremental claimable savings for 2020.

2021 Program and Marketing Strategies

Idaho Power plans to continue the Shade Tree Project in 2021, returning it to the Treasure Valley in the spring and the Magic Valley in the fall. To ensure the safety of customers and employees, the enrollment process will remain the same, but the trees will be shipped directly to customers' homes. Arbor Day will manage shipping in the spring and fall which will eliminate the need for customers to attend an event to collect their trees.

Idaho Power will continue to market the program through direct-mail, focusing on customers identified as living in newly constructed homes and those identified using the Urban Tree Canopy Assessment tool in the Treasure Valley. The program will be promoted in the April 2021 *Home Energy Report*. In addition, Idaho Power maintains a wait list of customers who were unable to enroll because previous offerings were full. Idaho Power will reach out to these customers through direct-mail or email for the 2021 offerings. Idaho Power will continue to leverage allied interest groups and use social media and boosted Facebook posts if enrollment response rates decline.

Simple Steps, Smart Savings™

		2020	2019
Participation and Savings			
	Participants (products)	6,894	5,729
	Energy Savings (kWh)	148,404	271,452
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$93,865	$87,599
	Oregon Energy Efficiency Rider	$3,539	$2,900
	Idaho Power Funds	$1,737	$0
	Total Program Costs—All Sources	$99,141	$90,499
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.073	$0.032
	Total Resource Levelized Cost ($/kWh)	$0.073	$0.043
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	0.78	1.40
	Total Resource Benefit/Cost Ratio	3.24	5.56

Description

Initiated in 2015, the Simple Steps, Smart Savings™ program is designed to increase sales of qualified energy-efficient appliances by encouraging customers to purchase energy-efficient clothes washers by offering an incentive on select products at the point of purchase.

Idaho Power and other regional utilities participate in the program, which is managed by a third-party contractor. Idaho Power pays the contractor a fixed amount for each kWh of energy savings achieved. A portion of the funding Idaho Power provides is used to buy down the price of the product, and a portion is applied to program administration and marketing. The funding can also be used for retailer promotions.

Customer rewards may include, but are not limited to, retailer gift cards, free related products, or reduced pricing. Each promotion is available in Idaho and Oregon.

BPA's Simple Steps program ended on September 30, 2020. The Simple Steps program was a combination of lighting sales along with showerhead and appliances sales. The decision to end the program was made because the lighting market transformed to high-efficiency lightbulbs. With most of the Simple Steps sales coming from lighting products, the program could not be cost-effectively maintained by just showerhead and appliances sales.

Idaho Power continued participation in the Simple Steps program until September 30. Idaho Power also participated in the BPA-sponsored, Simple Steps, Smart Savings™ energy-efficient lighting program, which is discussed further in the Energy Efficient Lighting program section of this report.

Program Activities

In the nine months the program was active, Idaho Power provided funding for qualified ENERGY STAR® rated clothes washers and high-efficiency showerheads. Idaho Power worked with Sears Hometown, RC Willey, and Best Buy to reduce the cost of select washers by $25. In 2020, customers

purchased 392 units, compared to 761 in 2019. The decrease in participation was likely due to restrictions related to COVID-19 as stores temporarily closed or required appointments to look at products.

Idaho Power worked with six participating retailers on the high-efficiency showerhead promotion to reduce the price as follows: $5-$6 for 1.5 and 1.75 gpm units and $2 for 2.0 gpm units. Customers purchased 6,502 qualified showerheads, as compared to 4,968 in 2019. Of those sales, 12% were 1.50 gpm, 5% were 1.75 gpm, and 83% were 2.0 gpm showerheads.

Marketing Activities

To help support the appliance promotions, static clings were displayed on all qualifying units. These pieces informed customers about the promotion and the incentive they would receive. Monthly visits to check stock, point-of-purchase signs, and displays were suspended from March 26 until September 1, when field staff returned to stores to remove displays and remind store staff and management of the program end date.

Idaho Power posted information about the appliance promotions on its Appliances web page until September 30.

Cost-Effectiveness

In 2019, the RTF reviewed and updated the savings assumptions for showerheads. As with past RTF workbooks, Idaho Power adjusts the assumptions regarding electric water heating saturation from the regional average of 60% to the company's average of 49% from the 2016 residential end-use study. Previously, the annual savings for showerheads ranged between 15 to 63 kWh with the electric water heat saturation adjustment. Based on the new workbook, showerhead annual savings are now between 5 and 69 kWh. While overall showerhead sales increased by 31% between 2019 and 2020, savings for showerheads decreased by 51%. This is largely due to increase of sales of the 2.0 gpm showerhead which made up 47% of sales 2019 and 83% in 2020. The savings for this showerhead type fell by 63% which impacted the overall cost-effectiveness of the program. The parameters that impacted the savings for showerheads include assumptions regarding the market baseline, in-situ flow rates, and number of showers.

For clothes washers, Idaho Power applied the per-unit savings from the approved BPA unit energy savings (UES) Measure List. While BPA applies the annual generator busbar savings of 153 kWh per unit, Idaho Power applies the annual site savings of 142 kWh per unit. This difference is due to the different line losses applied by Idaho Power and BPA. For the NEBs, Idaho Power used RTF's clothes washer workbook to determine the water and wastewater savings for the ENERGY STAR clothes washers.

The UCT and TRC ratios for the program are 0.78 and 3.24, respectively. The cost-effectiveness was largely impacted by the decrease of per unit showerheads savings. The RTF reviewed the showerhead savings again in 2020 and decided to deactivate the measure due to the market transformation in the region. Due to this and the other changes impacting the lighting portion of the Simple Steps promotion, BPA decided to sunset the offering on September 30, 2020.

For detailed information for all measures within the Simple Steps, Smart Savings™ program, see *Supplement 1: Cost-Effectiveness*.

2021 Program and Marketing Strategies

Idaho Power is in the process of trying to find a vendor to offer a new program to provide incentives for select ENERGY STAR rated appliances. Because the RTF deactivated the showerhead workbook,

Idaho Power is unable to claim savings and provide an incentive for the purchase of high-efficiency showerheads. As a result, Idaho Power will not be including showerheads in any buydown promotions.

Weatherization Assistance for Qualified Customers

	2020*	2019
Participation and Savings		
Participants (homes/non-profits)	115	197
Energy Savings (kWh)	218,611	649,299
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$0	$0
Oregon Energy Efficiency Rider	$0	$0
Idaho Power Funds	$1,385,577	$1,303,727
Total Program Costs—All Sources*	$1,385,577	$1,303,727
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.244	$0.114
Total Resource Levelized Cost ($/kWh)	$0.353	$0.171
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	0.20	0.35
Total Resource Benefit/Cost Ratio	0.33	0.43

* 2020 Total Program Costs includes accounting accruals and reversals associated with unspent dollars carried over into the next year. These accruals and reversals have been removed from the cost-effectiveness and levelized cost calculations.

Description

The WAQC program provides financial assistance to regional CAP agencies in Idaho Power's service area. This assistance helps fund weatherization costs of electrically heated homes occupied by qualified customers who have limited incomes. Weatherization improvements enable residents to maintain a more comfortable, safe, and energy-efficient home while reducing their monthly electricity consumption. Improvements are available at no cost to qualified customers who own or rent their homes. These customers also receive educational materials and ideas on using energy wisely in their homes. Local CAP agencies determine participant eligibility according to federal and state guidelines. The WAQC program also provides limited funds to weatherize buildings occupied by non-profit organizations that serve primarily special-needs populations, regardless of heating source, with priority given to the electrically heated.

In 1989, Idaho Power began offering weatherization assistance in conjunction with the State of Idaho Weatherization Assistance Program (WAP). In Oregon, Idaho Power offers weatherization assistance in conjunction with the State of Oregon WAP. This allows CAP agencies to combine Idaho Power funds with federal weatherization funds to serve more customers with special needs in electrically heated homes.

Idaho Power has an agreement with each CAP agency in its service area for the WAQC program that specifies the funding allotment, billing requirements, and program guidelines. Currently, Idaho Power oversees the program in Idaho through five regional CAP agencies: Eastern Idaho Community Action Partnership (EICAP), El Ada Community Action Partnership (EL ADA), Metro Community Services (Metro Community), South Central Community Action Partnership (SCCAP), and Southeastern Idaho Community Action Agency (SEICAA). In Oregon, Community Connection of Northeast Oregon, Inc. (CCNO), and Community in Action (CINA) provide weatherization services for qualified customers.

The Idaho Department of Health and Welfare (IDHW) uses the DOE-approved energy audit program (EA5) for the Idaho WAP and, therefore, the Idaho CAP agencies use the EA5.

Annually, Idaho Power requires verification of approximately 10% of the homes weatherized under the WAQC program. This is done through two methods. The first method uses Idaho's and Oregon's state monitoring processes for weatherized homes. The state hires the quality-control inspector who ensures measures were installed to DOE and state WAP specifications. Utility representatives, weatherization personnel from the CAP agencies, CAPAI, and a Building Performance Institute (BPI) certified QC inspector review homes weatherized by each of the CAP agencies.

For the second method, Idaho Power contracts with two companies—Kent Kearns Enterprises and Greenback Home Solutions, LLC—that employ building performance specialists to verify installed measures in customer homes. Kent Kearns Enterprises verifies homes weatherized for the WAQC program in Idaho Power's eastern and southern Idaho regions. Greenback Home Solutions verifies weatherization services provided through the WAQC program in the Capital and Canyon–West regions of Idaho. After these companies verify installed measures, any required follow-up is done by CAP agency personnel.

Idaho Power reports the activities related to the WAQC program as set forth below in compliance with IPUC Order No. 29505, as updated in Case No. IPC-E-16-30, Order No. 33702 and consolidates the WAQC Annual Report with Idaho Power's *Demand-Side Management Annual Report* each year.

Program Activities

Weatherized Homes and Non-Profit Buildings by County

In 2020, Idaho Power made $1,369,325 available to Idaho CAP agencies. Of the funds provided, $720,457 were paid to Idaho CAP agencies, while $648,868 were accrued for future funding. This larger carryover was caused by COVID-19 in-home activity restrictions limiting the number of homes CAP agencies weatherized. Of the funds paid in 2020, $654,961 directly funded audits, energy efficiency measures, and health and safety measures for qualified customers' homes (production costs) in Idaho, and $65,496 funded administration costs to Idaho CAP agencies for those homes weatherized.

In 2020, Idaho Power funds provided for the weatherization of 115 homes in Idaho, none in Oregon, and no non-profit buildings in Idaho. Table 12 shows each CAP agency, the number of homes weatherized, production costs, the average cost per home, administration payments, and total payments per county made by Idaho Power.

Table 12. WAQC activities and Idaho Power expenditures by agency and county in 2020

Agency/County	Number of Homes	Production Cost	Average Cost	Administration Payment to Agency	Total Payment
Idaho Homes					
EICAP					
Lemhi	0	$ 0	$ 0	$ 0	$ 0
Agency Total	**0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
EL ADA					
Ada	48	270,318	5,632	27,032	297,350
Elmore	8	54,716	6,839	5,472	60,187
Owyhee	11	63,107	5,737	6,311	69,417
Agency Total	**67**	**$ 388,141**	**$**	**$ 38,814**	**$ 426,955**
Metro Community Services					
Boise	1	6,504	6,504	650	7,155
Canyon	10	70,738	7,074	7,074	77,812
Gem	4	32,430	8,107	3,243	35,673
Payette	4	26,864	6,716	2,686	29,551

Agency/County	Number of Homes	Production Cost	Average Cost	Administration Payment to Agency	Total Payment
Washington	1	10,037	10,037	1,004	11,040
Agency Total	**20**	**$ 146,573**	**$**	**$ 14,657**	**$ 161,230**
SCCAP					
Blaine	3	20,894	6,965	2,089	22,984
Cassia	1	4,929	4,929	493	5,422
Jerome	4	26,786	6,696	2,679	29,464
Lincoln	1	9,274	9,274	927	10,202
Twin Falls	6	28,067	4,678	2,807	30,874
Agency Total	**15**	**$ 89,950**	**$**	**$ 8,995**	**$ 98,945**
SEICAA					
Bannock	7	19,489	2,784	1,949	21,438
Bingham	5	7,117	1,423	712	7,829
Power	1	3,690	3,690	369	4,059
Agency Total	13	**$ 30,296**	**$**	**$ 3,030**	**$ 33,326**
Total Idaho Homes	115	**$ 654,961**	**$**	**$ 65,496**	**$ 720,457**
Non-Profit Buildings					
Canyon	1	10,572	10,572	1,057	11,630
Lincoln	1	14,993	14,993	1,499	16,492
Payette	1	12,555	12,555	1,256	13,811
Twin Falls	1	13,924	13,924	1,392	15,316
Total Non-Profit Buildings	**0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
Oregon Homes					
CCNO					
Agency Total	**0**	**$ 0**	**0**	**$ 0**	**$ 0**
CINA					
Agency Total	**0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
Total Oregon Homes	**0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**
Total Program	**115**	**$ 654,961**	**$**	**$ 65,496**	**$ 720,457**

Note: Dollars are rounded.

The base funding for Idaho CAP agencies is $1,212,534 annually, which does not include carryover from the previous year. Idaho Power's agreements with CAP agencies include a provision that identifies a maximum annual average cost per home up to a dollar amount specified in the agreement between each CAP agency and Idaho Power. The intent of the maximum annual average cost allows the CAP agency flexibility to service some homes with greater or fewer weatherization needs. It also provides a monitoring tool for Idaho Power to forecast year-end outcomes. The average cost per home weatherized is calculated by dividing the total annual Idaho Power production cost of homes weatherized by the total number of homes weatherized that the CAP agencies billed to Idaho Power during the year. The maximum annual average cost per home in the 2020 agreement was $6,000. In 2020, Idaho CAP agencies had a combined average cost per home weatherized of $5,695.

There is no maximum annual average cost for the weatherization of buildings occupied by non-profit agencies.

CAP agency administration fees are equal to 10% of Idaho Power's per-job production costs. The average administration cost paid to agencies per Idaho home weatherized in 2020 was $570. Not included in this report's tables are additional Idaho Power staff labor, marketing, home verification,

and support costs for the WAQC program totaling $50,028 for 2020. These expenses were in addition to the WAQC program funding requirements in Idaho specified in IPUC Order No. 29505.

In compliance with IPUC Order No. 29505, WAQC program funds are tracked separately, with unspent funds carried over and made available to Idaho CAP agencies in the following year. In 2020, $156,791 in unspent funds from 2019 were made available for expenditures in Idaho. Table 13 details the funding base and available funds from 2019 and the total amount of 2020 spending.

Table 13. WAQC base funding and funds made available in 2020

Agency	2020 Base	Available Funds from 2019	Total 2020 Allotment	2020 Spending
Idaho				
EICAP	$ 12,788	$ 0	$ 12,788	$ 0
EL ADA	568,479	0	568,479	426,955
Metro Community Services	302,259	0	302,259	161,230
SCCAP	167,405	55,690	223,095	98,945
SEICAA	111,603	71,709	183,312	33,326
Non-profit buildings	50,000	29,391	79,391	0
Idaho Total	**$ 1,212,534**	**$ 156,791**	**$ 1,369,325**	**$ 720,457**

Note: Dollars are rounded.

To help keep weatherization crews and customers safe from exposure to COVID-19, CAP Agencies temporarily suspended weatherization activities for Idaho Power's WAQC program in March 2020. In 2020, neither CAP Agencies nor Idaho Power monitored weatherized homes and no visits were made to customer homes through the state monitoring system. Because only 10 homes were weatherized by March, Idaho Power did not have the opportunity to have any of the homes verified through its home verification system.

The DOE also had CAP Agency Weatherization adjust services and follow Centers for Disease Control (CDC) and DOE guidelines if individual agencies did not suspend services. Some CAP agencies began certain weatherization activities under CDC and DOE guidelines in early summer. Because weatherization personnel provided services for the state WAPs between March and December, Idaho Power allowed CAP agencies within its service area to leverage state and federal funding along with its funding.

Because COVID-19 restrictions caused various weatherization departments to lose months of work, production schedules were lower than normal, and more Idaho Power funding was not spent. Unspent funding will be carried over and used for weatherization services in 2021.

Weatherization Measures Installed

Table 14 details home counts for which Idaho Power paid all or a portion of each measure's cost during 2020. The home counts column shows the number of times any percentage of that measure was billed to Idaho Power during the year. If totaled, measure counts would be higher than total homes weatherized because the number of measures installed in each home varies.

WAQC and other state WAPs nationwide are whole-house programs that offer several measures that have costs but do not necessarily save energy, or for which the savings cannot be measured. Included in this category, are health and safety measures and home energy audits. Health and safety measures are necessary to ensure weatherization activities do not cause unsafe situations in a customer's home or compromise a home's existing indoor air quality (IAQ). Idaho Power contributes funding for the

installation of items that do not save energy, such as smoke and carbon monoxide detectors, vapor barriers, electric panel upgrades, floor registers, boots, kitchen range fans, and venting of bath and laundry areas. While these items increase health, safety, and comfort and are required for certain energy-saving measures to work properly, they increase costs of the job.

Table 14. WAQC summary of measures installed in 2020

	Counts		Production Costs
Idaho Homes			
Audit	85	$	9,129
Ceiling Insulation	39		38,046
CFLs/LED Bulbs	18		996
Doors	58		43,241
Ducts	16		9,483
Floor Insulation	23		29,528
Furnace Repair	2		549
Furnace Replacement	86		337,409
Health and Safety	21		15,410
Infiltration	79		8,628
Other	3		11,990
Pipes	5		346
Vents	5		222
Wall Insulation	5		2,128
Water Heater	1		1,348
Windows	73		146,509
Total Idaho Homes		**$**	**654,961**
Oregon Homes	0	**$**	**0**
Total Oregon Homes			**0**
Idaho Non-Profits	0		**0**
Total Idaho Non-Profit Measures		**$**	**0**

Note: Dollars are rounded.

Marketing Activities

Information about WAQC is available in a brochure (English and Spanish) and on the Income Qualified Customers page of Idaho Power's website. The CAP agencies promote the program and maintain a continual waiting list for interested customers.

Cost-Effectiveness

Program cost-effectiveness declined in 2020 from both the UCT and TRC perspective due to the adoption of updated per home savings estimates informed by a third-party weatherization billing analysis. The UCT declined from 0.35 to 0.20, while the TRC decreased from 0.43 to 0.33.

To address the decrease in cost-effectiveness from lower energy savings estimates, Idaho Power will work with EEAG, as well as the weatherization managers who oversee the weatherization work, to discuss ways to improve the program. See the WAQC evaluation section for more details of the billing analysis.

While final cost-effectiveness is calculated based on measured consumption data, cost-effectiveness screening begins during the initial contacts between CAP agency weatherization staff and the customer. In customer homes, the agency weatherization auditor uses the EA5 to conduct the initial audit of

potential energy savings for a home. The EA5 compares the efficiency of the home prior to weatherization to the efficiency after the proposed improvements and calculates the value of the efficiency change into a savings-to-investment ratio (SIR). The output of the SIR is similar to the PCT ratio. If the EA5 computes an SIR of 1.0 or higher, the CAP agency is authorized to complete the proposed measures. The weatherization manager can split individual measure costs between Idaho Power and other funding sources with a maximum charge of 85% of total production costs to Idaho Power. Using the audit tool to pre-screen projects ensures each weatherization project will result in energy savings.

The 2020 cost-effectiveness analysis continues to incorporate the following directives from IPUC Order No. 32788:

- Applying a 100% NTG value to reflect the likelihood that WAQC weatherization projects would not be initiated without the presence of a program
- Claiming 100% of project savings
- Including an allocated portion of the indirect overhead costs
- Applying the 10% conservation preference adder
- Claiming $1 of benefits for each dollar invested in health, safety, and repair measures
- Amortizing evaluation expenses over a three-year period

Finally, the cost-effectiveness calculations were updated in 2020 to remove the impacts of any accruals and reversals associated with unspent dollars carried over into the following year. Generally, the carryover dollars are reversed the following year when the CAP agencies spend the previous year's unused funds. A new accrual is made at the end of the year for the new carryover dollars. These annual accruals and reversal have been similar in amount each year and have had a relatively minimal impact on the total utility cost of the program and to the program's overall cost-effectiveness. As mentioned previously, because weatherization work was restricted during COVID-19, Idaho Power is carrying over a larger amount of dollars from 2020 to 2021. By leaving this accounting entry in the cost-effectiveness calculation, it would overstate expenses in 2020 while the subsequent reversal would understate expenses in 2021.

Customer Education and Satisfaction

The CAP agency weatherization auditor explains to the customer which measures are analyzed and why. Further education is done as the crew demonstrates the upgrades and how they will help save energy and provide an increase in comfort. Idaho Power provides each CAP agency with energy efficiency educational materials for distribution to customers during home visits. Any customers whose homes are selected for the company's post-weatherization home verification receive additional information and have the opportunity to ask the home verifiers more questions.

Idaho Power uses independent, third-party verification companies to ensure the stated measures were installed in the homes and to discuss the program with these customers. In 2020, home verifiers did not visit customer homes for feedback about the program due to COVID-19 concerns.

A customer survey was used to assess major indicators of customer satisfaction throughout the service area. All program participants in all regions were asked to complete a survey after their homes were weatherized. Survey questions gathered information about how customers learned of the program, reasons for participating, how much customers learned about saving energy in their homes, and the likelihood of household members changing behaviors to use energy wisely.

Idaho Power received survey results from 94 of 115 households weatherized by the program in 2020. Some highlights include the following:

- Nearly 39% of respondents learned of the program from a friend or relative, and over 21% learned of the program from an agency flyer.
- Almost 80% of the respondents reported their primary reason for participating in the weatherization program was to reduce utility bills, almost 40% had concerns about their existing furnace, and nearly 31% wanted to improve the comfort of their home.
- Over 73% reported they learned how air leaks affect energy usage, and nearly 67% indicated they learned how insulation affects energy usage during the weatherization process.
- Nearly 53% of respondents said they learned how to use energy wisely. Most respondents (98%) reported they were likely to change habits to save energy, and almost 63% reported they have shared all the information about energy use with members of their household.
- Over 94% of the respondents reported they think the weatherization they received will significantly affect the comfort of their home, and almost all (99%) said they were very satisfied with the program.
- Over 70% of the respondents reported the habit they were most likely to change was washing full loads of clothes, and more than 61% said that turning off all the lights when not in use was a habit they were likely to adopt to save energy. Turning the thermostat up in the summer was reported by nearly 53% of the respondents, and turning the thermostat down in the winter was reported by more than 56% as a habit they and members of the household were most likely to adopt to save energy.

A summary of the survey is included in *Supplement 2: Evaluation*.

Evaluations

In late 2019, Idaho Power contracted with Nexant to conduct a billing analysis of 2016-2018 weatherization jobs for both the WAQC and Weatherization Solutions for Eligible Customers programs. The analysis estimated the electric energy savings of the weatherization jobs by comparing whole-home energy usage of the participants, before and after the weatherization jobs, to a matched comparison group. The results of the analysis showed that savings from weatherization jobs are detectable, but savings are reduced relative to savings reported in previous years, especially in regard to heat pump installations. Weatherization jobs completed in 2019 were not calculated because the analysis requires a full year of post-weatherization billing data, which were unavailable at the time of the study.

For program reported savings, Nexant recommended using the calculated savings from only 2018 weatherization jobs, to use the most recent data. However, to avoid anomalous and unreliable results, Nexant recommended utilizing the 2016-2018 weatherization results where sample sizes are low. Idaho Power has calculated 2020 savings for these programs in the manner recommended by Nexant.

Any changes to the program as a result of the billing analysis will be reported in the *Demand-Side Management 2021 Annual Report*. See the complete analysis report in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

In 2021, Idaho Power will continue to provide financial assistance to CAP agencies while exploring changes to improve program delivery. The company will also continue to provide the most benefit possible to special-needs customers while working with Idaho and Oregon WAP personnel.

Idaho Power plans to verify approximately 10% of the homes weatherized under the WAQC program via home-verification companies and the Idaho and Oregon state monitoring process.

In 2021, Idaho Power will support the whole-house philosophy of the WAQC program and Idaho and Oregon WAP by continuing to allow a $6,000 annual maximum average per-home cost.

In Idaho during 2021, Idaho Power expects to contribute the base amount plus available funds from 2020 to total $1,861,402 in weatherization measures and agency administration fees. Of this amount, $129,391 will be provided to the non-profit pooled fund to weatherize buildings housing non-profit agencies that primarily serve qualified customers in Idaho.

Idaho Power will continue to maintain the program content on its website and other marketing collateral.

Weatherization Solutions for Eligible Customers

	2020	2019
Participation and Savings		
Participants (homes)	27	129
Energy Savings (kWh)	47,360	504,988
Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source		
Idaho Energy Efficiency Rider	$198,226	$936,721
Oregon Energy Efficiency Rider	$0	$0
Idaho Power Funds	$10,489	$20,905
Total Program Costs—All Sources	$208,715	$957,626
Program Levelized Costs		
Utility Levelized Cost ($/kWh)	$0.338	$0.119
Total Resource Levelized Cost ($/kWh)	$0.338	$0.119
Benefit/Cost Ratios		
Utility Benefit/Cost Ratio	0.13	0.30
Total Resource Benefit/Cost Ratio	0.23	0.43

Description

Weatherization Solutions for Eligible Customers is an energy efficiency program designed to serve Idaho Power residential customers in Idaho whose income falls between 175% and 250% of the current federal poverty level. Initiated in 2008, the program is designed to mirror the WAQC program. These customers often do not have disposable income to invest in energy efficiency upgrades, and they typically live in housing similar to WAQC customers.

The Weatherization Solutions program also benefits certain customers on the WAQC waiting list. When customer income overlaps both programs, this program may offer an earlier weatherization date than WAQC, resulting in less wait time for the customer and quicker energy savings.

Potential participants are interviewed by a participating contractor to determine household occupant income eligibility, as well as to confirm the home is electrically heated. If the home is a rental, the landlord must agree to maintain the unit's current rent for a minimum of one year, and to help fund a portion of the cost of weatherization. If the customer is eligible, an auditor inspects the home to determine which upgrades will save energy, improve IAQ, and/or provide health and safety measures for the residents. To be approved, energy efficiency measures and repairs must have an SIR of 1.0 or higher, interact with an energy-saving measure, or be necessary for the health and safety of the occupants.

The Weatherization Solutions for Eligible Customers program uses a home audit tool called the HAT14.1, which is similar to the EA5 audit tool used in WAQC. The home is audited for energy efficiency measures and the auditor proposes upgrades based on the SIR ratio calculated by HAT14.1. As in WAQC, if the SIR is 1.0 or greater, the contractor is authorized to upgrade that measure. Measures considered for improvement are window and door replacement; ceiling, floor, and wall insulation; HVAC repair and replacement; water heater repair and replacement; and pipe wrap. Also included is the potential to replace lightbulbs and refrigerators. Contractors invoice Idaho Power for the project costs, and if the home is a rental, a minimum landlord payment of 10% of the cost is required.

Idaho Power's agreement with contractors includes a provision that identifies a maximum annual average cost per home. The intent of the maximum annual average cost is to allow contractors the flexibility to service homes with greater or fewer weatherization needs. It also provides a monitoring tool for Idaho Power to forecast year-end outcomes.

Program Activities

In 2020, contractors weatherized 27 Idaho homes for the program: 10 in eastern Idaho, seven in Idaho Power's Canyon–West Region, four in south-central Idaho, and six in the company's Capital Region. Of those 27 homes weatherized, 15 were single-family, 11 were manufactured homes, and one was a multi-family unit.

Due to COVID-19 restrictions, in March 2020, the program suspended in-home activities. To help ensure crew members and customer safety, contractors did not enter customer homes throughout the rest of 2020.

Marketing Activities

Prior to the program suspending in-home activities in March, Idaho Power distributed one marketing email for weatherization and one bill insert in February. The email was sent to 3,010 customers and received 518 unique opens. The bill insert was sent to 297,471 residential customers in Idaho. The program was also promoted on the Idaho Power website homepage in January.

In the absence of Weatherization Solutions offerings, Idaho Power promoted do-it-yourself weatherization techniques in a social media post on National Weatherization Day and with a December bill insert. The insert was sent to 297,297 Idaho and Oregon residential customers and included tips like checking for air leaks, installing a smart thermostat, and behavior changes to increase comfort and lower energy bills.



Figure 17. Social media posts for Weatherization Solutions for Eligible Customers program

Cost-Effectiveness

Program cost-effectiveness declined in 2020 from both the UCT and TRC perspective due to the adoption of updated per home savings estimates as a result of a completed weatherization billing analysis. The 2020 UCT ratio is 0.13, down from 0.30, and the TRC ratio is 0.23 compared with 0.43 in 2019. See the WAQC evaluation section of this report for more details on the billing analysis.

Weatherization Solutions for Eligible Customers projects, similar to WAQC program guidelines, benefit from a pre-screening of measures through a home audit process. The home audit process ensures an adequate number of kWh savings to justify the project and provides more consistent savings for billing analysis. See WAQC cost-effectiveness for a discussion of the audit and prescreening process, which is similar for both programs.

For further details on the overall program cost-effectiveness assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction

A customer survey was used to assess major indicators of customer satisfaction with the program throughout the service area. All program participants in all regions were asked to complete a survey after their homes were weatherized. Survey questions gathered the following information:

- How customers learned of the program
- Reasons for participating
- How much customers learned about saving energy in their homes
- The likelihood of household members changing behaviors to use energy wisely

Idaho Power received survey results from 11 of 27 households weatherized by the program in 2020. Some highlights include the following:

- Eighteen percent of respondents learned of the program from a friend or relative, and another almost 18% learned of the program from an agency flyer. Even though Idaho Power did not send any direct-mail letters about the Weatherization Solutions program in 2020, over 54% of respondents said they learned about the program from direct-mail. These respondents may be recalling a letter they received in a previous year.
- Nearly 82% of the respondents reported their primary reason for participating in the weatherization program was to reduce utility bills, 27% wanted to improve the comfort of their home, and 27% had concerns about their existing furnace.
- Almost 73% reported they learned how air leaks affect energy usage, and over 45% indicated they learned how insulation affects energy usage.
- More than 55% of respondents said they learned how to use energy wisely. Eighty percent reported they were very likely to change habits to save energy, and almost 73% reported they have shared all the information about energy use with members of their household.
- Nearly 82% of the respondents reported they think the weatherization they received will significantly affect the comfort of their home, and 100% said they were very satisfied with the program.
- Eighty percent of the respondents reported the habit they were most likely to change was turning off lights when not in use, and 70% said that washing full loads of clothes was a habit they were likely to adopt to save energy. Turning the thermostat up in the summer was reported by 70% of the respondents and turning the thermostat down in the winter was reported by 70% as a habit they and members of the household were most likely to adopt to save energy.

A summary of the survey is included in *Supplement 2: Evaluation*.

Though two independent companies normally perform random verifications of weatherized homes and visit with customers about the program, in 2020, no homes were verified because of COVID-19 restrictions.

Evaluations

In 2020, Idaho Power contracted with Nexant to conduct a participant billing analysis of weatherization jobs completed in 2016-2018. The 2020 savings reported for the program are based on the recommendations and estimated savings from the Nexant evaluation. See the WAQC section of this report for more details.

Any program updates based on this analysis will be reported in the *Demand-Side Management 2021 Annual Report*. See the complete analysis report in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

Once COVID-19 safety protocols allow for in-home work to resume, Idaho Power will notify contractors to resume weatherization projects.

Idaho Power may evaluate program guidelines in 2021, and potentially update the current audit software to a newer version. Once program activities resume, Idaho Power will update brochures as necessary to help spread the word about the program in all communities. Additional marketing for the program may include bill inserts, emails, *News Briefs*, website updates, and advertisements in various regional publications, particularly those with a senior and/or low-income focus. Social media posts and boosts, coordinated partner content, and employee education may be used to increase awareness. Regional marketing and targeted digital ads will be considered based on need as evidenced by any regional contractor's waiting list for Weatherization Solutions services. The program will be promoted at county fairs, home shows, and resource fairs, as needed.

Commercial/Industrial Sector Overview

In 2020, Idaho Power's commercial sector consisted of 74,410 commercial, governmental, school, and small business customers. The number of customers increased by 1,555 or 2.1% from 2019. Energy use per month for customers in this sector is not as homogenous as other customer sectors and can vary by several hundred thousand kWh each month depending on customer type. In 2020, the commercial sector represented 27.1% of Idaho Power's total retail annual electricity sales.

Industrial and special contract customers are Idaho Power's largest individual energy consumers. In 2020, there were 127 customers in this category, which represented approximately 22.8% of Idaho Power's total retail annual electricity sales.

Idaho Power's C&I sector has many energy efficiency programs available to commercial, industrial, governmental, schools, and small business customers. The suite of options can help businesses of all sizes implement energy efficiency measures.

Table 15. Commercial/Industrial sector program summary, 2020

Program	Participants	Total Cost		Savings	
		Utility	Resource	Annual Energy (kWh)	Peak Demand (MW)
Demand Response					
Flex Peak Program	141 sites	$ 542,480	$ 542,480		24
Total		**$ 542,480**	**$ 542,480**		**24**
Energy Efficiency					
C&IEE					
Custom Projects	169 projects	18,059,396	41,604,451	94,006,717	
Green Motors—Industrial	10 motor rewinds			56,012	
New Construction	119 projects	2,383,983	4,175,611	14,565,936	
Retrofits	630 projects	3,587,277	11,964,431	20,965,215	
Commercial Energy-Saving Kit	1,379 kits	103,678	103,678	258,368	
Small Business Direct Install	139 projects	339,830	339,830	780,260	
Total		**$24,474,163**	**$ 58,188,001**	**130,632,507**	

Note: See Appendix 3 for notes on methodology and column definitions.
Totals may not add up due to rounding.

Energy Efficiency Programs

C&I Energy Efficiency—Custom Projects

For projects not covered by the New Construction or Retrofits options, Custom Projects offers incentives for qualifying large, custom energy efficiency projects and energy management measures, such as strategic energy management, tune-ups, system optimization, and recommissioning.

Additionally, Idaho business customers who wish to find ways to save energy and to quantify their savings can obtain a scoping assessment and detailed assessment through this option.

C&I Energy Efficiency—New Construction

This option offers specific incentives for designing and building better-than-code energy-efficient features into a new construction, major renovation, addition, expansion or change-of-space project.

C&I Energy Efficiency—Retrofits

This option offers specific incentives for simple energy-saving retrofits to existing equipment or facilities.

Green Motors Initiative

Under the Green Motors Initiative (GMI), service center personnel are trained and certified to repair and rewind motors to improve reliability and efficiency. If a rewind returns a motor to its original efficiency, the process is called a "Green Rewind." By rewinding a motor under this initiative, customers may save up to 40% of the cost of a new motor.

Commercial Energy-Saving Kits

This program offers free ESKs filled with products and tips to help small businesses save energy. Three industry-specific versions of the kit are delivered directly to Idaho Power's small business customers: office, restaurant, and retail.

Small Business Direct Install

Idaho Power launched a SBDI program in November 2019 targeting typically hard-to-reach small business customers. SBDI is implemented by a third-party contractor that provides turn-key services. Idaho Power pays 100% of the cost to install eligible measures for customers who use 25,000 kWh annually or less. SBDI is offered to eligible customers in a strategic geo-targeted approach.

Oregon Commercial Audits

This statutory-required program offers free energy audits, evaluations, and educational products to Oregon customers to help them achieve energy savings.

Demand Response Program

Flex Peak

Idaho Power pays an incentive to commercial and industrial customers who participate in this demand response program. These customers voluntarily help the company reduce summer demand on specific summer weekdays or for other system needs.

Marketing

In 2020, Idaho Power continued to market the programs listed above, targeting the following customers: commercial, industrial, governmental, schools, small businesses, architects, engineers, and other design professionals.

Bill Inserts and Print Materials

A bill insert highlighting how Idaho Power's incentives can save customers money was included in 41,313 business customer bills in March and 41,275 bills in July.

Additionally, the company redesigned its C&I Energy Efficiency overview brochure in January.

Print and Digital Advertising

In 2020, Idaho Power had planned to expand on the new ad campaign for the C&I Energy Efficiency Program launched in 2019. The ads targeted small to large businesses and showed that saving energy and money is for everyone by highlighting program participants. However, due to COVID-19

safety concerns around the logistics of maintaining appropriate social distancing while photographing the campaign, the company did not expand its campaign in 2020. Given that the campaign was not expanded, the company opted not to advertise in new print and digital publications as originally intended.

The company continued using ads highlighting energy efficiency, along with the company's clean energy and low-price messaging in select publications.

Print ads ran in the *Idaho Business Review* in April, May, August, September, October, and November; the *BOC Bulletin* in January and August; and the *Idaho Association of General Contractors Building Idaho* magazine in the spring. Ads also ran in the Building Owners and Managers Association (BOMA) membership directory and symposium program, *Idaho Business Review Top Projects Awards* publication, and the Idaho Association of General Contractors membership directory. Additionally, Idaho Power sponsored the Construction section in the *Idaho Business Review's Book of Lists*, which included an ad, company logo in the table of contents, and an article highlighting Idaho Power and the company's energy efficiency programs.

Idaho Power continued using search engine marketing to display Idaho Power's C&I Energy Efficiency Program near the top of the search results with the paid search terms when customers search for energy efficiency business terms. These ads received 183,107 impressions and 9,488 clicks.

Newsletters

Idaho Power produces and distributes *Energy@Work*, a newsletter about Idaho Power company information and energy efficiency topics for business customers. Typically, a printed version is produced twice a year, while an email version is produced quarterly. Two issues of the email version included content that aligns with the printed version, and the other two issues included more technical content.

Idaho Power had planned to send its first issue of *Energy@Work* in a print and electronic format in March 2020. The newsletter was about to go to print when COVID-19 became a serious concern, so the company pivoted its plans. The original newsletter content was replaced with articles highlighting free and low-cost tips for businesses that were running in a different capacity than normal, along with information on virtual training opportunities. Given that many people were now working from home, the company opted not to print the newsletter, but did send it electronically to 9,808 business customers in April.

The summer version of the newsletter was emailed to 12,315 customers in July. Topics included air circulation in buildings, a video about energy-saving improvements at the Idaho Humane Society, and descriptions of the free resources available to help customers save energy and money, such as IDL's ERL, tips brochures, and training opportunities. The fall issue, sent to 10,456 customers, focused on temporary incentive increases, Idaho Power's low prices, and a video about the proposed Boardman to Hemingway transmission line project. The winter issue was emailed to 13,085 customers in December. The newsletter highlighted the free energy efficiency services offered by the IDL, the recent closure of the Boardman Oregon coal plant, tips and incentives for reducing water leaks, and changes to net metering services.

Airport Advertising

To reach business customers, Idaho Power continued to display two backlit ads throughout the airport in 2020. An ad featuring program participants was located in the baggage claim area, while an ad on alternating airport display boards highlighted the company's clean energy goal—Clean Today. Cleaner Tomorrow.®—and the role energy efficiency plays in achieving that goal.

Radio

Idaho Power sponsored messages on public radio stations in Boise, Twin Falls, and Pocatello from July through September. The company ran a total of 370 messages in Boise and Twin Falls, and 549 messages in Pocatello.

Social Media

Idaho Power continued using regular LinkedIn posts focused on energy-saving tips, program details, incentives, and training opportunities. In April, the company ran a short series of energy-saving tips for businesses, specific to free and low-cost actions they could take during the pandemic. When appropriate, these messages were also shared on Idaho Power's Facebook and Twitter pages. The company also boosted Facebook posts related to some of the PR success story videos listed below.

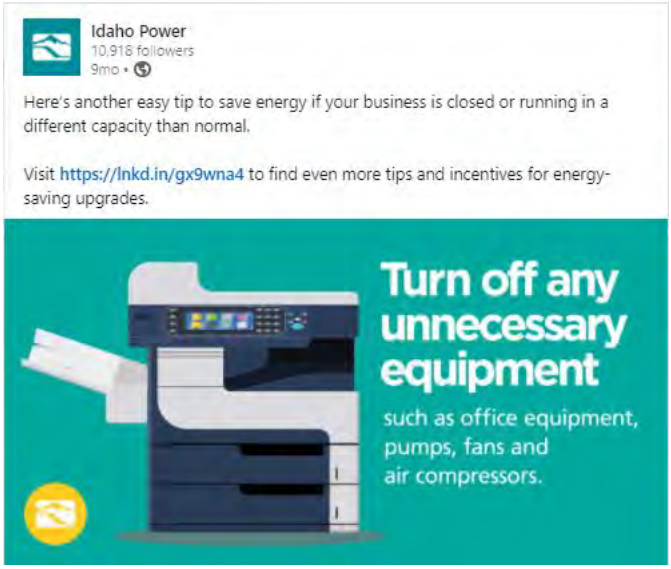


Figure 18. Energy-saving tip posted on LinkedIn

Public Relations

Idaho Power provides PR support to customers who want to publicize the work they have done to become more energy efficient. Upon request, Idaho Power creates large-format checks used for media events and/or board meetings. Idaho Power will continue to assist customers with PR opportunities by creating certificates for display within their buildings and speaking at press events, if requested.

While these opportunities were limited in 2020, Idaho Power did produce checks and/or sent news releases for several companies, including Healthwise, the City of Blackfoot, the Idaho Humane Society, McCain Foods, and Amalgamated Sugar.

The company also released success story videos on YouTube highlighting how the Sun Valley Resort and Idaho Humane Society benefitted from Idaho Power's energy efficiency programs. The videos were shared on Idaho Power's social media channels, boosted on Facebook and promoted via a *News Briefs* article to media. The Idaho Humane Society video was also shared in the *Connections* newsletter and *Energy@Work* newsletter.

Association and Event Sponsorships

Idaho Power's C&I Energy Efficiency Program typically sponsors a number of associations and events. In 2020, many of these events were cancelled or held virtually.

The company sponsored the BOMA Commercial Real Estate Symposium February 11, in Boise. The Idaho Power Business Innovation and Development director participated in a panel discussion about growth in Idaho. The company also developed slides with key company facts that rotated on the screen before the event, hosted a booth with energy efficiency materials, and placed an energy efficiency flyer on each table setting.

Idaho Power also remained a sponsor of the *Idaho Business Review's* Top Projects Awards held virtually in August. The company logo was used throughout the event and a video featuring an Idaho Power senior engineer congratulated the winners and promoted and thanked them for using the company's energy efficiency programs.



Figure 19. Ad for the *Idaho Business Review* Top Projects Award

Customer Satisfaction

Idaho Power conducts the Burke Customer Relationship Survey each year. In 2020, 57% of small business survey respondents indicated Idaho Power is meeting or exceeding their needs with information on how to use energy wisely and efficiently. Sixty-three percent of respondents indicated Idaho Power is meeting or exceeding their needs by encouraging energy efficiency with its customers. Fifty-one percent of Idaho Power small business customers surveyed in 2020 indicated the company is meeting or exceeding their needs in offering energy efficiency programs, and 23% of the respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of the small business survey respondents who have participated in at least one Idaho Power energy efficiency program, 89% are "very" or "somewhat" satisfied with the program.

In 2020, 62% of large commercial and industrial survey respondents indicated Idaho Power is meeting or exceeding their needs with information on how to use energy wisely and efficiently. Seventy percent of large commercial and industrial respondents indicated Idaho Power is meeting or exceeding their needs by encouraging energy efficiency with its customers. Sixty percent of customers surveyed in 2020 indicated the company is meeting or exceeding their needs in offering energy efficiency programs, and 75% of the respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of the large commercial and industrial survey respondents who have participated in at least one Idaho Power energy efficiency program, 97% are "very" or "somewhat" satisfied with the program.

Based on surveys conducted in 2020, 61% of the business respondents in *the J.D. Power and Associates 2020 Electric Utility Business Customer Satisfaction Study* indicated they were aware of Idaho Power's energy efficiency programs, and on an overall basis, those customers were slightly more satisfied with Idaho Power than customers who are unaware of the programs.

Training and Education

In 2020, Idaho Power engineers, program staff, field representatives, and hired consultants continued to provide technical training and education to help customers learn how to identify opportunities to improve energy efficiency in their facilities. The company has found that these activities increase awareness and participation in its energy efficiency and demand response programs and enhance customer program satisfaction. To market this service and distribute the training schedule and resources, Idaho Power used its website and *Energy@Work* newsletter.

In 2020, the company also began using a more unified approach to send emails informing customers of training opportunities. In place of asking each key account energy advisor to send the training announcements to their customers, the marketing specialist sent the training emails. The emails still appeared as if they were coming from the individual energy advisor but were sent from a central location. This resulted in emails that were more consistent looking and made tracking data on who received and opened the emails easier.

During each training session, the large commercial and industrial technical consultant gave an overview of the commercial and industrial programs available to customers.

As part of this outreach activity, Idaho Power collaborated with and supported stakeholders and organizations such as: IDL, BOMA, US Green Building Council (USGBC), and the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE). Using Idaho Power funding, the IDL performed several tasks aimed at increasing the energy efficiency knowledge of architects, engineers, trade allies, and customers. Specific activities included sponsoring a BSUG, conducting Lunch & Learn sessions held at various design and engineering firms, and offering the ERL.

Idaho Power delivered five equivalent full-time days of technical classroom-based, live, online training sessions in 2020 at no cost to the customers over the course of 12 days. Topics included the following:

- Air Handling System Efficiency
- Energy Efficiency of Chilled Water Systems
- Owning & Operating an Efficient Cooling Tower
- Evaporative Cooling for Commercial & Industrial Facilities
- Fundamentals of Compressed Air Systems

The level of participation in 2020 remained high, with 236 individuals signing up for the class and 179 unique logins to the technical sessions. Due to the virtual nature of the course delivery due to COVID-19, in some cases there were multiple attendees at a single login location. Customer feedback indicated the average satisfaction level was 87%. Idaho Power's average cost to deliver the technical trainings in 2020 was approximately $2,800 per class, about half the cost of in-person delivered classes in 2019.

Field Staff Activities

Idaho Power energy advisors were able to meet on site with customers for the first two and a half months in 2020. Due to COVID-19 restrictions, energy advisors stayed in contact with their customers later in the year via phone call, email, text, Skype, and WebEx. Idaho Power used a variety of Idaho Power-developed programs, tools, and services to help customers with their energy-related questions

and challenges. The company set activity goals for its energy advisors designed to engage customers in the energy efficiency programs such as a specific number of site visits, virtual customer contacts, or projects. Additionally, program specialists and engineers worked closely with field energy advisors to leverage established customer relationships. For example, residential and commercial energy advisors distributed informational materials to trade allies and other market participants who, in turn, supported and promoted Idaho Power's energy efficiency programs.

Customers regularly ask how to get the most out of their energy dollar. Idaho Power staff has been trained to properly advise customers in the wise use of energy-specific energy efficiency measures and, when needed, can recommend where to find answers. Idaho Power is equipped with experienced engineers, technically proficient personnel, and an extensive network of nationally recognized organizations, contacts at neighboring western electrical utilities, and energy efficiency clearing houses to handle energy-related questions.

Commercial and Industrial Energy Efficiency Program

		2020	2019
Participation and Savings*			
	Participants (projects/kits)	928	1,470
	Energy Savings (kWh)**	129,593,880	133,865,895
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source***			
	Idaho Energy Efficiency Rider	$23,293,492	$21,111,360
	Oregon Energy Efficiency Rider	$661,370	$545,544
	Idaho Power Funds	$75,793	$52,501
	Total Program Costs—All Sources	$24,030,655	$21,709,405
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.018	$0.013
	Total Resource Levelized Cost ($/kWh)	$0.044	$0.030
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	3.27	3.56
	Total Resource Benefit/Cost Ratio	1.63	2.00

*Metrics for each option (New Construction, Custom Projects, and Retrofits) are reported separately in the appendices and in *Supplement 1: Cost-Effectiveness*.

**2019 total includes 117,223 kWh of energy savings from 12 Green Motors projects. 2020 total includes 56,012 kWh of energy savings from 10 Green Motors projects.

***2019 and 2020 dollars include totals for New Construction, Custom Projects, and Retrofits.

Description

Three major program options targeting different energy efficiency projects are available to commercial, industrial, governmental, schools, and small business customers in the company's Idaho and Oregon service areas: Custom Projects, New Construction, and Retrofits.

Custom Projects

The Custom Projects option provides incentives for energy efficiency modifications to new and existing facilities. The goal is to encourage energy savings in Idaho and Oregon service areas by helping customers implement energy efficiency upgrades. Incentives reduce customers' payback periods for custom modifications that might not be completed otherwise. The Custom Projects option also offers energy assessment services to help identify and evaluate potential energy-saving modifications or projects.

Interested customers submit a pre-approval application to Idaho Power for potential modifications identified by the customer, Idaho Power, or a third-party consultant. Idaho Power reviews each application and works with the customer and vendors to gather sufficient information to support the energy savings calculations. All lighting projects use the Idaho Power Lighting Tool to calculate the annual energy savings and to determine the incentive.

Once the project is completed, customers submit a payment application; in some cases, large, complex projects may take as long as two years or more to complete. Each project is reviewed to ensure energy savings are achieved. Idaho Power engineering staff or a third-party consultant verifies the energy savings methods and calculations. Through this verification process, the end use measure information, project photographs, and project costs are collected.

On many projects, especially the larger and more complex projects, Idaho Power or a third-party consultant conducts on-site power monitoring and data collection before and after project implementation. The measurement and verification (M&V) process helps ensure the achievement of projected energy savings. Verifying applicants' information confirms energy savings are obtained and are within program guidelines. If changes in project scope take place, Idaho Power will recalculate energy savings and incentive amounts based on the actual installed equipment and performance.

New Construction

The New Construction option enables customers in Idaho Power's Idaho and Oregon service areas to incorporate energy-efficient design features and technologies to new construction, expansion, or major remodeling projects. New construction and major renovation project design and construction process is much longer than small retrofits and often encompasses multiple calendar years. Originated in 2004, the option currently offers a menu of 33 measures and incentives for efficient lighting and controls, cooling, ventilation, building shell, controls, appliances, refrigeration, office equipment, and compressed air projects. The customer may otherwise lose savings opportunities for these types of projects.

Retrofits

The Retrofits option is Idaho Power's prescriptive measure option for existing facilities. This part of the program encourages customers in Idaho and Oregon to implement energy efficiency upgrades by offering incentives on a defined list of measures. Eligible measures cover a variety of energy-saving opportunities in lighting, HVAC, building shell, food service equipment, and other commercial measures. Customers can also apply for non-standard lighting incentives. A complete list of the measures offered through Retrofits is included in *Supplement 1: Cost-Effectiveness*.

Program Activities

Idaho Power has found providing facility energy assessments, customer technical training, and education services are key to encouraging customers to consider energy efficiency modifications. The 2020 activities not already described in the Commercial and Industrial Sector Overview are below.

Custom Projects

Incentive levels for the non-lighting projects remained the same in 2020, at 18 cents per kWh of first year savings, up to 70% of the project cost. In 2020, the company added a new energy management incentive of $0.025/kWh saved up to 100% of the eligible costs.

The energy management incentive was added for a variety of reasons. Compared to capital investment projects related to energy efficiency, energy management projects:

- tend to have a shorter measure life and a much lower cost.
- involve O&M changes that save energy without interrupting the customer's service or product.
- generate cost-effective energy savings from measures rooted in low-cost or no-cost O&M improvements.

Idaho Power designed a new custom offering in 2020 for conducting leak assessments and fixing underground water leaks, which covers $1,000 per five miles of pipe for a third-party leak assessment and offers a custom incentive of $0.18/kWh saved up to 70% of the eligible cost to repair the leaks found with a leak assessment for eligible underground pipes.

Idaho Power funds the cost of engineering services, up to $4,500, for conducting energy scoping assessments to encourage its larger customers to adopt energy efficiency improvements. Idaho Power contracted with five firms to provide scoping assessments and general energy efficiency engineering support services.

The Custom Projects option had a successful year with a total of 169 completed projects, 22 of which were in Oregon. Custom Projects achieved energy savings of 94,007 MWh (Table 16). Energy savings increased in 2020 by 33% over 2019. Idaho Power also received 95 new applications representing a potential of 19,310 MWh of savings on future projects.

Table 16. Custom Projects annual energy savings by primary option measure, 2020

Option Summary by Measure	Number of Projects	kWh Saved
Compressed Air	9	1,083,535
Controls	5	641,988
Energy Management	11	2,202,821
Fans	3	876,224
HVAC	4	1,471,836
Lighting	89	12,566,042
Motors	1	1,895,391
Other	2	9,068,218
Pump	12	1,815,041
Refrigeration	18	30,168,378
VFD	15	32,217,243
Total*	**169**	**94,006,717**

*Does not include Green Motor Initiative project counts and savings.

Custom Projects engineers and the key account energy advisors visited large-commercial and industrial customers to conduct initial facility walk-throughs, commercial/industrial efficiency program informational sessions, and training on specific technical energy saving opportunities. These started as face-to-face interactions, though virtual/remote capabilities were developed and implemented when health or safety restrictions were necessary. Idaho Power also provided sponsorship for the 2020 Idaho Rural Water Conference (in person) and the 2020 ASHRAE Technical Conference (virtual). Custom Projects engineers gave presentations on Idaho Power programs and offerings at the Cohort for Schools Mid-term and Final Workshops (virtual), Water Cohort Workshops (in person and virtual), and the Eastern Oregon Operators Conference (virtual).

In 2020, Idaho Power contractors completed 11 scoping assessments on behalf of Idaho Power customers. These assessments identified over 6,000 MWh of savings potential and will be used to promote future projects.

Cohorts and Offerings

The Municipal Water Supply Optimization Cohort (MWSOC), Wastewater Energy Efficiency Cohort (WWEEC), the Eastern Idaho Water Cohort (EIWC) and Continuous Energy Improvement (CEI) Cohort for Schools program offerings are also driving a significant number of new projects in addition to increasing vendor engagement from the Streamlined Custom Efficiency (SCE) offering. Capital projects promoted or identified in strategic energy management offerings are reported and incentivized through other Idaho Power C&I programs, not as a cohort savings number. Each offering is described below.

Municipal Water Supply Optimization Cohort

The MWSOC began in January 2016. The goal of the cohort was to equip water professionals with the skills necessary to independently identify and implement energy efficiency opportunities that produce long-term energy and cost savings.

Third-year incentives and savings totaled $7,484 and 806,401 kWh /year with all incentives paid at 70% of the eligible cost. Third-year incentives were processed, and savings were reported in 2020.

Idaho Power continued the cohort for 11 of the original 15 participants and offered two continuation workshops in 2020. Idaho Power's contractor minimally contacted participants to check on project progress and opportunities and to address energy model data updates. Custom Projects engineers conducted multiple informational meetings for civil engineers (in person and virtual) who specialize in water and wastewater designs to educate them on the C&I Energy Efficiency Program, the assessment process, energy efficiency opportunities, and available tools and resources to help find energy efficiency projects.

Wastewater Energy Efficiency Cohort

In January 2014, Custom Projects launched WWEEC, a two-year cohort training approach and incentives for low- or no-cost energy improvements for 11 municipal wastewater facilities in Idaho Power's service area. In 2016, Idaho Power decided to extend the WWEEC to further engage customers. Seven of the 11 original participants are engaged in the WWEEC Continuation with many of the original participants starting major construction projects in years two and three of WWEEC.

Fifth-year incentives and savings were processed and reported in 2020, totaling $1.904 and 701,335 kWh/yr with incentives capped at 70%. In the fifth year, the consultant contacted participants to check on progress, discuss opportunities, and to address energy model data updates.

Continuous Energy Improvement Cohort for Schools

The goal of this cohort is to equip school district personnel with hands on training and guidance to help them get the most out of their systems while reducing energy consumption. The third program year of the Cohort for Schools ran from June 2019 through March 2020. Five school districts of the original nine continued to implement CEI concepts and planned activities for the cohort. In October of 2019, five new school districts began participating. These districts developed their energy teams, built initial facility energy models, and went through training on various aspects of CEI and energy efficiency.

Energy savings for the original five participants were evaluated from June 2019 through March 2020 and from October 2019 through March 2020 for the five new participants. Activities were planned through May 2020 to complete a full 12-month cycle for the original five participants, however, COVID-19 restrictions caused anomalous operations starting around April 2020 and program year three was therefore concluded. The cohort is implemented by a third-party consultant that provided final savings reports for third-party energy savings, but due to the timing of receiving the report, these savings will be claimed in 2021.

Third-year activities commenced in fall 2019, concluding at the end of March 2020. Three of the five new school districts withdrew from the cohort at the end of program year three due to challenges associated with COVID-19. The remaining seven continued through 2020. Of those seven, five districts are now modeling all schools in their district. One district added four new facilities to the cohort, one added two new facilities, and another added one new facility in program year three.

Activities in 2020 included managing a register of energy efficiency opportunities for each facility detailing low-cost and no-cost opportunities to reduce energy consumption. The consultant worked with each participant to complete as many identified opportunities as possible. Afterward, the consultant checked in monthly by phone to review opportunity register items and to discuss current activities. Additionally, Idaho Power completed scoping assessments for each new facility to identify capital project opportunities to aid the strategic capital planning process. Idaho Power provided program and incentive information, both in hard copy and electronically, along with many other energy-saving resources pertinent to school facilities.

A virtual mid-term workshop was held January 14, 2021, where school districts reported their results through the end of 2020.

Fourth-year activities will continue until May 31, 2021. Idaho Power will then review final M&V reports to establish energy savings and eligible costs for the fourth-year activities and will distribute the corresponding incentives to participating school districts.

Streamlined Custom Efficiency

Started in 2013, the SCE offering continues to keep vendor engagement high, targeting projects that may have typically been too small to participate in the Custom Projects option. Currently, the SCE offering provides custom incentives for refrigeration controllers for walk in coolers, process-related variable frequency drives (VFD), and other small, vendor-based projects that do not qualify for prescriptive incentives.

Idaho Power contracted with a third party to manage SCE data collection and analysis for each project. In 2020, the SCE offering processed 20 projects totaling 3,490,011 kWh of savings and $523,242 in incentives.

Eastern Idaho Water Cohort

The Eastern Idaho Water Cohort began in January 2018 with the goal to offer the MWOSC to the eastern part of Idaho Power's service area. This was accomplished in collaboration with Rocky Mountain Power and BPA to deliver joint workshops for customers located in eastern Idaho. Two Idaho Power customers participated. Second-year incentives were processed, and savings were reported in 2020 totaling $8,990 and 695,084 kWh/yr. In the second year of the offering, Idaho Power's contractor contacted participants to check on project progress and opportunities and to address energy model data updates. Idaho Power authorized a continuation for both customers and a draft of the third-year energy savings report is expected in 2021.

Green Motors Initiative

Idaho Power participates in the Green Motors Practices Group's (GMPG) GMI. Under the GMI, service center personnel are trained and certified to repair and rewind motors in an effort to improve reliability and efficiency. If a rewind returns a motor to its original efficiency, the process is called a "Green Rewind." By rewinding a motor under this initiative, customers may save up to 40% of the cost of a new motor. The GMI is available to Idaho Power's agricultural, commercial, and industrial customers.

Currently, nine motor service centers have signed on as GMPG members in Idaho Power's service area. Under the initiative, Idaho Power pays service centers $2 per horsepower (hp) for each National Electrical Manufacturers Association (NEMA)-rated motor up to 5,000 hp that received a verified Green Rewind. Half of that incentive is passed on to the customer as a credit on their rewind invoice. The GMPG requires all member service centers to sign and adhere to the GMPG Annual Member Commitment Quality Assurance agreement. The GMPG is responsible for verifying QA.

In 2020, a total of 10 C&I customers' motors were rewound, and the savings for the Green Rewinds is 56,012 kWh.

New Construction

In 2020, 119 projects were completed, resulting in 14,565,936 kWh in energy savings in Idaho and Oregon. New Construction had a 29% reduction in total projects and a 29% reduction in total savings compared to 2019.

Maintaining a consistent offering is important for large projects with long construction periods; however, changes are made to enhance customers' choices or to meet new code changes. Idaho Power

tries to keep the New Construction option consistent by making changes approximately every other year. The company began an internal review of the New Construction measures in 2020 and will update the program offerings in 2021. The TRM has been updated to include 2018 IECC information and will be finalized in 2021.

In addition to the customer incentive, a PAI is available to architects and/or engineers for supporting technical aspects and documentation of a project. On September 23, 2020, Idaho Power increased the eligible PAI incentive from 10% to 20% of the participant's total incentive, and correspondingly increased the PAI maximum from $2,500 to $5,000 per application.

The company believes the increase in PAI will increase engagement with architects and engineers and will be most beneficial to small and medium businesses as they prepare project documentation. These customers typically do not have staff with a technical background in construction which makes completing applications and submitting documentation a challenge. The previous PAI may not have been at a competitive rate for an architect or engineer to allocate his/her time to provide required program documentation for small energy savings projects. The company will study the impacts on customer participation and satisfaction with the increased PAI approximately one year after implementation. This timeframe provides sufficient lead time to promote the incentive increase for new construction projects. In 2020, 40 projects received the PAI compared to 65 projects in 2019. Idaho Power representatives did not make in-person visits to architectural and engineering firms in Boise in 2020 due to COVID-19 restrictions, but continued discussions via phone and email. These conversations are intended to build relationships with the local design community and to discuss Idaho Power's C&I Energy Efficiency Program.

The New Construction option continued random post-project verifications on 10% of projects completed in 2020. The University of Idaho's IDL did not complete on-site post-project verifications in 2020, but rather completed desk reviews of all documentation on 13 of the 119 projects—over 10% of the total completed. The purpose of the verifications is to confirm program guidelines and requirements are adequate to ensure the supporting final project documentation provided aligns with field installation. Only minor discrepancies were identified in verified projects in 2020. See *Supplement 2: Evaluation* for the complete IDL report.

The impact evaluation from 2019 had a recommendation to: "Utilize [Hours of Use] HOUs from the TRM for lighting and HVAC projects started after the TRM was implemented," and "Also, the sources for the TRMs data are clearly cited and can be traced back to original research." Idaho Power program staff will address this by including additional transparency and clarification in the new 2021 TRM and an updated hours of operation table for HVAC and lighting.

Retrofits

The Retrofits option achieved 20,965 MWh of energy savings in 2020, representing 630 projects. Once again, lighting retrofits comprised most of the energy savings and projects.

At the beginning of 2020, Idaho Power assessed ways to optimize local contractor and supplier participation in Retrofits and determined to convene a small focus group of contractors and suppliers to discuss their program participation experience. Idaho Power program staff also brainstormed ideas that might be helpful to optimize contractor/supplier involvement.

Because contractors and suppliers were focused on their businesses and the new safety and health protocols related to the pandemic, the focus group idea was not viable. Instead, Retrofits program staff chose to implement two tactics to help enhance program participant experience. One tactic was to increase outreach to participating contractors and suppliers. Though contractor outreach and the offer of support is something program staff regularly does, during the pandemic, it became even more important

to increase the frequency via phone, and text to let contractors and suppliers know the Retrofits incentives remained in place and program support was available.

Idaho Power asked a few regional utilities in 2020 how they were addressing the decline in program participation and found that some were offering increased incentives for a limited time. Contractors have choices on what projects they undertake and increasing lighting incentives provided the reason some needed to put their time toward lighting retrofit projects.

In August 2020, Idaho Power rolled out its second tactic to help enhance program participation: a temporary incentive increase for Idaho customers. The timing proved to be effective, as electrical contractors had, for the most part, resumed normal operations (compared to the early months of the pandemic). The company promoted the increased incentives via email and phone calls.

Within a few weeks, participating contractors shared that the increased incentives were having the desired effect. The initial timeline was to end the increased incentives in December 2020; however, electrical suppliers experienced difficulty receiving ordered equipment due to the worldwide impacts of the pandemic. In addition, Retrofits staff proposed to continue the increased incentives as part of the regular program offering and began preparations to roll out more comprehensive lighting incentive changes in the first quarter of 2021.

The COVID-19 pandemic had an impact on performing site inspections, visiting trade allies in-person, and holding in-person workshops in 2020. Lighting and non-lighting inspectors performed virtual project inspections from mid-March to early October. Most customers were able to accommodate the virtual inspections. The few projects where virtual inspections were not possible were inspected when site visits resumed in October.

The non-lighting Retrofits savings and cost are determined by Idaho Power's TRM. In 2020, the company contracted with a third party to update its TRM; program staff will review the update and propose changes to the non-lighting measures in 2021.

Idaho Power continued its contracts with various consultants to provide ongoing program support for lighting and non-lighting reviews and inspections, as well as contractor outreach.

The impact evaluation from 2019 recommended to: "Consider requiring pictures of the motor nameplate for the connected motor to VFD measures. The application specifies that the quantity is the lesser of the VFD or connected motor hp, it does not collect the motor hp. Motors are often in difficult to access locations, so a picture of the nameplate would help verify the motor hp." Idaho Power program staff discussed this recommendation and determined not to adopt it because in many situations obtaining a motor nameplate picture could pose a safety issue.

Marketing Activities

Idaho Power continued to primarily market the C&I Energy Efficiency Program as a single offering to businesses. See the Sector Overview for the company's efforts to market the C&I Energy Efficiency Program. Below are the option-specific marketing efforts for 2020.

Custom Projects

In addition to program-level marketing activities, Idaho Power continued to present large-format checks to interested Custom Projects participants and publicized these events to local media, when applicable. However, there were far fewer checks presented in-person in 2020 than in previous years due to COVID-19 restrictions. The company also released its Water Supply Cohort Success Story brochure and a new Custom Projects tips sheet focused on underground water leaks.

New Construction

Idaho Power placed an ad in the spring issue of the Idaho Associated General Contractors (IAGC) publication, *Building Idaho*. Accompanying the ad was an article promoting Idaho Power's New Construction incentives and highlighting a few recent projects.

The company also continued to place banners on select construction sites highlighting that the facility is being built or enhanced with energy efficiency in mind. A banner remained at St. Luke's McCall Medical Center throughout 2020.

Retrofits

In early 2020, Idaho Power launched an updated version of the Retrofits website to allow customers to easily find incentives by the following categories: lighting, HVAC/controls, food service equipment, building shell, and other. The company placed a pop-up on My Account in February that resulted in 3,553 views and 187 click-throughs from business customers.

The company used a paid LinkedIn ad to promote the Retrofits incentives in March. The ad targeted a variety of job titles that typically have an interest in, or input about, energy efficiency projects, including C-suite executives; engineers; architects; and sustainability, maintenance, and facilities contacts. Targeting was only available to LinkedIn users in the Boise and Pocatello areas—approximately 65,000 individuals. The ad resulted in 51,254 impressions and 413 website clicks.

Throughout the year, the company sent out emails promoting the Retrofits lighting incentives. The company's customer solutions advisors (CSA) then followed up by making personal phone calls to customers who received the email.

Having the CSAs follow up on marketing collateral helped increase interest in the lighting incentives and is a tactic the company plans to continue in 2021.

Green Motors Initiative

In 2020, Idaho Power developed and delivered postcards for participating service centers to use to collect the information (name, telephone number, pump/pole/meter number, address) needed for the customer to receive their incentive.

The company also developed a Green Motors brochure to use in place of the brochure developed by the Green Motors Practices Group. The new brochure was specific to Idaho Power customers, included a list of participating service centers, and matched the look and feel of the other C&I Energy Efficiency Program materials.

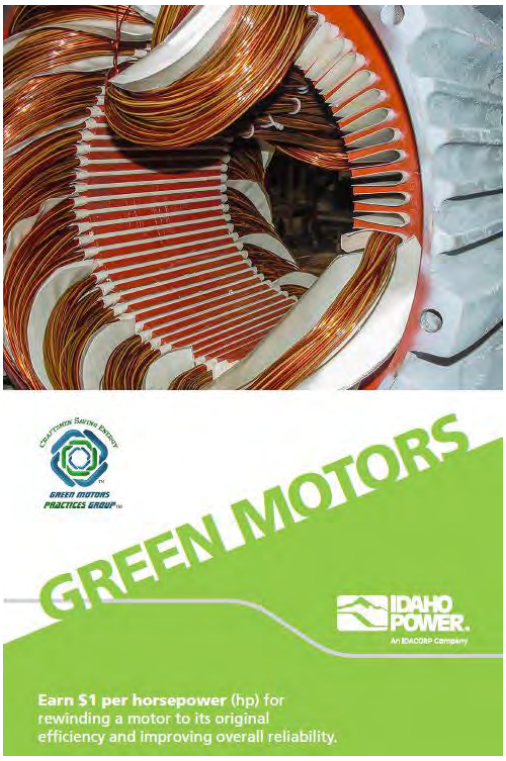


Figure 20. Green Motors brochure cover

Cost-Effectiveness

Custom Projects

Historically, all projects submitted through the Custom Projects option must meet cost-effectiveness requirements, which include TRC, UCT, and PCT tests from a project perspective. In 2020, Idaho Power began transitioning to the UCT as the primary cost-effectiveness test. The program requires that all costs related to the energy efficiency implementation and energy-savings calculations are gathered and submitted with the program application. Payback is calculated with and without incentives, along with the estimated dollar savings for installing energy efficiency measures. As a project progresses, any changes to the project are used to recalculate energy savings and incentives before the incentives are paid to the participant. To aid in gathering or verifying the data required to conduct cost-effectiveness and energy-savings calculations, third-party engineering firms are sometimes used to provide an assessment, or engineering M&V services available under the Custom Projects option.

The UCT and TRC ratios for the program are 3.26 and 1.61 respectively. Non-energy impacts were applied in 2020 based on an estimated per kWh value by commercial and industrial end-uses. These values were provided by a third-party as part of the 2019 impact evaluation of the New Construction and Retrofits options.

Details for the program cost effectiveness are in *Supplement 1: Cost-Effectiveness*.

New Construction

To calculate energy savings for the New Construction option, Idaho Power verifies the incremental efficiency of each measure over a code or standard practice installation baseline. Savings are calculated through two main methods. When available, savings are calculated using actual measurement parameters, including the efficiency of the installed measure compared to code-related efficiency. Another method for calculating savings is based on industry standard assumptions, when precise

measurements are unavailable. Because the New Construction option is prescriptive and the measures are installed in new buildings, there are no baselines of previous measurable kWh usage in the building. Therefore, Idaho Power uses industry standard assumptions from the IECC to calculate the savings achieved over how the building would have used energy absent of efficiency measures.

New Construction incentives are based on a variety of methods depending on the measure type. Incentives are calculated mainly through a dollar-per-unit equation using square footage, tonnage, operating hours, or kW reduction.

Based on the current deemed savings value from the TRM, nearly all measures were cost-effective, with the exception of some A/C units and heat pump units from the TRC perspective. Idaho Power determined these measures met at least one of the cost-effectiveness exceptions outlined in OPUC Order No. 94-590. Idaho Power had received a cost-effectiveness exception on these measures when it filed changes to the program in 2018 under Advice No. 18-08.

The UCT and TRC ratios for the program are 3.40 and 2.63 respectively. Non-energy impacts were applied in 2020 based on an estimated per kWh value by commercial and industrial end-uses. These values were provided by a third-party as part of the 2019 impact evaluation of the New Construction and Retrofits options.

Complete updated measure-level details for cost-effectiveness can be found in *Supplement 1: Cost-Effectiveness*.

Retrofits

For 2020, Idaho Power used most of the same savings and assumptions as were used after the program changes in 2019 for the Retrofits option. For all lighting measures, Idaho Power uses a Lighting Tool developed by Evergreen Consulting Group, LLC. An initial analysis was conducted to see if the lighting measures shown in the tool were cost-effective based on the average input of watts and hours of operation, while the actual savings for each project are calculated based on specific information regarding the existing and replacement fixture. For most non-lighting measures, deemed savings from the TRM or RTF are used to calculate the cost-effectiveness.

While all measures pass the UCT, several measures are not cost-effective from the TRC perspective. These measures include high-efficiency A/C units and heat pump units. After reviewing these measures, Idaho Power determined the measures met at least one of the cost-effectiveness exceptions outlined in OPUC Order No. 94-590. These cost-effectiveness exceptions were approved by the OPUC in Advice No. 18-08.

The UCT and TRC ratios for the program are 3.25 and 1.35 respectively. Non-energy impacts were applied in 2020 based on an estimated per kWh value by commercial and industrial end-uses. These values were provided by a third-party as part of the 2019 impact evaluation of the New Construction and Retrofits options.

Complete updated measure-level details for cost effectiveness can be found in *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction

Retrofits

Starting in August 2020, a survey was sent to customers who had a lighting project installed by a contractor. The purpose of the survey is to evaluate the customers' satisfaction level for the contractors listed on the Retrofits website. Survey questions gathered information about how customers learned of the program and their satisfaction with the program, contractor, and equipment.

A survey invitation was sent to 113 program participants in 2020. Idaho Power received survey results from 39 respondents. Some highlights include the following:

- Nearly 49% of respondents learned of the program from a contractor, and nearly 18% learned of the program from an Idaho Power employee.
- Nearly 90% of respondents said they were "very satisfied" with the program and almost 8% of respondents indicated they were "somewhat satisfied."
- Approximately 90% of respondents said they were "very satisfied" with the contractor they hired to install their equipment and over 5% of respondents indicated they were "somewhat satisfied."
- Just over 87% of respondents said they were "very satisfied" with the equipment installed, with just over 5% of respondents said they were "somewhat satisfied."

A copy of the survey results is included in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

In 2021, the three options will continue to be marketed as part of Idaho Power's C&I Energy Efficiency Program. Below are specific program strategies that apply to the individual options of the program.

Custom Projects

In 2021, the company plans to finalize the development of an Energy Management Commercial Audit Tool and, in conjunction with engineering services, will help identify and quantify energy savings opportunities for commercial customers. Also, the company plans to develop a compressed air leak detection and repair custom offering in 2021, similar to the water leak measure launched in 2020.

Activities and coaching will continue for the water and wastewater cohort participants and the Eastern Idaho Water Cohort. Idaho Power is also investigating details related to continuation and/or expansion of the CEI Cohort for Schools offering beyond the year-three completion scheduled for summer of 2022 and the wastewater cohort participants that have fulfilled their commitment.

Idaho Power will continue to provide:

- In-person, virtual or remote site visits and energy scoping assessments by Custom Projects engineers to identify projects and energy savings opportunities as conditions allow.
- Funding for detailed energy assessments for larger, complex projects. Virtual and/or remote assessments can also be offered in many cases.
- M&V of larger, complex projects. Virtual and/or remote M&V can also be utilized as conditions allow.
- Technical training for customers, virtually presented or in person as conditions allow.

New Construction

Idaho Power will continue to perform random post project verifications on a minimum of 10% of completed projects, sponsor technical training through the IDL to address the energy efficiency education needs of design professionals throughout the Idaho Power service area, and build relationships with local design professionals and organizations. The TRM reflective of the 2018 IECC will be finalized in 2021, and Idaho Power will finalize the list of measures offered for a program update in 2021.

Retrofits

Idaho Power will implement lighting measure changes identified in 2020 and non-lighting measure changes in the updated TRM.

Commercial Energy-Saving Kits

		2020	2019
Participation and Savings			
	Participants (sites)	1,379	2,629
	Energy Savings (kWh)	258,368	569,594
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$97,645	$154,632
	Oregon Energy Efficiency Rider	$5,678	$7,312
	Idaho Power Funds	$355	$0
	Total Program Costs—All Sources	$103,678	$161,945
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.047	$0.029
	Total Resource Levelized Cost ($/kWh)	$0.047	$0.029
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	1.24	1.57
	Total Resource Benefit/Cost Ratio	2.38	2.52

Description

The Commercial Energy-Saving Kit (Commercial ESK) program is offered to commercial business customers in Idaho and Oregon. Three industry-specific types are available for restaurants, retailers, and offices (Table 17)—and each contains installation instructions and a variety of items intended to help save energy related to lighting, hot water use, and intermittently used electrical devices. Idaho Power uses a third-party vendor for kit assembly and mailing. The vendor sends the kit through the mail directly to the customer on the company's behalf.

Table 17. Industry-specific Commercial ESK contents

Restaurant	Retail	Office
(3) 9-watt LED Lightbulbs	(2) 9-watt LED Lightbulbs	(2) 9-watt LED Lightbulbs
(2) Bathroom Aerator 1.0 gpm	(2) 8-watt LED BR30	(2) Bathroom Aerator 1.0 gpm
(2) Kitchen Aerator 1.5 gpm	(1) Bathroom Aerator 1.0 gpm	(1) Kitchen Aerator 1.5 gpm
(2) Exit Sign Retrofit	(2) Exit Sign Retrofit	(2) Exit Sign Retrofit
(1) Pre-rinse Spray Valve		(1) Advanced Power Strip

The vendor also batch-ships kits to area Idaho Power offices for distribution by its energy advisors. An energy advisor may then deliver a Commercial ESK while visiting a small business customer and use it as an introduction to the benefits of the other commercial energy efficiency programs offered by the company.

Program Activities

The vendor made no batch shipments in 2020, and Idaho Power conducted no in-person customer visits as of March 2020, because of COVID-19 restrictions. However, Idaho Power continued to offer

Commercial ESKs, with a primary focus on small business customers. Nearly all the kits were distributed by mail in 2020.

Idaho Power distributed 1,379 kits (Table 18), 97% of which were distributed after a customer made a request through the website or spoke with a company representative on the phone.

Table 18. Energy savings by type and number of Commercial ESKs distributed

State	Kit Type	Total Distributed	kWh Savings
Idaho	Restaurant	187	48,369
	Retail	227	54,394
	Office	887	140,607
Oregon	Restaurant	19	4,915
	Retail	9	2,157
	Office	50	7,926

Marketing Activities

Idaho Power promoted the Commercial ESKs using LinkedIn posts in May and December. A LinkedIn ad was planned for May but did not run due to technical difficulties with the LinkedIn advertising platform.

The company tried a new tactic by displaying a pop-up ad to small business customers who logged into My Account. The pop-up generated over 250 kit requests throughout an eight-week campaign that ran in June and July. Customers signing into My Account clicked on the pop up and requested a kit through the online order form. The form generated an email that was sent directly to the program specialist, who fulfilled the order.

A Retail Kit campaign launched in June with the goal of increased retail kit distribution. The program specialist created lists of retail customers sorted by the standard industrial classification code and region. The campaign asked energy advisors to call retail customers, preferably customers they had not had prior contact with. The energy advisors discussed energy efficiency program offerings and offered to ship a kit directly to the customer. The feedback received was positive, and the retail customers seem to appreciate the proactive approach and receiving the no-cost energy-efficient items.

Idaho Power launched a duplicate effort in August aimed at the restaurant industry. Some of the feedback from energy advisors included: it was harder to get ahold of customers; some were not interested; and many restaurants were operating in a difficult business climate. The restaurant industry saw significant uncertainty in 2020, as COVID-19-related restrictions impacted its bottom-line. The company's campaign did increase participation from the restaurant industry but potentially on a more limited scale than participation would have otherwise increased without COVID-19 challenges faced by restaurants.

Cost Effectiveness

Because no deemed savings values exist for the Commercial ESK program, Idaho Power made several assumptions for each kit. When the offering launched in mid-2018, the installation rates of the items in the kit was unknown. Idaho Power estimated the installation rates based on professional judgement. A follow-up survey was sent to active participants in November 2020 with an added question regarding fuel type to determine the percentage of electric water heaters. When the kits are distributed, the water heating fuel source is often unknown. Initially, Idaho Power assumed 40% of kits are distributed to businesses with electric water heat. In 2020, Idaho Power adjusted the electric water heat assumption

based on information from the 2018 potential study. Idaho Power will update this assumption in 2021 based on the follow up survey sent to customers in 2020.

For the LEDs and aerators, savings vary by kit type based on the average annual HOU and annual gallons of water used by business type. Savings for the pre-rinse spray valve in the restaurant kit is from the RTF; it is adjusted based on an assumed installation rate and discounted based on the electric water heat assumption.

For more information about the cost effectiveness savings and assumptions, see *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction

In November 2020, a follow-up survey was sent to past participants. The purpose of the survey was to obtain information on the customer's water heater fuel type as well as determine if the customer had installed any of the items in the kit.

The survey was sent to 3,723 kit recipients. Idaho Power received survey results from 312 respondents. Some highlights include the following:

- The office survey was sent to 2,880 participants, with 250 respondents completing the survey. The restaurant survey was sent to 499 participants, with 37 respondents completing the survey. The retail survey was sent to 344 participants, with 25 respondents completing the survey.
- When asked what best described the water heating source at their business, almost 61% of office kit respondents, approximately 54% of restaurant kit respondents, and 60% of retail kit respondents indicated they had electric water heat.
- Of those that received an office kit, over 89% indicated they installed both LEDs in their business. Almost 94% of respondents installed the power strip.
- Of those that received a restaurant kit, over 90% said they installed all three LEDs in their business, and almost 73% installed the pre-rinse spray valve.
- Of those that received a retail kit, over 84% indicated they installed both LEDs in their business while over 60% installed both BR30 reflector LEDs.

A copy of the survey results is included in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

In 2021, Idaho Power will continue working with the third-party vendor for Commercial ESK distribution to small business customers. The marketing activities will include a LinkedIn post and an online pop up during the My Account login. Additionally, a kit will be included as one of the welcome offerings when Idaho Power calls new business customers, and the online order form will remain available through the company's website.

Flex Peak Program

		2020	2019
Participation and Savings			
	Participants (sites)	141	145
	Energy Savings (kWh)	n/a	n/a
	Demand Reduction (MW)	24	31
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$84,716	$75,306
	Oregon Energy Efficiency Rider	$207,707	$256,606
	Idaho Power Funds	$250,056	$294,911
	Total Program Costs—All Sources	$542,480	$626,823
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	n/a	n/a
	Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	n/a
	Total Resource Benefit/Cost Ratio	n/a	n/a

Description

The Flex Peak Program is a voluntary program where participants are eligible to earn a financial incentive for reducing load. The program is available to Idaho and Oregon commercial and industrial customers with the objective to reduce the demand on Idaho Power's system during periods of extreme peak electricity use.

These are the program event guidelines:

- June 15 to August 15 (excluding weekends and July 4)
- Up to four hours per day between 2:00 p.m. and 8:00 p.m.
- Up to 15 hours per week
- No more than 60 hours per season
- At least three events per season

Customers with the ability to offer load reduction of at least 20 kW are eligible to enroll in the program. The 20-kW threshold allows a broad range of customers to participate in the program. Participants receive notification of a load reduction event two hours before the start of the event.

The program originated in 2009 as the FlexPeak Management program managed by a third-party contractor. In 2015, Idaho Power took over full administration and changed the name to Flex Peak Program. The IPUC issued Order No. 33292 on May 7, 2015, while the OPUC approved Advice No. 15 03 on May 1, 2015, authorizing Idaho Power to implement an internally managed Flex Peak Program (Schedule No. 82 in Idaho and Schedule No. 76 in Oregon) and to continue recovering its demand response program costs in the previous manner.

Program Activities

In 2020, 62 participants enrolled 141 sites in the program. Existing customers were automatically re-enrolled in the program. Participants had a committed load reduction of 35.8 MW in the first week of the

program and ended the season with an amount of 35.94 MW. The maximum available capacity of the program came from a nominated amount mid-season of 36.05 MW. In past years, certain events have achieved higher than a 100% realization rate, which would make this the maximum potential capacity for the program.

This weekly commitment, or nomination, was comprised of all 141 sites. The maximum realization rate during the season was 68%, and the average for the three events was 65%. The realization rate is the percentage of load reduction achieved versus the amount of load reduction committed for an event. The highest hourly load reduction achieved was 24.2 MW (at generation level) during the July 16 event (Table 19). The program had lower costs in 2020 over 2019 because of the slightly decreased enrolled capacity and because the actual reduction was lower in 2020 when events were called.

Table 19. Flex Peak Program demand response event details

Event Details	Thursday, July 16	Thursday, July 30	Wednesday, August 5
Event time	4–8 p.m.	4–8 p.m.	4–8 p.m.
Average temperature	93°F	102°F	93°F
Maximum load reduction (MW)	24.2	23	23.9

Event performance and realization rates for the 2020 season were significantly reduced due to the impact of COVID-19 on customer operations and their ability to reduce load. Typically, the program achieves a realization rate of 85% or greater. This year, many customers did not reduce energy use during program events because they were trying to increase production and recoup revenue after having been shut down for several months prior to the program season.

Also, many big box stores and HVAC-dependent businesses were not able to curtail load due to the need to increase the fresh air flow from outside. For example, Idaho Power Corporate Headquarters (CHQ) used more energy than normal all summer to cool the additional hot air brought in from the outside. Based on studies from the Peak Load Management Alliance, COVID-19 mitigation efforts significantly impaired commercial and industrial demand response on a national scale.

Marketing Activities

Though the terms of IPUC Order No. 32923 and OPUC Order No. 13-482 do not require program marketing, Idaho Power energy advisors regularly communicated with interested customers and current participants and encouraged them to enroll new sites. The company also continued to include the Flex Peak Program in its C&I Energy Efficiency Program collateral. Additional details can be found in the Commercial/Industrial Sector Overview.

Cost-Effectiveness

Idaho Power determines cost-effectiveness for its demand response program under the terms of IPUC Order No. 32923 and OPUC Order No. 13 482. Under the terms of the orders and the settlement, all Idaho Power's demand response programs were cost-effective for 2020.

The Flex Peak Program was dispatched for 12 event hours and achieved a maximum reduction of 24.2 MW. The total cost of the program in 2020 was $542,480. Had the Flex Peak Program been used for the full 60 hours, the cost would have been approximately $765,480.

A complete description of Idaho Power cost-effectiveness of its demand response programs is included in *Supplement 1: Cost-Effectiveness*.

Evaluations

As required each year by IPUC and OPUC, Idaho Power conducted an internal evaluation of the program's potential load reduction impacts. The goal of the review was to calculate the load reduction in MW for the program. The analysis also verified load reduction per site and per event. A copy of the results of this study is in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

The company will continue to communicate the value proposition with enrolled customers and the importance of active participation when events are called. Idaho Power will meet with existing participants during the off-season to discuss past-season performance and upcoming season details.

For the upcoming season, Idaho Power plans to focus on retaining currently enrolled participants and will consider using a My Account pop up to increase program awareness and enrollment. The program will also continue to be marketed along with the C&I Energy Efficiency Program.

The program specialist has already started working with potential candidates for the 2021 season with a focus on enrolling national chain stores within the Idaho Power service area. This customer type makes a good candidate for the program because of their extended operating hours, non-production load types, building automation controls, and consistent energy-use profiles. However, due to COVID-19, these stores may still have similar challenges with participation due to air flow as they did in 2020.

Oregon Commercial Audits

		2020	2019
Participation and Savings			
	Participants (audits)	2	11
	Energy Savings (kWh)	n/a	n/a
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$0	$0
	Oregon Energy Efficiency Rider	$1,374	$7,262
	Idaho Power Funds	$	$0
	Total Program Costs—All Sources	$1,374	$7,262
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	n/a	n/a
	Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	n/a
	Total Resource Benefit/Cost Ratio	n/a	n/a

Description

Oregon Commercial Audits identifies opportunities for all Oregon commercial and industrial building owners, governmental agencies, schools, and small businesses to achieve energy savings. Initiated in 1983, this statutory required program (ORS 469.865) is offered under Oregon Tariff Schedule No. 82.

Through this program, Idaho Power provides free energy audits, evaluations, and educational products to customers through a third-party contractor. During the audits, the contractor inspects the building shell, HVAC equipment, lighting systems, and operating schedules, if available, and reviews past billing data. These visits provide a venue for the contractor to discuss available incentives and specific business operating practices for energy savings. The contractor may also distribute energy efficiency program information and remind customers that Idaho Power personnel can offer additional energy-savings tips and information. Business owners can decide to change operating practices or make capital improvements designed to use energy wisely.

Program Activities

Idaho Power's contractor and personnel were available to assist customers and two customers requested and received audits by the contractor at the start of 2020. COVID-19 restrictions had a significant impact on this program in 2020, as in-person site visits were suspended between March 16 and November 16.

Marketing Activities

Idaho Power sent its annual direct-mailing to 1,566 Oregon commercial customers in September to explain the program's no-cost or low-cost energy audits and the available incentives and resources.

Cost-Effectiveness

As previously stated, the Oregon Commercial Audits program is a statutory program offered under Oregon Schedule 82, the Commercial Energy Conservation Services Program. Because the required parameters of the Oregon Commercial Audit program are specified in Oregon Schedule 82 and the company abides by these specifications, this program is deemed to be cost-effective. Idaho Power claims no energy savings from this program.

2021 Program and Marketing Strategies

Idaho Power does not expect to make any operational changes in 2021.

The company will continue to market the program through the annual customer notification and will consider additional opportunities to promote the program to eligible customers via its energy advisors.

Small Business Direct Install

		2020	2019
Participation and Savings			
	Participants (audits)	139	n/a
	Energy Savings (kWh)	780,260	n/a
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$322,463	n/a
	Oregon Energy Efficiency Rider*	$16,981	n/a
	Idaho Power Funds	$386	n/a
	Total Program Costs—All Sources	$339,830	n/a
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.058	n/a
	Total Resource Levelized Cost ($/kWh)	$0.058	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	1.04	n/a
	Total Resource Benefit/Cost Ratio	1.61	n/a

* Idaho activity of $15.9K charged to the Oregon Rider was reversed and charged to the Idaho rider in the first quarter of 2021.

Description

Idaho Power launched a SBDI program in November 2019 targeting typically hard-to-reach small business customers. SBDI is implemented by a third-party contractor. Idaho Power pays 100% of the cost to install eligible lighting measures for customers who use 25,000 kWh annually or less. SBDI is offered to eligible customers in a strategic geo-targeted approach.

Program Activities

In 2020, the company rolled out SBDI to customers in eastern Idaho. Three cities were targeted for the soft launch: Aberdeen, American Falls and Blackfoot. Direct-mail letters were sent to customers informing them of their eligibility to participate in the program. Follow-up calls were made to customers who received letters, offering another opportunity to hear about the program and to declare their interest in participating.

As customers responded to the letters and follow-up calls, lighting assessments were scheduled. Customers who agreed to have LEDs installed at their facility were scheduled for project installation beginning in January.

Customer interest in SBDI was on the rise when the COVID-19 pandemic occurred. Idaho Power suspended on-site customer activity for the SBDI program offering mid-March and removed the suspension early in October 2020, with on-site activity adhering to COVID-19 safety protocols. When on-site activity resumed in the fall, the company's third-party program implementer worked to reinstate equipment installers and reconnect with eligible customers who had signed up for a lighting assessment or project installation prior to COVID-19 restrictions.

There were 139 project installations performed in 2020, along with 11 post-installation inspections.

Marketing Activities

Idaho Power sent letters to 103 business customers in American Falls in January, 323 Blackfoot customers in February, 398 Blackfoot customers in March, and an additional 184 Blackfoot customers in December. The program contractor followed up with a phone call to customers about a week after they received the letter.

When on-site work was suspended due to COVID-19, the contractor reached out to the customers who were in the process to let them know the company would not be able to complete the project at that time. In August, the company sent an email to the customers who were waiting for the SBDI program to restart to let them know the on-site work remained suspended. Those customers received an email in October informing them the program had restarted, and they would receive a call from the contractor soon.

As a follow-up to the direct mail letters, over 1,000 outbound calls were placed to eligible customers, resulting in 207 scheduled lighting assessments during 2020.

Cost-Effectiveness

In 2020, the projects in the SBDI program were all lighting upgrades. Idaho Power's third-party contractor calculates the savings based on the existing fixture wattage, the replacement fixture wattage, and the HOU. The UCT and TRC ratios for the program are 1.04 and 1.61 respectively. Non-energy impacts were applied in 2020 based on an estimated per kWh value by commercial and industrial end-uses. These values were provided by a third-party as part of the 2019 impact evaluation of the New Construction and Retrofits options.

Details for the program cost effectiveness are in *Supplement 1: Cost-Effectiveness*.

Customer Satisfaction

Idaho Power's third-party program implementer sent 96 customer satisfaction surveys to program participants in 2020, of which 27 surveys were returned. Key highlights include the following:

- Nearly 89% of respondents said they were "very satisfied" with the program, and over 7% of respondents indicated they were "somewhat satisfied."
- All respondents reported they were "very satisfied" with the equipment installed.
- All respondents found the program easy to participate in, with nearly 93% indicating the program was "very easy" and over 7% reporting it was "somewhat easy" to participate in.
- All respondents reported they would be likely to recommend the program to other small businesses, with nearly 93% saying they were "very likely" and over 7% saying they were "somewhat likely" to recommend the program.
- When asked how their opinion of Idaho Power has changed since participating in the program, just over 48% of respondents reported having a more favorable opinion of Idaho Power and nearly 52% of respondents reporting no change in opinion.

A copy of the survey results is included in *Supplement 2: Evaluation*.

Evaluations

In 2020, Idaho Power contracted with Tetra Tech to conduct a process evaluation for the SBDI Program. However, due to limited program on-site installation activity because of COVID-19, it was decided the evaluation will be more informative if additional installations were completed. The contract will remain with Tetra Tech and the evaluation is estimated to resume in the second quarter of 2021.

2021 Program and Marketing Strategies

Idaho Power will continue to operate and market this program as described above. The company plans to expand the offering in its eastern region and move to the southern region mid-year 2021.

Irrigation Sector Overview

The irrigation sector is comprised of agricultural customers operating water pumping or water delivery systems to irrigate agricultural crops or pasturage. End use electrical equipment primarily consists of agricultural irrigation pumps and center pivots. The irrigation sector does not include water pumping for non-agricultural purposes, such as the irrigation of lawns, parks, cemeteries, golf courses, or domestic water supply.

In July 2020, the active irrigation service locations totaled 20,804 system-wide, which is an increase of 1.1% compared to July of 2019. The increase is primarily caused by adding service locations for pumps and center pivot irrigation systems as land is converted from furrow and surface irrigation to sprinkler irrigation.

Irrigation customers accounted for 1,987,418 MWh of energy usage in 2020, versus 1,759,137 MWh in 2019. The approximately 13% increase is primarily due to variations in weather. This sector represented nearly 13.5% of Idaho Power's total electricity sales, and approximately 28% of July sales. As stated above, customer numbers have increased slightly over time, while the energy usage trend for this sector has not changed significantly in many years. There is, however, a substantial yearly variation in usage due primarily to the impact of weather on irrigation customer needs.

The Irrigation Efficiency Rewards program, including the Green Motor Initiative, experienced increased annual savings: from 10,118 MWh in 2019 to 12,884 MWh in 2020. This is due primarily to an increase in the number and size of the project savings of the Custom Incentive Option.

Idaho Power re-enrolled the majority of 2019 Irrigation Peak Rewards participants in 2020, with 2,292 service points and a maximum load reduction potential of 298 MW. Table 20 shows the actual load reduction was 292 MW in 2020, and summarizes the overall expenses and program performance for both programs.

Table 20. Irrigation sector program summary, 2020

		Total Cost		Savings	
Program	**Participants**	**Utility**	**Resource**	**Annual Energy (kWh)**	**Peak Demand (MW)**
Demand Response					
Irrigation Peak Rewards	2,292 service points	$ 6,407,412	$ 6,407,412		292
Total		**$ 6,407,412**	**$ 6,407,412**		**292**
Energy Efficiency					
Irrigation Efficiency Rewards	1,018 projects	$ 3,401,673	$16,857,055	12,847,823	
Green Motors—Irrigation	23 motor rewinds			36,147	
Total		**$ 3,401,673**	**$16,857,055**	**12,883,970**	

Note: See Appendix 3 for notes on methodology and column definitions.
Totals may not add up due to rounding.

Energy Efficiency Programs

Irrigation Efficiency Rewards

An energy efficiency program designed to encourage customers to replace or improve inefficient irrigation systems and components. Customers receive incentives through the Custom Incentive Option for extensive retrofits and new systems and through the Menu Incentive Option for small maintenance upgrades.

Green Motor Initiative

Idaho Power pays service centers to rewind qualified irrigation motors. Half of this incentive is then given to the customer as a credit on the rewind invoice.

Demand Response Program

Irrigation Peak Rewards

A program designed to reduce peak load from irrigation pumps. Participating service points are automatically controlled by Idaho Power switches or manually interrupted by the customer when switch technology is not available.

Marketing

In 2020, the company mailed a summer edition of *Irrigation News* to all irrigation customers in its service area. In part, the newsletter educated customers about how to sign up for new or upgraded service and also promoted the Irrigation Efficiency Rewards program.

The Menu Incentive application was digitized and a tear-pad was created to make the process of distributing information and signing up for the program easier than ever.

The company also placed numerous ads in print agricultural publications to reach the target market in smaller farming communities. Publications included: *Ag Proud*, *Capital Press*, *Power County Press*, *Potato Grower Magazine*, *Owyhee Avalanche*, and *The Ag Expo East and West Programs*. Idaho Power used radio advertising to promote its presence at the Agri-Action show and to show support of Future Farmers of America and Ag Week conferences.

January through March the company ran 785 radio ads promoting the Irrigation Efficiency Rewards program. The 30-second spots ran in eastern and southern Idaho on a variety of stations, including news/talk, sports, classic rock, and country.

A tabletop display was used at irrigation-specific trade shows and highlighted specific equipment incentives. Throughout the year, social media posts promoted the company's presence at trade shows and highlighted the Irrigation Efficiency Rewards program.

Customer Satisfaction

Idaho Power conducts the *Burke Customer Relationship Survey* each year. In 2020, 62% of irrigation survey respondents indicated Idaho Power is meeting or exceeding their needs with information on how to use energy wisely and efficiently. Seventy-one percent of respondents indicated Idaho Power is meeting or exceeding their needs by encouraging energy efficiency with its customers. Fifty-four percent of Idaho Power customers surveyed in 2020 indicated the company is meeting or exceeding their needs in offering energy efficiency programs, and 41% of the respondents indicated they have participated in at least one Idaho Power energy efficiency program. Of the irrigation survey respondents who have participated in at least one Idaho Power energy efficiency program, 91% are "very" or "somewhat" satisfied with the program.

Training and Education

Idaho Power continued to market its irrigation programs by varying the location of workshops and offering new presentations to irrigation customers.

In 2020, prior to COVID-19 restrictions, Idaho Power provided five irrigation workshops, and participated in two additional vendor hosted workshops promoting the Irrigation Efficiency Rewards

program, due to impacts of COVID-19 restrictions this number was lower than a typical year. Approximately 225 customers attended workshops in Burley, Twin Falls, Jerome, Gooding, Caldwell, Mountain Home, and Buhl, Idaho. The company also participated in and had an exhibit at four agricultural trade shows prior to COVID-19 restrictions, the Idaho Irrigation Equipment Association Winter Show, Eastern Idaho Agriculture Expo, Western Idaho Agriculture Expo, and the Agri Action Ag Show.

Field Staff Activities

Idaho Power agricultural representatives (ag reps) were available to be on-site with customers offering Idaho Power energy efficiency and demand response program information, education, training, and irrigation system assessments and audits across the service area, for the first two and a half months in 2020. However, in March due to COVID-19 restrictions, ag reps were only able to stay in contact with their customers via phone call, email, and text. Later in the calendar year, because ag reps could be outdoors at customers' irrigation sites in a socially distanced manner, on-site work resumed adhering to COVID-19 safety protocols.

Also in 2020, agricultural representatives were still able to engage with agricultural irrigation equipment dealers with the goal of sharing expertise about energy-efficient system designs and increasing awareness about the program. However, due to COVID-19 restrictions this work was mostly through phone calls and emails. Agricultural representatives and the irrigation segment coordinator, a licensed agricultural engineer, participated in training to maintain or obtain their Certified Irrigation Designer and Certified Agricultural Irrigation Specialist accreditation sponsored by the nationally based Irrigation Association.

Irrigation Efficiency Rewards

		2020*	2019*
Participation and Savings			
	Participants (projects)	1,041	1,114
	Energy Savings (kWh)*	12,883,970	10,118,160
	Demand Reduction (MW)	n/a	n/a
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$3,165,075	$2,449,427
	Oregon Energy Efficiency Rider	$194,044	$174,120
	Idaho Power Funds	$42,553	$37,716
	Total Program Costs—All Sources	$3,401,673	$2,661,263
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	$0.025	$0.031
	Total Resource Levelized Cost ($/kWh)	$0.125	$0.119
Benefit/Cost Ratios**			
	Utility Benefit/Cost Ratio	4.00	2.44
	Total Resource Benefit/Cost Ratio	4.09	3.13

* 2020 total includes 36,147 kWh of energy savings from 23 Green Motors projects. 2019 total includes 44,705 kWh of energy savings from 34 Green Motors projects.

** 2020 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 4.03 and 4.09, respectively.

Description

Initiated in 2003, the Irrigation Efficiency Rewards program encourages energy-efficient equipment use and design in irrigation systems. Qualified irrigators in Idaho Power's service area can receive financial incentives and reduce their electricity usage through participation in the program. Two options help meet the needs for major or minor changes to new or existing systems: Custom Incentive and Menu Incentive. Irrigation customers can also qualify for an incentive when they "rewind" their irrigation motors.

Custom Incentive Option

The Custom Incentive Option is offered for extensive retrofits to existing systems or the installation of an efficient, new irrigation system.

For a new system, Idaho Power determines whether the equipment is more energy efficient than standard before approving the incentive. If an existing irrigation system is changed to a new water source, this program considers it a new irrigation system. The incentive for a new system is 25 cents per annual kWh saved, not to exceed 10% of the project cost.

For existing system upgrades, the incentive is 25 cents per annual kWh saved or $450 per kW demand reduction, whichever is greater. The incentive is limited to 75% of the total project cost.

The qualifying energy efficiency measures include any hardware changes that result in a reduction of the potential kWh use of an irrigation system or that result in a potential demand reduction. Idaho Power reviews, analyzes, and makes recommendations on each project after considering prior usage history, invoices, and, in most situations, post-installation demand data to verify savings and incentives.

Menu Incentive Option

The Menu Incentive Option covers a portion of the costs of repairing and replacing specific components that help the irrigation system use less energy. This option is designed for systems where small maintenance upgrades provide energy savings from these 11 separate measures:

- New flow-control type nozzles
- New nozzles for impact, rotating, or fixed head sprinklers
- New or rebuilt impact or rotating type sprinklers
- New or rebuilt wheel-line levelers
- New complete low-pressure pivot package (sprinkler, regulator, and nozzle)
- New drains for pivots or wheel-lines
- New riser caps and gaskets for hand lines, wheel lines, and portable main lines
- New wheel-line hubs (Thunderbird)
- New pivot gooseneck and drop tube
- Leaky pipe repair
- New center pivot base boot gasket

Payments are calculated on a predetermined kWh savings per component.

Green Motors Initiative

Idaho Power also participates in the Green Motors Practices Group's GMI. Under the initiative, Idaho Power pays service centers $2 per hp for motors 15 to 5,000 hp that received a verified Green Rewind. Half of that incentive is passed on to irrigation customers as a credit on their rewind invoice.

Program Activities

In 2020, 1,018 projects were completed as follows: 848 used the Menu Incentive Option and provided an estimated 4,015 MWh of energy savings; and 170 used the Custom Incentive Option and provided 8,832 MWh of energy savings (84 were new systems and 86 were on existing systems).

Also, a total of 23 irrigation customers' motors were rewound under the GMI and accounted for 36,147 kWh in savings.

Marketing Activities

In addition to training, education, and marketing activities mentioned in the Irrigation Sector Overview, the Idaho Power agricultural representative and program specialist worked one-on-one with irrigation dealers and vendors who are key to the successful promotion of the program. Due to the COVID-19 restrictions in the early spring of 2020, some of the program workshops were cancelled.

Cost-Effectiveness

Idaho Power calculates cost effectiveness using different savings and benefits assumptions and measurements under the Custom Incentive Option and the Menu Incentive Option of Irrigation Efficiency Rewards.

Each application under the Custom Incentive Option received by Idaho Power undergoes an assessment to estimate the energy savings that will be achieved through a customer's participation in the program. On existing system upgrades, Idaho Power calculates the savings of a project by determining what changes are made and comparing it to the service point's previous five years of electricity usage history on a case-by-case basis. On new system installations, the company uses standard practices as the

baseline and determines the efficiency of the applicant's proposed project. Based on the specific equipment to be installed, the company calculates the estimated post-installation energy consumption of the system. The company verifies the completion of the system design through aerial photographs, maps, and field visits to ensure the irrigation system is installed and used in the manner the applicant's documentation describes.

Each application under the Menu Incentive Option received by Idaho Power also undergoes an assessment to ensure deemed savings are appropriate and reasonable. Payments are calculated on a prescribed basis by measure. In some cases, the energy-savings estimates in the Menu Incentive Option are adjusted downward from deemed RTF savings to better reflect known information on how the components are actually being used. For example, a half-circle rotation center pivot will save half as much energy per sprinkler head as a full-circle rotation center pivot. All deemed savings are based on seasonal operating hour assumptions by region. If a system's usage history indicates it has lower operating hours than the assumptions, like the example above, the deemed savings are adjusted.

In March 2018, the RTF updated the irrigation hardware measure analysis, which resulted in a reduction of savings between 34 to 94% from the previous workbook. The major assumption driving the measure savings change in the program involves the calculation of the leakage per hardware item, which caused savings to decrease nearly 80% on average for several irrigation hardware types. Overall, the program remains cost-effective from both the UCT and TRC perspective. Two measures pass the UCT but fail the TRC while one measure, the rebuilt or new brass sprinkler, fails both the UCT and TRC. Idaho Power received a cost-effectiveness exception with Oregon under Order No. 18-476.

The company has been working with the RTF and the irrigation subcommittee to re-examine the assumptions and review the small maintenance measures under the Menu Incentive Option offered by Idaho Power and other utilities in the region. The irrigation subcommittee created a survey to be used by regional utilities to gather better information on maintenance practices of irrigation systems. The survey is meant to be a gauge of the maintenance practices of customers participating in the program versus non-participants. Idaho Power mailed the irrigation hardware survey to Idaho Power irrigation customers in February 2020 and received a 23% response rate. The results of the survey have been compiled. Review of the survey has taken place including conversations with BPA utility representatives. The RTF's next steps with the irrigation subcommittee will be determined in the first quarter of 2021.

The UCT and TRC for the program is 4.00 and 4.09 respectively. If the amount incurred for the 2020 evaluation was removed from the program's cost-effectiveness, the UCT would be 4.03 while the TRC would be 4.09.

Complete measure-level details for cost effectiveness can be found in *Supplement 1: Cost-Effectiveness*.

Evaluations

As part of the on-going research around irrigation hardware measures, Idaho Power, in coordination with the RTF and other utilities in the region, developed a survey to gain better understanding of the hardware maintenance practices of area irrigators. Idaho Power sent surveys to 6,248 irrigators in February 2020. Key highlights from the 1,433 responses include:

- Respondents indicated that almost 84% of their acreage is irrigated with a lift greater than 200 ft.
- The most popular crops in rotation are alfalfa hay (almost 68%); barley, wheat, or other grains (over 51%); and pasture (almost 47%).
- Less than 48% of respondents replace their irrigation hardware in less than 5 years. The number of years varied by irrigation hardware measures. For pivot or linear packages, just over 38% of

respondents indicated those are replaced within 5 years. For goosenecks, just over 21% of respondents indicated those are replaced within 5 years.

- Nearly 87% of respondents indicated they do not replace their irrigation components on a predetermined schedule.

A copy of the survey results is included in *Supplement 2: Evaluation*.

In 2020, Idaho Power contracted with Tetra Tech to conduct an impact and process evaluation on the Irrigation Efficiency Rewards Program. The evaluation noted the program is well-managed with comprehensive support from a knowledgeable and responsive Idaho Power staff.

The process evaluation reviewed program materials and interviewed Idaho Power program staff and agricultural representatives as well as irrigation vendors and participants. The evaluation found that materials are professional, informative and educational. Marketing messages appear to be reaching customers. The evaluation recommended Idaho Power continue transfer of documents to an electronic filing system, create a more systematic method for reviewing vendor activity levels and continue to refine the electronic program manual in case knowledgeable staff transition away from the program.

The impact evaluation calculated a 2019 program year kWh savings realization rate of 97.4% (100% for the Menu Program and 95.4% for Custom). The evaluation recommended Idaho Power formalize data collection of irrigation operating conditions, streamline custom calculations, and increase documentation for critical system components.

Idaho Power will consider all recommendations made in the report, and any changes to the program will be reported in the *Demand-Side Management 2021 Annual Report.* See the complete analysis report in *Supplement 2: Evaluation*.

2021 Program and Marketing Strategies

Irrigation Efficiency Rewards program marketing plans typically include conducting at least six customer-based irrigation workshops to promote energy efficiency, technical education, and program understanding. Though the Western Idaho Ag Expo, Agri-Action, and Idaho Irrigation Equipment Association Show & Conference are cancelled for 2021 due to COVID-19 restrictions, Idaho Power intends to participate virtually in the Eastern Idaho Ag Expo. Marketing the program to irrigation vendors will continue to be a priority.

The company will promote the program in agriculturally focused editions of newspapers, magazines, and radio ads. The radio ads will run during the spring throughout the company’s southern and eastern service areas.

Irrigation Peak Rewards

		2020	2019
Participation and Savings			
	Participants (participants)	2,292	2,332
	Energy Savings (kWh)	n/a	n/a
	Demand Reduction (MW)	292	278
Program Costs by Funding Source			
	Idaho Energy Efficiency Rider	$264,843	$239,523
	Oregon Energy Efficiency Rider	$185,224	$179,733
	Idaho Power Funds	$5,957,345	$6,352,452
	Total Program Costs—All Sources	$6,407,412	$6,771,708
Program Levelized Costs			
	Utility Levelized Cost ($/kWh)	n/a	n/a
	Total Resource Levelized Cost ($/kWh)	n/a	n/a
Benefit/Cost Ratios			
	Utility Benefit/Cost Ratio	n/a	n/a
	Total Resource Benefit/Cost Ratio	n/a	n/a

Description

Idaho Power's Irrigation Peak Rewards program is a voluntary, demand response program available to agricultural irrigation customers with metered service locations who have participated in the past. Initiated in 2004, one of the purposes of the program is to minimize or delay the need to build new supply-side resources.

The program pays irrigation customers a financial incentive to interrupt the operation of specific irrigation pumps using one or more control devices. Historically, the Irrigation Peak Rewards program provides a maximum of approximately 315 MW of load reduction, or nearly 9% of Idaho Power's all-time system peak.

The program offers two interruption options: Automatic Dispatch Option and Manual Dispatch Option. Automatic Dispatch Option pumps are controlled by an Advanced Metering Infrastructure (AMI) or a cellular device that remotely turns off the pump(s). Manual Dispatch Option pumps can participate if they have 1,000 cumulative hp or if Idaho Power has determined the AMI or cellular technology will not function properly at that location. These customers nominate a kW reduction and are compensated based on the actual load reduction during the event.

Program event guidelines for either interruption option are listed below:

- June 15 to August 15 (excluding Sundays and July 4)
- Up to four hours per day between 1 and 9 p.m.
- Up to 15 hours per week
- No more than 60 hours per season
- At least three events per season

The incentive structure consists of fixed and variable payments. The fixed incentive is $5.00/kW with an energy credit of $0.0076/kWh. The demand (kW) credit is calculated by multiplying the monthly billing kW by the demand-related incentive amount. The energy (kWh) credit is calculated by multiplying the

monthly billing kWh usage by the energy-related incentive amount. The incentive is applied to monthly bills, and credits are prorated for periods when reading/billing cycles do not align with the program season dates. An additional variable credit of $0.148/kWh applies to the fourth and subsequent events that occur between 1 p.m. and 8 p.m. The variable credit is increased to $0.198/kWh when customers allow Idaho Power to interrupt their pumps until 9 p.m.

Program rules allow customers the ability to opt out of dispatch events up to five times per service point. The first three opt outs incur a penalty of $5 per kW, while the remaining two incur a penalty of $1 per kW based on the current month's billing kW. The opt-out penalties may be prorated to correspond with the dates of program operation and are accomplished through manual bill adjustments. The penalties will never exceed the amount of the incentive that would have been paid with full participation.

Program Activities

In 2020, Idaho Power enrolled 2,292 (82.6%) of the eligible service points in its service area. The total nominated reduction was 400.52 MW vs. 408.65 MW in 2019. The total maximum potential reduction (capacity) for the program was 298 MW in 2020 vs 327 MW in 2019. The key factors impacting the lower maximum capacity were decreased nominated MW, decreased participation, increased device failure, and a lower percentage of enrolled pumps running on the highest day of irrigation load. Device failure identification and correction is an on-going effort pre-season and during season which requires urgency due to the strict timeline of the program. Contracted electricians continued to make site visits, however, those site visits had a slower start and were completed at a slower pace due to adhering with COVID-19 protocols.

The company used four electrical contractors during the year to maintain and troubleshoot the AMI devices and cellular devices for dispatching. Two of the four electricians were new to the program and site work involving the program. In October 2020, an effort was made to exchange nearly 211 cell devices for AMI devices due to upgrades made to substations throughout the IPC service area. Of the 211 work orders, 179 were completed and 39 are scheduled to be completed in May 2021. The exchanges will ensure a larger data set on the same technology platform, including analysis of hourly data. The cell device does not allow for monitoring on an hourly basis. The removed cell devices were retired.

Table 21. Irrigation Peak Rewards demand response event details

Event Details	Wednesday, June 24	Tuesday, July 21	Friday, July 31
Event Time	2–9 p.m.	2–9 p.m.	2–9 p.m.
Temperature	95	98	104
Maximum load reduction (MW)	292	241	226

Marketing Activities

Idaho Power used workshops, trade shows, and direct-mailings to encourage past participants to re-enroll in the program. The brochure, enrollment worksheet, and contact worksheet were mailed to all eligible participants in March 2020. See the Irrigation Sector Overview section for additional marketing activities.

Cost-Effectiveness

Idaho Power determines cost-effectiveness for the demand response programs under the terms of IPUC Order No. 32923 and OPUC Order No. 13-482. Under the terms of the orders and the settlement, all Idaho Power's demand response programs were cost-effective for 2020.

The Irrigation Peak Rewards program was dispatched for 12 event hours and achieved a maximum demand reduction of 292 MW. The total expense for 2020 was $6.4 million and would have been approximately $9.4 million if the program was operated for the full 60 hours.

A complete description of cost-effectiveness results for Idaho Power's demand response programs is included in *Supplement 1: Cost-Effectiveness*.

Evaluations

Each year, Idaho Power produces an internal report of the Irrigation Peak Rewards program. This report includes a load-reduction analysis, cost-effectiveness information, and program changes. A breakdown of the load reduction for each event day and each event hour including line losses is shown in Table 22. A copy of the program report is included in *Supplement 2: Evaluation*.

Table 22. Irrigation Peak Rewards program MW load reduction for events

Event Date	2–3 pm	3–4 pm	4–5 pm	5–6 pm	6–7 pm	7–8 pm	8–9 pm
6/24/2020	78.63	162.67	236.38	292.43	213.80	129.76	56.05
7/21/2020	61.75	118.38	190.55	240.52	178.77	122.14	49.97
7/31/2020	43.10	111.64	181.82	225.96	182.86	114.31	44.14

2021 Program and Marketing Strategies

Idaho Power will continue to recruit past participants in this program for the 2021 irrigation season; no program changes are expected. Because customers enroll for this program in the late winter or early spring when COVID-19 restrictions are still likely to be in place, the company's agricultural representatives will present information on the program during the virtual Eastern Idaho Ag Expo and other virtual training sessions. Each eligible customer will also be sent a comprehensive packet containing an informational brochure, enrollment worksheet, and contact worksheet encouraging their participation. Idaho Power agricultural representatives will continue to remind and inform customers to encourage program participation.

Other Programs and Activities

Local Energy Efficiency Funds

The purpose of Local Energy Efficiency Funds (LEEF) is to provide modest funding for short-term projects that do not fit within Idaho Power's energy efficiency programs but provide a direct benefit to the promotion or adoption of beneficial energy efficiency behaviors or activities. Idaho Power has been modifying its existing programs and expanding programs over the years to include as many cost-effective energy efficiency measures as possible for all customers. Due to the expanded options, there has been decreasing participation in the LEEF offering.

In 2020, Idaho Power received two LEEF applications for funding related to residential heating and cooling systems. Because both projects were deemed eligible for an existing energy efficiency program, an Idaho Power residential program specialist followed up with the applicants to encourage participation in the appropriate program.

Idaho Power's Internal Energy Efficiency Commitment

In 2020, Idaho Power continued to upgrade its substation buildings across the service area and prioritize the conversion to xeriscape landscaping.

Renovation projects continued at the Idaho Power CHQ in downtown Boise, with a project to exchange the old T-12 parabolic lighting fixtures with LED fixtures. Remodels continued to incorporate energy efficiency measures, such as lower partitions for better transfer of daylight, other lighting retrofits, and automated lighting controls. The CHQ building also participated in the Flex Peak Program again in 2020 and committed to reduce up to 200 kW of electrical demand during events. Unlike other program participants, Idaho Power does not receive any financial incentives for its participation.

Market Transformation

While all Idaho Power's energy efficiency programs and activities are gradually transforming markets by changing customer's knowledge, use and application of energy efficient technologies and principles. The traditional market transformation definition is an effort to permanently change the existing market for energy efficiency goods and services by engaging and influencing large national companies to manufacture or supply more energy-efficient equipment. Through market transformation activities, there is promotion of the adoption of energy-efficient materials and practices before they are integrated into building codes or become standard equipment. Idaho Power achieves market transformation savings primarily through its participation in NEEA. Although in 2020, Idaho Power and Avista did partner to engage with another third party to explore and evaluate potential opportunities or enhancements for traditional market transformation efforts that could benefit customers in both utilities service areas beyond what NEEA is currently supporting. This engagement will continue into 2021 and may lead to future efforts.

NEEA

Idaho Power has funded NEEA since its inception in 1997. NEEA's role is to look to the future to find emerging opportunities for energy efficiency and to create a path forward to make those opportunities a reality in the region.

Pursuant to IPUC Order No. 34556 Idaho Power participates in NEEA with funding from the Idaho Rider. The current NEEA contract is for the five years 2020-2024. NEEA categorizes the saving it achieves in five categories: total regional savings, baseline savings, local program savings, net market effects, and co-created saving created by NEEA and its utility funders working collaboratively. Of the

360–500 average megawatts (aMW) of savings forecast for 2020 to 2024, NEEA expects 70 to 100 aMW to be net market effects, and 115–152 aMW will be co-created savings. The current contract commits Idaho Power to paying NEEA $14.7 million, or approximately $2.9 million annually.

In 2020, Idaho Power participated in all of NEEA's committees and workgroups, including representation on the Regional Portfolio Advisory Committee (RPAC) and the Board of Directors. Idaho Power representatives participate in the RPAC, Cost-Effectiveness Advisory Committee, Commercial Advisory Committee, RETAC and the Idaho Energy Code Collaborative. The company also participates in NEEA's initiatives, including the Residential Building Stock Assessment, Commercial Building Stock Assessment, Commercial Code Enhancement (CCE), Strategic Energy Management (SEM), Top-Tier Trade Ally (NXT Level), and Luminaire Level Lighting Controls (LLLC).

For the 2020-2024 funding cycle, NEEA and its funders have reorganized the "advisory" committees. NEEA now has two coordinating committees: Products Coordinating Committee and Integrated Systems Coordinating Committee. NEEA and its funders will form working groups as needed in consultation with the RPAC. The RPAC will continue, as well as the Cost Effectiveness Advisory and the Regional Emerging Technology Advisory committees. The Idaho Energy Code Collaborative will also remain intact.

NEEA performed several market progress evaluation reports (MPER) on various energy efficiency efforts this year. In addition to the MPERs, NEEA provides market research reports through third-party contractors for energy efficiency initiatives throughout the Northwest. Copies of these and other reports mentioned below are referenced in *Supplement 2: Evaluation* and on NEEA's website under Resources & Reports. For information about all committee and workgroup activities, see the information below.

NEEA Marketing

To support NEEA efforts, Idaho Power educated residential customers on HPWH and DHPs and educated commercial customers and participating contractors on NXT Level Lighting Training and LLLC.

Idaho Power promoted DHPs and HPWHs as part of its H&CE Program. The company also promoted DHPs and HPWHs as part of its residential marketing campaign. Full details can be found in the H&CE Program's Marketing section.

Idaho Power continued to encourage trade allies to take the NXT Level Lighting Training. Idaho Power posted on LinkedIn in April and August highlighting NXT Level Lighting Training. To promote LLLC, Idaho Power added a link to an informational LLLC flyer on the main Retrofits and Lighting webpages. The company also posted about LLLCs on LinkedIn in August.

NEEA Activities: All Sectors

Cost-Effectiveness Advisory Committee

The advisory group meets four times a year to review evaluation reports, cost-effectiveness, and savings assumptions. One of the primary functions of the work group is to review all savings assumptions updated since the previous reporting cycle. The committee also reviews NEEA evaluation studies and data collection strategies and previews forthcoming research and evaluations.

Idaho Energy Code Collaborative

Since 2005, the State of Idaho has been adopting a state-specific version of the IECC. The Idaho Energy Code Collaborative was formed to assist the Idaho Building Code Board (IBCB) in the vetting and evaluation of future versions of the IECC for the residential and commercial building sectors. The group

is comprised of individuals having diverse backgrounds in the building industry and energy code development. Building energy code evaluations are presented by the group at the IBCB public meetings. The group also provides education to the building community and stakeholders to increase energy code knowledge and compliance. Idaho Power is an active member. The work is facilitated by NEEA.

On October 29, 2019, the IBCB approved the *2018 International Building Code*, *2018 International Existing Building Code*, *2018 International Residential Code*, *2018 International Energy Conservation Code* (residential), and the *2018 International Energy Conservation Code* (commercial) with amendments. The codes were on Idaho's 2020 legislative session agenda for potential adoption and were adopted with an effective date of January 1, 2021. The Idaho Energy Code Collaborative is an effort in which Idaho Power will continue to participate.

Regional Emerging Technology Advisory Committee

Idaho Power participated in the RETAC, which met quarterly to review the emerging technology pipeline for BPA, NEEA, and the Northwest Power and Conservation Council (NWPCC) Seventh Power Plan. Throughout 2020, RETAC focused on technologies for residential HVAC, commercial HVAC, and water heating. RETAC discussed the gaps and issues that exist for these technologies and how NEEA and the regional utilities can address those issues. This work will continue in 2021.

Regional Portfolio Advisory Committee

RPAC is responsible for overseeing NEEA's market transformation programs and their advancement through key milestones in the "Initiative Lifecycle." RPAC members must reach a full consent vote at selected milestones for a program to advance to the next stage. In 2018, NEEA and RPAC formed an additional group called the RPAC Plus (RPAC+), which included marketing subject matter experts to help coordinate NEEA's marketing activities with those of the funders. RPAC convenes quarterly meetings and adds other webinars as needed.

In 2020, RPAC conducted four quarterly meetings, one that had an in-person option and the rest that were virtual due to COVID-19 restrictions. Throughout 2020, RPAC received updates of savings forecasts, portfolio priorities, committee reports, and some of the impacts of COVID-19. In addition to quarterly meetings, NEEA held a webinar workshop specifically on HPWH on February 11, 2020 to discuss tools and strategies to bolster adoption.

In the first regular quarterly meeting on March 4, NEEA held another workshop on bolstering HPWH sales in the region which resulted in a recommendation for NEEA to create an awareness/education campaign.

On June 2, NEEA staff updated RPAC on lessons learned from some Midstream Commercial Commodity Lighting pilot projects, key insights from lighting sales data, and a linear commodity lighting opportunity.

At the August 25 meeting, NEEA gave an overview of the new residential HVAC program concept, which encompasses variable capacity air source heat pumps in central forced-air applications displacing less efficient, single-speed heat pumps and electric furnaces for both retrofits and new construction. NEEA also presented market transformation progress for DHPs and shared thinking on plans to transition to Long-term Monitoring and Tracking (LTMT) and reminded RPAC that the super-efficient dryers initiative was ending in 2021. Additionally, at the RPAC+ portion of the meeting, NEEA shared the details of a proposed HPWH awareness campaign.

At the November 4 meeting, NEEA gave RPAC members an overview of the DHP program's transition to the LTMT phase. Additionally, at this meeting NEEA gave an overview of the new Variable Speed Heat Pump program that will be brought to RPAC members for an Initiative Start vote at the first

quarterly meeting of 2021. NEEA also reported on the Carbon Offsets Research Work Group regarding the idea for creating carbon credits for HPWHs.

NEEA Activities: Residential

As a result of the NEEA advisory committee reorganization, the Residential Advisory Committee (RAC) was disbanded by NEEA and the tasks the committee worked on divided between the two coordinating committees: Products Coordinating Committee and Integrated Systems Coordinating Committee. The BetterBuilt NW Workgroup, which encompassed Residential New Homes and ENERGY STAR® Manufactured Homes, the Retail Products Portfolio (RPP) Initiative Workgroup and the Super-Efficient Dryers Workgroup were dissolved. Those initiatives are now included within the Product Coordinating Committee. Idaho Power is represented on both coordinating committees. Meetings were held in each quarter in 2020 for both coordinating committees. These committees provide utilities with the opportunity to give meaningful input into the design and implementation of NEEA programs as well as to productively engage with each other.

NEEA provides BetterBuiltNW online builder and contractor training, and manages the regional homes database, AXIS. NEEA continued to market an above-code manufactured homes specification, known as NEEM 2.0 to regional utilities. This specification may eventually replace the current NEEM 1.1 specification, which is dependent upon Housing and Urban Development (HUD) upgrading current code.

Residential Building Stock Assessment

NEEA began work on the Residential Building Stock Assessment (RBSA) in mid-2020. The RBSA is conducted approximately every five years. Its purpose is to determine common attributes of residential homes and to develop a profile of the existing residential buildings in the Northwest. The information is used by the regional utilities and NWPCC to determine load forecast and energy savings potential in the region.

Idaho Power participated in monthly work group meetings to discuss the study's objectives, framework, sampling design, and communication plan. It's anticipated that site visits in the region will begin in mid-2021 and will finish by mid-2022. For residential customers who choose to participate, the third-party contractor will schedule a site visit with a field technician who collects information on the home characteristics.

It is unknown when Idaho Power customers will be contacted for this study. A COVID-19 safety plan will be developed and approved by each utility prior to the start of the site visits. A final report will be available by the end of 2022.

NEEA Activities: Commercial/Industrial

NEEA continued to provide support for commercial and industrial energy efficiency activities in Idaho in 2020, which included partial funding of the IDL for trainings and additional tasks.

Commercial Code Enhancement

NEEA facilitated regional webinars for the CCE initiative for new construction to discuss how utilities can effectively align code changes and utility programs. The CCE is a NEEA initiative comprised of people with varying backgrounds and levels of association with the building construction industry. The group's goal is to enable the continual advancement of commercial construction and energy codes and identify opportunities to highlight above code best practice in local markets. This work will continue in 2021.

Top-Tier Trade Ally (NXT Level)

In 2020, NXT Level performed well in the region. The program continued to increase the pool of NXT Level designees. COVID-19 restrictions resulted in some increase in demand for online training; however, it also brought challenges in time and availability for participants to join the scheduled online training. NEEA updated the NXT Level 1 curriculum in 2020, as well as implemented new website resources.

Region-wide, 52 individuals were designated NXT Level 1, while 21 were newly designated NXT Level 2. Eleven companies achieved an NXT Level designation. Program-to-date, there are 335 individual NXT Level 1 and 80 NXT Level 2 designees, and 62 designated companies. In Idaho Power's service area there are 48 Level 1 individual designations, four Level 2 individual designations, and three company designations.

NXT Level 1 training was held in Pocatello in 2020 (pre-COVID-19) for the local International Brotherhood of Electrical Workers (IBEW) members. This was a pilot to see if an alternative delivery method to online was viable. The in-person training proved successful. This training resulted in 23 participants receiving Level 1 designation. Idaho Power encouraged NEEA to offer in-person NXT Level training in the future, when feasible and appropriate to do so.

Luminaire Level Lighting Controls

NEEA completed four studies in 2020: LLLC Incremental Cost Study, LLLC Market Assessment, LLLC and other Networked Lighting Controls (NLC) Energy Savings, and LLLC Replacement vs Redesign Comparison Study. These studies were provided to increase understanding of LLLC and its benefits.

NEEA assisted the implementers of Idaho State Code training to improve curriculum and educational resources related to LLLC.

NEEA partnered with the Seattle Lighting Design Lab (LDL) to offer a series of webinars on controls in 2020. Additionally, NEEA also delivered LLLC webinars in collaboration with IDL and their partner organizations, such as BOMA and the American Institute of Architects (AIA).

NEEA stated: "The LLLC program has engaged manufacturers with the objective of increasing their focus on LLLC by their sales channels in the Northwest, and four LLLC manufacturers agreed in 2020 to collaborate. While some training by manufacturers of sales agencies, distributors, and specifiers has begun, implementation was slowed in 2020 due to impacts and challenges of COVID-19. As those activities with manufacturers ramp up, it may present opportunities for collaboration with Idaho Power and other utilities."

NEEA Funding

In 2020, Idaho Power and NEEA commenced a five-year agreement for the funding cycle of 2020-2024. Per this agreement, NEEA implements market transformation programs in the company's service area. Idaho Power is committed to fund NEEA based on a quarterly estimate of expenses up to the five-year total direct funding amount of $14.7 million, or approximately $2.9 million annually. Of this amount in 2020, 100% was funded through the Idaho and Oregon Riders. Funding for the 2020-2024 five-year cycle was submitted to IPUC for approval on October 21, 2019. On February 20, 2020, Idaho Power received IPUC Order No. 34556, supporting Idaho Power's participation in NEEA from 2020–2024 with such participation to be funded through the Idaho Rider and subject to a prudency review.

In 2020, Idaho Power paid $2,789,210 to NEEA: $2,649,749 from the Idaho Rider for the Idaho jurisdiction and $139,460 from the Oregon Rider for the Oregon jurisdiction. Other expenses associated

with Idaho Power's participation in NEEA activities, such as administration and travel, were also paid from Idaho and Oregon Riders.

Final NEEA savings for 2020 will be released later in the year. Preliminary estimates reported by NEEA for 2020 indicate Idaho Power's share of regional market transformation savings as 15,991 MWh. These savings are reported in two categories, 1) codes-related and standards-related savings of 13,106 MWh (82%) and 2) non codes-related and non-standards-related savings of 2,885 MWh (18%).

In the *Demand Side Management 2019 Annual Report*, preliminary funding share estimated savings reported were 18,108 MWh. The final savings included in this report for 2019 final funding-share NEEA savings is 18,368 MWh. These include savings from code-related initiatives as well as non-code related initiatives. Idaho Power relies on NEEA to report the energy savings and other benefits of NEEA's regional portfolio of initiatives. For further information about NEEA, visit their website neea.org.

Regional Technical Forum

The RTF is a technical advisory committee to the NWPCC, established in 1999 to develop standards to verify and evaluate energy efficiency savings. Since 2004, Idaho Power has supported the RTF by providing annual financial support, regularly attending monthly meetings, participating in subcommittees, and sharing research and data beneficial to the forum's efforts.

The forum is made up of both voting members and corresponding members from investor-owned and public utilities, consultant firms, advocacy groups, ETO, and BPA, all with varied expertise in engineering, evaluation, statistics, and program administration. The RTF advises the NWPCC during the development and implementation of the regional power plan in regard to the following listed in the RTF charter:

- Developing and maintaining a readily accessible list of eligible conservation resources, including the estimated lifetime costs and savings associated with those resources and the estimated regional power system value associated with those savings.
- Establishing a process for updating the list of eligible conservation resources as technology and standard practices change, and an appeal process through which utilities, trade allies, and customers can demonstrate that different savings and value estimates should apply.
- Developing a set of protocols by which the savings and system value of conservation resources should be estimated, with a process for applying the protocols to existing or new measures.
- Assisting the NWPCC in assessing 1) the current performance, cost, and availability of new conservation technologies and measures; 2) technology development trends; and 3) the effect of these trends on the future performance, cost, and availability of new conservation resources.
- Tracking regional progress toward the achievement of the region's conservation targets by collecting and reporting regional research findings and energy savings annually.

The current agreement to sponsor the RTF extends through 2024. Under this agreement, Idaho Power is the fourth largest RTF funder, at a rate of $713,300 for the five-year period. For this funding cycle, gas utilities and the gas portion dual-fuel utilities are also funding the RTF.

When appropriate and when the work products are applicable to the climate zones and load characteristics in Idaho Power's service area, Idaho Power uses the savings estimates, measure protocols, and supporting work documents provided by the RTF. In 2020, Idaho Power staff participated in all RTF meetings and the RTF Policy Advisory Committee.

Throughout the year, Idaho Power reviews any changes enacted by the RTF to savings, costs, or parameters for existing and proposed measures. The company then determines how the changes might

be applicable to, or whether they impact, its programs and measures. The company accounted for all implemented changes in planning and budgeting for 2021.

Residential Energy Efficiency Education Initiative

Idaho Power recognizes the value of general energy efficiency awareness and education in creating behavioral change and customer demand for, and satisfaction with, its programs. The REEEI promotes energy efficiency to the residential sector. The company achieves this by creating and delivering educational materials and programs that result in wise and informed choices regarding energy use and increased participation in Idaho Power's energy efficiency programs.

Kill A Watt Meter Program

The Kill A Watt™ Meter Program remained active in 2020. Idaho Power's Customer Service Center and field staff continued to encourage customers to learn about the energy used by specific appliances and activities within their homes by visiting a local library to check out a Kill A Watt meter.



Figure 21. Kill A Watt meter

Teacher Education

As in previous years, Idaho Power continued to strengthen the energy education relationship with secondary school educators through participation on the Idaho Science, Technology, Engineering, and Mathematics (iSTEM) Steering Committee. In 2020, Idaho Power and Intermountain Gas attempted to expand their reach by adding a second professional development workshop for teachers at Idaho State University's iSTEM Institute, in addition to the four day, two-credit professional development workshop offered at the College of Western Idaho's iSTEM Institute. However, due to COVID-19 restrictions, all of the 2020 iSTEM Institutes were cancelled. Both Idaho Power and Intermountain Gas have agreed to continue sponsorship of two virtual workshop sessions in 2021.

Customer Education and Marketing

REEEI produced one Energy Efficiency Guide in 2020. Idaho Power distributed the guide primarily as an insert in local newspapers. The spring/summer themed guide was published and distributed by 20 newspapers in Idaho Power's service area the week of April 25; the *Boise Weekly* also inserted the

guide. The guide focused on providing answers to a number of energy efficiency questions customers had recently asked about home upgrades and do-it-yourself projects, including tips for renters and home buyers, how to get the best value for your dollar, and best practices for home water systems. Idaho Power promoted the guide on its homepage and on social media. The *Idaho Statesman* published two ads encouraging readers to look for the guide.



Figure 22. Spring/Summer edition of the *Energy Efficiency Guide*, 2020

The REEEI team investigated ways to adapt the fall/winter guide for a younger, more digitally native customer. On its website, Idaho Power provided links to current seasonal guides and past guides.

REEEI distributed energy efficiency messages through a variety of other communication methods in 2020. Idaho Power increased customer awareness of energy saving ideas via continued distribution of the fifth printing of the 96-page booklet *30 Simple Things You Can Do to Save Energy*, a joint publishing project between Idaho Power and The Earthworks Group. In 2020, the program distributed 2,424 copies directly to customers. This was accomplished primarily by fulfilling direct web requests from customers, through energy advisors during in-home visits, and in response to inquiries received by Idaho Power's Customer Care Center.

Idaho Power continues to recognize that educated employees are effective advocates for energy efficiency and Idaho Power's energy efficiency programs. Idaho Power CR&EE staff reached out to each of Idaho Power's geographical regions and the Customer Care Center to speak with energy advisors and other employees to discuss educational initiatives and answer questions about the company's energy efficiency programs.

Prior to COVID-19 restrictions, Idaho Power participated in the Idaho Remodeling and Design Show; Smart Women, Smart Money; and the Canyon County winter home show. Program specialists and EOEA looked for virtual opportunities to continue sharing messages regarding low-cost and no-cost energy-saving opportunities. In 2020, despite the COVID-19 pandemic challenges, Idaho Power's EOEAs delivered over 300 presentations with energy-saving messages to audiences of all ages. Additionally, Idaho Power's energy efficiency program specialists responded with detailed answers to 231 customer questions about energy efficiency and related topics received via Idaho Power's website.

Because of COVID-19 restrictions for in-person activities, REEEI increased digital communication efforts to bring a variety of energy-saving and money-saving tips to customers. Early in the year, Idaho Power's social media channels and *News Briefs* focused on content designed to help customers save energy while spending more time at home. COVID-conscious energy efficiency tips continued through the rest of 2020, including in a December bill insert that provided all residential customers with easy steps to get their home ready for winter heating and behavior tips for reducing energy use.





Figure 23. Bill insert example

Idaho Power used multiple channels to promote National Energy Awareness Month in October, including social media posts encouraging energy-efficient behaviors and program awareness. *News Briefs* and the KTVB and KMVT monthly television spots also highlighted Energy Awareness Month activities.

The REEEI continued to provide energy efficiency tips in response to media inquiries and in support of Idaho Power's social media posts. In addition to supplying information for publications, such as

Connections and Idaho Power's social media pages, energy efficiency tips and content were provided for *News Briefs* and KTVB and KMVT live news segments focused on energy efficiency.

2021 Program and Marketing Strategies

The initiative's 2021 goals are to improve customer awareness of the wise use of energy, increase program participation, and promote educational and energy-saving ideas that result in energy-efficient, conservation-oriented behaviors.

In addition to producing and distributing educational materials, the initiative will continue to manage the company's Educational Distributions program. Examples of activities conducted under Educational Distributions include developing LED lighting education material, distributing LED nightlights, administering the SEEK program, Welcome Kit distribution, and the HER Program.

The initiative will continue to educate customers using a multi-channel approach to explore new technologies and/or program opportunities that incorporate a behavioral component.

University of Idaho Integrated Design Lab

Idaho Power is a founding supporter of the IDL (idlboise.com), which is dedicated to the development of high-performance, energy-efficient buildings in the Intermountain West. Idaho Power has worked with the IDL since its inception in 2004 to educate the public about how energy-efficient business practices benefit the business and the customer. In 2020, Idaho Power entered into an agreement with the IDL to perform the tasks and services described below.

Foundational Services

The goal of this task was to provide energy efficiency technical assistance and project-based training to building industry professionals and customers. Requests for IDL involvement in building projects are categorized into one of three types:

- Phase I projects are simple requests that can be addressed with minimal IDL time.
- Phase II projects are more complex requests that require more involvement and resources from the lab.
- Phase III projects are significantly more complex and must be co-funded by the customer.

The IDL provided technical assistance on 16 new projects in the Idaho Power service area in 2020: ten Phase I projects, five Phase II projects, and one Phase III project. One of the projects was on a new building, and 15 were on existing buildings. The number of projects increased in 2020, compared to 13 in 2019, and the total building area impacted increased to approximately 385,000 ft^2, compared to 275,000 ft^2 in 2019. The related report is located in the IDL section of *Supplement 2: Evaluation*.

Lunch & Learn

The goal of the Lunch & Learn task was to educate architects, engineers, and other design and construction professionals about energy efficiency topics through a series of educational lunch sessions.

In 2020, the IDL scheduled 20 technical training lunches which were conducted virtually due to COVID-19 restrictions. Ten sessions were coordinated directly with architecture and engineering firms and organizations, and 10 were available to the public; a total of 366 architects, engineers, designers, project managers, and others attended.

The topics of the lunches (and the number performed of each) were: IAQ and Energy Efficiency in Buildings (2); Daylight in Buildings: Getting the Details Right (1); Chilled Beams (1); Radiant System

Design Considerations (2); Hybrid Ground Source Heat Pump Systems (1); The Architect's Business Case for Energy Performance Modeling (2); Future of Lighting Controls (1); Luminaire Level Lighting Control (1); Daylighting Multipliers-Increasing Daylight Harvesting Efficiency (2); High-Performance Classrooms (3); Variable Refrigerant Flows (VRF) and Heat Pumps (2); Dedicated Outdoor Air Systems (1); and COVID-19 in Buildings (1). The related report is in the IDL section of *Supplement 2: Evaluation*.

Building Simulation Users Group

The goal of this task was to facilitate the Idaho BSUG, which is designed to improve the energy efficiency related simulation skills of local design and engineering professionals.

In 2020, six monthly BSUG sessions were hosted by IDL. Five of the six sessions were hosted virtually due to COVID-19 restrictions. The sessions were attended by 12 professionals in-person and 93 professionals virtually. Evaluation forms were completed by attendees for each session. On a scale of 1 to 5, with 5 being "excellent" and 1 being "poor," analyzing results from the first six questions, the average session rating was 4.20 for 2020. For the final question, "The content of the presentation was…" on a scale of 1 to 5, with 1 being "too basic," 3 being "just right," and 5 being "too advanced," the average session rating was 3.5 for 2020.

Each presentation was archived on the BSUG 2.0 website along with general BSUG content. The related report is located in the IDL section of *Supplement 2: Evaluation*.

New Construction Verification

The goal of this task was to continue random post-project verification on 10% of the total completed C&I Energy Efficiency Program New Construction projects. In 2020, the IDL conducted a desk review of all project documentation because COVID-19 restrictions limited on-site inspections. The purpose of this verification was to confirm program guidelines and requirements help participants provide accurate information regarding measure installations. See the New Construction option in the C&I Energy Efficiency Program section for a summary of these activities. The complete verification report is located in the IDL section of *Supplement 2: Evaluation*.

This task also included the desk review of all daylight photo-control incentives to improve the quality of design and installation.

Energy Resource Library

The ERL, formally Tool Loan Library (TLL), gives customers access to resources for measuring and monitoring energy use on various systems. The goal of this task was to operate and maintain the library, which includes a web-based loan tracking system, and to teach customers how to use the resources in the library.

The inventory of the ERL consists of over 900 individual pieces of equipment. In 2020, 34 new tools were added to replace old data logging models and additional analog connectors were purchased for the XC power logger series due to a compatibility issue. The tools and manuals are available at no cost to customers, engineers, architects, and contractors in Idaho Power's service area to aid in the evaluation of energy efficiency projects and equipment they are considering. Due to COVID-19 restrictions, a contactless pick-up and drop-off system was put into place.

In 2020, 13 of the 17 tool loan requests were completed by 10 unique users from seven locations, including three new users. The related report is in the IDL section of *Supplement 2: Evaluation*.

In 2020, Idaho Power also helped the IDL update its ERL brochure and catalog. To reduce the risk of spreading COVID-19, the catalog was published electronically with plans to distribute hard copies in 2021.

Building Energy Analytics Case Study

In 2020, the IDL was unable to complete this task as previously intended due to COVID-19 restrictions. IDL did develop a tool to normalize operational history based on weather and to locate anomalies in building energy use. Rather than weather forecasts, the lab applied historical records of weather and utility bills to develop a template that any building operator or owner can use. The user may enter the latest usage in Excel and receive visual feedback from the spreadsheet. Unlike a full analytic software package (e.g., BuildingIQ, SkySpark, or EnergyCap), the IDL spreadsheet is a simplified method to identify when building operations drift from normal performance. This tool was provided to Idaho Power, and will be made available as a free resource to its customers on the IDL website by the second quarter of 2021.

The related report for this task is located in the IDL section of *Supplement 2: Evaluation*.

RTU Control Retrofits for Small Commercial

In 2020, the IDL changed this task compared to what was previously intended due to COVID-19 restrictions. The IDL redirected its efforts to study the energy impact of COVID-19 precautions on virtual Roof Top Units (RTU). The IDL modeled specific recommendations for a typical small office with three mitigation strategies: upgrading the filter ratings, increasing the percentage of outdoor air, and increasing the amount of time the RTUs are in ventilation mode.

The related report for this task is located in the IDL section of *Supplement 2: Evaluation*.

2021 IDL Strategies

In 2021, IDL will continue work on the Foundational Services, Lunch & Learn sessions, BSUG, New Construction Verifications, ERL, and one new task, Energy Impacts of IAQ Devices.

LIST OF ACRONYMS

A/C—Air Conditioning or Air Conditioner

Ad—Advertisement

AIA—American Institute of Architects

AMI—Advanced Metering Infrastructure

aMW—Average Megawatt

ASHRAE—American Society of Heating, Refrigeration, and Air Conditioning Engineers

B/C—Benefit/Cost

BCASEI—Building Contractors Association of Southeast Idaho

BCASWI—Building Contractors Association of Southwestern Idaho

BOMA—Building Owners and Managers Association

BPA—Bonneville Power Administration

BPI—Building Performance Institute

BRC—Business Reply Card

BSUG—Building Simulation Users Group

C&I—Commercial and Industrial

CAP—Community Action Partnership

CAPAI—Community Action Partnership Association of Idaho, Inc.

CCE—Commercial Code Enhancement

CCNO—Community Connection of Northeast Oregon, Inc.

CDC—Centers for Disease Control

CEI—Continuous Energy Improvement

CEL—Cost-Effective Limit

CFM—Cubic Feet per Minute

CHQ—Corporate Headquarters (Idaho Power)

CINA—Community in Action

COP—Coefficient of Performance

CR&EE—Customer Relations and Energy Efficiency

CSI—College of Southern Idaho

DHP—Ductless Heat Pump

DOE—US Department of Energy

DSM—Demand-Side Management

EA5—EA5 Energy Audit Program

ECM—Electronically Commutated Motor

EEAG—Energy Efficiency Advisory Group

EICAP—Eastern Idaho Community Action Partnership

EISA—Energy Independence and Security Act

EL ADA—El Ada Community Action Partnership

EM&V—Evaluation, Measurement, and Verification

EOEA—Education and Outreach Energy Advisors

ERL—Energy Resource Library

ESK—Energy-Saving Kit

ETO—Energy Trust of Oregon

ft—Feet

ft^2—Square Feet

GMI—Green Motors Initiative

GMPG—Green Motors Practice Group

gpm—Gallons per Minute

H&CE—Heating & Cooling Efficiency

HER—Home Energy Report

hp—Horsepower

HOU—Hours of Use

HPWH—Heat Pump Water Heater

HSPF—Heating Seasonal Performance Factor

HUD—Housing and Urban Development

IAQ—Indoor Air Quality

IBCA—Idaho Building Contractors Association

IBCB—Idaho Building Code Board

IBEW—International Brotherhood of Electrical Workers

ID—Idaho

IDHW—Idaho Department of Health and Welfare

IDL—Integrated Design Lab

IECC—International Energy Conservation Code

IPMVP—International Performance Measurement and Verification Protocol

IPUC—Idaho Public Utilities Commission

IRP—Integrated Resource Plan

iSTEM—Idaho Science, Technology, Engineering, and Mathematics

kW—Kilowatt

kWh—Kilowatt hour

LDL—Lighting Design Lab

LEEF—Local Energy Efficiency Funds

LIHEAP—Low Income Home Energy Assistance Program

LLLC—Luminaire Level Lighting Controls

LTMT—Long-Term Monitoring and Tracking

M&V—Measurement and Verification

MPER—Market Progress Evaluation Report

MVBA—Magic Valley Builders Association

MW—Megawatt

MWh—Megawatt-hour

MWSOC—Municipal Water Supply Optimization Cohort

n/a—Not Applicable

NEB—Non-Energy Benefit

NEEA—Northwest Energy Efficiency Alliance

NEEM—Northwest Energy-Efficient Manufactured Home Program

NEMA—National Electrical Manufacturers Association

NLC—Networked Lighting Controls

NPR—National Public Radio

NTG—Net to Gross

NWPCC—Northwest Power and Conservation Council

O&M—Operation and Maintenance

OPUC—Public Utility Commission of Oregon

OR—Oregon

ORS—Oregon Revised Statute

OTT—Over-the-Top

PAI—Professional Assistance Incentive

PCA—Power Cost Adjustment

PCT—Participant Cost Test

PLC—Powerline Carrier

PR—Public Relations

PSC—Permanent Split Capacitor

PTCS—Performance Tested Comfort System

QA—Quality Assurance

QC—Quality Control

RAC—Residential Advisory Committee

RCT—Randomized Control Trial

REEEI—Residential Energy Efficiency Education Initiative

RESNET—Residential Energy Services Network

RETAC—Regional Emerging Technology Advisory Committee

Rider—Energy Efficiency Rider

RIM—Ratepayer Impact Measure

RPAC—Regional Portfolio Advisory Committee

RPAC+—Regional Portfolio Advisory Committee Plus

RPP—Retail Products Portfolio

RTF—Regional Technical Forum

RTU—Rooftop Unit

SBDI—Small Business Direct Install

SCCAP—South Central Community Action Partnership

SCE—Streamlined Custom Efficiency

SEEK—Student Energy Efficiency Kits

SEICAA—Southeastern Idaho Community Action Agency

SEM—Strategic Energy Management

Simple Steps—Simple Steps, Smart Savings™

SIR—Savings-to-Investment Ratio

SRVBCA—Snake River Valley Building Contractors Association

STEM—Science, technology, engineering, and mathematics

TLL—Tool Loan Library

TRC—Total Resource Cost

TRM—Technical Reference Manual

TSV—Thermostatic Shower Valve

UCT—Utility Cost Test

UES—Unit Energy Savings

UM—Utility Miscellaneous

US—United States

USGBC—US Green Building Council

VFD—Variable Frequency Drive

VRF—Variable Refrigerant Flow

WAP—Weatherization Assistance Program

WAQC—Weatherization Assistance for Qualified Customers

WHF—Whole-House Fan

WWEEC—Wastewater Energy Efficiency Cohort

APPENDICES

Appendix 1. Idaho Rider, Oregon Rider, and NEEA payment amounts (January–December 2020)

Idaho Energy Efficiency Rider		
2020 Beginning Balance	$	(311,045)
2020 Funding plus Accrued Interest as of 12-31-2020		28,490,581
Total 2020 Funds		**28,179,537**
2020 Expenses as of 12-31-2020		(40,409,911)
Ending Balance as of 12-31-2020	**$**	**(12,230,374)**
Oregon Energy Efficiency Rider		
2020 Beginning Balance	$	(1,154,279)
2020 Funding plus Accrued Interest as of 12-31-2020		1,946,193
Total 2020 Funds		**791,914**
2020 Expenses as of 12-31-2020		(1,786,954)
Ending Balance as of 12-31-2020	**$**	**(995,040)**
NEEA Payments		
2020 NEEA Payments as of 12-31-2020	$	2,789,210
Total	**$**	**2,789,210**

Appendix 2. 2020 DSM expenses by funding source (dollars)

Sector/Program	Idaho Rider	Oregon Rider	Non-Rider Funds	Total
Energy Efficiency/Demand Response				
Residential				
A/C Cool Credit	$ 405,402	$ 25,200	$ 334,418	$ 765,020
Easy Savings: Low-Income Energy Efficiency Education	—	—	9,503	9,503
Educational Distributions	3,912,564	91,912	1,547	4,006,023
Energy Efficient Lighting	1,603,129	62,218	1,812	1,667,159
Energy House Calls	40,492	5,422	438	46,352
Heating & Cooling Efficiency Program	578,893	23,978	3,689	606,559
Home Energy Audit	128,547	—	1,999	130,546
Multifamily Energy Savings Program	83,951	4,350	1,528	89,829
Oregon Residential Weatherization	—	5,313	—	5,313
Rebate Advantage	174,670	4,897	855	180,422
Residential New Construction Pilot Program	471,542	—	1,962	473,504
Shade Tree Project	27,652	—	838	28,490
Simple Steps, Smart Savings™	93,865	3,539	1,737	99,141
Weatherization Assistance for Qualified Customers	—	—	1,385,577	1,385,577
Weatherization Solutions for Eligible Customers	198,226	—	10,489	208,715
Commercial/Industrial				
Commercial and Industrial Energy Efficiency Program				
Custom Projects	17,533,047	466,632	59,717	18,059,396
New Construction	2,278,454	98,415	7,114	2,383,983
Retrofits	3,481,992	96,323	8,962	3,587,277
Commercial Energy-Saving Kits	97,645	5,678	355	103,678
Flex Peak Program	84,716	207,707	250,056	542,480
Small Business Direct Install	322,463	16,981	386	339,830
Irrigation				
Irrigation Efficiency Rewards	3,165,075	194,044	42,553	3,401,673
Irrigation Peak Rewards	264,843	185,224	5,957,345	6,407,412
Energy Efficiency/Demand Response Total	**$ 34,947,166**	**$ 1,497,834**	**$ 8,082,880**	**$ 44,527,880**
Market Transformation				
NEEA	2,649,749	139,460	—	2,789,210
Market Transformation Total	**$ 2,649,749**	**$ 139,460**	**$ —**	**$ 2,789,210**
Other Programs and Activities				
Commercial/Industrial Energy Efficiency Overhead	393,112	20,994	8,854	422,960
Energy Efficiency Direct Program Overhead	322,964	15,228	8,555	346,747
Oregon Commercial Audit	—	1,374	—	1,374
Residential Energy Efficiency Education Initiative	209,644	11,192	2,895	223,731
Residential Energy Efficiency Overhead	985,565	50,967	5,630	1,042,162
Other Programs and Activities Total	**$ 1,911,284**	**$ 99,756**	**$ 25,935**	**$ 2,036,975**
Indirect Program Expenses				
Energy Efficiency Accounting & Analysis	929,467	48,680	199,325	1,177,471
Energy Efficiency Advisory Group	4,448	244	130	4,823
Special Accounting Entries	(32,203)	979	51,168	19,944
Indirect Program Expenses Total	**$ 901,712**	**$ 49,903**	**$ 250,623**	**$ 1,202,238**
Grand Total	**$ 40,409,911**	**$ 1,786,954**	**$ 8,359,437**	**$ 50,556,303**

Appendix 3. 2020 DSM program activity

Program	Participants		Total Costs: Program Administrator [b]	Total Costs: Resource [c]	Savings: Annual Energy (kWh)	Savings: Peak Demand [d] (MW)	Measure Life (Years)	Nominal Levelized Costs [a]: Utility ($/kWh)	Nominal Levelized Costs [a]: Total Resource ($/kWh)
Demand Response[1]									
A/C Cool Credit	22,536	homes	$ 765,020	$ 765,020	n/a	19.4	n/a	n/a	n/a
Flex Peak Program	141	sites	542,480	542,480	n/a	24.2	n/a	n/a	n/a
Irrigation Peak Rewards	2,292	service points	6,407,412	6,407,412	n/a	292.4	n/a	n/a	n/a
Total			**$ 7,714,912**	**$ 7,714,912**		**336.1**			
Energy Efficiency									
Residential									
Easy Savings: Low-Income Energy Efficiency Education	155	HVAC tune-ups	9,503	9,503	10,628		3	0.299	0.299
Educational Distributions	97,228	kits/giveaways	3,106,820	3,106,820	9,481,801		11	0.038	0.038
Energy Efficient Lighting	1,148,061	lightbulbs	1,667,159	3,065,781	13,942,202		14	0.012	0.022
Energy House Calls	51	homes	46,352	46,352	56,944		16	0.075	0.075
Heating & Cooling Efficiency Program	1,019	projects	606,559	1,911,792	1,839,068		14	0.033	0.103
Home Energy Audit	97	audits	130,546	142,649	31,938		12	0.448	0.490
Home Energy Report Program[2]	127,138	treatment size	899,203	899,203	10,427,940		1	0.081	0.081
Multifamily Energy Savings Program	33	units	89,829	89,829	28,041		11	0.372	0.372
Oregon Residential Weatherization	0	audits/projects	5,313	5,313	0		45	n/a	n/a
Rebate Advantage	116	homes	180,422	437,263	366,678		44	0.031	0.075
Residential New Construction Pilot	248	homes	473,504	865,989	649,522		58	0.044	0.081
Shade Tree Project	0	trees	28,490	28,490	52,662		30	n/a	n/a
Simple Steps, Smart Savings™	6,894	appliances/showerheads	99,141	98,629	148,404		12	0.073	0.073
Weatherization Assistance for Qualified Customers	115	homes/non-profits	1,385,577	1,728,293	218,611		30	0.244	0.353
Weatherization Solutions for Eligible Customers	27	homes	208,715	208,715	47,360		23	0.338	0.338
Sector Total			**$ 8,937,132**	**$ 12,644,620**	**37,301,800**		**11**	**$ 0.026**	**$ 0.038**
Commercial/Industrial									
Commercial Energy-Saving Kits	1,379	kits	103,678	103,678	258,368		11	0.047	0.047
Custom Projects	169	projects	18,059,396	41,604,451	94,006,717		15	0.018	0.042
Green Motors—Industrial	10	motor rewinds			56,012		8		
New Construction	119	projects	2,383,983	4,175,611	14,565,936		12	0.018	0.031
Retrofits	630	projects	3,587,277	11,964,431	20,965,215		12	0.019	0.063
Small Business Direct Install	139	projects	339,830	339,830	780,260		9	0.058	0.058
Sector Total			**$ 24,474,163**	**$ 58,188,001**	**130,632,507**		**14**	**$ 0.019**	**$ 0.044**

Program	Participants	Total Costs		Savings		Measure Life (Years)	Nominal Levelized Costs [a]	
		Program Administrator [b]	Resource [c]	Annual Energy (kWh)	Peak Demand [d] (MW)		Utility ($/kWh)	Total Resource ($/kWh)
Irrigation								
Green Motors—Irrigation	23 motor rewinds			36,147		20	n/a	n/a
Irrigation Efficiency Reward	1,018 projects	$ 3,401,673	$ 16,857,055	12,847,823		15	$ 0.025	$ 0.125
Sector Total		**$ 3,401,673**	**$ 16,857,055**	**12,883,970**		**15**	**$ 0.025**	**$ 0.125**
Energy Efficiency Portfolio Total		**$ 36,812,968**	**$ 87,689,675**	**180,818,277**		**14**	**$ 0.021**	**$ 0.049**
Market Transformation								
Northwest Energy Efficiency Alliance (codes and standards)				13,105,699				
Northwest Energy Efficiency Alliance (other initiatives)				2,884,939				
Northwest Energy Efficiency Alliance Totals[3]		**$ 2,789,210**	**$ 2,789,210**	**15,990,638**				
Other Programs and Activities								
Residential								
Residential Energy Efficiency Education Initiative		223,731	223,731					
Commercial								
Oregon Commercial Audits	2 audits	1,374	1,374					
Other								
Energy Efficiency Direct Program Overhead		1,811,869	1,811,869					
Total Program Direct Expense		**$ 49,354,064**	**$100,230,772**	**196,808,914**	**336**			
Indirect Program Expenses		1,202,238	1,202,238					
Total DSM Expense		**$ 50,556,303**	**$101,433,010**					

[a] Levelized Costs are based on financial inputs from Idaho Power's 2017 IRP, and calculations include line-loss adjusted energy savings.

[b] The Program Administrator Cost is the cost incurred by Idaho Power to implement and manage a DSM program.

[c] The Total Resource Cost is the total expenditures for a DSM program from the point of view of Idaho Power and its customers as a whole.

[d] Demand response program reductions are reported with 9.7% peak loss assumptions.

[1] Peak Demand is the peak performance of each respective program and not combined performance on the actual system peak hour.

[2] Expenses are contained in Educational Distributions expenses in Appendix 2.

[3] Savings are preliminary estimates provided by NEEA. Final savings for 2020 will be provided by NEEA April 2021.

Appendix 4. 2020 DSM program activity by state jurisdiction

	Idaho			Oregon		
Program	Participants	Program Administrator Costs	Demand Reduction (MW)/ Annual Energy Savings (kWh)	Participants	Program Administrator Costs	Demand Reduction (MW)/ Annual Energy Savings (kWh)
Demand Response[1]						
A/C Cool Credit	22,274 homes	$ 739,720	19.2	262 homes	$ 25,300	0.2
Flex Peak Program	133 sites	334,639	16.6	8 sites	207,841	7.6
Irrigation Peak Rewards	2,241 service points	6,222,017	284.3	51 service points	185,395	8.1
Total		**$ 7,296,376**	**320**		**$ 418,536**	**16**
Energy Efficiency						
Residential						
Easy Savings: Low-Income Energy Efficiency Education	155 HVAC tune-ups	9,503	10,628	0 HVAC tune-ups		
Educational Distributions	93,707 kits/giveaways	3,014,831	9,119,114	3,521 kits/giveaways	91,989	362,287
Energy Efficient Lighting	1,103,657 lightbulbs	1,604,850	13,375,546	44,404 lightbulbs	62,309	566,656
Energy House Calls	45 homes	40,908	49,686	6 homes	5,444	7,258
Heating & Cooling Efficiency Program	1,003 projects	582,397	1,781,404	16 projects	24,162	57,665
Home Energy Audit	97 audits	130,546	31,938	0 audits		
Home Energy Report Program	127,138 treatment size	899,203	10,427,940	0 treatment size		
Multifamily Energy Savings Program	33 units	85,402	28,041	0 projects	4,427	
Oregon Residential Weatherization	n/a			0 audits/projects	5,313	0
Rebate Advantage	114 homes	175,482	361,061	2 homes	4,940	5,616
Residential New Construction Pilot Program	248 homes	473,504	649,522	0 homes		
Shade Tree Project	0 trees	28,490	52,662	0 trees		
Simple Steps, Smart Savings™	6,737 appliances/showerheads	95,515	146,986	157 appliances/showerheads	3,625	1,418
Weatherization Assistance for Qualified Customers	115 homes/non-profits	1,361,163	218,611	0 homes/non-profits	24,414	0
Weatherization Solutions for Eligible Customers	27 homes	208,715	47,360	0 homes		
Sector Total		**$ 8,710,509**	**36,300,499**		**$ 226,623**	**1,001,300**
Commercial						
Commercial Energy-Saving Kits	1,301 kits	97,982	243,370	78 kits	5,696	14,997
Custom Projects	147 projects	17,589,778	91,121,979	22 projects	469,618	2,884,738
Green Motors—Industrial	9 motor rewinds		44,235	1 motor rewinds		11,777
New Construction	110 projects	2,285,212	14,134,439	9 projects	98,771	431,497
Retrofits	613 projects	3,490,506	20,263,512	17 projects	96,771	701,703
Small Business Direct Install	139 projects	322,829	780,260	0 projects	17,001	0
Sector Total		**$ 23,786,307**	**126,587,795**		**$ 687,856**	**4,044,712**

Program	Idaho Participants	Idaho Program Administrator Costs	Idaho Demand Reduction (MW)/ Annual Energy Savings (kWh)	Oregon Participants	Oregon Program Administrator Costs	Oregon Demand Reduction (MW)/ Annual Energy Savings (kWh)
Irrigation						
Green Motors—Irrigation	20 motor rewinds		34,313	3 motor rewinds		1,834
Irrigation Efficiency Rewards	980 projects	$ 3,205,500	12,124,461	38 projects	$ 196,172	723,362
Sector Total		**$ 3,205,500**	**12,158,773**		**$ 196,172**	**725,196**
Market Transformation						
Northwest Energy Efficiency Alliance (codes and standards)			12,450,414			655,285
Northwest Energy Efficiency Alliance (other initiatives)			2,740,692			144,247
Northwest Energy Efficiency Alliance Totals[2]		**$ 2,649,749**	**15,191,106**		**$ 139,460**	**799,532**
Other Programs and Activities						
Residential						
Residential Energy Efficiency Education Initiative		212,394			11,337	
Commercial						
Oregon Commercial Audits				2 audits	1,374	
Other						
Energy Efficiency Direct Program Overhead		1,723,528			88,341	
Total Program Direct Expense		**$ 47,584,364**			**$ 1,769,700**	
Indirect Program Expenses		1,139,804			62,434	
Total Annual Savings			**190,238,174**			**6,570,740**
Total DSM Expense		**$ 48,724,168**			**$ 1,832,134**	

[a.] Levelized Costs are based on financial inputs from Idaho Power's 2017 IRP and calculations include line loss adjusted energy savings.

[1] Peak Demand is the peak performance of each respective program and not combined performance on the actual system peak hour.

[2] Savings are preliminary estimates provided by NEEA. Final savings for 2020 will be provided by NEEA April 2021.

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MARCH 15 • 2021



2020 ANNUAL REPORT

DEMAND-SIDE MANAGEMENT

A VIEW
FROM ABOVE

SUPPLEMENT 1: **COST-EFFECTIVENESS**

Printed on recycled paper

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Supplement 1: Cost-Effectiveness

Cost-Effectiveness

Idaho Power considers cost-effectiveness of primary importance in the design, implementation, and tracking of energy efficiency and demand response programs.

Prior to the actual implementation of energy efficiency or demand response programs, Idaho Power performs a preliminary analysis to assess whether a potential program design or measure may be cost-effective. Incorporated in these models are inputs from various sources that use the most current and reliable information available. When possible, Idaho Power leverages the experiences of other utilities in the region and/or throughout the country to help identify specific program parameters. This is accomplished through discussions with other utilities' program managers and researchers. Idaho Power also uses electric industry research organizations, such as E Source, Northwest Energy Efficiency Alliance (NEEA) Regional Emerging Technology Advisory Committee (RETAC), the Consortium for Energy Efficiency (CEE), American Council for an Energy-Efficient Economy (ACEEE), and Advanced Load Control Alliance (ALCA) to identify similar programs and their results. Additionally, Idaho Power relies on the results of program impact evaluations and recommendations from consultants.

Idaho Power's goal is for all programs to have benefit/cost (B/C) ratios greater than one for the utility cost test (UCT) in Idaho, and the total resource cost (TRC) test in Oregon, at the program and measure level. In addition, Idaho Power will look at both the UCT and TRC as well as the participant cost test (PCT) at the program and measure level where appropriate. Each cost-effectiveness test provides a different perspective, and Idaho Power believes each test provides value when evaluating program performance. In 2020, Idaho Power began transitioning to the UCT as the primary cost-effectiveness test in Idaho as directed by the Idaho Public Utilities Commission (IPUC) in Order Nos. 34469 and 34503. The company will continue to calculate the TRC and PCT because each perspective can help inform the company and stakeholders about the effectiveness of a particular program or measure. Additionally, programs and measures offered in Oregon must still use the TRC as the primary cost-effectiveness test as directed by the Public Utility Commission of Oregon (OPUC) in Order No. 94-590.

Idaho Power uses several assumptions when calculating the cost-effectiveness of a given program or measure. For some measures within the programs, savings can vary based on factors, such as participation levels or the participants' locations. For instance, heat pumps installed in the Boise area will have less savings than heat pumps installed in the McCall area because of climate differences. If program participation and savings increase, fixed costs (such as labor and marketing) are distributed more broadly, and the program's cost-effectiveness increases.

When an existing program or measure is identified to be not cost-effective from either the UCT perspective in Idaho or the TRC perspective in Oregon, Idaho Power works with the Energy Efficiency Advisory Group (EEAG) to get additional input about next steps. The company must demonstrate why a non-cost-effective measure or program was implemented, or continued to be offered, and communicate the steps the company plans to take to improve its cost-effectiveness. This aligns with the expectations of the IPUC and OPUC.

In OPUC Order No. 94-590, issued in UM 551, the OPUC outlines specific cost-effectiveness guidelines for energy efficiency measures and programs managed by program administrators. It is the expectation of the OPUC that measures and programs offered in Oregon pass the TRC test. If Idaho Power determines a program or measure is not cost-effective but meets one or more of the exceptions set forth by Order No. 94-590, the company files an exceptions request with the OPUC to continue offering the measure or program within its Oregon service area.

Non cost-effective measures and programs may be offered by a utility if they meet one or more of the following additional conditions specified by Section 13 of OPUC Order No. 94-590:

A. The measure produces significant non-quantifiable non-energy benefits (NEB)

B. Inclusion of the measure will increase market acceptance and is expected to lead to reduced cost of the measure

C. The measure is included for consistency with other DSM programs in the region

D. Inclusion of the measure helps increase participation in a cost-effective program

E. The package of measures cannot be changed frequently, and the measure will be cost-effective during the period the program is offered

F. The measure or package of measures is included in a pilot or research project intended to be offered to a limited number of customers

G. The measure is required by law or is consistent with OPUC policy and/or direction

For operational and administrative efficiency, Idaho Power endeavors to offer identical programs in both its Oregon and Idaho jurisdictions; however, due to the different primary cost-effectiveness tests in each state, measures may not be offered in both states.

Methodology

For its cost-effectiveness methodology, Idaho Power relies on the Electric Power Research Institute (EPRI) *End Use Technical Assessment Guide* (TAG); the *California Standard Practice Manual* and its subsequent addendum; the National Action Plan for Energy Efficiency's (NAPEE) *Understanding Cost Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*; and the *National Action Plan on Demand Response*.

For energy efficiency programs, each program's cost-effectiveness is reviewed annually from a one-year perspective. The annual energy-savings benefit value is summed over the life of the measure or program and is discounted to reflect 2020 dollars. The result of the one-year perspective is shown in Table 3 and the Cost-Effectiveness Tables by Program section in this supplement.

The goal of demand response programs is to minimize or delay the need to build new supply-side resources. Unlike energy efficiency programs or supply-side resources, demand response programs must acquire and retain participants each year to maintain deployable demand-reduction capacity for the company.

As part of the public workshops on Case No. IPC-E-13-14, Idaho Power and other stakeholders agreed on a new methodology for valuing demand response. The settlement agreement, as approved in IPUC Order No. 32923 and OPUC Order No. 13-482, defined the annual value of operating the three demand response programs for the maximum allowable 60 hours to be no more than $16.7 million. The annual value calculation will be updated with each Integrated Resource Plan (IRP) based on changes that include, but are not limited to, need, capital cost, or financial assumptions. This amount was reevaluated in the 2015, 2017, and 2019 Second Amended IRPs to be $18.5, $19.8, and $19.6 million, respectively.

This value is the levelized annual cost of a 170-megawatt (MW) deferred resource over a 20-year life. The demand response value calculation includes this value even in years when the IRP shows no peak-hour capacity deficits. In 2020, the cost of operating the three demand response programs was $7.7 million. Idaho Power estimates that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $10.9 million and would have remained cost-effective.

Assumptions

Idaho Power relies on research conducted by third-parties to obtain savings and cost assumptions for various measures. These assumptions are routinely reviewed internally and with EEAG and updated as new information becomes available. For many of the residential and irrigation measures within *Supplement 1: Cost-Effectiveness*, savings and costs were derived from either the Regional Technical Forum (RTF) or the *Idaho Power Energy Efficiency Potential Study* conducted by Applied Energy Group (AEG).

The RTF regularly reviews, evaluates, and recommends eligible energy efficiency measures and provides the estimated savings and costs associated with those measures. For instance, because of the rapid changes in the lighting market, the RTF is currently evaluating lighting measures on an annual basis. As the RTF updates these savings and cost assumptions, Idaho Power applies them to current program offerings and assesses the need to make any program changes. Idaho Power staff participates in the RTF by attending monthly meetings and contributing to various sub-committees. Because cost data from the RTF information is in 2012 dollars, measures with costs from the RTF are escalated to 2020 dollars. The costs are escalated by 12.8%, which is the percentage provided by the RTF in workbook RTFStandardInformationWorkbook_ v4_2.xlsx.

Idaho Power uses a technical reference manual (TRM) developed by ADM Associates, Inc. for the savings and cost assumptions in the Commercial and Industrial (C&I) Energy Efficiency Program's New Construction and Retrofits options. In 2020, the company contracted with a thirty party to update the TRM. The updated TRM will be source for most prescriptive savings values for the New Construction and Retrofits options in 2021 once changes to the C&I Energy Efficiency program have been implemented.

Idaho Power also relies on other sources for savings and cost assumptions, such as the Northwest Power and Conservation Council (NWPCC), Northwest Energy Efficiency Alliance (NEEA), the Database for Energy Efficiency Resources (DEER), the Energy Trust of Oregon (ETO), the Bonneville Power Administration (BPA), third-party consultants, and other regional utilities. Occasionally, Idaho Power will also use internal engineering estimates and calculations for savings and costs based on information gathered from previous projects.

The company freezes savings assumptions when the budgets and goals are established for the next calendar year unless code changes, standard changes, or program updates necessitate a need to use updated savings. These assumptions are discussed in more detail in the cost-effectiveness sections for each program in the *Demand-Side Management 2020 Annual Report*. Generally, the 2020 energy savings reported for most programs will use the assumption set at the beginning of the year.

The remaining inputs used in the cost-effectiveness models are obtained from the IRP process. Idaho Power's 2017 IRP was acknowledged by the IPUC on February 9, 2018 and by the OPUC May 23, 2018 and is the source for the financial assumptions used in cost-effectiveness analysis. *Appendix C—Technical Appendix* of Idaho Power's 2017 IRP contains the DSM alternate costs, discount rate, and escalation rate. DSM alternate costs vary by season and time of day and are applied to an end-use load shape to obtain the value of a particular measure or program. DSM alternate energy costs are based on both the projected fuel costs of a peak-load serving resource and forward electricity prices as determined by Idaho Power's power supply model, AURORAxmp® Electric Market Model. The avoided capital cost of capacity is based on a gas-fired, simple-cycle turbine. In the 2017 IRP, the annual avoided capacity cost is $122 per kilowatt (kW).

Transmission and distribution (T&D) benefits are also included in the cost-effectiveness analyses. The estimated average value of energy efficiency on T&D deferral is $3.76/kW per year or $0.000429/kilowatt-hour (kWh). In compliance with Order No. 33365, this value is escalated and added to the 2017 DSM alternate energy costs and included in the cost-effectiveness analysis for 2020.

Idaho Power's *2019 Second Amended IRP* was filed on October 2, 2020, with the IPUC under case IPC-E-19-19 and with the OPUC under case LC 74. Because the *2019 Second Amended IRP* was not acknowledged at the time of the 2020 DSM program planning, the 2017 IRP is the source for all financial assumptions and cost-effectiveness analysis in 2020. Idaho Power plans to begin using the financial assumptions from the *2019 Second Amended IRP* for program planning once it has been acknowledged by the IPUC and OPUC. Because of this timing, updated DSM alternate costs based on the 2017 IRP were used for 2021 program planning and will be used to evaluate the 2021 cost-effectiveness.

As recommended by the NAPEE's *Understanding Cost-Effectiveness of Energy Efficiency Programs*, Idaho Power's weighted average cost of capital (WACC) of 6.74% is used to discount future benefits and costs to today's dollars. Once the DSM alternate costs and load shapes are applied to the annual kWh savings of a measure or program, the WACC is used to calculate the net present value (NPV) of the annual benefit for the UCT and TRC test B/C ratios. However, determining the appropriate discount rate

for participant cost and benefits is difficult because of the variety of potential discount rates that can be used by the different participants. Because the participant benefit is based on the anticipated bill savings of the customer, Idaho Power believes an alternate discount rate in place of the WACC is appropriate. Because the customer bill savings is based on Idaho Power's 2020 average customer segment rate and are not escalated, the participant bill savings are discounted using a real discount rate of 4.54%. The 4.54% is based on the 2017 IRP's WACC of 6.74% and an escalation rate of 2.1%. The real discount rate is used to calculate the NPV of any participant benefits or costs for the PCT or ratepayer impact measure (RIM) B/C ratios.

The formula to calculate the real discount rate is as follows:

$$((1 + \text{WACC}) \div (1 + \text{Escalation})) - 1 = \text{Real}$$

Line-loss percentages are applied to the metered-site energy savings to find the energy savings at the generation level. The *Demand-Side Management 2020 Annual Report* shows the estimated electrical savings at the customer meter level. Cost-effectiveness analyses are based on generation-level energy savings. The demand response program reductions are reported at the generation level with the line losses. The system line-loss factor is 9.6% while the summer peak line-loss factor is 9.7%.

Conservation Adder

The *Pacific Northwest Electric Power Planning and Conservation Act* (Northwest Power Act) states the following:

> …any conservation or resource shall not be treated as greater than that of any nonconservation measure or resource unless the incremental system cost of such conservation or resource is in excess of 110 per centum of the incremental system cost of the nonconservation measure or resource.

As a result of the Northwest Power Act, most utilities in the Pacific Northwest add a 10% conservation adder in energy efficiency cost-effectiveness analyses. In OPUC Order No. 94-590, the OPUC states:

> We support the staff's position that the effect of conservation in reducing uncertainty in meeting load growth is included in the ten percent cost adder and that no separate adjustment is necessary.

Additionally, in IPUC Order No. 32788 in Case No. GNR-E-12-01, "Staff noted that Rocky Mountain Power and Avista use a 10% conservation adder when calculating the cost-effectiveness of all their DSM programs." Staff recommended the utilities have the option to use a 10% adder, and the IPUC agreed with the recommendation to allow utilities to use the 10% adder in the cost-effectiveness analyses for low-income programs.

After reviewing the practices of other utilities in the Pacific Northwest, as well as the OPUC Order No. 94-590 and IPUC Order 32788, Idaho Power applies the 10% conservation adder in all energy

efficiency measure and program cost-effectiveness analyses when calculating the TRC test.

Net-to-Gross

Net-to-gross (NTG), or net-of-free-ridership (NTFR), is defined by NAPEE's *Understanding Cost-Effectiveness of Energy Efficiency Programs* as a ratio that does the following:

> Adjusts the impacts of the programs so that they only reflect those energy efficiency gains that are the result of the energy efficiency program. Therefore, the NTG deducts energy savings that would have been achieved without the efficiency program (e.g., 'free-riders') and increases savings for any 'spillover' effect that occurs as an indirect result of the program. Since the NTG attempts to measure what the customers would have done in the absence of the energy efficiency program, it can be difficult to determine precisely.

Capturing the effects of Idaho Power's energy efficiency efforts on free-ridership and spillover is difficult. Due to the uncertainty surrounding NTG percentages, Idaho Power used an NTG of 100% for nearly all measure and program cost-effectiveness analyses. The Home Energy Reports (HER) Program is an exception.

There is a potential of double counting savings in the HER Program if a customer receives a report and decides to participate in a program such as the Energy Efficient Lighting Program. Idaho Power's third-party consultant estimated that less than 5% of the savings may be double counted. Therefore, a NTG of 95% was applied to the cost-effectiveness analysis.

Sensitivity analyses are also conducted to show what the minimum NTG percentage needs to be for a program to remain (or become) cost-effective from either the TRC or UCT perspective. These NTG percentages are shown in the program cost-effectiveness pages of *Supplement 1: Cost-Effectiveness*.

Results

Idaho Power determines cost-effectiveness on a program basis and, where relevant, a measure basis. As part of *Supplement 1: Cost-Effectiveness* and where applicable, Idaho Power publishes the cost-effectiveness by measure, the PCT and RIM test at the program level, the assumptions associated with cost-effectiveness, and the sources and dates of metrics used in the cost-effectiveness calculation.

The B/C ratio from the participant cost perspective is not calculated for the Commercial Energy-Savings Kits, Educational Distributions, Energy House Calls, Multifamily Energy Savings Program, Small Business Direct Install, Weatherization Assistance for Qualified Customers (WAQC), and Weatherization Solutions for Eligible Customers programs. These programs have few or no participant-related costs. For energy efficiency programs, the cost-effectiveness models do not assume ongoing participant costs.

Supplement 1: Cost-Effectiveness contains annual cost-effectiveness metrics for each program using actual information from 2020 and includes results of the UCT, TRC, PCT, and RIM. Current customer

energy rates are used in the calculation of the B/C ratios from a PCT and RIM perspective. Rate increases are not forecasted or escalated. A summary of the cost-effectiveness by program can be found in Table 3.

In 2020, most of Idaho Power's energy efficiency programs were cost-effective from the UCT, except for Energy House Calls; Multifamily Energy Saving Program; Simple Steps, Smart Savings™; and the two weatherization programs for income-qualified customers.

In March 2020, in response to the COVID-19 pandemic restrictions, in-home or on-site activity for several programs was suspended in order to keep contractors and customers safe. Energy House Calls, Multifamily Energy Savings Program, and the two weatherization programs for income-qualified customers were among the programs impacted by the suspension. Because the WAQC program is administered through the state, work resumed in early summer 2020 once Community Action Partnership agencies restarted activity. However, in-home work on the remaining residential programs is still suspended as of early 2021. Once COVID-19 safety protocols allow, Idaho Power will resume in-home work for Energy House Calls, the Multifamily Energy Savings program, and Weatherization Solutions for Eligible Customers.

The company will continue to monitor these programs and will explore opportunities to further improve the programs' cost-effectiveness in 2021.

The Simple Steps, Smart Savings™ program had a TRC of 3.24 and a UCT of 0.78. While overall showerhead sales increased by 31% between 2019 and 2020, savings for showerheads decreased by 51%. This is largely due to increased sales of the 2.0 gpm showerhead which made up 47% of sales in 2019 and 83% in 2020. The savings for the 2.0 gpm showerhead fell by 63% which impacted the overall cost-effectiveness of the program. The RTF reviewed the showerhead savings again in 2020 and decided to deactivate the measure due to the market transformation in the region. Due to this and other changes impacting the lighting portion of the Simple Steps promotion, BPA decided to sunset the offering on September 30, 2020.

WAQC had a TRC of 0.33 and a UCT ratio of 0.20, and Weatherization Solutions for Eligible Customers had a TRC of 0.13 and a UCT ratio of 0.23. The cost-effectiveness ratios for both programs declined in 2020 from both the UCT and TRC perspective due to the adoption of updated third-party informed savings. The updated per-home savings estimates were a result of a weatherization billing analysis of the homes that participated in the programs between 2016 and 2018. The analysis estimated the electric energy savings of the weatherization jobs by comparing whole-home energy usage of the participants, before and after the weatherization jobs, to a matched comparison group. The results of the analysis showed that savings from weatherization jobs are detectable, but the savings are lower relative to the savings reported in previous years, especially in regards to heat pump installations. Weatherization jobs completed in 2019 were not included in the analysis because a full year of post weatherization billing data is required. A copy of this report can be found in *Supplement 2: Evaluation*.

To calculate the cost-effectiveness for the income-qualified weatherization programs, Idaho Power adopted the following IPUC staff recommendations from Case No. GNR E-12-01:

- Applied a 100% NTG.
- Claimed 100% of energy savings for each project.
- Included indirect administrative overhead costs. The overhead costs of 2.378% were calculated from the $1,202,238 of indirect program expenses divided by the total DSM expenses of $50,556,303 as shown in Appendix 3 of the *Demand-Side Management 2020 Annual Report*.
- Applied the 10% conservation preference adder.
- Amortized evaluation expenses over a three-year period.
- Claimed one dollar of NEBs for each dollar of utility and federal funds invested in health, safety, and repair measures.

Fifty-five out of 281 individual measures in various programs are not cost-effective from either the UCT or TRC perspective. Of the 55 measures, 26 are not cost-effective from the UCT perspective. Eighteen of those measures are associated with the direct-install programs that had in-home activity suspended due to COVID-19 restrictions. These measures have B/C ratios below one due to some administration costs still being incurred to maintain the program while in-home activity was suspended. For most of the measures that fail the TRC, Idaho Power filed cost-effectiveness exception requests with the OPUC in compliance with Order No. 94-590. Measures and programs that do not pass these tests may be offered by the utility if they meet one or more of the additional conditions specified by Section 13 of Order No. 94-590. These exception requests were approved under UM-1710 or with the specific program advice filings. The filings and exception requests are noted in Table 1.

Table 1. 2020 non-cost-effective measures

Program	Number of Measures	Number Fail UCT	Notes
Educational Distributions	1	1	Home Energy Reports was not cost-effective due to the additional costs associated with the expansion of the program and savings associated with the expansion reflect a partial year of savings. It is anticipated the offering will be cost-effective in future years.
Energy House Calls	10	10	Program impacted by the COVID-19 restrictions. Measures appear to be not cost-effective due to some administration costs still being incurred while in-home activity was suspended.
Heating & Cooling Efficiency Program	7	2	All measures except heat pump upgrades and smart thermostats pass UCT. All measures pass without the inclusion of administration costs. Cost-effectiveness exception request for ductless heat pumps (DHP) and open-loop water source heat pumps filed with the OPUC under UM-1710. OPUC Order No. 94-590, Section 13. Approved under Order No. 15-200. Exception request for the program and smart thermostats requested and approved with OPUC Advice No. 17-09.

Program	Number of Measures	Number Fail UCT	Notes
Multifamily Energy Savings Program	8	8	Program impacted by the COVID-19 restrictions. Measures appear to be not cost-effective due to some administration costs still being incurred while in-home activity was suspended.
Rebate Advantage	5	0	All measures pass UCT. Measures have a TRC between 0.61 and 0.96. Two measures would be cost-effective with TRC of 1.12 without the inclusion of administration costs. Meets OPUC Order No. 94-590, Section 10. Measure is included to increase savings in a cost-effective program.
Simple Steps, Smart Savings™	4	4	All measures pass TRC. All measures would be cost-effective without the inclusion of administration costs. Program was sponsored by Bonneville Power Administration and was sunsetted on September 30, 2020.
New Construction and Retrofits	7	0	All measures pass UCT. Measures offered in both options. Cost-effectiveness exception request filed and approved with OPUC Advice No. 18-08. OPUC Order No. 94-590, Section 13. Exceptions C and D.
New Construction	1	0	Measure passes UCT. TRC 0.94. Measure is included to increase participation in a cost-effective program.
Retrofits	9	0	All measures pass UCT. TRC ranges from 0.77 to 0.99. Three measures would be cost-effective without the inclusion of administration costs. Meets OPUC Order No. 94-590, Section 10. Cost-effectiveness exception request filed and approved with OPUC Advice No. 18-08. OPUC Order No. 94-590, Section 13. Exceptions C and D.
Irrigation Efficiency Rewards	3	1	Two measures pass UCT. TRC ranges from 0.67 to 0.87. Cost-effectiveness exception request filed with OPUC under UM-1710. OPUC Order No. 94-590, Section 13. Approved under Order No. 18-476. Exceptions A, C, and D.
Total	**55**	**26**	

The following tables list the annual program cost-effectiveness results including measure-level cost-effectiveness. Exceptions to the measure-level tables are programs that are analyzed at the project level such as: the Custom Projects option of the C&I Energy Efficiency Program, the Custom Incentive option of Irrigation Efficiency Rewards, Small Business Direct Install, WAQC, and Weatherization Solutions for Eligible Customers.

The measure-level cost-effectiveness includes the following inputs: measure life, energy savings, incremental cost, incentives, program administration cost, and non-energy impacts/benefits. Program administration costs include all non-incentive costs such as: labor, marketing, training, education, purchased services, and evaluation. Energy and expense data have been rounded to the nearest whole unit.

2020 DSM Detailed Expenses by Program

Included in this supplement is a detailed breakout of program expenses shown in Appendix 2 of the *Demand-Side Management 2020 Annual Report*. These expenses are broken out by funding source major-expense type (labor/administration, materials, other expenses, purchased services, and incentives).

Table 2. 2020 DSM detailed expenses by program (dollars)

Sector/Program	Idaho Rider	Oregon Rider	Idaho Power	Total Program
Energy Efficiency Total	**$ 34,192,205**	**$ 1,079,703**	**$ 1,541,060**	**$ 36,812,968**
Residential Total	**$ 7,313,531**	**$ 201,629**	**$ 1,421,972**	**$ 8,937,132**
Easy Savings: Low-Income Energy Efficiency Education	–	–	**9,503**	**9,503**
Labor/Administrative Expense	–	–	9,503	**9,503**
Educational Distributions	**3,912,564**	**91,912**	**1,547**	**4,006,023**
Labor/Administrative Expense	48,489	2,657	1,547	**52,693**
Materials and Equipment	2,121,135	62,675	–	**2,183,810**
Other Expense	53,605	2,821	–	**56,427**
Purchased Services	1,689,335	23,758	–	**1,713,093**
Energy Efficient Lighting	**1,603,129**	**62,218**	1,812	**1,667,159**
Incentives	852,060	30,657	–	**882,717**
Labor/Administrative Expense	56,797	3,101	1,812	**61,710**
Purchased Services	694,272	28,461	–	**722,733**
Energy House Calls	**40,492**	**5,422**	**438**	**46,352**
Labor/Administrative Expense	13,723	768	438	**14,929**
Materials and Equipment	2,067	109	–	**2,176**
Other Expense	5,896	727	–	**6,624**
Purchased Services	18,806	3,818	–	**22,624**
Heating & Cooling Efficiency Program	**578,893**	**23,978**	**3,689**	**606,559**
Incentives	336,715	11,475	–	**348,190**
Labor/Administrative Expense	115,716	6,285	3,689	**125,690**
Materials and Equipment	8,676	(593)	–	**8,083**
Other Expense	41,857	3,499	–	**45,356**
Purchased Services	75,929	3,312	–	**79,241**
Home Energy Audit	**128,547**	–	**1,999**	**130,546**
Labor/Administrative Expense	62,713	–	1,999	**64,711**
Materials and Equipment	398	–	–	**398**
Other Expense	42,820	–	–	**42,820**
Purchased Services	22,617	–	–	**22,617**
Multifamily Energy Savings Program	**83,951**	**4,350**	**1,528**	**89,829**
Labor/Administrative Expense	48,204	2,618	1,528	**52,349**
Materials and Equipment	32,015	1,685	–	**33,700**
Other Expense	903	48	–	**950**
Purchased Services	2,830	–	–	**2,830**
Oregon Residential Weatherization	–	**5,313**	–	**5,313**
Labor/Administrative Expense	–	3,969	–	**3,969**
Other Expense	–	1,344	–	**1,344**
Rebate Advantage	**174,670**	**4,897**	**855**	**180,422**
Incentives	114,000	2,000	–	**116,000**
Labor/Administrative Expense	26,803	1,456	855	**29,114**
Other Expense	11,843	1,040	–	**12,883**
Purchased Services	22,024	401	–	**22,425**
Residential New Construction Pilot Program	**471,542**	–	**1,962**	**473,504**
Incentives	389,800	–	–	**389,800**
Labor/Administrative Expense	65,764	–	1,962	**67,726**
Other Expense	15,963	–	–	**15,963**
Purchased Services	15	–	–	**15**

Sector/Program	Idaho Rider	Oregon Rider	Idaho Power	Total Program
Shade Tree Project	**27,652**	–	**838**	**28,490**
Labor/Administrative Expense	27,279	–	838	**28,118**
Other Expense	372	–	–	**372**
Simple Steps, Smart Savings™	**93,865**	**3,539**	**1,737**	**99,141**
Incentives	28,887	392	–	**29,279**
Labor/Administrative Expense	54,476	2,999	1,737	**59,213**
Purchased Services	10,502	147	–	**10,649**
Weatherization Assistance for Qualified Customers	–	–	**1,385,577**	**1,385,577**
Labor/Administrative Expense	–	–	49,777	**49,777**
Other Expense	–	–	2	**2**
Purchased Services	–	–	1,335,799	**1,335,799**
Weatherization Solutions for Eligible Customers	**198,226**	–	**10,489**	**208,715**
Labor/Administrative Expense	1,112	–	10,489	**11,601**
Other Expense	7,530	–	–	**7,530**
Purchased Services	189,584	–	–	**189,584**
Commercial/Industrial	**$ 23,713,600**	**$ 684,029**	**$ 76,534**	**$ 24,474,163**
Commercial Education Initiative	**97,645**	**5,678**	**355**	**103,678**
Labor/Administrative Expense	11,131	610	355	**12,097**
Materials and Equipment	65,641	5,004	–	**70,645**
Other Expense	888	**47**	–	**935**
Purchased Services	19,985	17	–	**20,001**
Custom Projects	**17,533,047**	**466,632**	**59,717**	**18,059,396**
Incentives	15,252,850	368,995	–	**15,621,845**
Labor/Administrative Expense	617,474	33,552	59,717	**710,743**
Materials and Equipment	2,082	110	–	**2,191**
Other Expense	233,924	5,413	–	**239,337**
Purchased Services	1,426,717	58,562	–	**1,485,279**
New Construction	**2,278,454**	**98,415**	**7,114**	**2,383,983**
Incentives	1,885,293	77,352	–	**1,962,645**
Labor/Administrative Expense	223,328	12,229	7,114	**242,671**
Other Expense	844	44	–	**889**
Purchased Services	168,988	8,790	–	**177,778**
Retrofits	**3,481,992**	**96,323**	**8,962**	**3,587,277**
Incentives	2,546,264	46,307	–	**2,592,571**
Labor/Administrative Expense	278,198	15,139	8,962	**302,299**
Materials and Equipment	1,175	62	–	1,237
Other Expense	15,531	817	–	**16,349**
Purchased Services	640,823	33,998	–	**674,821**
Small Business Direct Install	**322,463**	**16,981**	**386**	**339,830**
Labor/Administrative Expense	12,142	680	386	**13,208**
Other Expense	392	21	–	**412**
Purchased Services	309,928	16,280	–	**326,209**
Irrigation Total	**$ 3,165,075**	**$ 194,044**	**$ 42,553**	**$ 3,401,673**
Irrigation Efficiency Rewards	**3,165,075**	**194,044**	**42,553**	**3,401,673**
Incentives	2,794,877	173,940	–	**2,968,817**
Labor/Administrative Expense	304,617	16,598	42,431	**363,647**
Materials and Equipment	3,023	159	–	**3,182**
Other Expense	55,993	2,998	122	**59,113**
Purchased Services	6,566	348	–	**6,914**

Sector/Program	Idaho Rider	Oregon Rider	Idaho Power	Total Program
Market Transformation Total	**$ 2,649,749**	**$ 139,460**	**$ –**	**$ 2,789,210**
NEAA	**2,649,749**	**139,460**	**–**	**2,789,210**
Purchased Services	2,649,749	139,460	–	**2,789,210**
Other Program and Activities Total	**$ 1,911,284**	**$ 99,756**	**$ 25,935**	**$ 2,036,975**
Commercial/Industrial Energy Efficiency Overhead	**393,112**	**20,994**	**8,854**	**422,960**
Labor/Administrative Expense	285,625	15,542	8,854	**310,021**
Other Expense	82,072	4,180	–	**86,253**
Purchased Services	25,415	1,272	–	**26,687**
Energy Efficiency Direct Program Overhead	**322,964**	**15,228**	**8,555**	**346,747**
Labor/Administrative Expense	268,168	14,591	8,555	**291,314**
Other Expense	54,795	637	–	**55,433**
Oregon Commercial Audit	–	**1,374**	–	**1,374**
Labor/Administrative Expense	–	489	–	**489**
Other Expense	–	885	–	**885**
Residential Energy Efficiency Education Initiative	**209,644**	**11,192**	**2,895**	**223,731**
Labor/Administrative Expense	116,673	6,321	2,895	**125,890**
Materials and Equipment	2,013	106	–	**2,119**
Other Expense	90,805	4,757	–	**95,562**
Purchased Services	152	8	–	**160**
Residential Energy Efficiency Overhead	**985,565**	**50,967**	**5,630**	**1,042,162**
Labor/Administrative Expense	144,866	7,859	4,491	**157,216**
Other Expense	819,896	42,013	1,140	**863,048**
Purchased Services	20,803	1,095	–	**21,898**
Indirect Program Expenses Total	**$ 901,712**	**$ 49,903**	**$ 250,623**	**$ 1,202,238**
Energy Efficiency Accounting and Analysis	**929,467**	**48,680**	**199,325**	**1,177,471**
Labor/Administrative Expense	366,199	19,925	170,189	**556,313**
Materials and Equipment	196	10	–	**206**
Other Expense	5,938	313	29,136	**35,386**
Purchased Services	557,134	28,432	–	**585,566**
Energy Efficiency Advisory Group	**4,448**	**244**	**130**	**4,823**
Labor/Administrative Expense	4,084	225	130	**4,439**
Other Expense	365	19	–	**384**
Special Accounting Entries	**(32,203)**	**979**	**51,168**	**19,944**
Special Accounting Entry	(32,203)	979	51,168	**19,944**
Demand Response Total	**$ 754,961**	**$ 418,131**	**$ 6,541,820**	**$ 7,714,912**
Residential Total	**$ 405,402**	**$ 25,200**	**$ 334,418**	**$ 765,020**
A/C Cool Credit	**405,402**	**25,200**	**334,418**	**765,020**
Incentives		3,989	332,420	**336,410**
Labor/Administrative Expense	64,946	3,568	1,998	**70,512**
Materials and Equipment	(50,664)	(2,667)	–	**(53,330)**
Other Expense	14,190	747	–	**14,937**
Purchased Services	376,929	19,562	–	**396,492**
Commercial/Industrial Total	**$ 84,716**	**$ 207,707**	**$ 250,056**	**$ 542,480**
Flex Peak Program	**84,716**	**207,707**	**250,056**	**542,480**
Incentives	–	203,067	247,383	**450,450**
Labor/Administrative Expense	84,650	4,637	2,673	**91,961**
Purchased Services	66	3	–	**70**

Sector/Program	Idaho Rider	Oregon Rider	Idaho Power	Total Program
Irrigation Total	**$ 264,843**	**$ 185,224**	**$ 5,957,345**	**$ 6,407,412**
Irrigation Peak Rewards	**264,843**	**185,224**	**5,957,345**	**6,407,412**
Incentives	–	171,007	5,953,930	**6,124,937**
Labor/Administrative Expense	79,705	4,349	3,415	**87,469**
Materials and Equipment	52,259	2,750	–	**55,010**
Other Expense	1,133	60	–	**1,193**
Purchased Services	131,745	7,059	–	**138,804**
Grand Total	**$ 40,409,911**	**$ 1,786,954**	**$ 8,359,437**	**$ 50,556,303**

Table 3. Cost-effectiveness of 2020 programs by B/C test

Program/Sector	UCT	TRC	RIM	PCT
Educational Distributions	1.45	2.19	0.45	N/A
Energy Efficient Lighting	4.56	4.20	0.54	7.77
Energy House Calls	0.63	0.77	0.29	N/A
Heating & Cooling Efficiency Program	1.66	0.81	0.45	1.46
Multifamily Energy Savings Program	0.14	0.28	0.11	N/A
Rebate Advantage	1.69	0.98	0.39	2.17
Residential New Construction Pilot Program	1.54	1.20	0.45	2.26
Shade Tree Project*	N/A	N/A	N/A	N/A
Simple Steps, Smart Savings	0.78	3.24	0.36	13.23
Weatherization Assistance for Qualified Customers	0.20	0.33	0.14	N/A
Weatherization Solutions for Eligible Customers	0.13	0.23	0.10	N/A
Residential Energy Efficiency Sector	**1.64**	**1.91**	**0.45**	**6.41**
Commercial Energy-Saving Kits	1.24	2.38	0.56	N/A
Custom Projects	3.26	1.61	1.06	1.42
New Construction	3.40	2.63	0.80	3.14
Retrofits	3.25	1.35	0.79	1.56
Small Business Direct Install	1.04	1.61	0.53	N/A
Commercial/Industrial Energy Efficiency Sector**	**3.18**	**1.62**	**0.97**	**1.58**
Irrigation Efficiency Rewards	4.00	4.09	1.18	3.96
Irrigation Energy Efficiency Sector***	**4.01**	**4.09**	**1.18**	**3.96**
Energy Efficiency Portfolio	**2.71**	**2.08**	**0.83**	**2.45**

*Shade Tree Project tree distributions were suspended in 2020 due to COVID-19, no newly planted trees in 2020 to report energy savings.
**Commercial/Industrial Energy Efficiency Sector cost-effectiveness ratios include savings and participant costs from Green Motors Rewinds.
***Irrigation Energy Efficiency Sector cost-effectiveness ratios include savings and participant costs from Green Motors Rewinds.

Cost-Effectiveness Tables by Program

Educational Distributions

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	4,006,023	
Program Incentives		–	I
Total UC	**$**	4,006,023	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	5,827,739	$	4,006,023	1.45
TRC Test		8,788,414		4,006,023	2.19
RIM Test		5,827,739		12,905,566	0.45
PCT		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	19,909,741			
NPV Cumulative Energy (kWh)	114,912,206	$	5,827,739	S
10% Credit (Northwest Power Act)			582,774	
Total Electric Savings		**$**	**6,410,513**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	8,899,543	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	$2,377,901	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P
RIM Test	= S * NTG	= P + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	69%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: Energy savings as reported by the Franklin Energy for the 2019 to 2020 student kits.
NEBs for giveaway bulbs, welcome kit bulbs, and energy-saving kits include PV of periodic bulb replacement costs.
NEBs for student kit and energy-savings kit showerheads include the NPV of water and wastewater savings and, when applicable, gas (therm) savings.
No participant costs.
2020 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 1.48 and 2.23, respectively.

Year: 2020 **Program**: Educational Distributions **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Gross Energy Savings (kWh/yr)[b]**	**NPV DSM Alternate Costs[c]**	**NEB**	**Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UCT Ratio[f]**	**TRC Ratio[g]**	**Source/ Notes**
General Purpose LED Give away	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 250 to 1049 lumens Space Type: ANY	Baseline bulb	Lamp	Residential-All-Lighting-All	13	6.97	$3.58	$2.00	–	–	$0.023	21.93	36.38	1
Nightlight Give away	LED night light	baseline bulb	Lamp	IPC_Outdoor Lighting	10	12.00	$3.62	–	–	–	$0.023	12.88	14.16	2
Student Energy Efficiency Kit (SEEK) Program	2019-2020 kit offering. Kits include: high efficiency showerhead, showertimer, 3 LEDs, FilterTone alarm, digital thermometer, LED nightlight.	No kit	Kit	IPC_Student Kits	11	191.79	$99.38	$10.59	–	–	$0.247	2.10	2.53	3
Energy-Saving Kit—weighted average of non-electric and electric kit	9 - 250 to 1049 lumen General Purpose bulbs 1 - LED night light 1 - 1.75 gpm showerhead and thermostatic shower valve combo (electric kit only) 3 - faucet aerators (electric kit only)	No kit	Kit	IPC_Energy-savings Kits (weighted)	11	155.54	$69.37	$100.00	–	–	$0.332	1.34	3.41	4
Energy-Saving Kit (giveaway lightbulb only kit)	9 - 250 to 1049 lumen General Purpose bulbs 1 - LED night light"	No kit	Kit	IPC_Energy-savings Kits (non-electric)	13	74.73	$35.43	$18.04	–	–	$0.332	1.43	2.30	1,2
Welcome Kit (lightbulb only kit)	4 - 250 to 1049 lumen General Purpose bulbs 1 - LED night light	No kit	Kit	IPC_Welcome Kit	13	39.88	$19.64	$8.02	–	–	$0.455	1.08	1.63	1,2
Home Energy Reports	Home energy report	No behavior change	Report	IPC_Residential	1	82.02	$4.77	–	–	–	$0.086	0.64	0.71	5

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] No participant costs.
[e] Average program administration and overhead costs to achieve each kWh of savings for each initiative. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResLighting_Bulbs_v7_1.xlsm. 2019.
[2] DNV GL. Idaho Power Educational Distributions Impact and Process Evaluation. 2020
[3] Franklin Energy. 2019-2020 Idaho Power Energy Wise Program Summary Report. 2020.
[4] Lightbulbs - RTF. ResLighting_Bulbs_v7_1.xlsm. Showerhead - RTF. ThermostaticShowerRestrictionValve_v3_1. By Request installation rate reduced from 90% to 58%.Nightlight – DNV GL evaluation.
[5] Idaho Power HER Year 3 Final Program Summary. Aclara. 2020. Offering not cost-effective due to additional costs and savings ramp up related to program's mid-year expansion. Will continue to monitor in 2021.

Energy Efficient Lighting

Segment: Residential
2020 Program Results

Cost Inputs		Ref
Program Administration	$ 784,442	
Program Incentives	882,717	I
Total UC	$ **1,667,159**	P
Measure Equipment and Installation (Incremental Participant Cost)	$ 2,281,338	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	13,942,202			
NPV Cumulative Energy (kWh)	149,197,560	$	7,594,591	S
10% Credit (Northwest Power Act)			759,459	
Total Electric Savings		**$**	**8,354,050**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	12,333,930	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	4,514,331	NEB

Note: NEBs include PV of periodic bulb replacement costs.

Summary of Cost-Effectiveness Results			
Test	**Benefit**	**Cost**	**Ratio**
UC Test	$ 7,594,591	$ 1,667,159	4.56
TRC Test	12,868,381	3,065,781	4.20
RIM Test	7,594,591	14,001,089	0.54
PCT	17,730,977	2,281,338	7.77

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	22%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Year: 2020 **Program**: Energy Efficient Lighting **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV DSM Alternate Costs[c]**	**NEB**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UCT Ratio[f]**	**TRC Ratio[g]**	**Source/ Notes**
Decorative and Mini-Base	Retail_LED_Decorative and Mini-Base_250 to 1049 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	18.16	$9.32	$5.68	$3.73	$1.08	$0.056	4.45	3.36	1
General Purpose, Dimmable, and Three-Way	Retail_LED_General Purpose, Dimmable, and Three-Way_250 to 1049 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	9.25	$4.75	$2.45	$1.24	$0.73	$0.056	3.80	4.36	1
General Purpose, Dimmable, and Three-Way	Retail_LED_General Purpose, Dimmable, and Three-Way_1050 to 1489 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	26.23	$13.46	$7.24	$7.07	$1.18	$0.056	5.08	2.58	1
General Purpose, Dimmable, and Three-Way	Retail_LED_General Purpose, Dimmable, and Three-Way_1490 to 2600 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	13.10	$6.72	$3.23	$3.00	$1.00	$0.056	3.88	2.85	1
Globe	Retail_LED_Globe_250 to 1049 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	12.63	$6.48	$4.23	$2.90	$0.58	$0.056	5.04	3.15	1
Reflectors and Outdoor	Retail_LED_Reflectors and Outdoor_250 to 1049 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	11.13	$5.71	$2.00	$1.04	$0.99	$0.056	3.54	4.98	1
Reflectors and Outdoor	Retail_LED_Reflectors and Outdoor_1050 to 1489 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	10.51	$5.39	$2.45	$1.24	$1.00	$0.056	3.40	4.59	1
Reflectors and Outdoor	Retail_LED_Reflectors and Outdoor_1490 to 2600 lumens	Baseline bulb	Fixture	Residential All-Lighting	13	45.24	$23.22	$8.46	$6.77	$2.00	$0.056	5.12	3.66	1
LED Fixture Retailer	LED Indoor Fixture	Baseline bulb	Fixture	Residential All-Lighting	20	15.36	$10.69	$9.71	$2.37	$0.98	$0.056	5.81	6.65	2
LED Fixture Retailer	LED Outdoor Fixture	Baseline bulb	Fixture	IPC Outdoor Lighting	20	59.80	$31.58	$22.42	$8.73	$1.70	$0.056	6.25	4.73	2

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResLighting_Bulbs_v7_1.xlsm. 2019.
[2] RTF. ResLighting_Bulbs_v7_1.xlsm. 2019. Weighted average of actual fixture sales.

Energy House Calls

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	46,352	
Program Incentives		–	I
Total UC	**$**	46,352	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	29,017	$	46,352	0.63
TRC Test		35,776		46,352	0.77
RIM Test		29,017		101,692	0.29
PCT		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	56,944			
NPV Cumulative Energy (kWh)	659,466	$	29,017	S
10% Credit (Northwest Power Act)			2,902	
Total Electric Savings		**$**	**31,919**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	55,340	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	3,858	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P
RIM Test	= S * NTG	= P + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	160%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: NEBs include PV of periodic bulb replacement costs for direct-install LED bulbs.
NEBs for showerheads and faucet aerators include the NPV of water and wastewater savings.
No participant costs.

Year: 2020 **Program**: Energy House Calls **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
PTCS Duct Sealing	Manufactured Home Prescriptive Duct Sealing - Electric FAF - Heating Zone 1	Pre-existing duct leakage	Home	Residential-Manufactured Home Idaho -Heating-All	18	972.81	$509.40	$–	–	–	$0.814	0.64	0.71	1, 2
PTCS Duct Sealing	Manufactured Home Prescriptive Duct Sealing - Electric FAF - Heating Zone 2 or 3	Pre-existing duct leakage	Home	Residential-Manufactured Home Idaho -Heating-All	18	1,248.19	$653.60	$–	–	–	$0.814	0.64	0.71	1, 2
PTCS Duct Sealing	Manufactured Home Prescriptive Duct Sealing - Heat Pump - Heating Zone 1	Pre-existing duct leakage	Home	Residential-Manufactured Home Idaho -Heating-All	18	615.06	$322.07	$–	–	–	$0.814	0.64	0.71	1, 2
PTCS Duct Sealing	Manufactured Home Prescriptive Duct Sealing - Heat Pump - Heating Zone 2 or 3	Pre-existing duct leakage	Home	Residential-Manufactured Home Idaho -Heating-All	18	875.72	$458.56	$–	–	–	$0.814	0.64	0.71	1, 2
General Purpose LED Direct Install	Direct install - LED_General Purpose, Dimmable, and Three-Way_250 to 1049 lumens (Average High Use and Moderate Use)	baseline bulb	Lamp	Residential-All-Lighting-All	12	30.63	$14.71	$5.56	–	–	$0.814	0.59	0.87	2, 3
Low-flow faucet aerator	Direct install. Kitchen. Manufactured Home. Electric Resistance Hot Water.	non- low flow faucet aerator	Aerator	Residential-All-Water Heating-Water Heater	10	59.38	$25.33	$55.73	–	–	$0.814	0.52	1.73	2, 4
Low-flow faucet aerator	Direct install. Bathroom. Manufactured Home. Electric Resistance Hot Water.	non- low flow faucet aerator	Aerator	Residential-All-Water Heating-Water Heater	10	39.92	$17.03	$45.08	–	–	$0.814	0.52	1.96	2, 4
Low-flow showerheads	Residential Showerhead Replacement_2_00gpm_Any Shower_ Electric Water Heating_Direct Install	any showerhead 2.2 gpm or higher	Showerhead	Residential-All-Water Heating-Water Heater	10	93.85	$40.03	$32.69	–	–	$0.814	0.52	1.00	2, 5
Low-flow showerheads	Residential Showerhead Replacement_1_75gpm_Any Shower_ Electric Water Heating_Direct Install	any showerhead 2.2 gpm or higher	Showerhead	Residential-All-Water Heating-Water Heater	10	142.24	$60.67	$73.85	–	–	$0.814	0.52	1.21	2, 5
Water heater pipe covers	Up to 6 ft	No existing coverage	Pipe wrap	Residential-All-Water Heating-Water Heater	10	78.02	$33.28	$–	–	–	$0.814	0.52	0.58	2, 6

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] No participant costs.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResMH PerformanceDuctSeal_v3_0.xlsm. 2015.
[2] Program and measures not cost-effective due to some administration costs incurred while the in-home activity was suspended due to COVID-19 restrictions. Will continue to monitor in 2021.
[3] RTF. ResLighting_Bulbs_v7_1.xlsm. 2019.
[4] RTF. Aerators_v1_1.xlsm. 2018.
[5] RTF. Showerheads_v4_3.xlsm. 2019.
[6] AEG. Potential Study. 2018.

Heating & Cooling Efficiency Program

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	258,370	
Program Incentives		348,190	I
Total UC	**$**	**606,559**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	1,653,423	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	1,009,479	$	606,559	1.66
TRC Test		1,557,119		1,911,792	0.81
RIM Test		1,009,479		2,233,486	0.45
PCT		2,421,808		1,653,423	1.46

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	1,839,068			
NPV Cumulative Energy (kWh)	19,680,187	$	1,009,479	S
10% Credit (Northwest Power Act)			100,948	
Total Electric Savings		**$**	**1,110,427**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	1,626,927	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	446,692	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	240%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Note: NEBs include NPV of RTF values for annual operation and maintenance (O&M) savings and monetized comfort savings.

Year: 2020 **Program**: Heating & Cooling Efficiency Program **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV DSM Alternate Costs[c]**	**NEB**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UCT Ratio[f]**	**TRC Ratio[g]**	**Source/ Notes**
Heat Pump Conversion	Existing Single Family and Manufactured Home HVAC Conversion to Heat Pump with Commissioning and Sizing (Heating & Cooling Zone Weighted Average)	Conversion to high efficiency heat pump	Unit	Residential-All-Heating-Air-Source Heat Pump	15	7,446.54	$4,156.31	1,412.47	$4,297.50	$800.00	$0.140	2.26	1.12	1, 2, 3, 4
Heat Pump Upgrade	Existing Single Family and Manufactured Home HVAC Heat Pump Upgrade (Heating & Cooling Zone Weighted Average)	Heat pump to heat pump upgrade	Unit	Residential-All-Heating-Air-Source Heat Pump	15	536.45	$299.42	$18.79	$136.32	$250.00	$0.140	0.92	1.65	1, 2, 3, 4, 13
Heat Pump Upgrade	New Construction Single Family and Manufactured Home HVAC Heat Pump Upgrade (Heating & Cooling Zone Weighted Average)	Heat pump to heat pump upgrade	Unit	Residential-All-Heating-Air-Source Heat Pump	15	745.11	$415.89	$19.02	$153.30	$250.00	$0.140	1.17	1.85	1, 2, 3, 4
Open-Loop Heat Pump	Open loop water source heat pump for existing construction - 14.00 EER 3.5 COP (Heating & Cooling Zone Weighted Average)	Electric resistance/ Oil Propane	Unit	Residential-All-Heating-Air-Source Heat Pump	20	7,054.24	$4,780.05	$–	$10,729.38	$1,000.00	$0.140	2.40	0.45	5, 6
Open-Loop Heat Pump	Open loop water source heat pump for new construction - 14.00 EER 3.5 COP (Heating & Cooling Zone Weighted Average)	Electric resistance/ Oil Propane	Unit	Residential-All-Heating-Air-Source Heat Pump	20	7,814.67	$5,295.33	$–	$14,970.17	$1,000.00	$0.140	2.53	0.36	5, 6
Ductless Heat Pump	Zonal to DHP. (Heating & Cooling Zone Weighted Average)	Zonal Electric	Unit	Residential-All-Heating-Air-Source Heat Pump	15	2,279.83	$1,272.49	$1,062.51	$3,994.51	$750.00	$0.140	1.19	0.57	1, 5
Heat Pump Water Heater	Weighted average of tier 2 and tier 3, heating and cooling zone, and indoor, basement, garage install location.	Electric water heater	Unit	Residential-All-Water Heating-Heat Pump Water Heater	13	1,568.00	$775.05	$–	$706.80	$300.00	$0.140	1.49	0.92	7
Evaporative Cooler	Evaporative Cooler	Central Air Conditioning	Unit	Residential-Single Family Idaho-Cooling-All	12	1,471.00	$1,965.42	$–	$248.91	$150.00	$0.140	5.52	4.75	8
Prescriptive Duct Sealing	Duct Tightness - PTCS Duct Sealing - Average Heating System. Weighted average of Heating Zones 1-3.	Pre-existing duct leakage	Unit	Residential-Single Family Idaho -Heating-All	20	847.72	$495.44	$–	$712.30	$350.00	$0.140	1.06	0.66	5,9
Electronically Commutated Motor (ECM) Blower Motor	ECM Blower Motor	permanent split capacitor (PSC) motor	Unit	IPC_ECM	18	2,861.20	$1,759.44	$–	$300.00	$50.00	$0.140	3.90	2.76	10

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Whole-House Fan	Whole-House Fan	Displaced forced air dx cooling	Unit	Residential-Single Family Idaho-Cooling-All	18	445.60	$774.85	$–	$700.00	$200.00	$0.140	2.95	1.12	10
Smart Thermostat	Smart Thermostat	non wi-fi enabled thermostat/no thermostat	Unit	Residential-Single Family Idaho -Heating-All	5	579.76	$101.72	$–	$315.53	$75.00	$0.140	0.65	0.28	11, 12

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResSFExistingHVAC_v4_1.xlsx. Weighted average of 2020 participants in heating and cooling zones 1-3.
[2] RTF. ResHeatingCoolingCommissioningControlsSizingSF_v3_6.xlsm. Weighted average of 2020 participants in heating and cooling zones 1-3.
[3] RTF. ResMHExistingHVAC_v3_3.xlsx. Weighted average of 2020 participants in heating and cooling zones 1-3.
[4] RTF. ResMHHeatingCoolingCommissioningControlsSizing_v3_3.xlsx. Weighted average of 2020 participants in heating and cooling zones 1-3.
[5] Measure not cost-effective from TRC perspective.
[6] RTF. ResGSHP_v2_7. 2016. Weighted average of 2020 participants in heating and cooling zones 1-3.
[7] RTF. ResHPWH_v4_2.xlsm. 2020. Measure cost-effective without inclusion of admin costs.
[8] New Mexico Technical Resource Manual for the Calculation of Energy Efficiency Savings. Evaporative Cooling. Santa Fe. 2019.
[9] RTF. ResSFDuctSealing_v5_1.xlsm. 2019.
[10] Idaho Power engineering calculations based on Integrated Design Lab inputs. 2015.
[11] RTF. ResConnectedTstats_v1.3.xlsm. 2018
[12] Measure not cost-effective. Measure is being piloted and will be monitored in 2021.
[13] Measure not cost-effective. Measure cost-effective without inclusion of admin costs.

Multifamily Energy Savings Program

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	89,829	
Program Incentives		–	I
Total UC	**$**	89,829	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	12,318	$	89,829	0.14
TRC Test		25,035		89,829	0.28
RIM Test		12,318		110,536	0.11
PCT		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	28,041			
NPV Cumulative Energy (kWh)	256,460	$	12,318	S
10% Credit (Northwest Power Act)			1,232	
Total Electric Savings		**$**	13,550	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	20,707	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	11,486	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P
RIM Test	= S * NTG	= P + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	729%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: NEBs include PV of periodic bulb replacement costs for direct-install LED lightbulbs.
NEBS for showerheads and faucet aerators include the NPV of water and waste water savings.
No participant costs.

Year: 2020 **Program**: Multifamily Energy Savings Program **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
General Purpose LED Direct Install	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 250 to 1049 lumens Space Type: Average of Moderate and High-Use Interior	Baseline bulb	Lamp	Residential-All-Lighting-All	12	30.63	$14.71	$5.56	–	–	$3.203	0.15	0.22	1, 2
General Purpose LED Direct Install	Efficient Technology: LED Lamp Type: General Purpose and Dimmable Lumen Category: 1490 to 2600 lumens Space Type: Exterior	Baseline bulb	Lamp	IPC_ Outdoor Lighting	12	83.87	$29.93	$12.06	–	–	$3.203	0.11	0.17	1, 2
Globe LED Direct Install	Efficient Technology: LED Lamp Type: Globe Lumen Category: 250 to 1049 lumens Space Type: Moderate Use Interior	Baseline bulb	Lamp	Residential-All-Lighting-All	12	16.17	$7.76	$5.04	–	–	$3.203	0.15	0.26	1, 2
Decorative LED Direct Install	Efficient Technology: LED Lamp Type: Decorative or Minibase Lumen Category: 250 to 1049 lumens Space Type: Average of Moderate and High Use Interior	Baseline bulb	Lamp	Residential-All-Lighting-All	12	18.98	$9.11	$5.04	–	–	$3.203	0.15	0.25	1, 2
Low-flow faucet aerator	Direct install. Kitchen. Multifamily Home. Electric Resistance Hot Water.	non- low flow faucet aerator	Aerator	Residential-All-Water Heating-Water Heater	10	43.94	$18.74	$41.25	–	–	$3.203	0.13	0.44	2, 3
Low-flow faucet aerator	Direct install. Bathroom. Multifamily Home. Electric Resistance Hot Water.	non- low flow faucet aerator	Aerator	Residential-All-Water Heating-Water Heater	10	47.54	$20.28	$53.64	–	–	$3.203	0.13	0.50	2, 3
Low-flow showerheads and thermostatic shower valve combination unit	Residential_Direct install_Valve and 1.75 gpm showerhead_Electric resistance DHW	Any showerhead 2.2 gpm or higher	Showerhead	Residential-All-Water Heating-Water Heater	10	197.80	$84.37	$139.96	–	–	$3.203	0.13	0.37	2, 4

Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Benefit			Cost			B/C Tests		Source/ Notes
						Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	
Water heater pipe covers	up to 6 feet	No existing coverage	Pipe wrap	Residential-All-Water Heating-Water Heater	10	74.70	$31.86	$–	–	–	$3.203	0.13	0.15	2, 5

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] No participant costs.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. ResLighting_Bulbs_v7_1.xlsm. 2019.
[2] Program and measures not cost-effective due to some administration costs incurred while the in-home activity was suspended due to COVID-19 restrictions. Will continue to monitor in 2021.
[3] RTF. Aerators_v1_1.xlsm. 2018
[4] RTF. ResThermostaicShowerRestrictionValve_v3_1.xlsm. 2019.
[5] AEG. Potential Study. 2018..

Rebate Advantage

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	64,422	
Program Incentives		116,000	I
Total UC	**$**	**180,422**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	372,841	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	304,047	$	180,422	1.69
TRC Test		426,495		437,263	0.98
RIM Test		304,047		781,584	0.39
PCT		809,205		372,841	2.17

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	366,678			
NPV Cumulative Energy (kWh)	6,189,330	$	304,047	S
10% Credit (Northwest Power Act)			30,405	
Total Electric Savings		**$**	**334,452**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	601,162	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	92,043	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	106%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: 2020 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 1.73 and 0.99, respectively..

Year: 2020 **Program**: Rebate Advantage **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
ENERGY STAR® manufactured home	Estar_electric_ Heating Zone (HZ) 1_Cooling Zone (CZ) 3	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Residential-Manufactured Home Idaho -Heating-All	44	2,304.76	$1,911.10	$371.26	$2,708.26	$1,000.00	$0.176	1.36	0.79	1,2
ENERGY STAR manufactured home	Estar_electric_ HZ2_CZ1	Manufactured home built to Housing and Urban Development (HUD) code.	Home	Residential-Manufactured Home Idaho -Heating-All	45	3,311.66	$2,766.08	$1,270.55	$2,708.26	$1,000.00	$0.176	1.75	1.31	1
ENERGY STAR manufactured home	Estar_electric_ HZ2_CZ2	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	45	3,312.82	$2,767.05	$1,115.40	$2,708.26	$1,000.00	$0.176	1.75	1.26	1
ENERGY STAR manufactured home	Estar_electric_ HZ2_CZ3	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	45	3,314.53	$2,768.48	$1,115.40	$2,708.26	$1,000.00	$0.176	1.75	1.26	1
ENERGY STAR manufactured home	Estar_electric_ HZ3_CZ1	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	45	4,142.05	$3,459.67	$1,398.70	$2,708.26	$1,000.00	$0.176	2.00	1.51	1
EcoRated manufactured home	EcoRated_ electric_HZ1_CZ3	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	42	2,521.36	$2,058.01	$370.72	$2,980.16	$1,000.00	$0.176	1.43	0.77	1, 2
Northwest Energy Efficient Manufactured (NEEM) home	NEEM_electric_ HZ1_CZ3	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	41	2,981.20	$2,412.69	$423.60	$4,501.68	$1,000.00	$0.176	1.58	0.61	1, 2
NEEM home	NEEM_electric_ HZ2_CZ2	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	42	4,172.51	$3,405.74	$1,278.65	$4,501.68	$1,000.00	$0.176	1.96	0.96	1, 2, 3
NEEM home	NEEM_electric_ HZ2_CZ3	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	42	4,174.68	$3,407.51	$1,278.65	$4,501.68	$1,000.00	$0.176	1.96	0.96	1, 2, 3
NEEM home	NEEM_electric_ HZ3_CZ1	Manufactured home built to HUD code.	Home	Residential-Manufactured Home Idaho -Heating-All	43	5,155.10	$4,241.92	$1,619.89	$4,501.68	$1,000.00	$0.176	2.22	1.16	1

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. NewMHNewHomesandHVAC_v3_4.xlsm. 2017.
[2] Measure not cost-effective from TRC perspective.
[3] Measure cost-effective without inclusion of admin costs.

Residential New Construction Pilot Program

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	83,704	
Program Incentives		389,800	I
Total UC	**$**	**473,504**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	782,285	M

Summary of Cost-Effectiveness Results				
Test		**Benefit**	**Cost**	**Ratio**
UC Test	$	731,230	$ 473,504	1.54
TRC Test		1,040,084	865,989	1.20
RIM Test		731,230	1,619,686	0.45
PCT		1,771,712	782,285	2.26

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	649,522			
NPV Cumulative Energy (kWh)	11,359,554	$	731,230	S
10% Credit (Northwest Power Act)			73,123	
Total Electric Savings		**$**	**804,353**	A
Participant Bill Savings				
NPV Cumulative Participant Savings		$	1,146,182	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	235,730	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	73%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: 2012 International Energy Conservation Code (IECC) with amendments adopted in Idaho in 2014.

Year: 2020 **Program**: Residential New Construction Pilot Program **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV DSM Alternate Costs[c]**	**NEB**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UCT Ratio[f]**	**TRC Ratio[g]**	**Source/ Notes**
Next Step Home	Next Step Home - average per home savings.	Home built to International Energy Conservation Code 2012 Code. Adopted 2014.	Home	Residential-All-Heating-Air-Source Heat Pump	58	2,619.04	$2,948.51	$950.47	$3,154.94	$1,571.77	$0.129	1.54	1.20	1

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] NEEA circuit rider code enforcement initiative. 2020 average per home savings. Costs and NEBs from RTF. RESNCMTHouse_ID_v3_1_.xlsm. 2019.

Simple Steps, Smart Savings™

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	69,862	
Program Incentives		29,279	I
Total UC	**$**	**99,141**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	28,767	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	77,481	$	99,141	0.78
TRC Test		319,510		98,629	3.24
RIM Test		77,481		216,285	0.36
PCT		380,705		28,767	13.23

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	148,404			
NPV Cumulative Energy (kWh)	1,439,314	$	77,481	S
10% Credit (Northwest Power Act)			7,748	
Total Electric Savings		**$**	**85,229**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	117,145	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	234,281	NEB

Note: NEBs include the NPV of water savings from low-flow showerheads and clothes washers.

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	128%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Year: 2020 **Program**: Simple Steps, Smart Savings **Market Segment**: Residential **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[a]**	**Annual Gross Energy Savings (kWh/yr)[b]**	**NPV DSM Altnerate Costs[c]**	**NEB**	**Gross Incremental Participant Cost[d]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[e]**	**UCT Ratio[f]**	**TRC Ratio[g]**	**Source/ Notes**
Clothes Washer	ENERGY STAR® clothes washer—Any	Baseline clothes washers	Clothes washer	Residential-All-Appliances-Clothes Washer	14	142.29	$89.42	$206.53	$–	$25.00	$0.471	0.97	3.31	1, 2, 3
Low-Flow Showerhead	Low-flow showerhead 2.0 gpm Any shower any water Heating Retail	Showerhead 2.2 gpm or higher	Showerhead	Residential-All-Water Heating-Water Heater	10	5.55	$2.37	$9.45	$–	$2.00	$0.471	0.51	2.61	3, 4
Low-Flow Showerhead	Low-flow showerhead 1.75 gpm Any shower any water Heating Retail	Showerhead 2.2 gpm or higher	Showerhead	Residential-All-Water Heating-Water Heater	10	30.95	$13.20	$52.77	$–	$5.00	$0.471	0.67	3.44	3, 4
Low-Flow Showerhead	Low-flow showerhead 1.5 gpm Any shower any water Heating Retail	Showerhead 2.2 gpm or higher	Showerhead	Residential-All-Water Heating-Water Heater	10	69.05	$29.45	$117.78	$–	$6.00	$0.471	0.76	3.90	3, 4

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] BPA. UES_Measures_List.xlsx. 2019.
[2] NEBs from RTF. ResClothesWashers_v6_1.xlsm. 2018. Adjusted savings by changing Electric Water Heating saturation from 61% to 49% to match IPC mix.
[3] Offering sunsetted by Bonneville Power Administration on September 30, 2020.
[4] RTF. ResShowerheads_v4_3.xlsm. 2019. Adjusted savings by changing Electric Water Heating saturation from 60% to 49% to match IPC mix.

Weatherization Assistance for Qualified Customers

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	115,524	
Community Action Partnership (CAP) Agency Payments		654,961	
Total UC	**$**	**770,485**	P
Accruals/Reversal of Carryover Dollars		615,092	
Total Program Expenses		1,385,577	
Idaho Power Indirect Overhead Expense Allocation—2.378%	$	32,949	OH
Additional State Funding		342,716	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	218,611			
NPV Cumulative Energy (kWh)	3,358,364	$	160,708	S
10% Credit (Northwest Power Act)			16,071	
Total Electric Savings		**$**	**176,779**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	307,429	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs				
Health and Safety		$	152,189	
Repair			48	
Other			44,628	
NEBs Total		**$**	**196,865**	NEB

Summary of Cost-Effectiveness Results				
Test		**Benefit**	**Cost**	**Ratio**
UC Test	$	160,708	$ 803,434	0.20
TRC Test		373,644	1,146,150	0.33
RIM Test		160,708	1,110,863	0.14
PCT		N/A	N/A	N/A

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P + OH
TRC Test	= (A + NUI + NEB) * NTG	= P + OH + M
RIM Test	= S * NTG	= P + OH + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	500%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: Savings updated in 2020 based on a billing analysis of the 2016-2018 weatherization projects.
Program cost-effectiveness incorporated IPUC staff recommendations from case GNR-E-12-01. Recommendations include: Claimed 100% of savings; increased NTG to 100%; added a 10% conservation preference adder; health, safety, and repair NEBs; and allocation of indirect overhead expenses.
No customer participant costs. Costs shown are from the DOE state weatherization assistance program.

Weatherization Solutions for Eligible Customers

Segment: Residential
2020 Program Results

Cost Inputs			Ref
Program Administration	$	36,561	
Weatherization LLC Payments		172,154	
Total Program Expenses/Total UC	**$**	**208,715**	P
Idaho Power Indirect Overhead Expense Allocation—2.378%	$	4,963	OH
Additional State Funding		–	M

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	47,360			
NPV Cumulative Energy (kWh)	658,102	$	28,385	S
10% Credit (Northwest Power Act)			2,839	
Total Electric Savings		**$**	**31,224**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	57,901	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs				
Health and Safety			11,239	
Repair			1,026	
Other			6,184	
NEBs Total		**$**	**18,449**	NEB

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	28,385	$	213,678	0.13
TRC Test		49,673		213,678	0.23
RIM Test		28,385		271,579	0.10
PCT		N/A		N/A	N/A

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P +OH
TRC Test	= (A + NUI + NEB) * NTG	= P + OH + M
RIM Test	= S * NTG	= P + OH + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	753%
Average Customer Segment Rate/kWh	$0.085
Line Losses	9.60%

Notes: Savings updated in 2020 based on a billing analysis of the 2016–2018 weatherization projects.
Program cost-effectiveness incorporated IPUC staff recommendations from case GNR-E-12-01. Recommendations include: Claimed 100% of savings; increased NTG to 100%; added a 10% conservation preference adder; health, safety, and repair NEBs; and allocation of indirect overhead expenses.
No customer participant costs.

Commercial Energy-Saving Kits

Segment: Commercial
2020 Program Results

Cost Inputs			Ref
Program Administration	$	103,678	
Program Incentives		–	I
Total UC	**$**	**103,678**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	128,900	$	103,678	1.24
TRC Test		246,463		103,678	2.38
RIM Test		128,900		232,121	0.56
PCT		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	258,368			
NPV Cumulative Energy (kWh)	2,363,048	$	128,900	S
10% Credit (Northwest Power Act)			12,890	
Total Electric Savings		**$**	**141,790**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	128,443	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	104,672	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P
RIM Test	= S * NTG	= P + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	80%
Average Customer Segment Rate/kWh	$0.057
Line Losses	9.60%

Notes: NEBs include PV of periodic bulb replacement costs for direct-install LED bulbs and water, waste water, and therm savings from water-saving devices.

Year: 2020 **Program**: Commercial Energy-Saving Kits **Market Segment**: Commercial **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Restaurant Commercial Kit	3-9W LEDs, 2-bathroom aerators, 2-kitchen aerators, 2-exit sign retrofit, 1-pre-rinse spray valve.	no kit	kit	IPC_Commercial Kit Restaurant	10	258.66	$123.03	$424.10	–	–	$0.401	1.19	5.39	1
Retail Commercial Kit	2-9W LEDs, 2-8W LED BR30s, 1-bathroom aerator, 2-exit sign retrofit	no kit	kit	IPC_Commercial Kit Retail	10	239.62	$115.72	$7.37	–	–	$0.401	1.20	1.40	1
Office Commercial Kit	2-9W LEDs, 2-bathroom aerators, 1-kitchen aerator, 2-exit sign retrofit, 1-advance power strip	no kit	kit	IPC_Commercial Kit Office	12	158.52	$83.07	$9.87	–	–	$0.401	1.31	1.59	1

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM Alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] IPC analysis based on average hours of use by building type and varying electric water heat saturations. Hours of use from TRM. Electric water heat saturation from 2018 potential study.

Custom Projects

Segment: Industrial
2020 Program Results

Cost Inputs		Ref
Program Administration	$ 2,437,551	
Program Incentives	15,621,845	I
Total UC	**$ 18,059,396**	P
Measure Equipment and Installation (Incremental Participant Cost)	$ 39,166,900	M

Summary of Cost-Effectiveness Results			
Test	**Benefit**	**Cost**	**Ratio**
UC Test	$ 58,874,100	$ 18,059,396	3.26
TRC Test	67,072,105	41,604,451	1.61
RIM Test	58,874,100	55,728,891	1.06
PCT	55,601,935	39,166,900	1.42

Net Benefit Inputs (NPV)			Ref
Resource Savings			
2020 Annual Gross Energy (kWh)	94,006,717		
NPV Cumulative Energy (kWh)	1,048,711,046	$ 58,874,100	S
10% Credit (Northwest Power Act)		5,887,410	
Total Electric Savings		**$ 64,761,510**	A
Participant Bill Savings			
NPV Cumulative Participant Savings		$ 37,669,495	B
Other Benefits			
Non-Utility Rebates/Incentives		$ –	NUI
NEBs		$ 2,310,595	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	41%
Average Customer Segment Rate/kWh	$0.037
Line Losses	9.60%

Notes: Energy savings are unique by project and are reviewed by Idaho Power engineering staff or third-party consultants. Each project must complete a certification inspection.
Green Rewind initiative is available to agricultural, commercial, and industrial customers. Commercial and industrial motor rewinds are paid under Custom Projects, but the savings are not included in the program cost-effectiveness.
Green Rewind savings are included in the sector cost-effectiveness.
NEB/impacts on a $/kWh for each end-use. Based on 2019 impact evaluation of other C&I programs.

Year: 2020 **Program**: Custom Projects **Market Segment**: Industrial **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Green Motors Program Rewind: Motor size 15 HP	Green Motors Program Rewind: Motor size 15 HP	Standard rewind practice	Motor	MF_Motors	7	525.20	$179.86	$–	$141.08	$15.00	$0.030	5.85	1.26	1
Green Motors Program Rewind: Motor size 20 HP	Green Motors Program Rewind: Motor size 20 HP	Standard rewind practice	Motor	MF_Motors	7	702.77	$240.67	$–	$157.40	$20.00	$0.030	5.86	1.48	1
Green Motors Program Rewind: Motor size 25 HP	Green Motors Program Rewind: Motor size 25 HP	Standard rewind practice	Motor	MF_Motors	8	893.48	$344.69	$–	$179.84	$25.00	$0.030	6.65	1.83	1
Green Motors Program Rewind: Motor size 30 HP	Green Motors Program Rewind: Motor size 30 HP	Standard rewind practice	Motor	MF_Motors	8	962.42	$371.29	$–	$197.51	$30.00	$0.030	6.31	1.80	1
Green Motors Program Rewind: Motor size 40 HP	Green Motors Program Rewind: Motor size 40 HP	Standard rewind practice	Motor	MF_Motors	8	1,120.77	$432.37	$–	$241.37	$40.00	$0.030	5.87	1.73	1
Green Motors Program Rewind: Motor size 50 HP	Green Motors Program Rewind: Motor size 50 HP	Standard rewind practice	Motor	MF_Motors	8	1,206.18	$465.32	$–	$267.20	$50.00	$0.030	5.40	1.69	1
Green Motors Program Rewind: Motor size 60 HP	Green Motors Program Rewind: Motor size 60 HP	Standard rewind practice	Motor	MF_Motors	8	1,268.50	$489.37	$–	$315.14	$60.00	$0.030	4.99	1.52	1
Green Motors Program Rewind: Motor size 75 HP	Green Motors Program Rewind: Motor size 75 HP	Standard rewind practice	Motor	MF_Motors	8	1,305.49	$503.64	$–	$340.63	$75.00	$0.030	4.41	1.46	1
Green Motors Program Rewind: Motor size 100 HP	Green Motors Program Rewind: Motor size 100 HP	Standard rewind practice	Motor	MF_Motors	8	1,723.08	$664.74	$–	$422.56	$100.00	$0.030	4.38	1.54	1
Green Motors Program Rewind: Motor size 125 HP	Green Motors Program Rewind: Motor size 125 HP	Standard rewind practice	Motor	MF_Motors	8	1,990.39	$767.86	$–	$421.20	$125.00	$0.030	4.16	1.76	1
Green Motors Program Rewind: Motor size 150 HP	Green Motors Program Rewind: Motor size 150 HP	Standard rewind practice	Motor	MF_Motors	8	2,366.02	$912.77	$–	$469.17	$150.00	$0.030	4.13	1.86	1
Green Motors Program Rewind: Motor size 200 HP	Green Motors Program Rewind: Motor size 200 HP	Standard rewind practice	Motor	MF_Motors	8	3,138.34	$1,210.72	$–	$564.81	$200.00	$0.030	4.12	2.02	1
Green Motors Program Rewind: Motor size 250 HP	Green Motors Program Rewind: Motor size 250 HP	Standard rewind practice	Motor	MF_Motors	8	3,798.53	$1,465.41	$–	$725.92	$250.00	$0.030	4.03	1.92	1
Green Motors Program Rewind: Motor size 300 HP	Green Motors Program Rewind: Motor size 300 HP	Standard rewind practice	Motor	MF_Motors	8	4,534.67	$1,749.40	$–	$733.76	$300.00	$0.030	4.01	2.21	1
Green Motors Program Rewind: Motor size 350 HP	Green Motors Program Rewind: Motor size 350 HP	Standard rewind practice	Motor	MF_Motors	8	5,286.56	$2,039.47	$–	$769.07	$350.00	$0.030	4.01	2.42	1

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Green Motors Program Rewind: Motor size 400 HP	Green Motors Program Rewind: Motor size 400 HP	Standard rewind practice	Motor	MF_Motors	8	5,994.15	$2,312.44	$–	$858.98	$400.00	$0.030	3.99	2.45	1
Green Motors Program Rewind: Motor size 450 HP	Green Motors Program Rewind: Motor size 450 HP	Standard rewind practice	Motor	MF_Motors	8	6,732.12	$2,597.14	$–	$938.94	$450.00	$0.030	3.98	2.50	1
Green Motors Program Rewind: Motor size 500 HP	Green Motors Program Rewind: Motor size 500 HP	Standard rewind practice	Motor	MF_Motors	8	7,490.56	$2,889.73	$–	$1,014.37	$500.00	$0.030	3.99	2.57	1
Green Motors Program Rewind: Motor size 600 HP	Green Motors Program Rewind: Motor size 600 HP	Standard rewind practice	Motor	MF_Motors	8	10,137.37	$3,910.83	$–	$1,526.53	$600.00	$0.030	4.33	2.35	1
Green Motors Program Rewind: Motor size 700 HP	Green Motors Program Rewind: Motor size 700 HP	Standard rewind practice	Motor	MF_Motors	8	11,776.73	$4,543.27	$–	$1,665.44	$700.00	$0.030	4.31	2.48	1
Green Motors Program Rewind: Motor size 800 HP	Green Motors Program Rewind: Motor size 800 HP	Standard rewind practice	Motor	MF_Motors	8	13,430.58	$5,181.29	$–	$1,847.86	$800.00	$0.030	4.31	2.53	1
Green Motors Program Rewind: Motor size 900 HP	Green Motors Program Rewind: Motor size 900 HP	Standard rewind practice	Motor	MF_Motors	8	15,077.39	$5,816.61	$–	$2,037.17	$900.00	$0.030	4.30	2.57	1
Green Motors Program Rewind: Motor size 1,000 HP	Green Motors Program Rewind: Motor size 1,000 HP	Standard rewind practice	Motor	MF_Motors	8	16,681.86	$6,435.58	$–	$2,195.45	$1,000.00	$0.030	2.96	2.10	1
Wastewater Energy Efficiency Cohort	Cohort workshop training	No change	Participant	Industrial-Water & Wastewater-All-All	1	150,148.60	$9,210.83	$-	$2,353.51	$1,647.45	$0.030	1.50	1.48	2
Water Supply Optimization Cohort	Cohort workshop training	No change	Participant	Industrial-Water & Wastewater-All-All	1	701,335.00	$43,023.22	$-	$2,720.00	$1,904.00	$0.030	1.88	1.99	2

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2019 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. Ind_and_Ag_GreenMotorRewind_v3_1.xlsm. 2017.
[2] 2020 average savings per cohort participant.

New Construction

Segment: Commercial
2020 Program Results

Cost Inputs		Ref
Program Administration	$ 421,337	
Program Incentives	1,962,645	I
Total UC	**$ 2,383,983**	P
Measure Equipment and Installation (Incremental Participant Cost)	$ 3,754,274	M

Summary of Cost-Effectiveness Results			
Test	**Benefit**	**Cost**	**Ratio**
UC Test	$ 8,097,676	$ 2,383,983	3.40
TRC Test	10,990,031	4,175,611	2.63
RIM Test	8,097,676	10,124,459	0.80
PCT	11,785,709	3,754,274	3.14

Net Benefit Inputs (NPV)			Ref
Resource Savings			
2020 Annual Gross Energy (kWh)	14,565,936		
NPV Cumulative Energy (kWh)	141,271,009	$ 8,097,676	S
10% Credit (Northwest Power Act)		809,768	
Total Electric Savings		**$ 8,907,444**	A
Participant Bill Savings			
NPV Cumulative Participant Bill Savings		$ 7,740,477	B
Other Benefits			
Non-Utility Rebates/Incentives		$ –	NUI
NEBs		$ 2,082,587	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	29%
Average Customer Segment Rate/kWh	$0.057
Line Losses	9.60%

Notes: Non-energy benefits/impacts on a $/kWh for each end-use. Based on 2019 impact evaluation.

Year: 2020 **Program**: New Construction **Market Segment**: Commercial **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Lighting	Interior Light Load Reduction. Part A: 10-19.9% below code.	Code standards	ft²	Commercial-Miscellaneous-Interior Lighting-All	14	0.44	$0.28	–	$0.14	$0.10	$0.030	2.45	1.99	1
Lighting	Interior Light Load Reduction. Part B: 20-29.9% below code.	Code standards	ft²	Commercial-Miscellaneous-Interior Lighting-All	14	0.88	$0.56	–	$0.28	$0.20	$0.030	2.45	1.99	1
Lighting	Interior Light Load Reduction. Part C: Equal to or greater than 30% below code.	Code standards	ft²	Commercial-Miscellaneous-Interior Lighting-All	14	2.00	$1.26	–	$0.65	$0.30	$0.030	3.51	1.96	1
Lighting	Exterior Light Load Reduction. Minimum of 15% below code.	Code standards	kW	IPC_Outdoor Lighting	15	4,059.00	$1,751.69	–	$287.00	$200.00	$0.030	5.44	4.71	1
Lighting	Daylight Photo Controls	Code standards	ft²	Commercial-Miscellaneous-Interior Lighting-All	14	1.97	$1.24	–	$0.46	$0.25	$0.030	4.02	2.64	1
Lighting	Occupancy Sensors	Code standards	Sensor	Commercial-Miscellaneous-Interior Lighting-All	8	387.00	$152.10	–	$134.22	$25.00	$0.030	4.15	1.15	1
Lighting	High-Efficiency Exit Signs	Code standards	Sign	IPC_8760	16	28.00	$17.85	–	$10.83	$7.50	$0.030	2.14	1.68	1
A/C	Unitary Commercial A/C, Air Cooled (Cooling Mode). <= 5 tons. Split system & single package. Part A: Base to CEE Tier 1	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	69.00	$69.23	–	$33.68	$30.00	$0.030	2.16	2.13	1
A/C	Unitary Commercial A/C, Air Cooled (Cooling Mode). <= 5 tons. Split system & single package. Part B: Base to CEE Tier 2	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	108.00	$108.37	–	$60.30	$75.00	$0.030	1.39	1.88	1
Heat Pump	Heat Pumps, Air Cooled (Cooling Mode). <= 5 tons. Split system & single package. Part A: Base to CEE Tier 1	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	69.00	$69.23	–	$153.00	$30.00	$0.030	2.16	0.49	1, 2
Heat Pump	Heat Pumps, Air Cooled (Cooling Mode). <= 5 tons. Split system & single package. Part B: Base to CEE Tier 2	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	108.00	$108.37	–	$168.27	$75.00	$0.030	1.39	0.70	1, 2
VRF AC	Variable Refrigerant Flow Units. <= 64 tons. A/C. Part B: Base to CEE Tier 1	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	82.50	$82.78	–	$69.24	$75.00	$0.030	1.07	1.27	1
VRF AC	Variable Refrigerant Flow Units. <= 5 tons. A/C. Part C: Base to CEE Tier 2	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	118.00	$118.40	–	$181.50	$100.00	$0.030	1.14	0.70	1, 2

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
VRF Heat Pump	Variable Refrigerant Flow Units. <= 64 tons. Heat Pump. Part B: Base to CEE Tier 1	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	124.00	$124.42	–	$141.75	$75.00	$0.030	1.58	0.94	1, 2
VRF Heat Pump	Variable Refrigerant Flow Units. <= 5 tons. Heat Pump. Part C: Base to CEE Tier 2	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	15	160.00	$160.54	–	$165.50	$100.00	$0.030	1.53	1.04	1
A/C	Air-cooled chiller condenser, IPLV 14.0 EER or higher	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	20	200.00	$239.30	–	$56.50	$80.00	$0.030	2.78	4.21	3
A/C	Water-cooled chiller electronically operated, reciprocating and positive displacement	Code standards	Tons	Commercial-Miscellaneous-Cooling-All	20	118.30	$141.55	–	$33.40	$40.00	$0.030	3.25	4.21	4
A/C	Airside economizer	Code standards	Ton of cooling	Commercial-Miscellaneous-Cooling-All	15	186.00	$186.63	–	$81.36	$75.00	$0.030	2.32	2.36	1
A/C	Direct evaporative cooler	Code standards	Tons	IPC_Evap Cooler	15	315.00	$424.65	–	$364.00	$200.00	$0.030	2.03	1.25	1
Building Shell	Reflective roof treatment	Code standards	ft_2 roof area	Commercial-Miscellaneous-Cooling-All	15	0.12	$0.12	–	$0.05	$0.05	$0.030	2.18	2.39	1
Controls	Energy Management System (EMS) controls. Part A: 1 strategy	Code standards	Tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	226.00	$155.99	$14.25	$162.49	$60.00	$0.030	2.34	1.10	1
Controls	Energy Management System (EMS) controls. Part B: 2 strategies	Code standards	Tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	408.00	$281.61	$19.00	$162.49	$70.00	$0.030	3.42	1.88	1
Controls	EMS controls. Part C: 3 strategies	Code standards	Tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	511.00	$352.71	$30.88	$162.49	$80.00	$0.030	3.70	2.36	1
Controls	EMS controls. Part D: 4 strategies	Code standards	Tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	568.00	$392.05	$49.88	$162.49	$90.00	$0.030	3.66	2.68	1
Controls	EMS controls. Part E: 5 strategies	Code standards	Tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	618.00	$426.56	$49.88	$162.49	$100.00	$0.030	3.60	2.87	1
Controls	Guest room energy management system	Code standards	Ton	Commercial-Lodging-Ventilation-All	11	571.00	$281.68	–	$57.50	$50.00	$0.030	4.20	4.15	1
Controls	Part A. Variable speed drive on HVAC system applications: -chilled water pumps -condenser water pumps -cooling tower fans	Code standards	HP	Commercial-Miscellaneous-Ventilation-All	15	268.00	$184.98	–	$165.33	$60.00	$0.030	2.72	1.17	1

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Controls	Part B. Variable speed drive on HVAC system applications: -supply -return -outside air -make-up air -hot water pumps	Code standards	HP	Commercial-Miscellaneous-Ventilation-All	15	996.00	$687.47	–	$142.05	$100.00	$0.030	5.29	4.40	1
Variable Speed Controls	Part C: Variable speed drive on Potato/Onion Storage Shed Ventilation	No VFD	HP	IPC_Onion Potato VSD	10	1,193.00	$408.90	–	$264.00	$200.00	$0.030	1.73	1.50	1
Demand Controlled Kitchen Ventilation Exhaust Hood	Demand Controlled Kitchen Ventilation Exhaust Hood	Kitchen hood with constant speed ventilation motor	HP	Commercial-Restaurant-Ventilation-All	15	4,423.00	$3,055.19	–	$1,991.00	$200.00	$0.030	9.18	1.58	1
Appliances with Electric Water Heating	Efficient Laundry Machines (electric)	Code standards	Unit	Commercial-Lodging-Water Heating-All	10	994.00	$441.57	$1,320.39	$393.00	$125.00	$0.030	2.85	4.27	5
Appliances with Electric Water Heating	ENERGY STAR® undercounter (residential style) dishwasher	Code standards	Machine	Commercial-Restaurant-Water Heating-All	12	2,210.00	$1,241.76	$230.78	$232.00	$200.00	$0.030	4.66	5.35	6
Appliances with Electric Water Heating	ENERGY STAR commercial dishwasher	Code standards	Machine	Commercial-Restaurant-Water Heating-All	12	5,561.00	$3,124.63	$622.41	$3,978.00	$500.00	$0.030	4.69	0.98	6, 7
Refrigeration	Refrigeration head pressure controls	Code standards	HP	Commercial-Miscellaneous-Refrigeration-All	16	225.00	$148.26	–	$166.60	$40.00	$0.030	3.17	0.94	1, 7
Refrigeration	Refrigeration floating suction controls	Code standards	HP	Commercial-Miscellaneous-Refrigeration-All	16	77.00	$50.74	–	$53.75	$10.00	$0.030	4.12	1.00	1
Refrigeration	Efficient refrigeration condensers	Code standards	Tons of refrigeration	Commercial-Miscellaneous-Refrigeration-All	15	114.00	$71.76	–	$35.00	$20.00	$0.030	3.06	2.05	1
Strip Curtains	For walk-in freezers	No protective barrier	Curtain/Door	Commercial-Warehouse-Refrigeration-All	4	4,865.00	$938.32	–	$213.00	$150.00	$0.030	3.17	2.88	1
Strip Curtains	For walk-in refrigerators	No protective barrier	Curtain/Door	Commercial-Warehouse-Refrigeration-All	4	3,024.00	$583.25	–	$213.00	$150.00	$0.030	2.42	2.11	1
Automatic High-Speed Doors	Freezer to Refrigerator	manual or electric warehouse door	Door	Commercial-Warehouse-Refrigeration-All	8	101,222.00	$36,678.24	–	$11,650.00	$4,000.00	$0.030	5.21	2.75	1
Automatic High-Speed Doors	Freezer to Dock	manual or electric warehouse door	Door	Commercial-Warehouse-Refrigeration-All	8	140,093.00	$50,763.32	–	$11,650.00	$8,000.00	$0.030	4.16	3.52	1

Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Benefit			Cost			B/C Tests		Source/ Notes
						Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	
Smart Power Strips	Load-sensing, motion-sensing, or timer-controlled power strip	No existing load or motion-sensing, or timer-controlled power strip	Power strip	Commercial-Small Office-Office Equipment-All	4	118.00	$23.96	–	$33.00	$10.00	$0.030	1.77	0.72	1, 7
High-Volume, Low-Speed Fan	High-Volume, Low-Speed Fan	Standard high-speed fan	Fan	Commercial-Warehouse-Ventilation-All	15	16,733.00	$11,131.47	–	$3,185.00	$2,000.00	$0.030	4.45	3.32	1
Compressed Air	Air compressor VFD	No existing VFD	HP	Commercial-Miscellaneous-Miscellaneous-All	15	949.00	$627.77	–	$223.00	$150.00	$0.030	3.52	2.75	1
Compressed Air	No-Loss Condensate Drain	Open tube with ball valve	HP	Commercial-Miscellaneous-Miscellaneous-All	10	1,830.00	$871.45	–	$700.00	$300.00	$0.030	2.46	1.27	1
Compressed Air	Low Pressure Drop Filter	Standard filter	HP	Commercial-Miscellaneous-Miscellaneous-All	5	44.00	$11.31	–	$10.00	$7.50	$0.030	1.28	1.10	1
Compressed Air	Refrigerated Compressed Air Dryer	Standard air dryer	CFM	Commercial-Miscellaneous-Miscellaneous-All	10	10.62	$5.06	–	$6.00	$2.00	$0.030	2.18	0.88	1, 2
Compressed Air	Efficient Compressed Air Nozzle <= ¼ inch	Standard air nozzle	Unit	Commercial-Miscellaneous-Miscellaneous-All	15	602.50	$398.56	–	$49.50	$30.00	$0.030	8.29	6.49	1
Compressed Air	Efficient Compress Air Nozzle > ¼ inch	Standard air nozzle	Unit	Commercial-Miscellaneous-Miscellaneous-All	15	2,997.50	$1,982.88	–	$104.00	$60.00	$0.030	13.23	11.25	1
Engine Block Heater Controls	Wall-mounted engine block heater	Standard engine block heater without controls	Unit	IPC_Engine Block	15	2,733.00	$1,187.48	–	$70.00	$50.00	$0.030	9.00	8.59	1
Engine Block Heater Controls	Engine-mounted engine block heater	Standard engine block heater without controls	Unit	IPC_Engine Block	15	2,335.00	$1,014.55	–	$120.00	$100.00	$0.030	5.97	5.87	1
Dairy VFD	VFD on milking vacuum pump	No existing VFD	HP	Commercial-Miscellaneous-Miscellaneous-All	15	3,084.00	$2,040.10	–	$356.00	$250.00	$0.030	5.96	5.00	1

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] Idaho Power TRM prepared by ADM Associates, Inc. 2018.
[2] Measure not cost-effective from TRC perspective. Measure included in the program to increase participation in a cost-effective program and to encourage adoption of higher-efficiency equipment.
[3] Idaho Power TRM prepared by ADM Associates, Inc. 2018. Averaged air-cooled chillers.
[4] Idaho Power TRM prepared by ADM Associates, Inc. 2018. Averaged water-cooled chillers.
[5] Idaho Power TRM prepared by ADM Associates, Inc. 2018. NEBs from water savings from RTF. ComClothesWashers_v5_1.xlsm. Simple average. 2018.
[6] Idaho Power TRM prepared by ADM Associates, Inc. 2018. NEBs from water savings from RTF. ComDishwasher_v1_2.xlsm. 2012.
[7] Measure not cost-effective from TRC perspective. Measure to be removed in 2021 due to updated saving assumptions and cost-effectiveness issues.

Retrofits

Segment: Commercial
2020 Program Results

Cost Inputs		Ref
Program Administration	$ 994,706	
Program Incentives	2,592,571	I
Total UC	**$ 3,587,277**	P
Measure Equipment and Installation (Incremental Participant Cost)	$ 10,989,726	M

Summary of Cost-Effectiveness Results			
Test	**Benefit**	**Cost**	**Ratio**
UC Test	$ 11,655,243	$ 3,587,277	3.25
TRC Test	16,201,715	11,984,431	1.35
RIM Test	11,655,243	14,728,391	0.79
PCT	17,114,633	10,989,726	1.56

Net Benefit Inputs (NPV)			Ref
Resource Savings			
2020 Annual Gross Energy (kWh)	20,965,215		
NPV Cumulative Energy (kWh)	203,335,858	$ 11,655,243	S
10% Credit (Northwest Power Act)		1,165,524	
Total Electric Savings		**$ 12,820,768**	A
Participant Bill Savings			
NPV Cumulative Participant Savings		$ 11,141,114	B
Other Benefits			
Non-Utility Rebates/Incentives		$ –	NUI
NEBs		$ 3,380,947	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	46%
Average Customer Segment Rate/kWh	$0.057
Line Losses	9.60%

Note: Measure inputs from Evergreen Consulting Group or the TRM prepared by ADM Associates, Inc., unless otherwise noted.
NEB/impacts on a $/kWh for each end-use. Based on 2019 impact evaluation.

Year: 2020 **Program**: Retrofits **Market Segment**: Commercial **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Standard/High Performance T8 Fluorescents	4-foot T8	4-foot T12	fixture	Commercial-Miscellaneous-Interior Lighting-All	6	182.49	$55.56	–	$53.17	$30.01	$0.030	1.57	1.04	1
Standard T8 Fluorescents	6-foot T8	6-foot T12	fixture	Commercial-Miscellaneous-Interior Lighting-All	6	332.20	$101.14	–	$76.03	$16.00	$0.030	3.90	1.29	1
Standard T8 Fluorescents	4-foot T8	8-foot T12	fixture	Commercial-Miscellaneous-Interior Lighting-All	6	445.52	$135.65	–	$66.50	$50.58	$0.030	2.12	1.87	1
T5/T8 High Bay - New Fixture	4-foot T8/T5	Fixture using > 200 input watts	fixture	Commercial-Miscellaneous-Interior Lighting-All	9	1,195.77	$521.93	–	$206.92	$135.44	$0.030	3.05	2.36	1
Relamp T8/ T5HO to Reduced Wattage T8/ T5HO	Reduced wattage T8/T5 re-lamp	4' T8/T5 HO	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	124.99	$69.82	–	$21.65	$1.00	$0.030	14.70	3.02	1
Permanent Fixture Removal	Permanent Fixture Removal		fixture	Commercial-Miscellaneous-Interior Lighting-All	6	876.59	$266.89	–	$29.48	$22.73	$0.030	5.44	5.26	1
LEDs	Screw-in or pin-based LED	Existing lamp using > input watts	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	502.97	$280.97	–	$56.37	$30.96	$0.030	6.10	4.33	1
LEDs	LED tubes (type A, B & DM)	lamp using > 17 watts	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	279.42	$156.09	–	$65.25	$6.02	$0.030	10.84	2.33	1
LEDs	LED Tubes (type C) or hardwired conversion	fixture using higher wattage	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	312.08	$174.33	–	$99.52	$15.60	$0.030	6.98	1.76	1
LED Exit Sign	LED fixture or sign lighting retrofit kit	fixture using higher wattage	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	429.23	$239.77	–	$180.93	$61.64	$0.030	3.22	1.36	1
Lighting Controls	New LED fixture or LED fixture kit with lighting control strategies	fixture using higher wattage	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	545.54	$304.75	–	$239.55	$103.76	$0.030	2.54	1.31	1

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Lighting Controls	New LED fixture with Networked Controls	fixture using higher wattage	fixture	Commercial-Miscellaneous-Interior Lighting-All	12	599.03	$334.63	–	$339.77	$131.79	$0.030	2.23	1.03	1
LED Exit Sign	LED Exit sign	fixture using higher wattage	fixture	IPC_8760	12	230.68	$117.73	–	$68.69	$40.00	$0.030	2.51	1.71	1
Lighting Controls	Lighting Controls	Manual controls	fixture	Commercial-Miscellaneous-Interior Lighting-All	10	179.65	$85.97	–	$90.10	$27.59	$0.030	2.61	0.99	1, 9
Standard T8 Fluorescents	6-foot T8	6-foot T12	fixture	IPC_Outdoor Lighting	6	386.42	$71.58	–	$76.03	$14.00	$0.030	2.80	0.90	1, 9
Standard T8 Fluorescents	4-foot T8	8-foot T12	fixture	IPC_Outdoor Lighting	6	496.54	$91.98	–	$83.27	$41.88	$0.030	1.62	1.03	1
T5/T8 High Bay - New Fixture	4-foot T8/T5	Fixture using > 200 input watts	fixture	IPC_Outdoor Lighting	11	1,643.61	$541.62	–	$195.03	$102.71	$0.030	3.56	2.44	1
Permanent Fixture Removal	Permanent Fixture Removal		fixture	IPC_Outdoor Lighting	6	1,016.60	$188.32	–	$35.78	$17.73	$0.030	3.90	3.13	1
LEDs	Screw-in or pin-based LED	Existing lamp using > input watts	fixture	IPC_Outdoor Lighting	12	583.30	$208.15	–	$87.93	$27.96	$0.030	4.58	2.17	1
LEDs	LED tubes (type A, B & DM)	lamp using > 17 watts	fixture	IPC_Outdoor Lighting	12	324.04	$115.63	–	$66.98	$6.02	$0.030	7.35	1.66	1
LEDs	LED Tubes (type C) or hardwired conversion	fixture using higher wattage	fixture	IPC_Outdoor Lighting	12	342.71	$122.29	–	$113.60	$6.85	$0.030	7.14	1.09	1
LED Exit Sign	LED fixture or sign lighting retrofit kit	fixture using higher wattage	fixture	IPC_Outdoor Lighting	12	804.15	$286.96	–	$275.95	$91.09	$0.030	2.49	1.05	1
Lighting Controls	New LED fixture or LED fixture kit with lighting control strategies	fixture using higher wattage	fixture	IPC_Outdoor Lighting	12	1,324.18	$472.53	–	$427.62	$198.89	$0.030	1.98	1.11	1
Lighting Controls	New LED fixture with Networked Controls	fixture using higher wattage	fixture	IPC_Outdoor Lighting	12	1,454.01	$518.86	–	$456.12	$261.72	$0.030	1.70	1.14	1
Lighting Controls	Lighting Controls	Manual controls	fixture	IPC_Outdoor Lighting	10	364.55	$109.87	–	$109.12	$27.59	$0.030	2.29	0.93	1, 9
Refrigeration Case Lighting	Refrigeration Case Lighting		lamp	Commercial-Miscellaneous-Refrigeration-All	6	347.86	$99.74	–	$97.91	$42.36	$0.030	1.89	1.01	1
Air Conditioning Units	<= 5 ton AC Unit. Base to CEE Tier 1	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	69.00	$69.23	–	$33.68	$30.00	$0.030	2.16	2.13	3
Air Conditioning Units	<= 5 ton AC Unit. Base to CEE Tier 2	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	108.00	$108.37	–	$60.30	$75.00	$0.030	1.39	1.88	3

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Air Conditioning Units	<= 5 ton VRF. Base to CEE Tier 2	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	118.00	$118.40	–	$181.50	$100.00	$0.030	1.14	0.70	2, 3
Air Conditioning Units	<= 64 ton VRF. Base to CEE Tier 1	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	82.50	$82.78	–	$69.24	$75.00	$0.030	1.07	1.27	3
Heat Pump (HP) units	<= 5 ton HP Unit. Base to CEE Tier 1	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	69.00	$69.23	–	$153.00	$30.00	$0.030	2.16	0.49	2, 3
Heat Pump (HP) units	<= 5 ton HP Unit. Base to CEE Tier 2	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	108.00	$108.37	–	$168.27	$75.00	$0.030	1.39	0.70	2, 3
Heat Pump (HP) units	<= 5 ton Variable Refrigerant Flow (VRF). Base to CEE Tier 2	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	160.00	$160.54	–	$165.50	$100.00	$0.030	1.53	1.04	3
Heat Pump (HP) units	<= 64 ton VRF. Base to CEE Tier 1	Code standards	tons	Commercial-Miscellaneous-Cooling-All	15	124.00	$124.42	–	$141.75	$75.00	$0.030	1.58	0.94	2, 3
Chillers	Air-cooled chiller condenser, IPLV 14.0 EER or higher	Standard air-cooled chiller	tons	Commercial-Miscellaneous-Cooling-All	20	200.00	$239.30	–	$56.50	$80.00	$0.030	2.78	4.21	4
Chillers	Water-cooled chiller electronically operated, reciprocating and positive displacement	Standard water-cooled chiller	tons	Commercial-Miscellaneous-Cooling-All	20	118.30	$141.55	–	$33.40	$40.00	$0.030	3.25	4.21	5
Economizers	Airside economizer control addition	No prior control	ton of cooling	Commercial-Miscellaneous-Cooling-All	15	278.00	$278.94	–	$155.01	$100.00	$0.030	2.57	1.88	3
Economizers	Airside economizer control repair	Non-functional economizer	ton of cooling	Commercial-Miscellaneous-Cooling-All	15	278.00	$278.94	–	$73.65	$50.00	$0.030	4.78	3.74	3
Evaporative Cooler	Direct evaporative cooler	Replacing standard AC unit	tons	Commercial-Miscellaneous-Cooling-All	15	315.00	$316.07	–	$364.00	$200.00	$0.030	1.51	0.93	2, 3
Automated Controls	EMS controls with 1 strategy	Proposed strategy not existing (retrofit system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	371.00	$256.07	$19.00	$197.98	$100.00	$0.030	2.30	1.44	3
Automated Controls	EMS controls with 2 strategies	Proposed strategy not existing (retrofit system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	621.00	$428.63	$19.00	$197.98	$125.00	$0.030	2.98	2.26	3
Automated Controls	EMS controls with 3 strategies	Proposed strategy not existing (retrofit system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	870.00	$600.50	$66.51	$197.98	$150.00	$0.030	3.41	3.24	3
Automated Controls	EMS controls with 4 strategies	Proposed strategy not existing (retrofit system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	1,730.00	$1,194.09	$228.04	$197.98	$175.00	$0.030	5.26	6.17	3

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Automated Controls	EMS controls with 5 strategies	Proposed strategy not existing (retrofit system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	1,798.00	$1,241.03	$230.42	$197.98	$200.00	$0.030	4.89	6.33	3
Automated Controls	EMS controls with 1 strategy	Proposed strategy not existing (new system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	226.00	$155.99	$14.25	$162.49	$60.00	$0.030	2.34	1.10	3
Automated Controls	EMS controls with 2 strategies	Proposed strategy not existing (new system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	408.00	$281.61	$19.00	$162.49	$70.00	$0.030	3.42	1.88	3
Automated Controls	EMS controls with 3 strategies	Proposed strategy not existing (new system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	511.00	$352.71	$30.88	$162.49	$80.00	$0.030	3.70	2.36	3
Automated Controls	EMS controls with 4 strategies	Proposed strategy not existing (new system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	568.00	$392.05	$49.88	$162.49	$90.00	$0.030	3.66	2.68	3
Automated Controls	EMS controls with 5 strategies	Proposed strategy not existing (new system)	tons of cooling	Commercial-Miscellaneous-Ventilation-All	15	618.00	$426.56	$49.88	$162.49	$100.00	$0.030	3.60	2.87	3
Automated Controls	Lodging room occupancy controls	Manual controls	ton	Commercial-Lodging-Ventilation-All	11	665.00	$328.05	–	$150.61	$75.00	$0.030	3.45	2.12	3
Electronically Commutated Motor (ECM)	ECM motor in HVAC application	Shaded pole or permanent split capacitor motor	motor	Commercial-Miscellaneous-Ventilation-All	15	1,354.00	$934.57	–	$305.00	$100.00	$0.030	6.65	2.97	3
Premium Windows	Low U-value, U-factor of .30 or less	Standard windows	ft2 window area	Commercial-Miscellaneous-Heating-Electric Furnace	25	6.87	$4.57	–	$5.92	$2.50	$0.030	1.69	0.82	2, 3
Reflective Roofing	Adding reflective roof treatment	Non-reflective low pitch roof	ft2 roof area	Commercial-Miscellaneous-Cooling-All	15	0.12	$0.12	–	$0.05	$0.05	$0.030	2.18	2.39	3
Ceiling Insulation	Increase to R38 min. insulation	Insulation level, R11 or less	ft2 wall area	Commercial-Miscellaneous-Heating-Electric Furnace	25	2.00	$1.33	–	$1.38	$0.35	$0.030	3.24	1.02	3
Wall Insulation	Increase to R11 min. insulation	Insulation level, R2.5 or less	ft2 wall area	Commercial-Miscellaneous-Heating-Electric Furnace	25	9.15	$6.08	–	$0.66	$0.40	$0.030	9.02	7.16	3
Wall Insulation	Increase to R19 min. insulation	Insulation level, R2.5 or less	ft2 wall area	Commercial-Miscellaneous-Heating-Electric Furnace	25	10.29	$6.84	–	$0.66	$0.55	$0.030	7.96	7.77	3
Computers	PC network power management	No central control software in place	unit	Commercial-Small Office-Office Equipment-All	4	148.00	$30.05	–	$12.00	$10.00	$0.030	2.08	2.01	3

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Laundry Machines	High efficiency washer	Standard washer, electric HW	unit	Commercial-Lodging-Water Heating-All	8	994.00	$361.80	$1,101.06	$393.00	$125.00	$0.030	2.34	3.55	3, 6
Stock Tank	Thermostatically controlled Stock Tank De-Icer	Non thermostatically controlled de-icer	unit	Commercial-Miscellaneous-Heating-Electric Furnace	10	3,030.00	$1,010.66	–	$51.60	$50.00	$0.030	7.17	7.80	7
HVAC Fan Motor Belt	Type AX notched V-belt Type BX notched V-belt	Type A solid V-belt Type B solid V-belt	hp	Commercial-Miscellaneous-Ventilation-All	5	78.00	$21.05	–	$1.90	$5.00	$0.030	2.87	5.46	3
HVAC Fan Motor Belt	Synchronous belt	Standard fan belt	hp	Commercial-Miscellaneous-Ventilation-All	5	199.00	$53.71	–	$67.00	$35.00	$0.030	1.31	0.81	2, 3
Commercial showerhead, electric water heat	2.0 gpm or less installed in health club/fitness business	Showerhead using 2.2 gpm or greater	unit	Commercial-Small Office-Water Heating-All	10	2,159.00	$958.87	$2,659.79	$3.66	$15.00	$0.030	12.02	54.28	8
Commercial showerhead, electric water heat	2.0 gpm or less installed in commercial business (non health club/fitness business)	Showerhead using 2.2 gpm or greater	unit	Commercial-Small Office-Water Heating-All	10	115.00	$51.07	$141.63	$3.66	$9.00	$0.030	4.10	27.82	8
Smart Power Strips	Load-sensing, motion-sensing, or timer-controlled power strip	No existing load-sensing, motion-sensing, or timer-controlled power strip	power strip	Commercial-Small Office-Office Equipment-All	4	118.00	$23.96	–	$37.00	$10.00	$0.030	1.77	0.65	3, 15
Engine block heater	Stationary pump-driven circulating block heater	Thermosiphon electric resistance circulating block heater < 3 kW	unit	IPC_Engine Block	15	7,469.00	$3,245.26	–	$1,400.00	$200.00	$0.030	7.65	2.20	3
Engine block heater	Stationary pump-driven circulating block heater	Thermosiphon electric resistance circulating block heater 3 kW or greater	unit	IPC_Engine Block	15	17,633.00	$7,661.49	–	$1,950.00	$1,500.00	$0.030	3.78	3.40	3
Engine block heater	Wall mounted engine block heater	Thermosiphon electric resistance circulating block heater 3 kW or greater	unit	IPC_Engine Block	15	2,733.00	$1,187.48	–	$120.00	$50.00	$0.030	9.00	6.47	3
Engine block heater	Engine-mounted engine block heater	Thermosiphon electric resistance circulating block heater 3 kW or greater	unit	IPC_Engine Block	15	2,335.00	$1,014.55	–	$170.00	$100.00	$0.030	5.97	4.65	3
High Volume Low Speed Fan	High Volume Low Speed Fan	Standard high speed fan	Fan	Commercial-Warehouse-Ventilation-All	15	16,733.00	$11,131.47	–	$4,185.00	$2,000.00	$0.030	4.45	2.61	3
Compressed Air	Air compressor VFD	No existing VFD	HP	Commercial-Miscellaneous-Miscellaneous-All	15	949.00	$627.77	–	$223.00	$150.00	$0.030	3.52	2.75	3
Compressed Air	Low Pressure Drop Filter	Open tube with ball valve	HP	Commercial-Miscellaneous-Miscellaneous-All	5	44.00	$11.31	–	$10.00	$7.50	$0.030	1.28	1.10	3

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Compressed Air	No-Loss Condensate Drain	Standard filter	HP	Commercial-Miscellaneous-Miscellaneous-All	10	1,830.00	$871.45	–	$700.00	$300.00	$0.030	2.46	1.27	3
Compressed Air	Efficient Compressed Air Nozzle <= ¼ inch	Standard air nozzle	unit	Commercial-Miscellaneous-Miscellaneous-All	15	602.50	$398.56	–	$49.50	$30.00	$0.030	8.29	6.49	3
Compressed Air	Efficient Compress Air Nozzle > ¼ inch	Standard air nozzle	unit	Commercial-Miscellaneous-Miscellaneous-All	15	2,997.50	$1,982.88	–	$104.00	$60.00	$0.030	13.23	11.25	3
Compressed Air	Refrigerated Compressed Air Dryer	Standard air dryer	CFM	Commercial-Miscellaneous-Miscellaneous-All	10	10.62	$5.06	–	$6.00	$2.00	$0.030	2.18	0.88	2, 3
Refrigeration	Install auto-closer - walk-in	no/damaged auto-closer, low temp	door	Commercial-Miscellaneous-Refrigeration-All	8	2,509.00	$930.16	–	$157.00	$125.00	$0.030	4.64	4.41	3
Refrigeration	Install auto-closer - reach-in	Damaged auto-closer, low temp	door	Commercial-Miscellaneous-Refrigeration-All	8	326.00	$120.86	–	$122.00	$100.00	$0.030	1.10	1.01	3
Refrigeration	Install auto-closer - walk-in	No/damaged auto-closer, med. Temp	door	Commercial-Miscellaneous-Refrigeration-All	8	562.00	$208.35	–	$157.00	$100.00	$0.030	1.78	1.32	3
Refrigeration	Install auto-closer - reach-in	Damaged auto-closer, med. Temp	door	Commercial-Miscellaneous-Refrigeration-All	8	243.00	$90.09	–	$122.00	$70.00	$0.030	1.17	0.77	2, 3
Refrigeration	Add anti-sweat heat controls	Low/med. Temp case w/ out controls	linear ft	Commercial-Miscellaneous-Refrigeration-All	8	266.00	$98.61	–	$47.90	$40.00	$0.030	2.06	1.94	3
Automatic high speed doors	Freezer to Dock	manual or electric warehouse door	Door	Commercial-Warehouse-Refrigeration-All	8	155,659.00	$56,403.73	–	$12,650.00	$8,000.00	$0.030	4.45	3.58	3
Automatic high speed doors	Freezer to Refrigerator	manual or electric warehouse door	Door	Commercial-Warehouse-Refrigeration-All	8	112,469.00	$40,753.64	–	$12,650.00	$4,000.00	$0.030	5.53	2.80	3
Strip Curtain	For walk-in freezers	no protective barrier	Curtain/ Door	Commercial-Warehouse-Refrigeration-All	4	4,865.00	$938.32	–	$274.00	$150.00	$0.030	3.17	2.46	3
Strip Curtain	For walk-in refrigerators	no protective barrier	Curtain/ Door	Commercial-Warehouse-Refrigeration-All	4	3,024.00	$583.25	–	$274.00	$150.00	$0.030	2.42	1.76	3
Evaporative Fans	Add evaporative fan controls	low or med. temp. walk-in or reach-in with no controls	fan	Commercial-Miscellaneous-Refrigeration-All	15	696.00	$438.13	–	$161.74	$75.00	$0.030	4.57	2.64	3
Evaporative Fans	Install ECM/PSC evap fan motor	Med. or low temp. walk-in	motor	Commercial-Miscellaneous-Refrigeration-All	15	1,075.00	$676.70	–	$296.78	$100.00	$0.030	5.12	2.26	3

Measure Name	Measure Descriptions	Replacing	Measure unit	End Use	Measure Life (yrs)[a]	Benefit			Cost			B/C Tests		Source/ Notes
						Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	
Evaporative Fans	Install ECM/PSC evap fan motor	Med. or low temp. reach-in	motor	Commercial-Miscellaneous-Refrigeration-All	15	429.00	$270.05	–	$84.45	$60.00	$0.030	3.71	3.05	3
Floating Head/Suction Pressures	Head pressure controller	Standard head pressure control	HP	Commercial-Miscellaneous-Refrigeration-All	16	440.00	$289.93	–	$272.60	$80.00	$0.030	3.11	1.12	3
Floating Head/Suction Pressures	Suction pressure controller	Standard suction pressure control	HP	Commercial-Miscellaneous-Refrigeration-All	16	104.00	$68.53	–	$86.91	$20.00	$0.030	2.96	0.84	2, 3
Demand Controlled Kitchen Ventilation Exhaust Hood	VFD installed on kitchen exhaust and/or makeup air fan	Kitchen hood with constant speed ventilation	HP	Commercial-Restaurant-Ventilation-All	15	4,423.00	$3,055.19	–	$1,991.00	$200.00	$0.030	9.18	1.58	3
Vending Machines	Non-cooled snack control	Vending machine with no sensor	sensor	Commercial-Miscellaneous-Miscellaneous-All	5	387.00	$99.49	–	$75.00	$50.00	$0.030	1.61	1.26	3
Commercial kitchen equipment	ENERGY STAR® undercounter (residential style) dishwasher	Code standards	machine	Commercial-Restaurant-Water Heating-All	12	2,210.00	$1,241.76	$230.78	$232.00	$200.00	$0.030	4.66	5.35	3, 10
Commercial kitchen equipment	ENERGY STAR commercial dishwasher	Code standards	machine	Commercial-Restaurant-Water Heating-All	12	5,561.00	$3,124.63	$622.41	$3,978.00	$500.00	$0.030	4.69	0.98	3, 10, 15
Commercial kitchen equipment	ENERGY STAR listed electric combination oven (6-15 pans)	Standard electric oven	oven	Commercial-Restaurant-Food Preparation-All	10	12,999.00	$6,682.73	–	$1,779.71	$1,100.00	$0.030	4.49	3.39	11
Commercial kitchen equipment	ENERGY STAR listed electric combination oven (16-20 pans)	Standard electric oven	oven	Commercial-Restaurant-Food Preparation-All	10	17,877.00	$9,190.49	–	$486.25	$300.00	$0.030	10.99	9.89	11
Commercial kitchen equipment	ENERGY STAR listed electric convection oven	Standard electric oven	oven	Commercial-Restaurant-Food Preparation-All	10	1,672.00	$859.57	–	$1,006.07	$300.00	$0.030	2.45	0.90	2, 12
Commercial kitchen equipment	ENERGY STAR listed electric fryer	Standard fryer	fryer	Commercial-Restaurant-Food Preparation-All	8	2,449.00	$1,036.25	–	$859.20	$400.00	$0.030	2.19	1.22	13
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 3 pan	Standard steamer	steamer	Commercial-Restaurant-Food Preparation-All	9	21,470.00	$10,077.53	–	$393.67	$80.00	$0.030	13.92	10.68	14
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 4 pan	Standard steamer	steamer	Commercial-Restaurant-Food Preparation-All	9	28,564.00	$13,407.29	–	$150.26	$100.00	$0.030	14.01	14.64	14
Commercial kitchen equipment	ENERGY STAR listed electric steamer - 5 pan	Standard steamer	steamer	Commercial-Restaurant-Food Preparation-All	9	35,659.00	$16,737.52	–	–	$150.00	$0.030	13.72	15.09	14

						Benefit			Cost			B/C Tests		
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Commercial kitchen equipment	ENERGY STAR listed electric steamer - 6 pan	Standard steamer	steamer	Commercial-Restaurant-Food Preparation-All	9	42,754.00	$20,067.76	–	$65.18	$175.00	$0.030	13.77	16.38	14
Commercial kitchen equipment	ENERGY STAR listed electric steamer -10 pan or larger	Standard steamer	steamer	Commercial-Restaurant-Food Preparation-All	9	71,133.00	$33,388.21	–	$4,462.55	$200.00	$0.030	14.31	5.57	14
Variable-speed controls	Variable speed drive on HVAC system applications: -chilled water pumps -condenser water pumps -cooling tower fans	Single-speed HVAC system fan/pump	HP	Commercial-Miscellaneous-Ventilation-All	15	268.00	$184.98	–	$194.28	$60.00	$0.030	2.72	1.01	3
Variable-speed controls	Variable speed drive on HVAC system applications: -supply -return -outside air -make-up air -hot water pumps	Single-speed HVAC system fan/pump	HP	Commercial-Miscellaneous-Ventilation-All	15	996.00	$687.47	–	$174.82	$100.00	$0.030	5.29	3.69	3
Variable speed controls	Variable speed drive on potato and onion storage shed ventilation	No existing VSD	HP	IPC_Onion Potato VSD	10	1,193.00	$408.90	–	$264.00	$200.00	$0.030	1.73	1.50	3
Dairy VFD	VFD on milking vacuum pump	No existing VSD	HP	Commercial-Miscellaneous-Miscellaneous-All	15	3,084.00	$2,040.10	–	$356.00	$250.00	$0.030	5.96	5.00	3

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] Evergreen Consulting Group, LLC. Idaho Power Lighting Tool. 2018.
[2] Measure not cost-effective from TRC perspective. Measure included in the program to increase participation in a cost-effective program and to encourage adoption of higher efficiency equipment.
[3] Idaho Power TRM prepared by ADM Associates, Inc. 2018.
[4] Idaho Power TRM prepared by ADM Associates, Inc. 2018. Averaged air cooled chillers.
[5] Idaho Power TRM prepared by ADM Associates, Inc. 2018. Averaged water cooled chillers.
[6] Idaho Power TRM prepared by ADM Associates, Inc. 2018. NEBs from water savings from RTF. ComClothesWashers_v5_1.xlsm. Simple average. 2018.
[7] RTF. AgStockTankDe-Icer_v1_1.xlsm. 2018.
[8] RTF. Showerheads_v3.1.xlsm.
[9] Measure not cost-effective. Measure cost-effective without inclusion of admin costs.
[10] Idaho Power TRM prepared by ADM Associates, Inc. 2018. NEBs from water savings from RTF. ComDishwasher_v1_2.xlsm. 2012.
[11] RTF. ComCookingCombinationOven_v2_3.xlsm. 2018.
[12] RTF. ComCookingConvectionOven_v2_3.xlsm. Simple average of half and full size ovens. 2018.
[13] RTF. ComCookingFryer_v2_3.xlsm. 2018.
[14] RTF. ComCookingSteamer_v2_4.xlsm. 2018.
[15] Measure not cost-effective from TRC perspective. Measure to be removed in 2021 due to updated saving assumptions and cost-effectiveness issues.

Small Business Direct Install

Segment: Commercial
2020 Program Results

Cost Inputs			Ref
Program Administration	$	339,830	
Program Incentives		–	I
Total UC	**$**	**339,830**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	–	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	352,506	$	339,830	1.04
TRC Test		547,198		339,830	1.61
RIM Test		352,506		670,533	0.53
PCT		N/A		N/A	N/A

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	780,260			
NPV Cumulative Energy (kWh)	6,184,935	$	352,506	S
10% Credit (Northwest Power Act)			35,251	
Total Electric Savings		**$**	**387,757**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	330,703	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	159,441	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	N/A	N/A

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	96%
Average Customer Segment Rate/kWh	$0.059
Line Losses	9.60%

Notes: Energy savings are unique by project and are reviewed by the third-party implementer.
NEB/impacts on a $/kWh for each end-use. Based on 2019 impact evaluation of other C&I programs

Irrigation Efficiency Rewards

Segment: Irrigation
2020 Program Results

Cost Inputs			Ref
Program Administration	$	432,856	
Program Incentives		2,968,817	I
Total UC	**$**	**3,401,673**	P
Measure Equipment and Installation (Incremental Participant Cost)	$	16,424,199	M

Summary of Cost-Effectiveness Results					
Test		**Benefit**		**Cost**	**Ratio**
UC Test	$	13,600,586	$	3,401,673	4.00
TRC Test		68,905,024		16,857,055	4.09
RIM Test		13,600,586		11,554,657	1.18
PCT		65,066,180		16,424,199	3.96

Net Benefit Inputs (NPV)				Ref
Resource Savings				
2020 Annual Gross Energy (kWh)	12,847,823			
NPV Cumulative Energy (kWh)	143,345,570	$	13,600,586	S
10% Credit (Northwest Power Act)			1,360,059	
Total Electric Savings		**$**	**14,960,644**	A
Participant Bill Savings				
NPV Cumulative Participant Bill Savings		$	8,152,985	B
Other Benefits				
Non-Utility Rebates/Incentives		$	–	NUI
NEBs		$	53,944,379	NEB

Benefits and Costs Included in Each Test		
UC Test	= S * NTG	= P
TRC Test	= (A + NUI + NEB) * NTG	= P + ((M-I) * NTG)
RIM Test	= S * NTG	= P + (B * NTG)
PCT	= B + I + NUI + NEB	= M

Assumptions for Levelized Calculations	
Discount Rate	
Nominal (WACC)	6.74%
Real ((1 + WACC) / (1 + Escalation)) – 1	4.54%
Escalation Rate	2.10%
Net-to-Gross (NTG)	100%
Minimum NTG Sensitivity	25%
Average Customer Segment Rate/kWh	$0.058
Line Losses	9.60%

Notes: Energy savings are combined for projects under the Custom and Menu program. Savings under each Custom project is unique and individually calculated and assessed.
For Custom option, NEBs including yield, labor, and other benefits reported by the customer. For Menu option, NEBs from RTF.
Green Rewind initiative is available to agricultural, commercial, and industrial customers. Agricultural motor rewinds are paid under Irrigation Efficiency Rewards, but the savings are not included in the program cost-effectiveness.
Green Rewind savings are included in the sector cost-effectiveness.
2020 cost-effectiveness ratios include evaluation expenses. If evaluation expenses were removed from the program's cost-effectiveness, the UCT and TRC would be 4.03 and 4.09, respectively.

Year: 2020 **Program**: Irrigation Efficiency Rewards **Market Segment**: Irrigation **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name[a]	**Measure Descriptions**	**Replacing**	**Measure Unit**	**End Use**	**Measure Life (yrs)[b]**	**Annual Gross Energy Savings (kWh/yr)[c]**	**NPV DSM Alternate Costs[d]**	**NEB**	**Gross Incremental Participant Cost[e]**	**Incentive/ Unit**	**Admin Cost ($/kWh)[f]**	**UCT Ratio[g]**	**TRC Ratio[h]**	**Sources/ Notes**
Nozzle Replacement	New flow-control-type nozzles replacing existing brass nozzles or worn out flow control nozzles of same flow rate or less	Brass nozzles or worn out flow control nozzles of same flow rate or less	Unit	IPC_Irrigation	4	25.84	$9.19	$1.79	$6.35	$1.50	$0.034	3.86	1.65	1
Nozzle Replacement	New nozzles replacing existing worn nozzles of same flow rate or less	Worn nozzle of same flow rate or less	Unit	IPC_Irrigation	4	25.84	$9.19	$1.79	$0.91	$0.25	$0.034	8.14	6.65	1
Sprinklers	Rebuilt or new brass impact sprinklers	Worn sprinkler	Unit	IPC_Irrigation	4	3.30	$1.17	$9.09	$12.31	$2.75	$0.034	0.41	0.84	1, 2
Levelers	Rebuilt or new wheel line levelers	Worn wheel line leveler	Unit	IPC_Irrigation	5	4.54	$1.98	$4.73	$6.23	$0.75	$0.034	2.19	1.08	1
Sprinklers	Center pivot/linear move: Install new sprinkler package on an existing system	Worn sprinkler system	Unit	IPC_Irrigation	5	24.08	$10.49	$11.12	$25.15	$8.00	$0.034	1.19	0.87	1, 2
Gasket Replacement	New gaskets for hand lines, wheel lines, or portable mainline	Worn gasket	Unit	IPC_Irrigation	5	16.14	$7.03	$3.68	$1.99	$1.00	$0.034	4.54	4.49	1
Drain Replacement	New drains, hand lines, wheel lines, or portable mainline	Worn drain	Unit	IPC_Irrigation	5	10.50	$4.57	$2.55	$4.36	$3.00	$0.034	1.36	1.61	1
Hub Replacement	New wheel line hubs	Worn hubs	Unit	IPC_Irrigation	10	26.55	$20.80	$5.65	$41.49	$12.00	$0.034	1.61	0.67	1, 2
New Goose Necks	New goose neck with drop tube or boomback	Worn gooseneck	Outlet	IPC_Irrigation	15	15.20	$16.09	$–	$6.99	$1.00	$0.034	10.61	2.36	3
Pipe Repair	Cut and pipe press or weld repair of leaking hand lines, wheel lines, and portable mainline	Leaking pipe	Joint	IPC_Irrigation	8	46.40	$30.26	$11.70	$12.08	$8.00	$0.034	3.16	3.29	1
Gasket Replacement	New center pivot base boot gasket	Worn gasket	Unit	IPC_Irrigation	8	1,932.19	$1,260.13	$–	$391.29	$125.00	$0.034	6.61	3.03	1

[a] Available measures in the Irrigation Efficiency Rewards Menu Incentive Option. For the Custom Incentive Option, projects are thoroughly reviewed by Idaho Power staff.
[b] Average measure life.
[c] Estimated peak demand reduction measured at the customer's meter, excluding line losses.
[d] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[e] Incremental participant cost prior to customer incentives.
[f] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[g] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[h] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. AgIrrigationHardware_v4_1.xlsm. 2018. Weighted average of Western Idaho (16.75%), Eastern Washington & Oregon (1.42%), and Eastern & Southern Idaho (81.84%).
[2] Measure not cost-effective. Measure to be monitored. Measure included to increase participation in a cost-effective program.
[3] RTF. AgIrrigationHardware_v3_3.xlsm. 2016. Weighted average. Measure not included in v4_1.

Year: 2020 **Program**: Irrigation Efficiency Rewards—Green Motors **Market Segment**: Irrigation **Program Type**: Energy Efficiency

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Green Motors Program Rewind: Motor size 15 HP	Green Motors Program Rewind: Motor size 15 HP	Standard rewind practice	Motor	IPC_Irrigation	18	222.19	$263.27	–	$129.74	$15.00	$0.034	11.67	2.11	1
Green Motors Program Rewind: Motor size 20 HP	Green Motors Program Rewind: Motor size 20 HP	Standard rewind practice	Motor	IPC_Irrigation	18	297.32	$352.29	–	$144.74	$20.00	$0.034	11.70	2.50	1
Green Motors Program Rewind: Motor size 25 HP	Green Motors Program Rewind: Motor size 25 HP	Standard rewind practice	Motor	IPC_Irrigation	17	447.57	$512.75	–	$165.38	$25.00	$0.034	12.75	3.12	1
Green Motors Program Rewind: Motor size 30 HP	Green Motors Program Rewind: Motor size 30 HP	Standard rewind practice	Motor	IPC_Irrigation	17	482.11	$552.32	–	$181.63	$30.00	$0.034	11.91	3.07	1
Green Motors Program Rewind: Motor size 40 HP	Green Motors Program Rewind: Motor size 40 HP	Standard rewind practice	Motor	IPC_Irrigation	17	561.43	$643.19	–	$221.96	$40.00	$0.034	10.89	2.94	1
Green Motors Program Rewind: Motor size 50 HP	Green Motors Program Rewind: Motor size 50 HP	Standard rewind practice	Motor	IPC_Irrigation	17	604.21	$692.20	–	$245.72	$50.00	$0.034	9.81	2.86	1
Green Motors Program Rewind: Motor size 60 HP	Green Motors Program Rewind: Motor size 60 HP	Standard rewind practice	Motor	IPC_Irrigation	21	553.16	$714.38	–	$289.79	$60.00	$0.034	9.06	2.55	1
Green Motors Program Rewind: Motor size 75 HP	Green Motors Program Rewind: Motor size 75 HP	Standard rewind practice	Motor	IPC_Irrigation	21	569.29	$735.21	–	$313.25	$75.00	$0.034	7.79	2.43	1
Green Motors Program Rewind: Motor size 100 HP	Green Motors Program Rewind: Motor size 100 HP	Standard rewind practice	Motor	IPC_Irrigation	21	751.39	$970.38	–	$388.58	$100.00	$0.034	7.73	2.58	1
Green Motors Program Rewind: Motor size 125 HP	Green Motors Program Rewind: Motor size 125 HP	Standard rewind practice	Motor	IPC_Irrigation	23	555.70	$752.38	–	$281.33	$125.00	$0.034	5.23	2.76	1
Green Motors Program Rewind: Motor size 150 HP	Green Motors Program Rewind: Motor size 150 HP	Standard rewind practice	Motor	IPC_Irrigation	23	660.58	$894.39	–	$313.37	$150.00	$0.034	5.19	2.93	1
Green Motors Program Rewind: Motor size 200 HP	Green Motors Program Rewind: Motor size 200 HP	Standard rewind practice	Motor	IPC_Irrigation	23	876.20	$1,186.32	–	$377.26	$200.00	$0.034	5.16	3.21	1
Green Motors Program Rewind: Motor size 250 HP	Green Motors Program Rewind: Motor size 250 HP	Standard rewind practice	Motor	IPC_Irrigation	19	1,357.04	$1,658.76	–	$484.87	$250.00	$0.034	5.60	3.44	1
Green Motors Program Rewind: Motor size 300 HP	Green Motors Program Rewind: Motor size 300 HP	Standard rewind practice	Motor	IPC_Irrigation	19	1,620.02	$1,980.21	–	$490.12	$300.00	$0.034	5.58	4.00	1
Green Motors Program Rewind: Motor size 350 HP	Green Motors Program Rewind: Motor size 350 HP	Standard rewind practice	Motor	IPC_Irrigation	19	1,888.64	$2,308.55	–	$513.69	$350.00	$0.034	5.57	4.39	1

						Benefit			Cost			B/C Tests		
Measure Name	Measure Descriptions	Replacing	Measure Unit	End Use	Measure Life (yrs)[a]	Annual Gross Energy Savings (kWh/yr)[b]	NPV DSM Alternate Costs[c]	NEB	Gross Incremental Participant Cost[d]	Incentive/ Unit	Admin Cost ($/kWh)[e]	UCT Ratio[f]	TRC Ratio[g]	Source/ Notes
Green Motors Program Rewind: Motor size 400 HP	Green Motors Program Rewind: Motor size 400 HP	Standard rewind practice	Motor	IPC_Irrigation	19	2,141.43	$2,617.55	–	$573.75	$400.00	$0.034	5.54	4.45	1
Green Motors Program Rewind: Motor size 450 HP	Green Motors Program Rewind: Motor size 450 HP	Standard rewind practice	Motor	IPC_Irrigation	19	2,405.07	$2,939.80	–	$627.16	$450.00	$0.034	5.53	4.56	1
Green Motors Program Rewind: Motor size 500 HP	Green Motors Program Rewind: Motor size 500 HP	Standard rewind practice	Motor	IPC_Irrigation	19	2,676.03	$3,271.01	–	$677.53	$500.00	$0.034	5.53	4.68	1
Green Motors Program Rewind: Motor size 600 HP	Green Motors Program Rewind: Motor size 600 HP	Standard rewind practice	Motor	IPC_Irrigation	24	4,113.93	$5,687.00	–	$1,338.28	$600.00	$0.034	7.69	4.23	1
Green Motors Program Rewind: Motor size 700 HP	Green Motors Program Rewind: Motor size 700 HP	Standard rewind practice	Motor	IPC_Irrigation	24	4,779.22	$6,606.68	–	$1,460.06	$700.00	$0.034	7.66	4.48	1
Green Motors Program Rewind: Motor size 800 HP	Green Motors Program Rewind: Motor size 800 HP	Standard rewind practice	Motor	IPC_Irrigation	24	5,450.38	$7,534.48	–	$1,619.98	$800.00	$0.034	7.65	4.59	1
Green Motors Program Rewind: Motor size 900 HP	Green Motors Program Rewind: Motor size 900 HP	Standard rewind practice	Motor	IPC_Irrigation	24	6,118.68	$8,458.32	–	$1,785.95	$900.00	$0.034	7.63	4.67	1
Green Motors Program Rewind: Motor size 1,500 HP	Green Motors Program Rewind: Motor size 1,500 HP	Standard rewind practice	Motor	IPC_Irrigation	24	8,423.43	$11,644.35	–	$2,633.80	$1,500.00	$0.034	5.21	3.80	1

[a] Average measure life.
[b] Estimated kWh savings measured at the customer's meter, excluding line losses.
[c] Sum of NPV of DSM alternate cost. Based on end-use load shape, measure life, savings including line losses, and alternate costs by pricing period as provided in the 2017 IRP. TRC test benefit calculation includes 10% conservation adder from the Northwest Power Act.
[d] Incremental participant cost prior to customer incentives.
[e] Average program administration and overhead costs to achieve each kWh of savings. Calculated from 2020 actuals.
[f] UCT Ratio = (NPV DSM Alternate Costs) / ((Admin Cost/kWh * kWh Savings) + Incentives)
[g] TRC Ratio = ((NPV DSM Alternate Costs * 110%) + NEB) / ((Admin Cost/kWh * kWh Savings) + Incentives + (Incremental Participant Cost - Incentives))
[1] RTF. Ind_and_Ag_GreenMotorRewind_v3_1.xlsm. 2017.

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MARCH 15 • 2021



2020 ANNUAL REPORT

DEMAND-SIDE MANAGEMENT

A VIEW FROM ABOVE

SUPPLEMENT 2: **EVALUATION**

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EVALUATION AND RESEARCH SUMMARY

Idaho Power considers program evaluation an essential component of its demand-side management (DSM) operational activities. The company contracts with third-party contractors to conduct impact, process, and other evaluations on a scheduled and as-required basis. Third-party contracts are generally awarded using a competitive bid process managed by Idaho Power's Corporate Services. In some cases, research and analysis is conducted internally and managed by Idaho Power's Research and Analysis team within the Customer Relations and Energy Efficiency (CR&EE) department.

Idaho Power uses industry-standard protocols for its internal and external evaluation efforts, including the *National Action Plan for Energy Efficiency—Model Energy Efficiency Program Impact Evaluation Guide*, the *California Evaluation Framework, the International Performance Measurement and Verification Protocol* (IPMVP), the *Database for Energy Efficiency Resources*, and the Regional Technical Forum's (RTF) evaluation protocols.

The company also supports regional and national studies to promote the ongoing cost-effectiveness of programs, the validation of energy savings and demand reduction, and the efficient management of its programs. Idaho Power considers primary and secondary research, cost-effectiveness analyses, potential assessments, impact and process evaluations, and customer surveys as important resources in providing accurate and transparent program savings estimates. Recommendations and findings from evaluations and research are used to continuously refine and improve Idaho Power's DSM programs.

In 2020, Idaho Power contracted with ADM Associates, DNV GL and Tetra Tech to conduct program evaluations for the Educational Distributions (impact and process, DNV GL), Home Energy Reports (process, DNV GL), Irrigation Efficiency Rewards (impact and process, Tetra Tech), and Rebate Advantage (impact, ADM Associates) programs. Nexant conducted a joint billing analysis for the Weatherization Assistance for Qualified Customers and Weatherization Solutions for Eligible Customers programs. DNV GL started the Home Energy Report Program process evaluation with the Educational Distributions evaluations. However, due to some late findings, additional analysis was required to complete the evaluation. The evaluation report will be completed in April 2021 and will be included in the *Demand-Side Management 2021 Annual Report.* Idaho Power also contracted Tetra Tech to conduct a process evaluation on the Small Business Direct Install program. The start of the evaluation has been delayed until the second quarter of 2021 to allow time for more installs to be completed after the program was shut down early 2020 due to the COVID-19 pandemic.

Franklin Energy conducted a program summary analysis for residential Energy-Savings Kits as well as Student Energy Efficiency Kits. Aclara conducted a summary analysis for the Home Energy Reports Program, and AM Conservation conducted a summary analysis for the Commercial Energy Saving Kits Program. The company conducted internal analyses for the 2020 demand response events for Irrigation Peak Rewards, Flex Peak and A/C Cool Credit Programs.

Idaho Power also contracted with Applied Energy Group to conduct an Energy Efficiency Potential Study for Idaho Power's service area and ADM Associates to update the *Technical Reference Manual*. Due to the size of these reports, they are not included in the report, but can be accessed by a link found in Other Reports section.

Throughout 2020, Idaho Power administered several surveys regarding energy efficiency programs to measure customer satisfaction. Some surveys were administered by a third-party contractor; other surveys were administered by Idaho Power either through traditional paper and electronic surveys or through the company's online Empowered Community.

An evaluation schedule and final reports from all evaluations, research, and surveys are included in this *Demand-Side Management 2020 Annual Report, Supplement 2: Evaluation*.

EVALUATION PLAN

Energy Efficiency 2010–2022 Program Evaluation Plans

Program Evaluation Schedule	2022	2021	2020	2019	2018	2017
Residential Energy Efficiency Programs						
Educational Distributions			I/P			
Energy Efficient Lighting					I	
Energy House Calls				I/P		
Heating & Cooling Efficiency Program		I/P				I/P
Home Energy Audit	P					I
Home Energy Reports	I/O	O	P/O	O	O	
Multifamily Energy Savings Program	I/P				I/P	
Rebate Advantage			I			
Residential Energy Efficiency Education Initiative						
Residential New Construction Pilot Program				I/P		
Shade Tree Project				O	O	
Simple Steps, Smart Savings™						
Weatherization Assistance for Qualified Customers			O			
Weatherization Solutions for Eligible Customers			O			
Commercial/Industrial Energy Efficiency Programs						
Commercial Energy-Saving Kits						
Custom Projects		I/P			I	P
New Construction	I/P			I		P
Retrofits	I/P			I		P
Small Business Direct-Install		P				
Irrigation Energy Efficiency Programs						
Irrigation Efficiency Rewards			I/P			
Demand-Response Programs						
A/C Cool Credit	O	I	O	I	O	O
Flex Peak Program	O	I	O	O	O	O
Irrigation Peak Rewards	O	I	O	O	O	O

Evaluation Type: I = Impact, P = Process, O = Other

Program not yet in existence:

Program Evaluation Schedule	2016	2015[1]	2014	2013	2012	2011	2010
Residential Energy Efficiency Programs							
Educational Distributions							
Energy Efficient Lighting			I	P			
Energy House Calls						I	P
Heating & Cooling Efficiency Program				P	I		P
Home Energy Audit			P				
Home Energy Reports							
Multifamily Energy Savings Program							
Rebate Advantage	I/P					I	
Residential Energy Efficiency Education Initiative	O						P
Residential New Construction Pilot Program							
Shade Tree Project			P				
Simple Steps, Smart Savings™							
Weatherization Assistance for Qualified Customers			O	P	I		
Weatherization Solutions for Eligible Customers			O	P	I		
Commercial/Industrial Energy Efficiency Programs							
Commercial Energy-Saving Kits							
Custom Projects			I/P			I	P
New Construction	I				I		P
Retrofits	I			P	I		P
Small Business Direct-Install							
Irrigation Energy Efficiency Programs							
Irrigation Efficiency Rewards	I/P		P/O	P/I			P
Demand-Response Programs							
A/C Cool Credit	O	O	O	O	P	O	
Flex Peak Program	O	O		P/O		O	
Irrigation Peak Rewards	O	O	O	O		O	

Evaluation Type: I = Impact, P = Process, O = Other

Program not yet in existence:

[1] Energy efficiency programs evaluated in 2015 have since been combined with another program or eliminated

ENERGY EFFICIENCY ADVISORY GROUP NOTES

The following pages include notes from EEAG meetings held on February 13, April 28, May 6, August 5, October 8, and November 12, 2020.

Energy Efficiency Advisory Group (EEAG)
Notes dated February 13th, 2020

Present:

Tina Jayaweera-Northwest Power & Conservation Council (on phone)
Wil Gehl–Community. Action Partnership Assoc of ID
Stacey Donohue–Idaho Public Utilities Commission
Diego Rivas–Northwest Energy Coalition
Connie Aschenbrenner–Idaho Power
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Katie Pegan–Office of Energy & Mineral Resources
Sid Erwin–Idaho Irrigation Pumpers Association
Billie McWinn*-Idaho Power
Haley Falconer-City of Boise

Not Present:

Jim Hall-WaFd
Selena O'Neal-Ada County Operations
Anna Kim–Public Utility Commission of Oregon

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Tracey Burtch*–Idaho Power
Shelley Martin–Idaho Power
Pete Pengilly*–Idaho Power
Andrea Simmonsen*–Idaho Power
Todd Greenwell–Idaho Power
Chellie Jensen–Idaho Power
Rachelle Farnsworth-IPUC
Jordan Prassinos*-Idaho Power
Madison Olson-Office of Energy & Mineral Resources
Becky Arte-Howell-Idaho Power
Denise Humphreys-Idaho Power
Amanda Richards-Honeywell
Tonja Dyke-Idaho Power
Sheree Willhite–Idaho Power
Theresa Drake–Idaho Power
Chad Severson–Idaho Power
Annie Meyer*-Idaho Power
Krista West-Idaho Power
Zeke VanHooser-Idaho Power
Chris Pollow–Idaho Power
Mindi Shodeen-Idaho Power
Paul Goralski-Idaho Power
Brad Iverson-Long-Idaho Public Utilities Commission
Brittany Nixon-Idaho Power
Randy Thorn-Idaho Power
Allison Williams-Idaho Power
Jared Hansen*-Idaho Power

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:34 am

Announcements

Pete convened the meeting with housekeeping and safety. He announced that Kent Hanway has resigned from EEAG. Billie will be organizing and leading EEAG meetings and will be reaching out to members individually for one on one meetings. Rosemary had members and guests introduce themselves. There were no comments or questions on the November 2019 or the revised January 2019 meeting notes.

Pete updated the group on the IECC 2018 Building Codes. He showed a copy of the letter that Idaho Power submitted to the Senate Commerce Committee in support of the adoption of the 2018 building codes, including the 2018 International Conservation Code with amendments as recommended by the Idaho Building Code Board. Letters from support came from City of Boise, Association of Idaho Cities, The American Institute of Architects, and others.

9:45 am-Potential Study/Load Forecast/IRP Schedule—Pete Pengilly, Jared Hansen, Jordan Prassinos

Pete explained a potential study and outlined the timeline and process of Integrated Resource Planning (IRP). One member asked if the IRP will be doing an economic screen. Pete explained that the company is working on how to bundle the achievable technical potential.

Jared Hansen showed a video that explained the 2017 IRP. The basic concept of IRP planning is still the same; balancing cost, risk, and environment. The goal of this balancing is to create a portfolio that is in the best interest of customers. The 2019 IRP process utilized an optimized resource expansion model that created several different portfolios. Since this was a new process, the company did further analysis and an amended IRP was submitted. There was some discussion about the 120 MW of solar resource included in the preferred portfolio.

Load Forecast-Jordan Prassinos

Jordan explained the residential end use components and how residential load is forecasted. The commercial and industrial modeling process uses seven linear regression models that are then segmented by customer type. Jordan explained the three different methods that Idaho Power is evaluating for potential use in the next IRP cycle. There were questions regarding the three different models being considered. There was discussion around historical energy efficiency being predictive of future energy efficiency trends and making sure that energy efficiency savings targets are set appropriately for IRP planning. EEAG members recognized the company's efforts in the IRP planning and thanked them for sharing this information.

Pete provided an update on the 2020 potential study timeline, its emphasis on the Utility Cost Test (UCT) and the bundling of energy efficiency. The company will schedule a webinar in March to discuss the results of the potential study. EEAG members expressed appreciation for the effort the company is putting into this change and recognize that it is a lot of work. In preparation for the webinar, one member asked for more information prior to the meeting in order to ensure feedback provided to the company is meaningful.

10:48 am-Break

11:06 am-Preliminary 2019 Savings/Financial Results—Pete Pengilly

Pete provided portfolio energy savings and expenses, savings amounts by sector, demand response results year over year, and cumulative energy efficiency savings. Pete also provided the Idaho and Oregon year-end rider balances. He went on to explain that all numbers are preliminary and are still being audited. Once the company publicly releases its earnings, he will send out more detailed information to EEAG members.

One member commented on the negative rider balance. Connie explained that there have been some large variances from the company's initial forecast when the 2.75% funding level was recommended – largely attributed to Custom Efficiency program projects. The company will and has always pursued all cost-effective energy efficiency regardless of the rider balance but will commit to reevaluating the Rider collection after the impact of transitioning to the UCT is better understood.

Pete provided more detail on what expenditures are included in the "purchased services" category. One member thanked the company for breaking out those expenses and recognized that even though they may not be actual incentives, the customer still benefits from them. Pete highlighted "Other DSM Activities." These are activities that the company participates in but doesn't count energy savings.

- Lunch & Learn
- IDL Tool Loan Library (900 pieces of equipment available for customer to check out)
- Training sponsorships for Commercial/Industrial customers
- Irrigation & Ag shows
- Residential EE Guides
- Company participation in 45 local community outreach events

One member commented that these activities are very important investments. They help to build relationships and trust with customers. Pete also thanked the EEAG for encouraging and supporting Idaho Power in these efforts.

11:23 am-Commercial/Industrial/Irrigation Programs—Quentin Nesbitt

Quentin provided updates and 2019 results on the commercial, industrial, and irrigation programs. He highlighted the Small Business Direct Install program and provided a status update since its launch in November. He also highlighted a video that was developed in coordination with the Integrated Design Lab and the Idaho Power Teacher extern last summer. During the last few EEAG meetings there had been discussion around the Green Motors measure and with feedback from EEAG members, new informational collateral was developed for participating shops in Idaho Power's service area to help drive participation. One member suggested reaching out to the pump service providers.

Quentin passed around a new brochure that was created for the Wastewater/Water Cohort. He shared a success story that was a direct result of the cohort workshop process.

Quentin updated the group on the Targeting Operational Energy Savings Energy Management incentive. This will be targeting energy management, behavioral changes.

The company is still working with the Regional Technical Forum (RTF) workgroup to evaluate savings for the Irrigation Menu program. Idaho Power worked with the RTF to develop a survey that was recently sent to all Idaho Power irrigation customers. The results of this survey will be evaluated and provided to the RTF.

12:00 pm—Lunch

1:00 pm-Meeting Reconvened

1:05 pm-Residential Program Update—Andrea Simmonsen

Andrea highlighted the preliminary year-to-date participation and energy savings for the residential programs. She provided an update on the status of changes made to the smart thermostats measure qualifications in the Heating & Cooling Efficiency program, and the new incentive tiers for the Residential New Construction program, both of which were implemented on January 1st. EEAG showed support for grandfathering new homes that were in the pipeline as of that date at the initial incentive level of $1500. Andrea provided examples of different measure scenarios that contractors could install to increase their incentive. There were questions about how new building codes could impact this program. Andrea answered that these new building codes go into effect in 2021 and the company will monitor any potential impacts to the program.

Andrea provided an update on the Home Energy Reports. These reports will be expanding to reach a total of 150,000 participants, which includes current pilot participants. She also requested feedback from EEAG regarding nightlights. Currently, the company hasn't been claiming energy savings for these. Andrea provided three different savings assumptions the company is considering. These LED nightlights are great for giveaways at home shows and can be a great way to engage customers on programs and energy efficiency.

Several EEAG members gave examples of how they or their family members currently use nightlights. There was questions and comments about the types of customers to target, how to make sure they are being used in high usage areas, and that this could be a good way to introduce LED usage. One member commented that it isn't clear that the nightlights are LED. Could there be a way to make that connection for people, so they know what they are buying. A survey could be done with customers to get an idea of hours of use and how many of what types of lights they replaced.

2:13 pm- Home Improvement Program—Kathy Yi

Kathy provided a background and historical timeline of the Home Improvement Program. The last full year of this program was in 2016. For the current 2020 analysis, 2016 participation numbers were used. This is an initial analysis using known changes at this moment in time. The company looked at several different scenarios along with numerous measure combinations for determining cost effectiveness; 2017 vs. 2019 DSM Alternate Costs and the different RTF Multifamily and Single-Family Workbook versions. Several caveats to these assumptions were shared and cost-effective outcomes could change based on new information. The company will continue to analyze new information as it becomes available and would like feedback from EEAG.

There was discussion about analyzing a tiered incentive approach which could lead to higher savings and participation, potentially adding low-e storm windows, and exploring assumptions around attic insulation levels. One member would like to see the actual cost effective "pass" ratios for future presentations. One member suggested packaging known cost-effective measures with measures that barely pass. Another member thought it might be worth exploring how the Home Energy Audit could tie together with some of these measures. EEAG members thanked Idaho Power for bringing the analysis to EEAG and soliciting feedback.

2:23 pm -Marketing— Annie Meyer

Annie highlighted marketing tactics the company had done in 2019 and what they will be pursuing in 2020. She played a radio spot that targeted irrigation customers and shared a video highlighting energy efficiency upgrades completed at the Sun Valley Lodge. One member asked if there is a way to correlate sign-ups and incentives to the radio spots. Annie answered that is more difficult to attribute any uptick with radio vs. digital ads. Another member complimented the company on the McCall Shore Lodge article asked if other businesses would be highlighted that would appeal to a different customer demographic. Tracey Burtch answered that upcoming articles would feature the Humane Society and Fresca.

235 pm Wrap/up Discussion

This was a great year for savings. Congratulations! I appreciated the Home Improvement presentation. It was really done well.

I appreciate everyone's comments and suggestions that help to direct the company's activities.

It was a good meeting. Kathy's presentation was good and as savings for programs start to go down, it will be a challenge for us to find ways to improve programs.

I appreciate everyone understanding that energy efficiency is in a transformative time and looking for ways to think outside of the box.

I really appreciated the IRP presentation. It very helpful for me.

With Kent stepping away it would be good to still have someone else from the architect world on EEAG.

This was a good follow up meeting on stuff that we have talked about at other meetings. I appreciated the IRP presentation and the transparency.

It feels like a full meeting and there was a lot of opportunity for us to provide valuable feedback and input.

I think there was a good balance of information.

The next meeting will be May 6th and look for a webinar in the next couple of months.

2:40 pm Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)-Webinar
Notes April 28th, 2020

Present:

Steve Hubble (sitting in for Haley Falconer)-City of Boise
Wil Gehl–Community Action Partnership Assoc of Idaho
Tina Jayaweera-Northwest Power & Conservation Council
Connie Aschenbrenner–Idaho Power
Diego Rivas–Northwest Energy Coalition
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Katie Pegan–Office of Energy & Mineral Resources
Anna Kim–Public Utility Commission of Oregon
Pete Pengilly*-Idaho Power
Stacey Donohue–Idaho Public Utilities Commission

Not Present:

Selena O'Neal-Ada County
Sid Erwin–Idaho Irrigation Pumpers Association
Jim Hall-Washington Federal Bank

Guests and Presenters*:

Scott Wright-Idaho Power
Andrea Simmonsen-Idaho Power
Becky Arte-Howell–Idaho Power
Quentin Nesbitt-Idaho Power
Alison Williams-Idaho Power
Jordan Prassinos-Idaho Power
Jared Hansen-Idaho Power
Paul Goralski–Idaho Power
Theresa Drake–Idaho Power
Brad Iverson-Long-Idaho Public Utilities Commission
Rachelle Farnsworth-Idaho Public Utilities Commission
Kurtis Kolnowski*-AEG
Jared Ellsworth-Idaho Power
John Chatburn-Office of Energy & Mineral Resources

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:00 a.m.

Rosemary had attendees introduce themselves and go over WEBEX protocols. Theresa welcomed the group and let them know that Pete would be retiring in July, covered leadership changes and spoke about how the company continues to pursue energy efficiency and customer engagement during remote work.

9:15 a.m.-Incentive Levels and the UCT—Pete Pengilly

Pete presented the Integrated Resource Plan (IRP) timeline and incentive levels. One member asked if Pete could speak more about finding the right incentive level and that he agreed with the balance mentioned. Pete commented that the company wants to find the right balance to drive participation but not free ridership. One

member asked if a free ridership evaluation has ever been conducted so that an assessment could be done. Pete answered that type of information is hard to research, but it is done for every program. Kathy added that a sensitivity analysis is done at a program level to see how low the net-to-gross percentage can go before it is no longer cost-effective. Another member stated that it was their understanding that those kinds of studies are not always helpful because the information comes from self-reporting and may not always be reliable. Another member stated that those surveys could be used for the bigger ticket items where there is a more calculated purchase decision and not a light bulb and why someone bought it.

10:00 a.m.-Preview of Draft Energy Efficiency Potential Study 2020—Kurtis Kolnowski, AEG

Kurtis provided an overview of the 2020 Potential Study that was completed for Idaho Power Company.

One EEAG member asked if the comprehensive residential end use survey was incorporated into the 2018 study or if it was incorporated in the 2020 study. Kurtis answered that it was done in 2016 so it would have been incorporated in the 2018 study. Pete added that it is on the company's list to conduct a new one. One member asked if the UCT includes non-energy impacts. Kurtis answered that they are not included.

Treatment of EISA in the Study slide

One member commented that LED saturation varies between different bulb types and lumen bins. There could be some more targeted lighting work rather than the broad-brush approach. May be some activity to improve the fixture integrated lamp market instead of just the bulb market.

Another member stated that since the DOE rolled back the 2020 lighting standards and the Regional Technical Forum (RTF) provided a new forecast, would Idaho Power be using that new forecast? Kurtis answered that would be correct, the new RTF forecast is being used.

Another member asked if the different types of lighting categories were included in the study. Kurtis answered that they weren't modeled specifically but they were included in the results.

Levels of Potential slide

One member stated that it is nice to see that the achievable potential assumptions are being looked at again and look forward to diving in and learning more.

Sector-level achievable potential slide

One member commented about technical potential changing due to lighting.

10:30 a.m. DSM Inputs for 2021 IRP—Pete Pengilly

Inputs slide

Since 2002 we have been using the same inputs for the IRP, which were based on conditions that existed during that timeframe. Idaho Power proposes to update the inputs to be reflective of current conditions, and as part of that will update the hourly buckets, the avoided energy for summer on-peak hours, and the capacity resource based on the most recent acknowledged IRP and year of identified capacity deficit.

Updated weighted average avoided cost slide

One member stated that for the 2019 IRP, Idaho Power talked a lot about the need for B2H to enable market access during summer peaks because current transmission is constrained. How does this align with the proposal to use market prices now for summer peaks hours? The proposed updates to the DSM alternate costs wouldn't necessarily be reflective of market prices for summer peak hours, rather it would be reflected of the marginal energy prices from Aurora, instead of replacing all summer on-peak prices with the variable operating costs from a SCCT.

Timeline for 2021 IRP slide-

One member asked if those changes reflected in what Kurtis presented? The information that Kurtis presented reflected the achievable economic potential from the utility cost perspective.

Pete spoke about the plans to hold an EEAG/IRPAC subcommittee workshop exploring how EE potential would be included in the 2021 IRP. An invite would be sent to EEAG once scheduled.

Wrap Up Discussion

Pete asked the group for their input on options for the upcoming May 6th EEAG meeting**.**

- I would like to hear about topics on how to think through ways to capture energy efficiency while not being in people's homes.
- I support whatever type of meeting the company would like to have but asked how they could provide feedback based on today's meeting. Pete stated that the best way would be to email him or Quentin**.**
- I like the idea of a half day webinar. I am interested to hear how the programs are working in the current environment.
- I would like to keep regular scheduled meeting and get materials out in advance.
- I prefer a WEBEX.
- I will be the lone voice against a full day WEBEX. I think a half day meeting at the most, and email update is fine.

10:55 a.m.- Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Notes dated May 6th, 2020
Webinar

Present:

Steve Hubble-City of Boise
Wil Gehl–Community Action Partnership Assoc of Idaho
Pete Pengilly*-Idaho Power
Diego Rivas–Northwest Energy Coalition
Connie Aschenbrenner–Idaho Power
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Katie Pegan–Office of Energy & Mineral Resources
Anna Kim–Public Utility Commission of Oregon
Tina Jayaweera-Northwest Power & Conservation Council

Not Present:

Stacey Donohue–Idaho Public Utilities Commission
Haley Falconer–City of Boise
Jim Hall-WAFD
Sid Erwin–Idaho Irrigation Pumpers Association
Selena O'Neal-Ada County

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Tracey Burtch*–Idaho Power
Andrea Simmonsen*–Idaho Power
Chad Severson-Idaho Power
Donn English-Idaho Public Utilities Commission
Paul Goralski–Idaho Power
Theresa Drake–Idaho Power
Annie Meyer-Idaho Power
Brad Iverson-Long-Idaho Public Utilities Commission
Brittany Nixon-Idaho Power

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:00am

Rosemary convened the meeting with introductions. There were no comments or concerns regarding the February 13th notes. Quentin stated that Idaho Power is planning on holding a workshop to discuss options for incorporating energy efficiency into the Integrated Resource Plan (IRP). This workshop will be comprised of interested members from the EEAG, Integrated Resource Planning Advisory Committee (IRPAC), and the company's Load Forecasting department. The appropriate venue for questions and comments regarding energy efficiency in the 2021 IRP will be during that workshop.

9:10 am-First Quarter Savings & Financial Results—Pete Pengilly

Pete provided portfolio energy savings and expenses, savings amounts by sector, and the Oregon and Idaho Rider balances through March 31st, 2020**.** There was a comment regarding the current balances of the rider. Connie stated that as of right now, the company has not addressed the percentage currently collected in the rider. At the time the percentage was decreased to 2.75% there was evidence that it was an appropriate reduction. As we all know, forecasting can be difficult, and the company paid out a couple of large commercial/industrial incentives which lowered the rider balance. The company is mindful of the impact of increasing rates during the current economic environment. The group further discussed and some EEAG member's comments are that the company needs to address the rider balance and the preference would be to do it sooner rather than later. The longer the company waits the more it will potentially have to increase the percentage to cover the shortfall. Connie stated that at the next EEAG meeting we will plan to discuss further. One member stated that on the commercial/industrial side, businesses are in dire financial situations so there could be a reduction in funding for capital projects.

Pete reviewed the information that Theresa Drake had sent out in an email showing how COVID-19 has impacted the company's programs. The decisions that have been made align with the Governor's stay-at-home order and Rebound Idaho.

9:30 am Commercial/Industrial/ Irrigation Programs—Quentin Nesbitt

Quentin provided updates and year-to-date savings for the commercial, industrial, and irrigation programs. He also provided program performance data for Commercial Energy-saving Kits. Small Business Direct Install, and the Cohort projects. He provided an update on enrollments for Flex Peak and Irrigation Peak, the company's demand response programs**.**

9:50 am- Residential Programs—Andrea Simmonsen

Andrea provided preliminary year-to-date energy savings by program and customer participation. She provided an update on the night lights that were discussed at the February EEAG meeting. As a reminder, the night lights are a great way for the company to engage and start conversations with customers about energy efficiency. During our last meeting a suggestion was made to make it clear on the night light, that it is an LED. Andrea stated that all new lights that are ordered will have that information on them and she showed a picture of how that will look. Because there are still some night lights in stock that won't have that message, an educational card will be included with the light in a reusable bag.

Andrea provided an update on all the residential programs. The program specialist for the Weatherization programs is working with Project Share to update guidelines and help coordinate additional federal funding that will help customers avoid potential disconnections due to current economic conditions. The company is working on a special project to reach out to customers via telephone to obtain email address and/or numbers for texting. During that call energy efficiency questions can be addressed, programs introduced, and energy savings tips can be provided.

EEAG thanked Andrea for the updates. It was mentioned it is understandable that there is a reduction in projects and participation. There was a comment about advocating at the federal level to make sure there is enough money to support energy savings and how we need to work together to find a way to recoup energy savings in the future Theresa thanked the member for the suggestions and stated that she could take these comments offline and will follow up.

10:12 am- Marketing Overview—Tracey Burtch

Tracey provided an update on the types of energy efficiency marketing the company is doing during COVID-19. Alerts have been posted to the company's webpage indicating that programs could be impacted and social media posts shared tips for residential and business customers. The Enery@Work new**s**letter was delivered to customers and provided energy tips for business's dealing with potential shutdowns. The commercial/industrial trainings were postponed but the company is looking into an online format.

10:18 am-Wrap/Up Discussion.

Thank you, I think this went very well. You all navigated the online experience well.

Thank you for providing this meeting online, it went well and thanks for condensing. Thanks to everyone for making the adjustments.

There is going to be a large increase in federal financial assistance. We are hoping to receive those funds in May.

I think this format went well. I do like the marketing focus on tips especially for businesses as they are seeing financial impacts. I like the suggestion of looking for federal funding assistance. My position was funded by a grant from the DOE 10yrs ago.

Thank you for putting this together. I like the webinars being shorter/more numerous. I found today's material to be very informative.

I am excited for the opportunity in June to participate in potential study and IRP workshop. Congrats to Pete on his upcoming retirement.

I appreciate the shorter webinars and congrats to Pete. I'll miss having you around.

Thanks to the Idaho Power team for being flexible and showing us how COVID-19 has impacted you.

Congrats to Pete on your retirement.

Pete thanked everyone for their time and comments regarding his retirement. The next meeting is scheduled for August 5th, 2020.

10:30am Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
8/5/2020
Via WebEx

Present:

Brad Iverson-Long-Idaho Public Utilities Commission
Wil Gehl–Community Action Partnership Assoc of Idaho
Haley Falconer–City of Boise
Diego Rivas–Northwest Energy Coalition
Anna Kim–Public Utility Commission of Oregon
Connie Aschenbrenner*–Idaho Power
Quentin Nesbitt-Idaho Power
Don Strickler–Simplot
Ben Otto-Idaho Conservation League
Katie Pegan–Office of Energy & Mineral Resources
Lynn Tominaga–Idaho Irrigation Pumpers Association
Tina Jayaweera-Northwest Power & Conservation Council

Not Present:

Stacey Donohue–Idaho Public Utilities Commission
Jim Hall-Wafd
Sid Erwin-Idaho Irrigation Pumpers Association
Selena O'Neal-Ada County

Guests and Presenters*:

Quentin Nesbitt*-Idaho Power
Tracey Burtch*–Idaho Power
Andrea Simmonsen*–Idaho Power
Shawna Potter*-Idaho Power
Juliet Petersen*–Idaho Power
Chad Severson-Idaho Power
Erik Olson-Office of Energy & Mineral Resources
Mindi Shodeen-Idaho Power
Cheryl Paoli-Idaho Power
Chellie Jensen-Idaho Power
Paul Goralski–Idaho Power
Theresa Drake*–Idaho Power
Annie Meyer*-Idaho Power
Randy Thorn-Idaho Power
Steve Hubble-City of Boise
Donn English-Idaho Public Utilities Commission
Shelley Martin-Idaho Power
Denise Humphreys-Idaho Power
Krista West-Idaho Power
Sheree Willhite-Idaho Power

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi* (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:05 am

Rosemary started the meeting with the introductions of EEAG members.

9:05 am-May Meeting Notes-Announcements—Theresa Drake, Connie Aschenbrenner

Theresa updated the group on the leadership transitions in the Customer Relations and Energy Efficiency Department. Juliet Petersen is the new Commercial, Industrial, and Irrigation Leader. With the recent retirement of Pete Pengilly, Quentin Nesbitt has assumed the role of Customer Research & Analysis Leader. Shawna Potter is the new Residential Leader while Billie McWinn is on a temporary duty assignment as a Regional Customer Relations Manager at the Canyon Operations Center.

Connie provided an update of the Idaho Rider balance. In June of 2019, the rider percentage was decreased from 3.75% to 2.75%. As of June 30, 2020, the Rider balance is in a deficit of approximately $8.2 million.

The company is working on its 2021 budget. It is also working towards incorporating the Utility Cost Test into its cost effectiveness of programs. Connie reminded the group that due to the 2019 Integrated Resource Plan (IRP) delays, the 2021 IRP DSM working group has been delayed.

There were questions and comments about the ongoing rider balance fluctuations, some EEAG members support a longer-term view of the rider balance for customer stability. Quentin commented that predicting the number of projects and incentive amounts for the Commercial/Industrial programs can be a challenge. As you can see from the current Rider balance, it is not affecting participation or the company's efforts in pursuing all cost-effective energy efficiency. One member raised a concern that a deficit balance could result in a limit to funding future energy efficiency acquisition and decreased energy savings and going forward it would be better to err on the side of over collection in the Rider with mechanisms in place for returning customer money if needed. One member commented that they agreed with the over collection of Rider funds and acknowledged that this deficit isn't hindering Idaho Power from pursuing cost-effective energy efficiency. There was a question about programmatic change timelines and the recently completed Potential Study results. Quentin stated that upcoming presentations would cover upcoming changes that will impact programs. Connie added that the company intends to schedule a workshop to specifically address energy efficiency and the potential study for interested members of EEAG and IRPAC.

9:42 am-Future Impacts to Programs—Kathy Yi

Kathy's presentation focused on impacts to programs in 2021. She covered cost-effectiveness assumptions and impacts to residential and commercial/industrial/irrigation programs. She asked the group for their feedback on a future presentation of the low-income programs billing analysis and evaluations. The consensus was that this would be a valuable presentation.

Kathy provided an overview of the three Energy Efficiency Kits and the two Buy-Down offerings; Simple Steps, Smart Savings and Energy Efficient Lighting. In 2021 energy savings for LED lightbulbs in the kits will be reduced significantly after the first year. Idaho Power is proposing to sunset the Mail by Request Kits in its current format. The New Customer Kit is not cost effective, but the company thinks there is opportunity to offer it in a different format. Energy savings for the Student Kits are custom calculated based on information provided by students, parents, and teachers. These will still be offered but they could be impacted by an uncertain school year due to COVID.

Bonneville Power Administration (BPA) is ending the Simple Steps, Smart Savings program on September 30, 2020. The residential programs presentation will cover the next steps.

Kathy next highlighted the Cohort offerings and Irrigation Menu within the Commercial, Industrial, and Irrigation programs. Persistence is a major assumption within the Cohort offering. Employees leave the company; equipment changes which can impact cost effectiveness. The company will continue to monitor this program. The Irrigation Efficiency program may still be cost effective because of the custom projects. The prescriptive or menu offering has been impacted by RTF savings assumptions. The company will still provide this program and is still

actively participating with the RTF on measure savings assumptions. There isn't a specific timeline when this work will be complete. Idaho Power along with other utilities are gathering customer survey information and the intent of that data will be used to inform research. It is an ongoing project.

There were questions and comments around water savings associated with the Irrigation programs and how those are considered non-energy benefits, using less water means less electricity is used for pumps. One member commented that they would like to see the water savings message highlighted in marketing tactics and as an educational component. One member asked if savings from a capital project that originated from the cohort could be allocated to the cohort. Quentin answered that cohort savings is reported within the Custom offering. A member suggested the company continue to look at the kit or giveaway method of delivery to keep energy savings high.

10:22 am C&I&I Programs—Juliet Petersen

Juliet provided updates and year-to-date savings for the commercial, industrial, and irrigation programs. She updated the group on COVID-19 impacts and adaptations to programs. She highlighted the New Construction program and Retrofits and requested feedback from EEAG on proposed changes.

The Commercial New Construction program has experienced a decrease in energy savings compared to this time last year and based on the number of projects in the pipeline. The team is exploring ways to increase participation in this program. One opportunity that has been identified is an increase to the professional assistance incentive. This incentive is available for the third-party architect or engineer who supports the participant in the application process. This incentive is separate from the project incentive and does not impact the participant incentive. Juliet used MentiMeter to obtain feedback and suggestions from EEAG members.

There were questions regarding the current state of the commercial new construction market during COVID and if the company has seen changes in the market and in participation in the program. The Program Specialist answered that there doesn't appear to be any disruption in new construction. There could be impacts in the future in how the current building spaces are utilized. There may be less new construction and more remodeling of existing spaces.

Juliet asked the group- "How long do you think the trial period should last to evaluate effectiveness of changes?"

- The majority of EEAG members preferred a 12-month timeframe.

Several EEAG members commented that it will take time to communicate these changes to the architect and engineers and support the 12-month timeframe.

Feedback from EEAG members- "Proposed changes to the new construction program."

- Seeing no slowdown of people moving to Idaho. Getting these buildings built correctly the first time is key. We can't count on building codes in the residential sector to ensure conservation.

- Several members commented that this was a "good idea" and that it's important to track the impact / evaluate the program.

- I'd be interested in the professional feedback on a flat incentive for the professional assistance vs based on a percentage.

The Retrofit program participation has seen a decline in projects submitted. Part of this decline could be due to COVID-19 impacts. Several peer utilities have temporarily increased their incentives for their lighting programs.

Idaho Power is proposing a temporary increase to drive participation. Juliet highlighted the measures that are being considered. Increasing incentives on a short-term basis will allow the company to pause and evaluate the impact of the changes and share those with EEAG before a permanent change is implemented.

Juliet asked the group- "What feedback do you have about the proposed changes to the retrofits lighting program?"

- The standard of the IPUC is to "pursue all cost-effective energy efficiency." If you can increase the incentive and remain cost effective, then the standard requires this
- I think that testing various option on a temporary basis is reasonable. It could help to identify more long-term opportunities and help with short term challenges
- No objection but a lot of this lighting is going to happen anyway. Will need to consider the role of the markets vs. the program
- The length of time could drive people based on "expiring deal"

11:00 am Residential Programs—Andrea Simmonsen/Shawna Potter

Andrea provided preliminary year-to-date energy savings by program and customer participation. Several programs that require site visits; Energy House Calls, Home Energy Audits, Multifamily Direct Install, have been impacted by COVID-19. Idaho Power is still taking those enrollments and will follow-up with customers when it becomes safe to do so**.** Wil Gehl provided an update on weatherization and the agencies that provide that service. They are reprioritizing their work in areas where it is safe to do so. Their main concern is the health and safety of their clients.

The slide from the May EEAG meeting that highlights the programs impacted by COVID-19 was reviewed. A question was asked if the company has considered using AMI data for virtual energy audits or explored that possibility due to COVID. Andrea answered that some companies have started doing that and she is collecting data on the mechanics of that technology. One EEAG member encouraged the company to lean into this opportunity and not be put off by those who don't participate but rather, focus on the early adopters and use that to encourage other who may be hesitant to participate in virtual audits.

Normally this time of year, our Education & Outreach Energy Advisors would be visiting local senior centers to provide in-person educational events. Due to COVID-19, the company needed to come up with different ways to reach these customers. Working with the coordinators and directors of different senior centers, the Energy Advisors assembled giveaway bags at home and dropped them off at senior centers in lieu of hosting in-person events.

The company also added a new line on the AC Cool Credit postcard that reminds customers to let Idaho Power know if they have recently had their air conditioners replaced or serviced. The company has received positive feedback from customers.

Shawna provided an update on the Shade Tree offering. The spring and fall events for 2020 have been cancelled due to COVID-19. The program specialist is researching options for next year. She also provided an update on the Educational Distributions: Welcome Kits, Student EE Kits, and the Energy Savings Kits (mail-by-request kits). As was mentioned in Kathy's presentation, the Welcome Kits may not be cost effective in 2021. With school attendance uncertainty, certain logistics will need to be addressed, which could impact the Student EE kits offering. As Kathy reviewed in her presentation, the Energy Savings Kits will not be cost effective next year. Because of this, the company is proposing to sunset the Energy Savings Kits offering with a plan to offer a last push in October using a postcard. She asked EEAG for ideas on language the company could use to promote this.

One member suggested the "last chance" tactic is effective because people are incented by not wanting to miss out on an opportunity.

Shawna informed the group that Bonneville Power Administration (BPA) is ending the Simple Steps, Smart Savings program as of September 30, 2020. Idaho Power's Energy Efficient Lighting program will be impacted. In Kathy's presentation, she mentioned how lighting savings has decreased which is why BPA is ending this program. She also mentioned that showerhead savings were recently deactivated by the Regional Technical Forum, so there is no savings that Idaho Power can claim for those. Idaho Power is exploring alternatives to this program. There were questions and comments about cost effectiveness of a local program vs. the cost sharing of a regional program. One member commented that they are glad to see Idaho Power pursuing a possible replacement for this program.

11:47 am Marketing—Tracey Burtch/Annie Meyer

Tracey and Annie updated the group on the marketing efforts the company is pursuing while also being empathetic to our customers during COVID-19. A new Tip Tuesday design was implemented to focus on saving energy and money while we all spend more time in the home. The company also promoted a summer contest between July 24-August 2 within My Account. As of this presentation, there have been approximately 7300 entries and a lot of positive customer feedback. The company also transitioned the Business Tips on social media to focus on training opportunities that are available.

12:00 pm Wrap-up/Open Discussion

- Will the evaluation presentation happen at the November meeting or later? Quentin answered that hasn't been decided, he was looking for feedback at this time.
- I do like the shorter meetings. Today's meeting content good. Having a small break would have been helpful.
- I agree, I do like the shorter meetings.

Quentin thanked the group for their participation and feedback. The next EEAG meeting will be Thursday November 12th.

12:00 pm Meeting Adjourned

Energy Efficiency Advisory Group (EEAG)
Webinar Notes
October 8th, 2020

Present:

Haley Falconer-City of Boise
Wil Gehl–Community Action Partnership Assoc of Idaho
Diego Rivas–Northwest Energy Coalition
Connie Aschenbrenner–Idaho Power
Anna Kim–Public Utility Commission of Oregon
Lynn Tominaga–Idaho Irrigation Pumpers Association - sitting in for Sid Erwin
Ben Otto-Idaho Conservation League
Katie Pegan–Office of Energy & Mineral Resources
Donn English–Idaho Public Utilities Commission
Quentin Nesbitt*-Idaho Power
Tina Jayaweera-Northwest Power & Conservation Council

Not Present:

Selena O'Neal-Ada County
Don Strickler–Simplot
Jim Hall-Wafd

Guests and Presenters*:

Shawna Potter-Idaho Power
Cheryl Paoli–Idaho Power
Becky Arte-Howell–Idaho Power
Juliet Petersen*–Idaho Power
Kevin Keyt-Idaho Public Utilities Commission
George Jiang*-Nexant
Becky Arte-Howell-Idaho Power
Paul Goralski–Idaho Power
Theresa Drake–Idaho Power
Brad Iverson-Long-Idaho Public Utilities Commission
Rachelle Farnsworth-Idaho Public Utilities Commission
Tyler Lehman*-Nexant

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:32am

Rosemary started the meeting with introductions of EEAG members.

9:38 am- Evaluation of WAQC & Weatherization Solutions—Ty Lehman & George Jiang-Nexant

Tyler and George presented the WAQC & Weatherization Solutions evaluation results. They provided a brief overview of the programs, the 2018 program summary statistics, the ex-post methodology, and the savings results.

There were questions and comments regarding types of homes weatherized, types of heat pumps used, and if weatherized homes had air conditioning. Weatherization was completed on apartments and multi-family homes that were multi-level. The type of heat pump installed depended on the type most suitable to the building and the space. They were sized using Manual J heat load calculator. Most of these properties typically have air conditioning window units. Once a heat pump is installed and if they have a window unit, it would be removed and the old window would be replaced by a new, more efficient one. One member asked how these evaluation results compare to other utility weatherization programs. Nexant answered that they are seeing similar results, although it depends on the size of the weatherization program. Across the U.S it is around 20% of savings and Idaho Power is 15%, so it is close. One member asked about the requirement that a home must be electrically heated to participate. The program specialist answered that in order to participate in this program, a home must be electrically heated. Customers that have gas heated homes would qualify and be processed through the state program. One member added that weatherization opportunities for gas heated homes is typically lower due to the lower cost of that fuel.

Theresa thanked the group for the great discussion and asked Quentin to recap. Quentin stated that the weatherization evaluation was a billing analysis, which is completed to verify the energy savings being claimed or to know what the savings values are. They also help identify any potential processes improvements.

10:24 am-WAQC & Weatherization Solutions Discussion—Quentin Nesbitt

Quentin opened up the discussion saying Idaho Power would like to explore ways to improve program cost-effectiveness and proposed three potential ideas: Move WAQC to acceptable measures list with prescriptive savings & incentives, give weatherization managers guidance on payment amounts per measure based on cost effectiveness, and adjust installation criteria to align better with cost effectiveness. Wil Gehl spoke to the group about the State Energy Audit Tool (EA5) and the function of the tool. At the end of October 2021, EA5 will no longer be used. The State of Idaho doesn't have the funding or bandwidth to maintain its own tool so it will be using an "off the shelf" product. Other utilities in the state use a deemed measure list. If Idaho power is unable to pay 100% of a measure, this approach of having an acceptable measure list with prescriptive savings and incentives is an effective way to move the program closer to cost-effective.

There were questions and comments on types of measures being installed in the home, funding sources and how those are leveraged, and how weatherization managers determine which measures should be installed in a home. An EEAG member commended Idaho Power for exploring ways to improve program cost-effectiveness. Making changes makes it easier to approve funding and to defend that increase. Theresa suggested a future presentation to provide a more in-depth review of these two programs.

11:05 am-DSM Program Evaluation Schedule—Quentin Nesbitt

Quentin highlighted the evaluation schedule that was posted in the 2019 annual report. He explained the different types of evaluations and the status of evaluations taking place so far in 2020. He presented the planned 2022 evaluation schedule and informed EEAG the company intends to move the evaluations for the New Construction and Retrofit programs to 2022. These evaluations were originally planned for 2021.
One member asked about the Direct Install program being delayed due to COVID-19 and when an evaluation could be done on that program. Quentin answered that by March of 2021 enough time will have passed to get the processes streamlined for an evaluation.

11:17 am-Program Status Update—-Juliet Petersen

Juliet provided an update of the programs that have been impacted by COVID-19. As it has been discussed during previous EEAG meetings, many of the programs were not impacted. In response to the pandemic, the company did suspend in-person customer work early in the year. On location work for impacted programs has resumed. A plan was developed to safely resume on location work this week for the commercial, industrial, and irrigation programs. The guidelines for resuming this work include:

- Wearing face masks always
- Social distancing when possible
- Completing a self-assessment check list prior to each engagement
- Hand sanitizing immediately prior to entering and exiting a location
- Educating employees and contractors on the symptoms of COVID-19

At the EEAG meeting in August, the company discussed implementing an increase to the New Construction programs professional assistance incentive (PAI). The goal is to incent engineering and architecture firms to help more customers with filling out the paperwork to participate in the program. Based on EEAG recommendations and approval from the Public Utility Commission of Oregon, Idaho Power has implemented an increase to the PAI across its service area.
One member complimented the company on the quick turnaround of this proposal.

Before the meeting adjourned, one member suggested that it would be helpful for the company to share its thoughts on the prescriptive changes to the weatherization programs. Quentin stated that the company will provide that at a future meeting. The company is researching ways to improve the program despite the lowered cost-effectiveness.

Energy Efficiency Advisory Group (EEAG) Notes
November 12th, 2020

Present:

Haley Falconer-City of Boise
Wil Gehl–Community Action Partnership Assoc of Idaho
Don Strickler-Simplot
Diego Rivas–Northwest Energy Coalition
Connie Aschenbrenner–Idaho Power
Nadine Hanhan–Public Utility Commission of Oregon-sitting in for Anna Kim
Tina Jayaweera-Northwest Power & Conservation Council
Ben Otto-Idaho Conservation League
Katie Pegan–Office of Energy & Mineral Resources
Quentin Nesbitt*-Idaho Power
Donn English-Idaho Public Utilities Commission
Lynn Tominaga–Idaho Irrigation Pumpers Association-sitting in for Sid Erwin

Not Present:

Jim Hall–Wafd

Guests and Presenters*:

Chellie Jensen*-Idaho Power
Kathy Yi*–Idaho Power
Shawna Potter*–Idaho Power
Peter Richardson–ICL
Steve Hubble-City of Boise
Terri Carlock-Idaho Public Utilities Commission
Dahl Bietz-Idaho Power
Denise Humphreys-Idaho Power
Tracey Burtch-Idaho Power
Shelley Martin-Idaho Power
Paul Goralski–Idaho Power
Theresa Drake–Idaho Power
Don Reading-ICL
Kevin Keyt-Idaho Public Utilities Commission
John Chatburn-OER
Chris Pollow-Idaho Power
Zeke VanHooser-Idaho Power
Sheree Willhite-Idaho Power
Melissa Thom-Idaho Power
Mindi Shodeen-Idaho Power

Note Takers:

Shawn Lovewell (Idaho Power) with Kathy Yi (Idaho Power)

Meeting Facilitator: Rosemary Curtin

Meeting Convened at 9:30 am

Rosemary started the meeting with EEAG members and guest introductions. There were no comments or questions on the August or October meeting notes. Theresa introduced Chellie Jensen and informed the group that she has stepped in to cover for Juliet Petersen in her absence.

9:40 am-Announcements

Quentin went over the Agenda for the meeting and briefly described each subject. Connie thanked EEAG members for their attendance at today's meeting and for their continued engagement. EEAG plays a crucial role for the company in achieving its energy efficiency targets. She provided an update on the Idaho Public Utilities Commission's final decision of the prudence determination that was filed for 2019. The company also submitted a filing in August of 2020 to request an increase to the Idaho Rider.

9:43 am-YTD Financials & Savings—Quentin Nesbitt

Quentin highlighted the portfolio energy savings and expenses, savings by sector, and the Oregon and Idaho Rider balances thru September 30th, 2020. There were questions regarding the rider balance and why the August projections for the balance showed a higher deficit. Connie answered that when the company submitted the filling for the rider balance increase, the anticipated under collected balance at the end of 2020 would be $12.7 million, less than the anticipated $14.6 million year-end under collected balance shared with EEAG in August. The balance at the end of September was $8.5 million. There have been some large commercial and industrial incentives that have been paid, but incentives ended up being lower than what was projected in those months because the timing of incentive payments changed.

9:55 am-Commercial, Industrial & Irrigation programs—Chellie Jensen

Chellie provided an update on the overall performance of the commercial, industrial, and irrigation programs thru the end of September along with the marketing updates She highlighted how the company has adapted to COVID-19 impacts and how it is working with customers and contractors. She also covered several proposed measure changes to the Retrofit program. The company is working with a third-party contractor to develop an energy management commercial audit tool. The final draft has been received and is being reviewed. Internal training on the tool will begin soon.

There were questions about Idaho Power's efforts to work with customers who are seeing an increase in energy usage because of COVID and needing to increase outside air exchanges. Chellie answered that the company is researching, in conjunction with the Integrated Design Lab (IDL), best options for customer in these situations. One member commented that there is still a lot of new commercial construction in Idaho, does the company know the percentage of new projects that have applied for incentives in the New Construction program. The Program Specialist answered that she has seen an increase in new pre-applications, but that she doesn't have an exact percentage. She did state that the company frequently engages with local architects and engineers to get projects submitted. One member commented that Idaho Power had a system peak on August 18th, outside of the demand response (DR) season. They suggested that the company should consider extending the season. Quentin thanked the member for that comment and mentioned that the company is considering it.

10:45 am-Residential Programs—Shawna Potter

Shawna provided preliminary year-to-date energy savings by program and customer participation. She reminded the group which residential programs have been impacted by COVID-19. Some utilities have implemented virtual audits and the company is exploring ways to implement these into the Home Energy Audit program. The company is also looking into creative delivery or drive thru models for the Shade Tree events. She provided updates and changes that have been made to marketing and customer communications. One member complemented the company on providing marketing materials in Spanish and encouraged them to continue.

One meeting participant commented that they have received multiple home energy reports on their home, and they find them helpful. They received a second report after they made some HVAC system changes and they could see those changes reflected in the report in how their usage was analyzed. They also installed their own smart thermostat now that the DIY option is approved and thanked the company for making that change.

At the August meeting the company informed EEAG that the it will be sunsetting the Energy Savings Kits on December 31st. The company has engaged in three marketing campaigns to ensure that all eligible customers have received invitations to participate. The company will still maintain the Welcome Kits, for new residents and the Student Energy Efficiency Kits. Idaho Power is exploring alternative kit options moving forward. A decrease in residential lighting savings will have an impact on the Multifamily Energy Savings Direct Install program. The company is exploring a model where it can calculate savings and has reached out to other utilities that are doing this. Their installers collect additional information that can provide additional savings potential. Idaho Power has reached out its group of installers and they have indicated that they are willing to spend the extra time needed to gather additional information to increase program savings. One meeting participant expressed their appreciation of the company exploring ways to keep this program cost effective, especially since those that live in multi-family units are typically lower income.

During the October webinar meeting, Idaho Power and a third-party consultant, Nexant, reviewed the two low-income programs; WAQC and Weatherization Solutions. EEAG requested that Idaho Power provide a presentation that covers the background and logistics of these two programs. With a deeper dive, it could then effectively consider the information provided in Nexant's presentation and help inform next steps on potential program enhancements to increase cost-effectiveness. The company will be scheduling that in the next couple of months and looks forward to EEAG participation. One member asked if this deep dive would look at the relationship with other funding sources and other programs within Idaho. Shawna stated that it could be weaved into the discussion and she will make a note for the program specialist. Another member commented that there may be other metrics that Idaho Power could use to analyze the cost effectiveness of these programs. Connie pointed out that these programs have not been cost effective for some time, but the company is mindful of being prudent with all customer funds and it will continue to communicate with the Commission regarding program cost-effectiveness. Another member asked Idaho Power how EEAG can support the continuation of these programs. Connie mentioned that continued involvement and participation as individual organizations that intervene in cases, or by providing direct feedback to the commission through comments when the DSM prudence cases are filed.

11:25 am-Future Retail Lighting Savings—Kathy Yi

Kathy provided an overview of how Idaho Power calculates energy savings for LEDs, how the Regional Technical Forum (RTF) is now calculating savings in period 1 vs. period 2, and how the Energy Trust of Oregon's (ETO) is evaluating their current lighting program. Idaho Power reached out to the ETO and they shared their findings. ETO is continuing with their buy-down program but only in areas that have not naturally transitioned to LEDs; grocery, dollar stores, mass merchandise stores. Most of the savings for lighting in the current program is from the larger retailers or box stores like Costco or Home Depot. One member asked if Idaho Power and ETO analysis looked at the mix of bulb types in the 250-1049 lumen range. Kathy answered that the numbers on slide 17 are preliminary and ETO does change market share by lumen bins, so Idaho Power is doing more research on that.

Shawna stated that Idaho Power has been exploring alternatives to its buy down program. ETO is doing targeted market approach and the company has heard other utilities are doing a similar targeted market approach. Idaho Power would like feedback from EEAG on continuing to explore this option. One member stated that the RTF has looked at integral fixtures and asked if Idaho Power has considered doing a buy down on those types as a next step. Kathy stated that fixtures were part of Simple Steps, but she wasn't sure about integral fixtures, where the bulb and fixture are all one piece. She stated that it could be considered based on vendor proposal. Another member complemented Idaho Power and thinks this is a smart way to manage this transition. They also acknowledged Kathy's hard work in putting together this deep dive lighting presentations and keeping EEAG up to date.

Wrap Up

- Thank you for the presentations. I want to make sure that, with Idaho's continued growth, we are not missing any opportunities.

- I appreciated the deep dive on the lighting program and look forward to the weatherization presentation.

- Thank you and I miss seeing everyone in person. Let's continue to look for ways that we can work together, especially keeping our low-income population top of mind.

- Thank you for the meeting.

- Thank you and I look forward to further information that will be developed.

- I appreciate the presentations and agree with most of the comments from EEAG members.

- Thank you for another great meeting especially around the lighting. I think maintaining the lighting program especially in those low-income retailers is very important and would encourage looking for those opportunities to help people having the hardest time right now.

- Connie stated that she appreciates EEAG participation and engagement. It isn't just limited to EEAG meetings. If anyone has ideas feel free to contact Idaho Power at any time.

12:00 pm Meeting Reconvened

NEEA Market Effects Evaluations

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
NEEA Q4 2020 Emerging Technology Newsletter	Commercial and Industrial (C&I) and Residential	NEEA	NEEA	Quarterly update on emerging technology projects
2017 Oregon Residential Specialty Code Energy Efficiency: Impact Assessment	Residential	Ecotope	NEEA	Code Saving Analysis
NEEA Q3 Quarterly Report	NEEA	NEEA	NEEA	Performance Report
2019 Non-residential Lighting Annual Survey Report	C&I	Cadeo Group	BPA	Annual Survey
2019-2020 Luminaire Level Lighting Controls Market Assessment	C&I	NMR Group, Energy Futures Group	NEEA	Market Evaluation
NEEA Q3 2020 Emerging Technology Newsletter	C&I and Residential	NEEA	NEEA	Quarterly update on emerging technology projects
Air Cleaner Unit Savings Review	Residential	Apex Analytics	NEEA	Savings Forecast Model Review for Retail Product Portfolio Program
Air Cleaner Specification and Baseline Assessment Review	Residential	Apex Analytics	NEEA	Savings Forecast Model Review for Retail Product Portfolio Program
NEEA Q3 Codes, Standards and New Construction Newsletter	C&I and Residential	NEEA	NEEA	Newsletter
2019 Oregon Commercial Energy Code - Energy Savings Analysis	C&I	Mike D. Kennedy, Inc.	NEEA	Code Saving Analysis
Heat Pump Water Heater Qualified Products List	Residential	NEEA	NEEA	Qualified Products List for Heat Pump Water Heater program
HVAC Market Actor Profile Report	C&I	Apex Analytics	NEEA	Market Research for commercial HVAC market actors
HVAC/ Very High Efficiency Dedicated Outside Air Systems Specifier Focus Groups Report	C&I	Sparrow Strategy	NEEA	Market Research for commercial HVAC program
Energy Savings from Networked Lighting Control Systems With and Without Luminaire Level Lighting Controls	C&I	Mike D. Kennedy, Inc.	NEEA	Savings study for Luminaire Level Lighting Program
Washington State Commercial Energy Code Technical Roadmap Report	C&I	Noresco	NEEA	Code Research Study
2019 Reduced Wattage Lamp Replacement Program Long-Term Monitoring and Tracking Report	C&I	Evergreen Economics	NEEA	Program Evaluation for Reduced Wattage Lamp Replacement Program

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
2019 Alliance Cost Effectiveness Model Review for Heat Pump Water Heaters	Residential	Ecotope, Larson Energy Research	NEEA	Savings Forecast Model Review for Heat Pump Water Heater Program
Q4 2020 Market Research and Evaluation Newsletter	C&I and Residential	NEEA	NEEA	Newsletter
2019 Alliance Cost Effectiveness Model Review for Ductless Heat Pumps	Residential	Ecotope, Larson Energy Research	NEEA	Savings Forecast Model Review for Ductless Heat Pump program
Luminaire Level Lighting Controls Replacement vs. Redesign Comparison Study	C&I	University of Oregon	NEEA	Limited field study to measure energy savings between two different products.
2019 Annual Report Snapshot	NEEA	NEEA	NEEA	Performance Report
Northwest Ductless Heat Pump Initiative: Market Progress Evaluation #8 Addendum - Ductless Heat Pumps in Cold Climates Installer Research	Residential	Cadmus Group	NEEA	Market Evaluation
NEEA Q2 2020 Emerging Technology Newsletter	C&I and Residential	NEEA	NEEA	Quarterly update on emerging technology projects
NEEA Q2 2020 Codes, Standards and New Construction Newsletter	C&I and Residential	NEEA	NEEA	Newsletter
EXP07:19 Load Based and Climate-Specific Testing and Rating Procedures for Heat Pumps and Air Conditioners	Residential	Bruce Harley Energy Consulting	NEEA	Consulting for test procedure development
Q3 2020 Market Research and Evaluation Newsletter	C&I and Residential	NEEA	NEEA	Newsletter
2019-2020 Washington Residential New Construction Code Study	Residential	CLEAResult	NEEA	Market Evaluation
2019 Residential Lighting Market Analysis	Residential	Apex Analytics	NEEA	Market Evaluation
Cycle 5 (2015-2019) Market Progress Report	NEEA	NEEA	NEEA	Performance Report
Power Drive Systems - Energy Savings and Non-Energy Benefits in Constant & Variable Load Applications	C&I	Cadeo Group	NEEA	Savings study for pump systems
Building Commissioning - 2019 Long Term Monitoring and Tracking (LTMT) Report	C&I	Cadmus Group	NEEA	Market Evaluation
Market-Ready High Performance Walls: Phase 2 Report	Residential	Earth Advantage	NEEA	Market Assessment
Market-Ready High Performance Walls: Phase 1 Report	Residential	Earth Advantage	NEEA	Market Assessment
Home Energy Metering Study Public Data User Guide	Residential	Evergreen Economics	NEEA	Test procedure

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
RBSA End Use Load Shape Data Year 1 (1 of 4)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 1 (2 of 4)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 1 (3 of 4)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 1 (4 of 4)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 2 (1 of 5)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 2 (2 of 5)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 2 (3 of 5)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 2 (4 of 5)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
RBSA End Use Load Shape Data Year 2 (5 of 5)	Residential	Ecotope	NEEA	Residential Building Stock Assessment
Commercial Building Stock Assessment 4 Presentation	C&I	NEEA	NEEA	Study
CBSA 4 Data Files	C&I	Cadmus Group	NEEA	Commercial Building Stock Assessment
CBSA 4 Database User Manual	C&I	Cadmus Group	NEEA	Commercial Building Stock Assessment
CBSA 4 Database Dictionary	C&I	Cadmus Group	NEEA	Commercial Building Stock Assessment
CBSA 4 (2019) Final Report	C&I	Cadmus Group	NEEA	Commercial Building Stock Assessment
CBSA 4 Appendix Tables (Weighted)	C&I	Cadmus Group	NEEA	Commercial Building Stock Assessment
Drive Power Initiative - 2019 Long Term Monitoring and Tracking Report	C&I	Cadmus Group	NEEA	Market Evaluation of Extended Motor Product program
NEEA Q1 2020 Emerging Technology Newsletter	C&I and Residential	NEEA	NEEA	Quarterly update on emerging technology projects
Energy Modeling of Commercial Gas Rooftop Units in Support of CSA P.8 Standard	C&I	Cadeo Group	NEEA	Study to support new test procedure standard
HVAC/Very High Efficiency Dedicated Outside Air Systems Specifier Interview Report	C&I	Cadeo Group	NEEA	Market Research
Thin Triple Pane Windows: A Market Transformation Strategy for Affordable R5 Windows	Residential	Stephan Selkowitz Consultants	NEEA	White paper on strategies for advanced primary windows

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
NEEA Q1 2020 Codes, Standards and New Construction Newsletter	C&I and Residential	NEEA	NEEA	Newsletter
2019 BOC Program Dataset Analysis	Commercial	BrightLine Group	NEEA	Market Evaluation
Commercial Window Attachments: Secondary Window Market Characterization	C&I	Evergreen Economics	NEEA	Market Characterization
Advanced Water Heating Specification	Residential	NEEA	NEEA	Technical Specification
Q2 2020 Market Research and Evaluation Newsletter	C&I and Residential	NEEA	NEEA	Newsletter
Oregon Residential Specialty Code: Energy Efficiency Analysis	Residential	Ecotope	NEEA	Code study
Robur Heat Pump Trial	C&I	Energy 350	NEEA	Field study
Natural Gas Advanced Water Heating Specification	Residential	NEEA	NEEA	Technical Specification
Gas Tankless Water Heater Combined Research Report	Residential	ILLUME Advising, LLC	NEEA	Market Characterization study
NEEA 2020 Marketing Calendar	C&I and Residential	NEEA	NEEA	Calendar
NEEA Q4 2019 Emerging Technology Newsletter - February Update	C&I and Residential	NEEA	NEEA	Newsletter
A Christmas Carol: How Visions Past and Present Help Plan for the Future	Residential	NEEA	NEEA	Analysis of Residential Building Stock Study
A Realistic Measure of Residential Clothes Dryer Performance	Residential	NEEA, Sam Diego Consulting	NEEA	Savings study
Market Transformation Strategies for Commercial Code Enhancement	C&I	NEEA	NEEA	White paper describing Commercial Code Enhancement program
Paving the way for new market transformation programs: building a bridge from resource acquisition	Residential	NEEA	NEEA	White paper describing ENERGY STAR Retail Products Platform (ESRPP)
New Homes Rater Focus Groups Research Report	Residential	ILLUME Advising, LLC	NEEA	Market Research
NEEA Q4 2019 Codes, Standards and New Construction Newsletter	C&I and Residential	NEEA	NEEA	Newsletter

Titles appearing in blue are links to the online versions of the reports. A PDF of this supplement can be found at idahopower.com/ways-to-save/energy-efficiency-program-reports/.

INTEGRATED DESIGN LAB

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
2020 Task 1: Foundational Services	Commercial	IDL	Idaho Power	EE Assistance & Education
2020 Task 2: Lunch and Learn	Commercial	IDL	Idaho Power	EE Training & Education
2020 Task 3: BSUG	Commercial	IDL	Idaho Power	EE Training & Education
2020 Task 4: New Construction Verifications	Commercial	IDL	Idaho Power	EE Verifications
2020 Task 5: Energy Resource Library	Commercial	IDL	Idaho Power	EE Assistance & Education
2020 Task 6: Building Energy Analytics	Commercial	IDL	Idaho Power	EE Assistance & Education
2020 Task 7: RTU Control Retrofits for Small Commercial Facilities	Commercial	IDL	Idaho Power	EE Research

2020 Task 1: Foundational Services

Summary of Projects

Idaho Power Company External Year-End Report

December 31, 2020

Prepared for:
Idaho Power Company

Author:
Damon Woods

Report Number: 2001_001-01

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Acronyms and Abbreviations

AIA	American Institute of Architects
ASHRAE	American Society of Heating, Refrigeration, and Air-conditioning Engineers
DOAS	Dedicated Outdoor Air System
EMS	Energy Management System
EUI	Energy Use Intensity [kBtu/ft^2/yr]
HVAC	Heating Ventilation and Air Conditioning
IDL	Integrated Design Lab
IPC	Idaho Power Company
IR	Infrared
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
NEEA	Northwest Energy Efficiency Alliance
RTU	Rooftop Unit
UI	University of Idaho
UVGI	Ultraviolet Germicidal Irradiation
VAV	Variable Air Volume
VRF	Variable Refrigerant Flow

1. INTRODUCTION

The University of Idaho Integrated Design Lab (UI-IDL) provided technical design assistance in 2020 for energy efficiency building projects through the Foundational Services task. This program, supported by Idaho Power (IPC), offered three phases of assistance from which customers could choose. A marketing flyer, developed in prior years, outlining the three phases is shown below. Phase I includes projects with budgets less than $2,000, Phase II is limited to projects from $2,000 to $4,000, and Phase III is any project with a budget greater than $4,000.

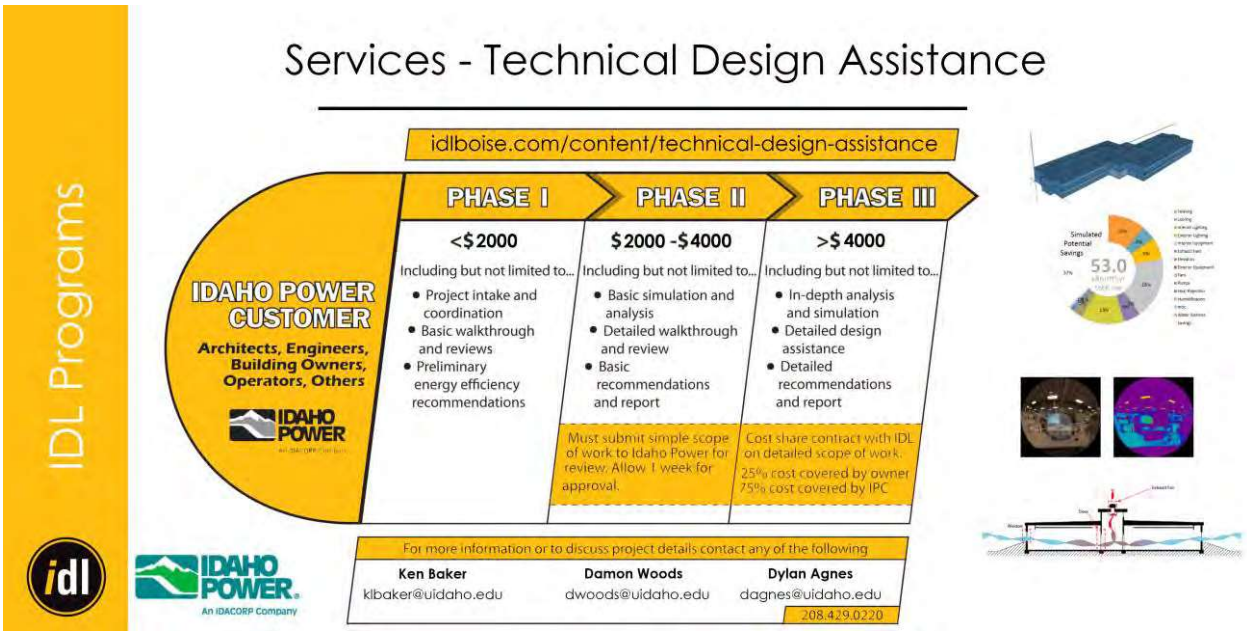


Figure 1: Foundational Services Flyer Outlining Phases

Information on the Foundational Services program was provided at each Lunch and Learn and BSUG presentation. Advertising for the program was also offered over the course of the year to local government officials, developers, and the architects and engineers that interacted with IDL.

2. PROJECT SUMMARY

The IDL worked on 16 Foundational Service projects in 2020 (a 23% increase from last year). Two project requests came from municipalities, while the majority were requested by private companies. In total, there were ten Phase I projects, five Phase II projects, and one Phase III project. While five projects were focused on new construction, the majority of assistance was requested for retrofits. The full list of projects is shown in Table 1 below. Details on the projects that resulted in a memo or report are included in the individual project reports submitted to IPC. In 2020, the IDL assisted with approximately 385,000 ft^2 of buildings. This is more than the 275,000 ft^2 of buildings worked on in 2019 and the 250,000 ft^2 worked on in 2018.

Table 1: 2020 Foundational Services Project Summary

Projects	Phase	Status	Notes	Retro/ New	Ft	Location	Type
Fire Station	1	Complete	Assisted on energy modeling for VRF	New	23,000	Boise	Civic
Community School	2	Complete	Energy treasure hunt - virtual consulting	Retro	121,725	Ketchum	Education
Charter School	2	In progress	Energy modeling training for team	Retro	25,000	Boise	Community
Public Works Department	2	In progress	Ventilation upgrade options	Retro	5,000	McCall	Civic
Senior Center	1	Complete	Converting room to walk-in cooler	Retro	5,000	Twin Falls	Community
Assembly Hall	1	Complete	Questions on COVID-19 and ventilation	Retro	8,000	Boise	Assembly
Visitor's Center	3	In progress	Minimizing energy use in design	New	5,000	Picabo	Community
Chapel	1	Complete	Restoration with desire for radiant system and potential envelope upgrades	Retro	7,000	Pocatello	Community
Municipal Building	2	In progress	Remote collaboration w/CSHQA when design phase begins	Retro	15,600	Ketchum	Civic
Community	1	In progress	Ventilation upgrades for COVID	Retro		Ketchum	Mix
Office Building	1	Complete	Propane vs electric heating costs	new	7,500	Marsing	Office
College	1	Complete	Ventilation recommendations for COVID	Retro	11,000	Nampa	Education
Barracks	1	Complete	Infiltration energy impact	New	24,000	Boise	Civic
Dairy Expansion	2	Complete	Radiant cooling for warehouse expansion	New	2,000	Gooding	Dairy
Weather Normalization	1	Complete	HDD and CDD methods for normalizing EUI	Retro		Ada County	Civic
UV Germ Irradiation	1	Complete	Energy impact and UV levels required for COVID19 removal from return air	Retro	125,000	Boise	Office

2020 TASK 2: LUNCH AND LEARN

SUMMARY OF EFFORT AND OUTCOMES

IDAHO POWER COMPANY EXTERNAL YEAR-END REPORT

December 31, 2020

Prepared for:
Idaho Power Company

Authors:
Dylan Agnes

Report Number: 2001_002-01

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Prepared for:
Idaho Power Company

Contract Number:
IPC KIT #5277

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DISCLAIMER

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ACRONYMS AND ABBREVIATIONS

AIA	American Institute of Architects
Arch	Architect(ure)
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCGCC	Boise Green Building Code
BESF	Building Energy Simulation Forum (Energy Trust of Oregon)
Bldg.	Building
BOMA	Building Owners and Managers Association
CSI	Construction Specifications Institute
Cx	Customer Experience
DOE	Department of Energy
Elec.	Electrical
EUI	Energy Use Intensity
GSHP	Ground Source Heat Pump
HVAC	Heating, Ventilation, and Air Conditioning
IBOA	Intermountain Building Operators Association
IBPSA	International Building Performance Simulation Association
IDL	Integrated Design Lab
IECC	International Energy Conservation Code
IES	Illuminating Engineering Society
IPC	Idaho Power Company
LEED	Leadership in Energy & Environmental Design
LED	Light Emitting Diode
M&V	Measurement and Verification
Mech.	Mechanical
Mgmt.	Management
NCARB	National Council of Architectural Registration Boards
TBD	To Be Determined
UI	University of Idaho
USGBC	U.S. Green Building Council
WBS	WELL Building Standard

1. 2020 SUMMARY AND CUMULATIVE ANALYSIS

Table 1: 2020 Lunch and Learn Summary

	Date	Title	Presenter	Group / Location	Attendees
1	5/7	Radiant System Design Considerations	Damon	Architecture Firm 1	2
2	7/29	Covid 19 in Buildings	Kevin	Open Webinar	97
3	8/11	VRFs & Heat Pumps	Damon	Open Webinar	27
4	8/12	Daylighting Multipliers – Increasing Daylight Harvesting Efficiency	Dylan	Architecture Firm 2	4
5	8/25	High Performance Classrooms	Damon	Open Webinar	21
6	8/25	The Architect's Business Case for Energy Performance Modeling	Ken	Architecture Firm 3	8
7	9/1	Radiant System Design Considerations	Damon	Architecture Firm 3	7
8	9/8	Daylighting Multipliers – Increasing Daylight Harvesting Efficiency	Dylan	Open Webinar	18
9	9/22	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Ken	Open Webinar	46
10	10/20	High Performance Classrooms	Damon	Open Webinar	21
11	10/22	High Performance Classrooms	Damon	Architecture Firm 4	9
12	10/29	Daylight in Buildings - Getting the Details Right	Dylan	Architectural Organization 1	13
13	11/3	Luminaire Level Lighting Controls	Dylan	Open Webinar	17
14	11/4	VRFs & Heat Pumps	Damon	Architectural Organization 2	11
15	11/9	Indoor Air Quality (IAQ) and Energy Efficiency in Buildings	Ken	Architectural Organization 1	1
16	11/12	The Architect's Business Case for Energy Performance Modeling	Ken	Architecture Firm 4	6
17	11/17	Dedicated Outdoor Air Systems (DOAS) Integration	Damon	Open Webinar	16
18	12/1	Chilled Beams	Damon	Open Webinar	15
19	12/15	Future of Lighting Controls	Dylan	Open Webinar	14
20	12/16	Hybrid Ground Source Heat Pump System	Damon	Architectural Organization 2	13
				Total Attendees	**366**

Table 1 on the previous page summarizes all Lunch and Learn presentations given in 2020. The statistics in this section are cumulative for the 20 presentations. At each presentation participants were asked to sign in and fill out an evaluation form. Presentations were judged on a scale of 1 to 5, please see table 2.

Table 2: Evaluation Form Scale

Evaluation	1	2	3	4	5
In general, today's presentation was:	Not Useful		Somewhat Useful		Very Useful
The content of the presentation was:	Too Basic		About Right		Too Advanced
Please rate the following parts of the presentation: Organization, Clarity, Opportunity for Questions, Instructor's Knowledge of Subject Matter, and Delivery of Presentation	Needs Improvement		Good		Excellent

Table 3: Overall Attendance Breakdown

Architect:	127	Electrician:	2
Engineer:	73	Contractor:	
Mech. Engineer:	5	Other:	156
Elec. Engineer:		None Specified:	3
Total (Online):	366		

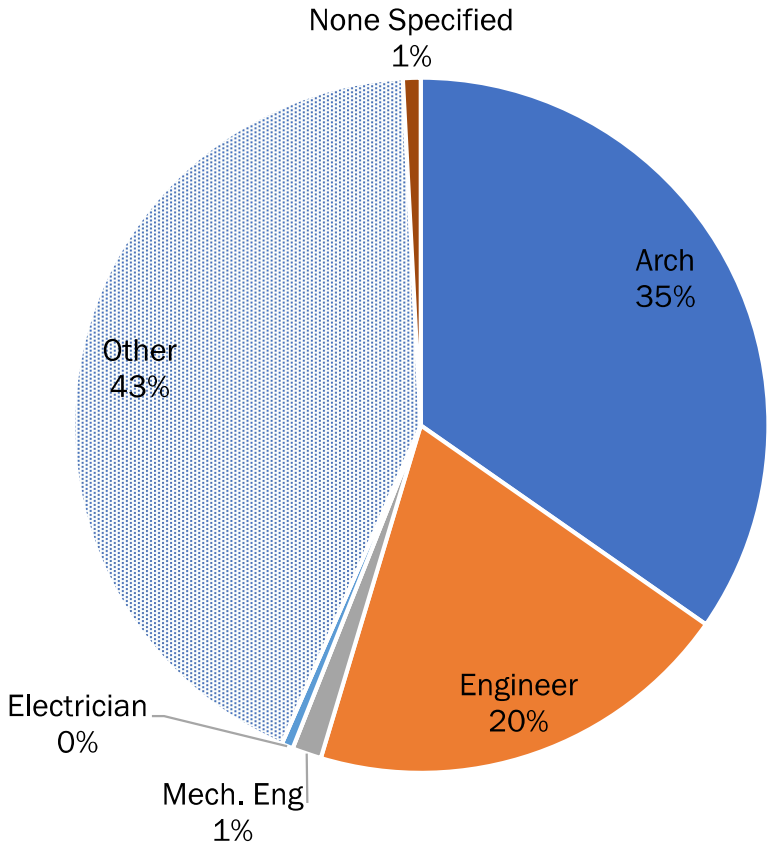


Figure 1: Attendee Profession

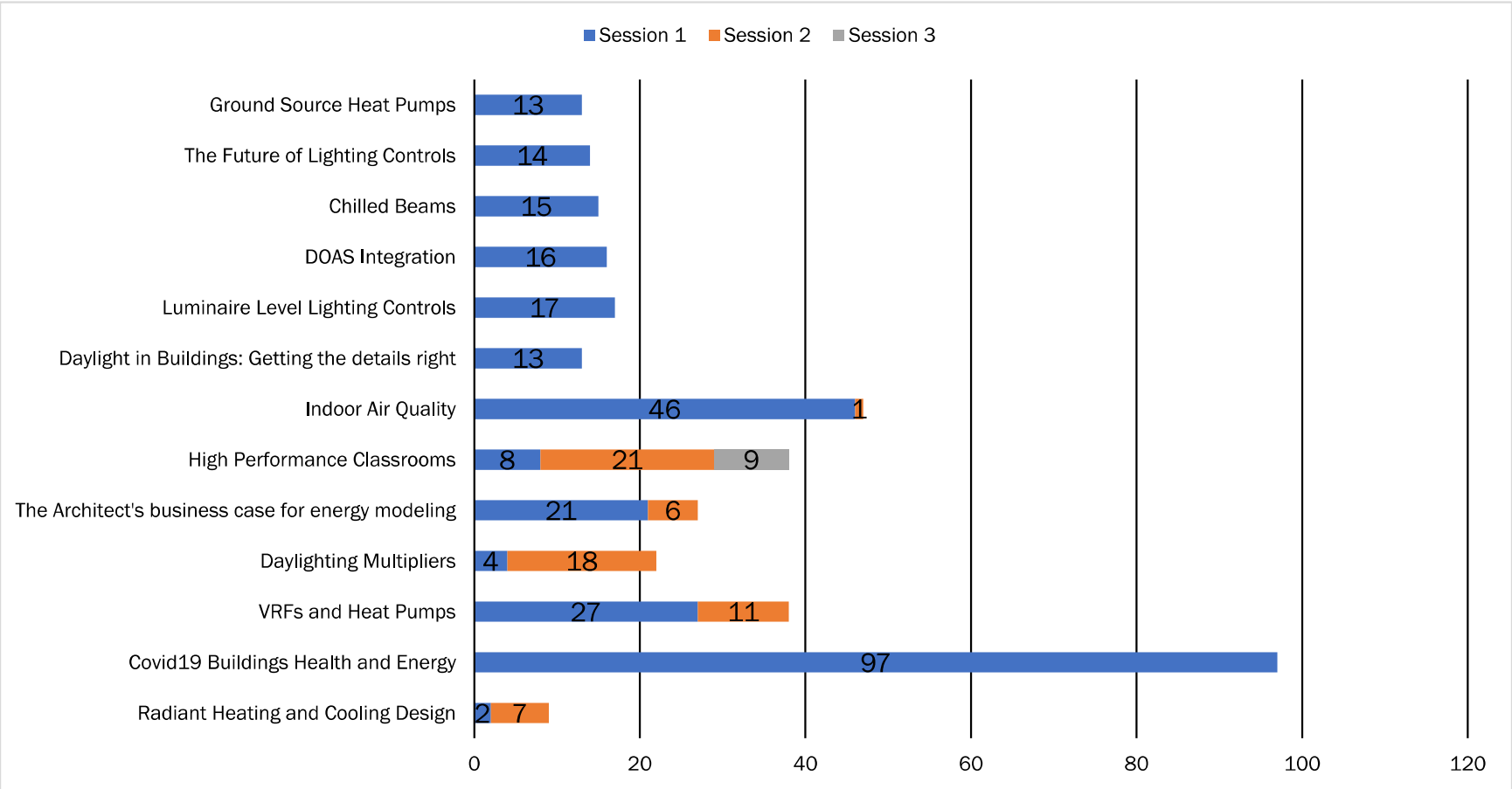


Figure 2: Attendee Count by Title and Number of Session

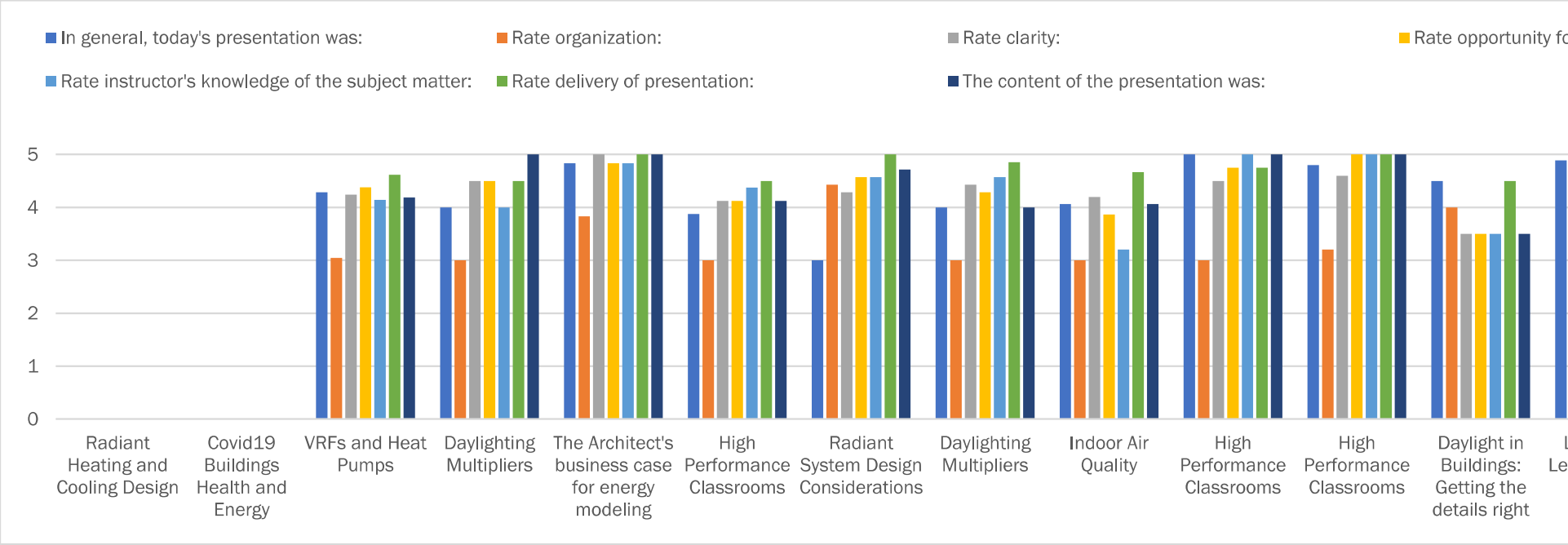


Figure 3: Average Evaluations by Session Title

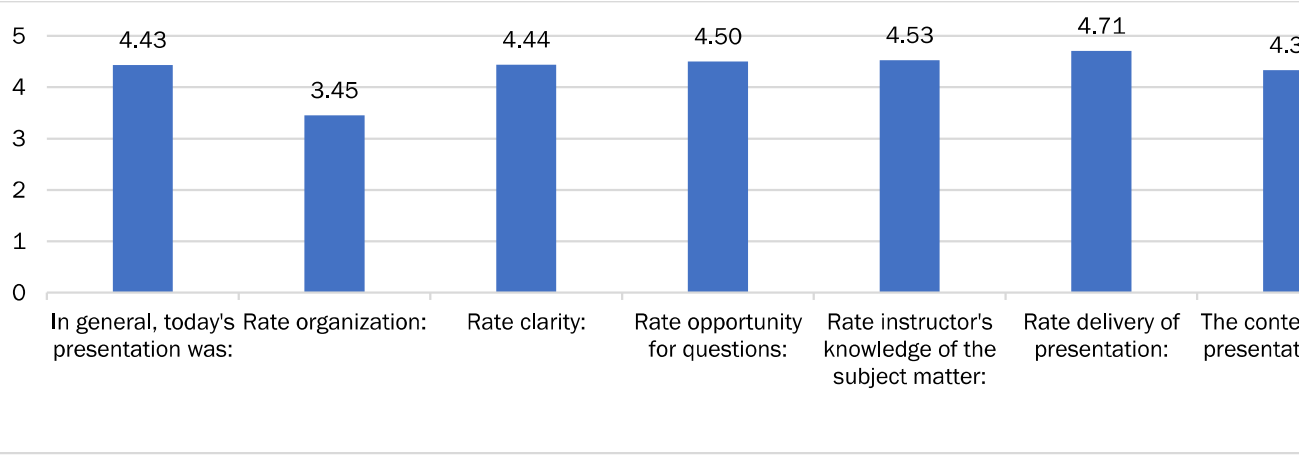


Figure 4: Overall Averages of Evaluations for all Sessions

2. SESSION SUMMARIES

After each lunch and learn session, an evaluation form was requested via Zoom in the form of poll to each participant. The Zoom platform only allows for multiple choice responses in their polling feature which limited our typical evaluation data collection. In addition, the first two sessions have no feedback due to technical difficulties with the ZOOM platform. The feedback will be used to improve future sessions. The feedback received from participants is generally constructive criticism used to keep sessions updated but also to propose future potential topics and questions to the Integrated Design Lab.

2.1 SESSION 1: RADIANT HEATING AND COOLING DESIGN (05/07/2020)

Title: Radiant Heating and Cooling Design

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building design reduces loads to levels achievable by radiant systems. This collaboration between the disciplines has a direct relationship to the ultimate performance of the system and comfort of the building. Key decisions must be made early in the design process to ensure the feasibility and performance of an installed system. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different capabilities, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	05/07/20
Location:	Architectural Firm 1 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	2	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (Online):	2		

2.2 SESSION 2: COVID-19 BUILDINGS HEALTH AND ENERGY (07/29/2020)

Title: Covid-19 Building Health and Energy

Description: COVID19 has immediately impacted building design and operation and the results will transform architecture, commissioning, and building operation practices for decades to come. It is also shifting the conversations and priorities around human health, energy efficiency, and non-energy benefits. Dr. Van Den Wymelenberg is an expert in indoor air quality and directs the University of Oregon Biology and the Built Environment (BioBE) Center that has been studying the indoor microbiome with funding from the Alfred P. Sloan Foundation. He will contextualize the current pandemic with regard to historic changes to architectural design following previous pandemics, summarize a decade of discovery about the indoor microbiome (including information about fungi, bacteria, and viruses), present results from testing buildings for the novel coronavirus over the last four months. He will provide insights into how to reopen and operate buildings to support human health as we move forward through and beyond COVID19, and facilitate a discussion about the balance (conflicts and synergies) between health and energy in buildings.

Presentation Info:

Date:	07/29/20
Location:	Open Webinar
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	26	Electrician:	
Engineer:	16	Contractor:	
Mech. Engineer:		Other*:	54
Elec. Engineer:		None Specified:	1
Total (Online):	**97**		

2.3 SESSION 3: VRF'S AND HEAT PUMPS (08/11/2020)

Title: VRF's and Heat Pumps

Description: Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's climates. Including ERVs with DOAS.

Presentation Info:

Date:	08/11/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	8	Electrician:	
Engineer:	8	Contractor:	
Mech. Engineer:		Other*:	10
Elec. Engineer:		None Specified:	1
Total (Online):	**27**		

2.4 SESSION 4: DAYLIGHTING MULTIPLIERS (08/12/2020)

Title: Daylighting Multipliers

Description: This session will cover the role that daylighting multipliers play when trying to increase the efficiency of daylight harvesting in a building through design applications, such as, light shelves, manufactured glazing, and material specification. Participants will learn about the rate of return and energy efficiency cost effectiveness for daylighting strategies, building form, location, and multipliers. The class will explain how the layers of daylighting/electric lighting strategies and control systems and how they add or subtract to the overall efficiency of the design.

Presentation Info:

Date:	08/12/20
Location:	Architectural Firm 2 – Boise, ID
Presenter:	Dylan Agnes

Attendance:

Architect:	3	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	1
Elec. Engineer:		None Specified:	
Total (Online):	**4**		

2.5 SESSION 5: THE ARCHITECT'S BUSINESS CASE FOR ENERGY MODELING (08/25/2020)

Title: The Architect's Business Case for Energy Modeling

Description: Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

Presentation Info:

Date:	08/25/20
Location:	Open Webinar
Presenter:	Ken Baker

Attendance:

Architect:	6	Electrician:	
Engineer:	4	Contractor:	
Mech. Engineer:		Other*:	11
Elec. Engineer:		None Specified:	
Total (Online):	21		

2.6 SESSION 6: HIGH PERFORMANCE CLASSROOMS (08/25/2020)

Title: High Performance Classrooms

Description: Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state over the last 50 years of school design will introduce the problems faced by designers. This session will highlight several case studies of high-performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

Presentation Info:

Date:	08/25/20
Location:	Architecture Firm 3 - Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	7	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	1
Total (Online):	8		

2.7 SESSION 7: RADIANT SYSTEM DESIGN CONSIDERATIONS (09/01/2020)

Title: Radiant System Design Considerations

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building design reduces loads to levels achievable by radiant systems. This collaboration

between the disciplines has a direct relationship to the ultimate performance of the system and comfort of the building. Key decisions must be made early in the design process to ensure the feasibility and performance of an installed system. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different capabilities, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	09/01/20
Location:	Architecture Firm 3 - Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	1
Elec. Engineer:		None Specified:	
Total (Online):	**7**		

2.8 SESSION 8: DAYLIGHTING MULTIPLIERS (09/08/2020)

Title: Daylighting Multipliers

Description: This session will cover the role that daylighting multipliers play when trying to increase the efficiency of daylight harvesting in a building through design applications, such as, light shelves, manufactured glazing, and material specification. Participants will learn about the rate of return and energy efficiency cost effectiveness for daylighting strategies, building form, location, and multipliers. The class will explain how the layers of daylighting/electric lighting strategies and control systems and how they add or subtract to the overall efficiency of the design.

Presentation Info:

Date:	09/08/20
Location:	Open Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	7	Electrician:	
Engineer:	5	Contractor:	
Mech. Engineer:		Other:	6
Elec. Engineer:		None Specified:	
Total (Online):	**18**		

2.9 SESSION 9: INDOOR AIR QUALITY (09/22/2020)

Title: Indoor Air Quality

Description: In an effort to operate buildings in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	09/22/20
Location:	Open Webinar
Presenter:	Ken Baker

Attendance:

Architect:	9	Electrician:	
Engineer:	13	Contractor:	
Mech. Engineer:		Other:	24
Elec. Engineer:		None Specified:	
Total (Online):	**46**		

2.10 SESSION 10: HIGH PERFORMANCE CLASSROOMS (10/20/2020)

Title: High Performance Classrooms

Description: Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state over the last 50 years of school design will introduce the problems faced by designers. This session will highlight several case studies of high-performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

Presentation Info:

Date:	10/20/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	7	Electrician:	
Engineer:	4	Contractor:	
Mech. Engineer:		Other:	10

Elec. Engineer:		None Specified:	
Total (Online):	**21**		

2.11 SESSION 11: HIGH PERFORMANCE CLASSROOMS (10/22/2020)

Title: High Performance Classrooms

Description: Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state over the last 50 years of school design will introduce the problems faced by designers. This session will highlight several case studies of high-performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

Presentation Info:

Date:	10/22/20
Location:	Architectural Firm 4 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:	1	Contractor:	
Mech. Engineer:		Other:	2
Elec. Engineer:		None Specified:	
Total (Online):	**9**		

2.12 SESSION 12: DAYLIGHT IN BUILDINGS: GETTING THE DETAILS RIGHT (10/29/2020)

Title: Daylight in Buildings: Getting the Details Right

Description: This session lays out the process of creating high quality and comfortable day-lit spaces. Following the schematic design documentation of the key surfaces for daylighting within a space, there are several details that can make or break the overall success of the daylighting design. This presentation highlights the importance of interior surface colors and reflectance, interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. Concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight are also presented.

Presentation Info:

Date:	10/29/20
Location:	Architectural Organization 1 – Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	6	Electrician:	
Engineer:	2	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (Online):	**13**		

2.13 SESSION 13: LUMINAIRE LEVEL LIGHTING CONTROLS (11/03/20)

Title: Luminaire Level Lighting Controls

Description: LLLCs have sensors and controls within individual fixtures that enable them to be controlled remotely or on a case-by-case basis. Remote control allows users to adjust the programming criteria or illumination levels without replacing the fixtures. In conventional lighting systems, lighting zones are defined as a collective unit and thus are centrally controlled. LLLCs however, incorporate sensors into each fixture, such as occupancy, daylight, temperature or receive/broadcast signals. Each fixture has the potential to become a semi-autonomous zone that is capable of responding to small changes in the area under each fixture. Furthermore, individual fixtures can communicate with other fixtures, using wireless or infrared signals, to share data for an even greater potential to increase energy savings and user satisfaction. Some LLLCs can be connected by gateway to transfer information collected. This data is analyzed, usually through manufacturer's software, to provide a user interface different from a typical text editor. From there users are able to identify trends in occupancy and lighting energy consumption that can then be used to refine the building schedules for occupancy and lighting and, if applicable, for the buildings' HVAC schedule programming.

Presentation Info:

Date:	11/03/20
Location:	Open Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	7	Electrician:	
Engineer:	2	Contractor:	
Mech. Engineer:		Other:	8
Elec. Engineer:		None Specified:	
Total (Online):	**17**		

2.14 SESSION 14: VRF'S AND HEAT PUMPS (11/04/2020)

Title: VRF's and Heat Pumps

Description: Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's climates. Including ERVs with DOAS.

Presentation Info:

Date:	11/04/20
Location:	Architectural Organization 2 – Webinar
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	5
Elec. Engineer:		None Specified:	
Total (Online):	**11**		

2.15 SESSION 15: INDOOR AIR QUALITY (11/09/2020)

Title: Indoor Air Quality

Description: In an effort to operate buildings in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	11/09/20
Location:	Architectural Organization 1 – Webinar
Presenter:	Ken Baker

Attendance:

Architect:	1	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (Online):	**1**		

2.16 SESSION 16: THE ARCHITECT'S BUSINESS CASE FOR ENERGY MODELING (11/12/2020)

Title: The Architect's Business Case for Energy Modeling

Description: Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the

process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

Presentation Info:

Date:	11/12/20
Location:	Architecture Firm 4 – Boise, ID
Presenter:	Ken Baker

Attendance:

Architect:	5	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	1
Elec. Engineer:		None Specified:	
Total (Online):	6		

2.17 SESSION 17: DOAS INTEGRATION (11/17/2020)

Title: DOAS Integration

Description: This session lays out the process of creating high quality and comfortable day-lit spaces. Following the schematic design documentation of the key surfaces for daylighting within a space, there are several details that can make or break the overall success of the daylighting design. This presentation highlights the importance of interior surface colors and reflectance, interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. Concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight are also presented.

Presentation Info:

Date:	11/17/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:	5	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (Online):	16		

2.18 SESSION 18: CHILLED BEAMS (12/01/2020)

Title: Chilled Beams

Description: How to incorporate chilled beams into building design: the costs, the energy savings, and the impacts on the architectural program and HVAC system.

Presentation Info:

Date:	12/01/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	2	Electrician:	
Engineer:	8	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (Online):	**15**		

2.19 SESSION 19: THE FUTURE OF LIGHTING CONTROLS (12/15/2020)

Title: The Future of Lighting Controls

Description: Although LEDs have shown, they are a big game changer in the commercial lighting realm; lower lighting power density is not the only area of value when considering lighting. We can further increase savings from these highly efficient lighting systems by introducing control systems that collect data and user input to create an evolving feedback loop that seeks peak system operation. While LLLC's (Luminaire Level Lighting Control) use this feature, they still use the same infrastructure as the lighting and control system that have come before it, which can be a limitation for expanding the systems efficiency and integration to other building systems. We believe the internet of things (IoT) will change the lighting and controls industry, providing an excellent medium for an integrated, multi-service IoT platform. Why? Where there are people, there are lights; where there are people, there will also be the need for connectivity. New and connected lighting controls provide a means to deliver valuable IoT services and increased energy savings.

Presentation Info:

Date:	12/15/20
Location:	Open Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	3	Electrician:	1
Engineer:	2	Contractor:	
Mech. Engineer:		Other*:	8

Elec. Engineer:		None Specified:	
Total (Online):	**14**		

2.20 SESSION 20: GROUND SOURCE HEAT PUMPS (12/15/2020)

Title: Ground Source Heat Pumps

Description: The initial cost of ground-source heat pump systems can be substantially higher than conventional systems, limiting it as a design option. This presentation will highlight how, with a hybrid GSHP system, it is possible to optimize the overall system life-cycle cost while reducing initial cost and maintaining a low operating cost. The GSHP system should be sized based on coincidental building loads and the system components including, the heat exchanger and additional central plant equipment.

Presentation Info:

Date:	12/16/20
Location:	Architectural Organization 2 – Webinar
Presenter:	Damon Woods

Attendance:

Architect:	5	Electrician:	1
Engineer:	3	Contractor:	
Mech. Engineer:		Other*:	4
Elec. Engineer:		None Specified:	
Total (Online):	**13**		

3. FUTURE WORK

Feedback was gathered from the 141 Lunch and Learn evaluations received throughout 2020. The comments from these were valuable but were limited in the type of response that could be given, therefore, there are no recommended topics for 2021. If the online format of presentations continues into 2021, the IDL will investigate alternative evaluations options to collect data.

4. APPENDICES

APPENDIX A: SESSION SUMMARIES

At the conclusion of each lunch and learn session, an evaluation poll via Zoom was presented to each participant. The feedback was used to improve future sessions. Below are summaries of session information, attendance counts, and the feedback received from the evaluation forms. It should be noted that comments recorded from evaluations were not collected due to limitations with the ZOOM platform which only allows for multiple choice polling to participants.

4.1.1 SESSION 1: RADIANT HEATING AND COOLING DESIGN (05/07/2020)

Title: Radiant Heating and Cooling Design

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building design reduces loads to levels achievable by radiant systems. This collaboration between the disciplines has a direct relationship to the ultimate performance of the system and comfort of the building. Key decisions must be made early in the design process to ensure the feasibility and performance of an installed system. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different capabilities, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	05/07/20
Location:	Architectural Firm 1 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	2	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (Online):	**2**		

Evaluations: No evaluations were collected due to technical difficulties with the ZOOM platform.

		Scale
In general, today's presentation was:	**0.0**	1 Not Useful - 5 Very Useful
Rate organization:	**0.0**	1 Needs Improvement - 5 Excellent
Rate clarity:	**0.0**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**0.0**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**0.0**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**0.0**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**0.0**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments:

4.1.2 SESSION 2: COVID-19 BUILDINGS HEALTH AND ENERGY (07/29/2020)

Title: Covid-19 Buildings Health and Energy

Description: Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's climates. Including ERVs with DOAS.

Presentation Info:

Date:	07/29/20
Location:	Engineering Firm 1 – Boise, ID
Presenter:	Kevin Van Den Wymelenberg

Attendance:

Architect:	26	Electrician:	
Engineer:	16	Contractor:	
Mech. Engineer:		Other*:	54
Elec. Engineer:		None Specified:	1
Total (Online):	**97**		

Evaluations: No evaluations were collected due to technical difficulties with the ZOOM platform.		**Scale**
In general, today's presentation was:	**0.0**	1 Not Useful - 5 Very Useful
Rate organization:	**0.0**	1 Needs Improvement - 5 Excellent
Rate clarity:	**0.0**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**0.0**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**0.0**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**0.0**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**0.0**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments:

4.1.3 SESSION 3: VRF'S AND HEAT PUMPS (08/11/2020)

Title: VRF's and Heat Pumps

Description: Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's climates. Including ERVs with DOAS.

Presentation Info:

Date:	08/11/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	8	Electrician:	
Engineer:	8	Contractor:	
Mech. Engineer:		Other*:	10
Elec. Engineer:		None Specified:	1
Total (Online):	**27**		

Evaluations: No evaluations were collected for this webinar.		**Scale**
In general, today's presentation was:	**4.3**	1 Not Useful - 5 Very Useful
Rate organization:	**4.2**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.4**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.1**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.6**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**4.2**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**3.0**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.4 SESSION 4: DAYLIGHTING MULTIPLIERS (08/12/2020)

Title: Daylighting Multipliers

Description: This session will cover the role that daylighting multipliers play when trying to increase the efficiency of daylight harvesting in a building through design applications, such as, light shelves, manufactured glazing, and material specification. Participants will learn about the rate of return and energy efficiency cost effectiveness for daylighting strategies, building form, location, and multipliers. The class will explain how the layers of daylighting/electric lighting strategies and control systems and how they add or subtract to the overall efficiency of the design.

Presentation Info:

Date:	08/12/20
Location:	Architectural Firm 2 – Boise, ID
Presenter:	Dylan Agnes

Attendance:

Architect:	3	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	1
Elec. Engineer:		None Specified:	
Total (Online):	**4**		

Evaluations:		**Scale**
In general, today's presentation was:	**4.0**	1 Not Useful - 5 Very Useful
Rate organization:	**3.0**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.5**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.5**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.0**	1 Needs Improvement - 5 Excellent

Rate delivery of presentation:	**4.5**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**5.0**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.5 SESSION 5: THE ARCHITECT'S BUSINESS CASE FOR ENERGY MODELING (08/25/2020)

Title: The Architect's Business Case for Energy Modeling

Description: Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

Presentation Info:

Date:	08/25/20
Location:	Open Webinar
Presenter:	Ken Baker

Attendance:

Architect:	6	Electrician:	
Engineer:	4	Contractor:	
Mech. Engineer:		Other*:	11
Elec. Engineer:		None Specified:	
Total (Online):	**21**		

Evaluations:		**Scale**
In general, today's presentation was:	**3.9**	1 Not Useful - 5 Very Useful
Rate organization:	**3.0**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.1**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.1**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.4**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**4.5**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**4.1**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.6 SESSION 6: HIGH PERFORMANCE CLASSROOMS (08/25/2020)

Title: High Performance Classrooms

Description: Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state over the last 50 years of school design will introduce the problems faced by designers. This session will highlight several case studies of high-performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

Presentation Info:

Date:	08/25/20
Location:	Architecture Firm 3 - Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	7	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	1
Total (Online):	8		

Evaluations:		**Scale**
In general, today's presentation was:	**4.8**	1 Not Useful - 5 Very Useful
Rate organization:	**3.8**	1 Needs Improvement - 5 Excellent
Rate clarity:	**5.0**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.8**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.8**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**5.0**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**5.0**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.7 SESSION 7: RADIANT SYSTEM DESIGN CONSIDERATIONS (09/01/2020)

Title: Radiant System Design Considerations

Description: Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers

to ensure that the building design reduces loads to levels achievable by radiant systems. This collaboration between the disciplines has a direct relationship to the ultimate performance of the system and comfort of the building. Key decisions must be made early in the design process to ensure the feasibility and performance of an installed system. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different capabilities, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Presentation Info:

Date:	09/01/20
Location:	Architecture Firm 3 - Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	1
Elec. Engineer:		None Specified:	
Total (Online):	**7**		

Evaluations:		**Scale**
In general, today's presentation was:	**3.0**	1 Not Useful - 5 Very Useful
Rate organization:	**4.4**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.3**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.6**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.6**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**5.0**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**4.7**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.8 SESSION 8: DAYLIGHTING MULTIPLIERS (09/08/2020)

Title: Daylighting Multipliers

Description: This session will cover the role that daylighting multipliers play when trying to increase the efficiency of daylight harvesting in a building through design applications, such as, light shelves, manufactured glazing, and material specification. Participants will learn about the rate of return and energy efficiency cost effectiveness for daylighting strategies, building form, location, and multipliers. The class will explain how the layers of daylighting/electric lighting strategies and control systems and how they add or subtract to the overall efficiency of the design.

Presentation Info:

Date:	07/09/20

Location:	Open Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	7	Electrician:	
Engineer:	5	Contractor:	
Mech. Engineer:		Other:	6
Elec. Engineer:		None Specified:	
Total (Online):	**18**		

Evaluations:		**Scale**
In general, today's presentation was:	**4.0**	1 Not Useful - 5 Very Useful
Rate organization:	**3.0**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.4**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.3**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.6**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**4.9**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**4.0**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.9 SESSION 9: INDOOR AIR QUALITY (09/22/2020)

Title: Indoor Air Quality

Description: In an effort to operate buildings in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	09/22/20
Location:	Open Webinar
Presenter:	Ken Baker

Attendance:

Architect:	9	Electrician:	
Engineer:	13	Contractor:	
Mech. Engineer:		Other:	24
Elec. Engineer:		None Specified:	
Total (Online):	**46**		

Evaluations:		Scale
In general, today's presentation was:	4.1	1 Not Useful - 5 Very Useful
Rate organization:	3.0	1 Needs Improvement - 5 Excellent
Rate clarity:	4.2	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	3.9	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	3.2	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	4.7	1 Needs Improvement - 5 Excellent
The content of the presentation was:	4.1	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on evaluations collected.

4.1.10 SESSION 10: HIGH PERFORMANCE CLASSROOMS (10/22/2020)

Title: High Performance Classrooms

Description: Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state over the last 50 years of school design will introduce the problems faced by designers. This session will highlight several case studies of high-performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

Presentation Info:

Date:	10/22/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	7	Electrician:	
Engineer:	4	Contractor:	
Mech. Engineer:		Other:	10
Elec. Engineer:		None Specified:	
Total (Online):	21		

Evaluations:		Scale
In general, today's presentation was:	5.0	1 Not Useful - 5 Very Useful
Rate organization:	3.0	1 Needs Improvement - 5 Excellent
Rate clarity:	4.5	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	4.8	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	5.0	1 Needs Improvement - 5 Excellent

Rate delivery of presentation:	4.8	1 Needs Improvement - 5 Excellent
The content of the presentation was:	5.0	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.11 SESSION 11: HIGH PERFORMANCE CLASSROOMS (10/22/2020)

Title: High performance Classrooms

Description: Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

Presentation Info:

Date:	10/22/20
Location:	Architectural Firm 4 – Boise, ID
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:	1	Contractor:	
Mech. Engineer:		Other:	2
Elec. Engineer:		None Specified:	
Total (Online):	9		

Evaluations:

		Scale
In general, today's presentation was:	4.8	1 Not Useful - 5 Very Useful
Rate organization:	3.2	1 Needs Improvement - 5 Excellent
Rate clarity:	4.6	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	5.0	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	5.0	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	5.0	1 Needs Improvement - 5 Excellent
The content of the presentation was:	5.0	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.12 SESSION 12: DAYLIGHT IN BUILDINGS – GETTING THE DETAILS RIGHT (10/29/2020)

Title: Daylight in Buildings – Getting the Details Right

Description: This session lays out the process of creating high quality and comfortable day-lit spaces. Following the schematic design documentation of the key surfaces for daylighting within a space, there are several details that can make or break the overall success of the daylighting design. This presentation highlights the importance of interior surface colors and reflectance, interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. Concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight are also presented.

Presentation Info:

Date:	10/29/2020
Location:	Architectural Organization 1 – Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	6	Electrician:	
Engineer:	2	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (Online):	13		

Evaluations: No evaluation were handed out

		Scale
In general, today's presentation was:	4.5	1 Not Useful - 5 Very Useful
Rate organization:	4.0	1 Needs Improvement - 5 Excellent
Rate clarity:	3.5	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	3.5	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	3.5	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	4.5	1 Needs Improvement - 5 Excellent
The content of the presentation was:	3.5	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.13 SESSION 13: LUMINAIRE LEVEL LIGHTING CONTROLS (11/03/20)

Title: Luminaire Level Lighting Controls

Description: LLLCs have sensors and controls within individual fixtures that enable them to be controlled remotely or on a case-by-case basis. Remote control allows users to adjust the programming criteria or illumination levels without replacing the fixtures. In conventional lighting systems, lighting zones are defined as a collective unit and thus are centrally controlled. LLLCs however, incorporate sensors into each fixture, such as occupancy, daylight, temperature or receive/broadcast signals. Each fixture has the potential to become a semi-autonomous zone that is capable of responding to small changes in the area under each fixture.

Furthermore, individual fixtures can communicate with other fixtures, using wireless or infrared signals, to share data for an even greater potential to increase energy savings and user satisfaction. Some LLLCs can be connected by gateway to transfer information collected. This data is analyzed, usually through manufacturer's software, to provide a user interface different from a typical text editor. From there users are able to identify trends in occupancy and lighting energy consumption that can then be used to refine the building schedules for occupancy and lighting and, if applicable, for the buildings' HVAC schedule programming.

Presentation Info:

Date:	11/03/20
Location:	Open Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	7	Electrician:	
Engineer:	2	Contractor:	
Mech. Engineer:		Other:	8
Elec. Engineer:		None Specified:	
Total (Online):	17		

Evaluations: No evaluations were handed out

		Scale
In general, today's presentation was:	4.9	1 Not Useful - 5 Very Useful
Rate organization:	3.0	1 Needs Improvement - 5 Excellent
Rate clarity:	4.7	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	4.8	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	4.3	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	4.9	1 Needs Improvement - 5 Excellent
The content of the presentation was:	4.6	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.14 SESSION 14: VRF'S AND HEAT PUMPS (11/04/2020)

Title: VRF's and Heat Pumps

Description: Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's climates. Including ERVs with DOAS.

Presentation Info:

Date:	11/04/20
Location:	Architectural Organization 2 – Webinar
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	5
Elec. Engineer:		None Specified:	
Total (Online):	**11**		

Evaluations:		**Scale**
In general, today's presentation was:	**5.0**	1 Not Useful - 5 Very Useful
Rate organization:	**3.0**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.5**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.8**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.8**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**5.0**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**4.8**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.15 SESSION 15: INDOOR AIR QUALITY (11/09/2020)

Title: Indoor Air Quality

Description: In an effort to operate buildings in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Presentation Info:

Date:	11/09/20
Location:	Architectural Organization 1 – Webinar
Presenter:	Ken Baker

Attendance:

Architect:	1	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other:	
Elec. Engineer:		None Specified:	
Total (Online):	**1**		

Evaluations: No evaluations were handed out		**Scale**
In general, today's presentation was:	**5.0**	1 Not Useful - 5 Very Useful

Rate organization:	3.0	1 Needs Improvement - 5 Excellent
Rate clarity:	5.0	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	5.0	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	5.0	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	5.0	1 Needs Improvement - 5 Excellent
The content of the presentation was:	5.0	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.16 SESSION 16: THE ARCHITECT'S BUSINESS CASE FOR ENERGY MODELING (11/12/2020)

Title: The Architect's Business Case for Energy Modeling

Description: Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

Presentation Info:

Date:	11/12/20
Location:	Architecture Firm 1 – Boise, ID
Presenter:	Ken Baker

Attendance:

Architect:	5	Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	1
Elec. Engineer:		None Specified:	
Total (Online):	6		

Evaluations:

		Scale
In general, today's presentation was:	5.0	1 Not Useful - 5 Very Useful
Rate organization:	5.0	1 Needs Improvement - 5 Excellent
Rate clarity:	4.7	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	4.7	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	5.0	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	5.0	1 Needs Improvement - 5 Excellent
The content of the presentation was:	3.0	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.17 SESSION 17: DOAS INTEGRATION (11/17/2020)

Title: DOAS Integration

Description: This session lays out the process of creating high quality and comfortable day-lit spaces. Following the schematic design documentation of the key surfaces for daylighting within a space, there are several details that can make or break the overall success of the daylighting design. This presentation highlights the importance of interior surface colors and reflectance, interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. Concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight are also presented.

Presentation Info:

Date:	11/17/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	6	Electrician:	
Engineer:	5	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (Online):	**16**		

Evaluations:

		Scale
In general, today's presentation was:	**4.3**	1 Not Useful - 5 Very Useful
Rate organization:	**4.6**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.5**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.4**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.5**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**4.7**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**3.1**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.18 SESSION 18: CHILLED BEAMS (12/01/2020)

Title: Chilled Beams

Description: How to incorporate chilled beams into building design: the costs, the energy savings, and the impacts on the architectural program and HVAC system.

Presentation Info:

Date:	12/01/20
Location:	Open Webinar
Presenter:	Damon Woods

Attendance:

Architect:	2	Electrician:	
Engineer:	8	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	
Total (Online):	**15**		

Evaluations:

		Scale
In general, today's presentation was:	**4.5**	1 Not Useful - 5 Very Useful
Rate organization:	**4.6**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.7**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.2**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.5**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**4.6**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**3.1**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.19 SESSION 19: THE FUTURE OF LIGHTING CONTROLS (12/15/2020)

Title: The Future of Lighting Controls

Description: Although LEDs have shown, they are a big game changer in the commercial lighting realm; lower lighting power density is not the only area of value when considering lighting. We can further increase savings from these highly efficient lighting systems by introducing control systems that collect data and user input to create an evolving feedback loop that seeks peak system operation. While LLLC's (Luminaire Level Lighting Control) use this feature, they still use the same infrastructure as the lighting and control system that have come before it, which can be a limitation for expanding the systems efficiency and integration to other building systems. We believe the internet of things (IoT) will change the lighting and controls industry, providing an excellent medium for an integrated, multi-service IoT platform. Why? Where there are people, there are lights;

where there are people, there will also be the need for connectivity. New and connected lighting controls provide a means to deliver valuable IoT services and increased energy savings.

Presentation Info:

Date:	12/15/20
Location:	Open Webinar
Presenter:	Dylan Agnes

Attendance:

Architect:	3	Electrician:	1
Engineer:	2	Contractor:	
Mech. Engineer:		Other*:	8
Elec. Engineer:		None Specified:	
Total (Online):	**14**		

Evaluations:		**Scale**
In general, today's presentation was:	**4.0**	1 Not Useful - 5 Very Useful
Rate organization:	**4.2**	1 Needs Improvement - 5 Excellent
Rate clarity:	**4.1**	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	**4.5**	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	**4.3**	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	**3.8**	1 Needs Improvement - 5 Excellent
The content of the presentation was:	**3.1**	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

4.1.20 SESSION 20: GROUND SOURCE HEAT PUMPS (12/16/2020)

Title: Ground Source Heat Pumps

Description: The initial cost of ground-source heat pump systems can be substantially higher than conventional systems, limiting it as a design option. This presentation will highlight how, with a hybrid GSHP system, it is possible to optimize the overall system life-cycle cost while reducing initial cost and maintaining a low operating cost. The GSHP system should be sized based on coincidental building loads and the system components including, the heat exchanger and additional central plant equipment.

Presentation Info:

Date:	12/16/20

Location:	Architectural Organization 2 – Webinar
Presenter:	Damon Woods

Attendance:

Architect:	5	Electrician:	1
Engineer:	3	Contractor:	
Mech. Engineer:		Other*:	4
Elec. Engineer:		None Specified:	
Total (Online):	13		

Evaluations:		**Scale**
In general, today's presentation was:	4.4	1 Not Useful - 5 Very Useful
Rate organization:	4.3	1 Needs Improvement - 5 Excellent
Rate clarity:	4.2	1 Needs Improvement - 5 Excellent
Rate opportunity for questions:	4.3	1 Needs Improvement - 5 Excellent
Rate instructor's knowledge of the subject matter:	4.6	1 Needs Improvement - 5 Excellent
Rate delivery of presentation:	4.3	1 Needs Improvement - 5 Excellent
The content of the presentation was:	3.0	1 Too Basic - 3 Just Right - 5 Too Advanced

Comments: No comments were made on the evaluations collected.

APPENDIX B: LUNCH AND LEARN 2020 TOPICS OFFERED

HIGH PERFORMANCE CLASSROOMS (TOPIC 2001)

Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state over the last 50 years of school design will introduce the problems faced by designers. This session will highlight several case studies of high-performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

OPENSTUDIO – PARAMETRIC ANALYSIS TOOL (TOPIC 2002)

This session will cover the parametric analysis tool (PAT) within OpenStudio. PAT removes the need to hand edit each model to try out different architectural design, energy efficiency measures, or mechanical systems. Participants will learn the fundamental concepts of measure writing for OpenStudio, simulation parameters, running a simulation with PAT, and

how firms can utilize this feature to inform early design decisions in regards to building performance.

Daylighting Multipliers – Increasing Daylight Harvesting Efficiency (Topic 2003)

This session will cover the role that daylighting multipliers play when trying to increase the efficiency of daylight harvesting in a building through design applications, such as, light shelves, manufactured glazing, and material specification. Participants will learn about the rate of return and energy efficiency cost effectiveness for daylighting strategies, building form, location, and multipliers. The class will explain how the layers of daylighting/electric lighting strategies and control systems and how they add or subtract to the overall efficiency of the design.

High Efficiency Heat Recovery (Topic 1903)

This session will cover the role that high efficiency HRV's play in designing and specifying high-performing Dedicated Outdoor Air systems. Several recent northwest case studies have shown whole-building savings of 40 to 60% on existing building retrofits using DOAS with high efficiency heat recovery. The current code requirements of HRVs will be contrasted with the performance of new and emerging products. High efficiency HRV's can have a high capital cost but can generate large energy savings with increased control of cooling and ventilation. Several economic models will be presented showing financial impacts of using high efficiency HRVs in a project.

Future of Lighting Controls (Topic 1901)

Although LEDs have shown, they are a big game changer in the commercial lighting realm; lower lighting power density is not the only area of value when considering lighting. We can further increase savings from these highly efficient lighting systems by introducing control systems that collect data and user input to create an evolving feedback loop that seeks peak system operation. While LLLC's (Luminaire Level Lighting Control) use this feature, they still use the same infrastructure as the lighting and control system that have come before it, which can be a limitation for expanding the systems efficiency and integration to other building systems. We believe the internet of things (IoT) will change the lighting and controls industry, providing an excellent medium for an integrated, multi-service IoT platform. Why? Where there are people, there are lights; where there are people, there will also be the need for connectivity. New and connected lighting controls provide a means to deliver valuable IoT services and increased energy savings.

The Architects' Business Case for Energy Performance Modeling (Topic 1902)

Most of us think of energy modeling as an engineering exercise. The truth is that more models and simulations are performed, and to better result, if the architect understands when and how to support the process and how to utilize the output. A building energy model can provide the architect an iterative process to increase the real-world effectiveness

of energy systems within a building. This session will explore the value-add of energy modeling from the architect's perspective, providing a business case for more active involvement in advocation for energy performance modeling.

Luminaire Level Lighting Controls (LLLCs) (Topic 1904)

LLLCs have sensors and controls within individual fixtures that enable them to be controlled remotely or on a case-by-case basis. Remote control allows users to adjust the programming criteria or illumination levels without replacing the fixtures. In conventional lighting systems, lighting zones are defined as a collective unit and thus are centrally controlled. LLLCs however, incorporate sensors into each fixture, such as occupancy, daylight, temperature or receive/broadcast signals. Each fixture has the potential to become a semi-autonomous zone that is capable of responding to small changes in the area under each fixture. Furthermore, individual fixtures can communicate with other fixtures, using wireless or infrared signals, to share data for an even greater potential to increase energy savings and user satisfaction. Some LLLCs can be connected by gateway to transfer information collected. This data is analyzed, usually through manufacturer's software, to provide a user interface different from a typical text editor. From there users are able to identify trends in occupancy and lighting energy consumption that can then be used to refine the building schedules for occupancy and lighting and, if applicable, for the buildings' HVAC schedule programming.

Daylight in Buildings: Getting the Details Right (HSW) (Topic 1409)

This session lays out the process of creating high quality and comfortable day-lit spaces. Following the schematic design documentation of the key surfaces for daylighting within a space, there are several details that can make or break the overall success of the daylighting design. This presentation highlights the importance of interior surface colors and reflectance, interior space layouts, furniture design, window details (including glazing specifications), and shading strategies. Concepts of lighting control systems to ensure that energy is saved from the inclusion of daylight are also presented.

Radiant Heating and Cooling Design (HSW) (Topic 1407)

Designing for radiant systems and thermally active surfaces represents a key opportunity for integrated design and high-performance buildings. While radiant systems can be inherently more energy efficient than air-based systems, their success requires close collaboration between architects and engineers to ensure that the building design reduces loads to levels achievable by radiant systems. This collaboration between the disciplines has a direct relationship to the ultimate performance of the system and comfort of the building. Key decisions must be made early in the design process to ensure the feasibility and performance of an installed system. A wide spectrum of configurations and types of radiant systems are available for designers, with each having different capabilities, capacities, and complexities according to their setup. This presentation will cover some general rules of thumb to consider for radiant systems, as well as provide an overview of the key architectural and engineering design decisions associated with each system configuration.

Hybrid Ground Source Heat Pump System (HSW) (Topic 1420)

The initial cost of ground-source heat pump systems can be substantially higher than conventional systems, limiting it as a design option. This presentation will highlight how, with a hybrid GSHP system, it is possible to optimize the overall system life-cycle cost while reducing initial cost and maintaining a low operating cost. The GSHP system should be sized based on coincidental building loads and the system components including, the heat exchanger and additional central plant equipment.

Indoor Air Quality (IAQ) and Energy Efficiency in Buildings (HSW) (Topic 1702)

In an effort to operate buildings in the most energy efficient manner, we are designing building envelopes to be as airtight as possible with as little outside air as allowable. In this presentation the following issues are addressed: significance of IAQ to human health and productivity, the link between IAQ and building energy demands, and efficient technologies for optimizing IAQ.

Chilled Beams (Topic 1801)

How to incorporate chilled beams into building design: the costs, the energy savings, and the impacts on the architectural program and HVAC system.

VRFs & Heat Pumps (Topic 1802)

Designing features of decoupled buildings. Sizing VRF and heat pump systems for Idaho's climates. Including ERVs with DOAS.

.

2020 TASK 3: BSUG

SUMMARY OF EFFORT AND OUTCOMES

IDAHO POWER COMPANY EXTERNAL YEAR-END REPORT

December 31, 2020

Prepared for:
Idaho Power Company

Author:
Dylan Agnes

Report Number: 2001_003-01

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Prepared by:
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Prepared for:
Idaho Power Company

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DISCLAIMER

While the recommendations in this report have been reviewed for technical accuracy and are believed to be reasonably accurate, the findings are estimates and actual results may vary. All energy savings and cost estimates included in the report are for informational purposes only and are not to be construed as design documents or as guarantees of energy or cost savings. The user of this report, or any information contained in this report, should independently evaluate any information, advice, or direction provided in this report.

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1. Acronyms and Abbreviations

AIA	American Institute of Architects
App	Application
ARUP	London based multi-discipline firm
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BCVTP	Building Controls Virtual Test-Bed
BEMP	Building Energy Modeling Professional
BESF	Building Energy Simulation Forum (Energy Trust of Oregon)
BIM	Building Information Modeling
BOMA	Building Owners and Managers Association
BSME	Bachelor of Science in Mechanical Engineering
BSUG	Building Simulation Users' Group
CBECS	Commercial Building Energy Consumption Survey
Comm	Commercial
Elec.	Electrical
HePESC	Heat Pump Energy Savings Calculator
HVAC	Heating, Ventilation, and Air Conditioning
IBPSA	International Building Performance Simulation Association
IDL	Integrated Design Lab
IPC	Idaho Power Company
LBNL	Lawrence Berkeley National Laboratory
LEED	Leadership in Energy & Environmental Design
LLLC	Luminaire Level Lighting Control
M. Arch	Masters of Architecture
ME	Mechanical Engineer(ing)
Mech.	Mechanical
MEP	Mechanical, Electrical, and Plumbing
MS Arch	Masters of Science Architecture
NCARB	National Council of Architectural Registration Boards
RDA	Revit Daylighting Analysis
TMY	Typical Meteorological Year
UDC	Urban Design Center
UI	University of Idaho
USGBC	U.S. Green Building Council

2. Introduction

The 2020 Idaho Power scope of work for the Building Simulation Users' Group (BSUG) task included planning, organization and hosting of six meetings, recording attendance and evaluations, archiving video of the presentations, and maintaining the BSUG 2.0 website. Added this year was the IDL launch of a new website (http://www.idlboise.com/content/bsug-20).

3. 2020 Summary and Cumulative Analysis

In 2020, six sessions were coordinated and hosted. Sessions are summarized below with details in the following sections. The February session was held in-person while the remaining sessions were held as online only.

Table 1: Overall Summary of Sessions

Date	Title	Presenter	Presenter Company	RSVPs		Attendees	
				In-person	Online	In-person	Online
2/13	Trends: Buildings, Technologies and Tools	Dru Crawley	ASHRAE	16	-	12	0
7/30	The State of Autodesk Simulation Software – Revit	Dylan Agnes	IDL	-	41	0	15
8/26	Utilizing Grasshopper and Ladybug in the Design Process	Ryan Schwartz	Cushing Terrell	-	56	0	28
9/30	Revit's Insight Daylighting Analysis	Dylan Agnes	IDL	-	12	0	9
10/28	Energy Modeling for Code Compliance	Tim Johnson	Cushing Terrell	-	51	0	26
11/18	High Performance Classrooms	Damon Woods	IDL	-	43	0	15
			Total:	**16**	**203**	**12**	**93**
				219		**105**	

3.1 2020 Attendance

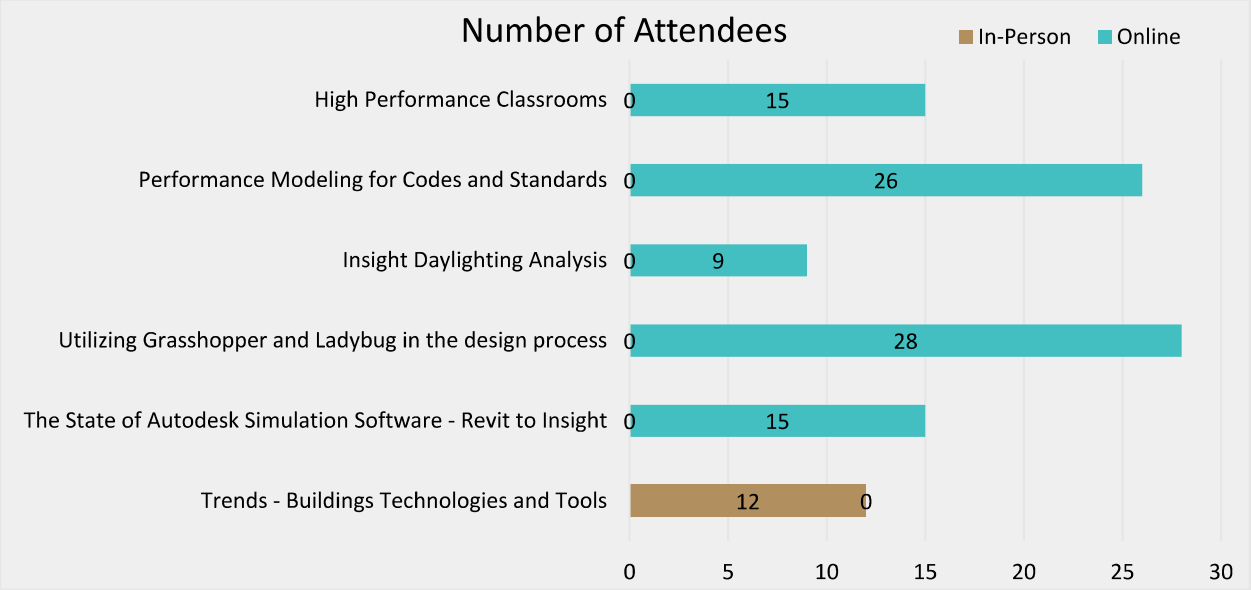


Figure 1: Attendee Count by Session and Type

Table 2: Overall Attendance Breakdown

Architect:	7	Electrician:	
Engineer:	18	Contractor:	
Mech. Engineer:	7	Other:	15
Elec. Engineer:	1	None Specified:	57
Total (In-Person):	**12**		
Total (Online):	**93**		
Total (Combined):	**105**		

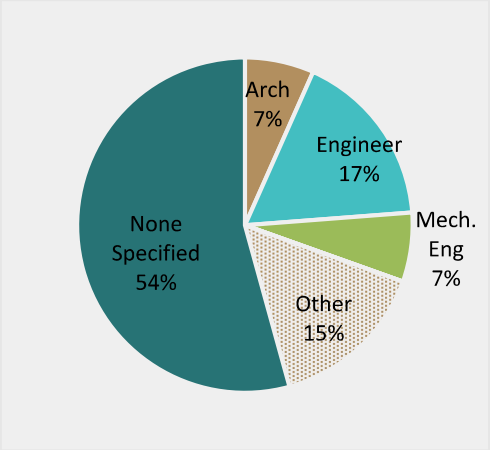


Figure 2: Attendee Profession Breakdown

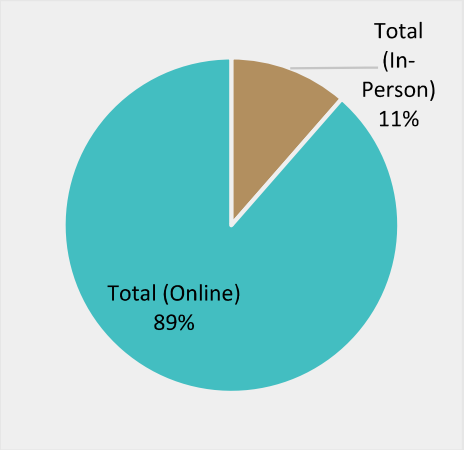


Figure 3: Attendee Type Breakdown

3.2 2020 Evaluations

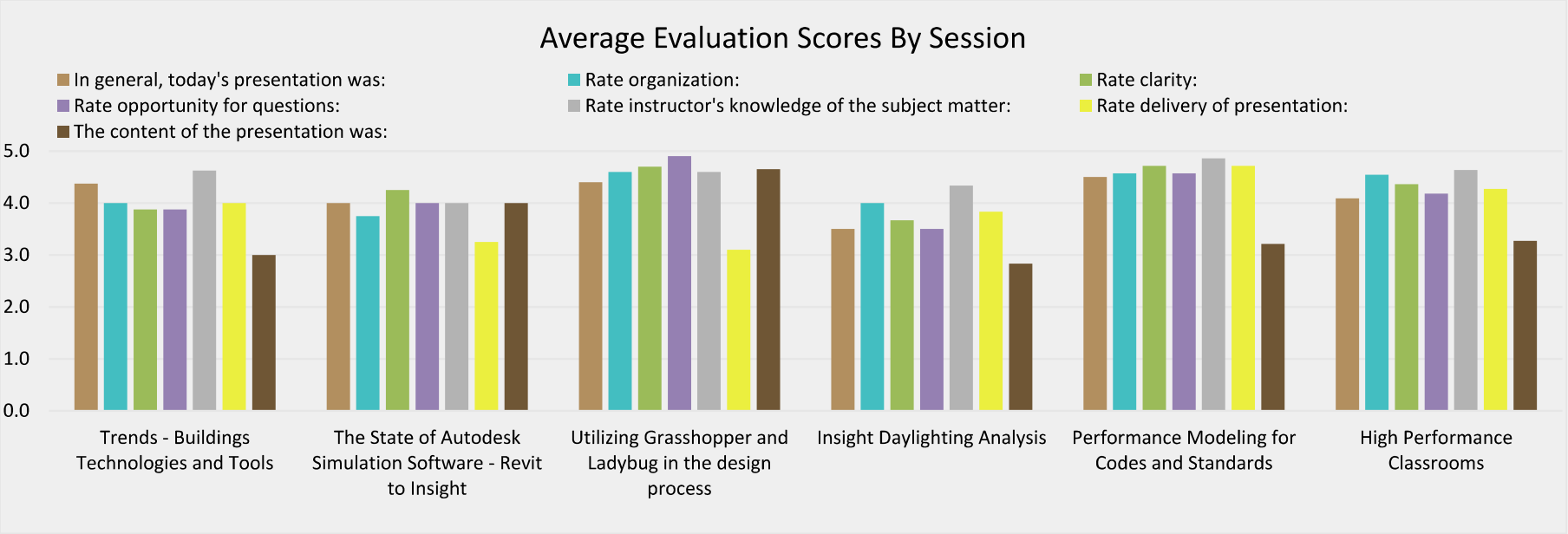


Figure 4: Average Evaluations by Session

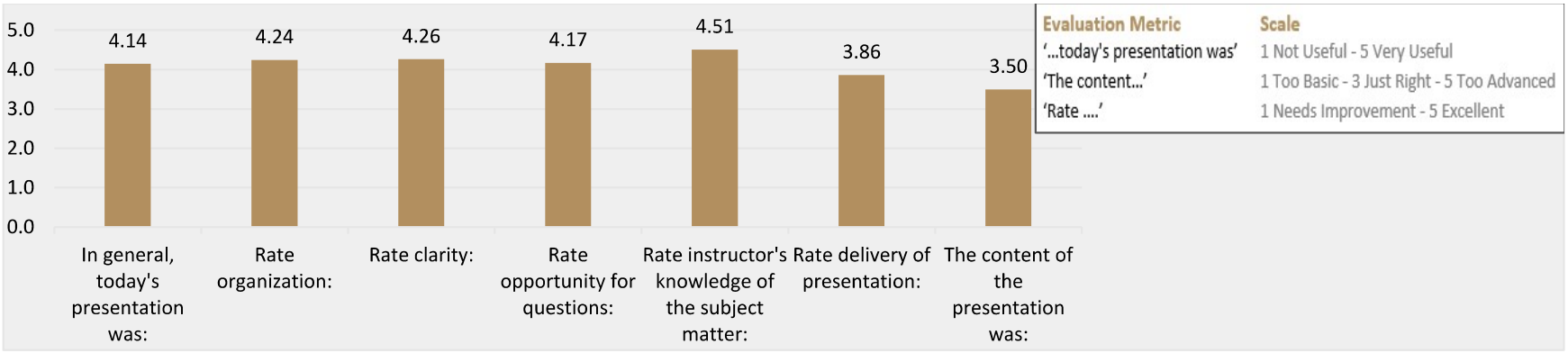


Figure 5: Average Evaluation Scores for All Sessions

4. SESSION SUMMARIES

4.1 Session 1: Trends – Buildings Technologies and Tools (2/13/20)

Title: Trends – Buildings Technologies and Tools

Date: 02/13/20

Description: The buildings industry faces many challenges and opportunities over the next few decades. Over the next ten years, changes in building technology—particularly wireless controls and solid-state lighting—will profoundly alter how our buildings are designed, built, and operated. Building energy simulation (SIM) has evolved into a powerful tool for evaluating the energy performance of potential or existing buildings. Building simulation allows easy comparison of the energy and environmental performance of many hundreds of design or retrofit options. The buildings touted today as 'net-zero energy' or 'sustainable' would not be possible without energy simulation—but no single simulation tool can model all aspects of our buildings today. This presentation provides an overview of trends and drivers affecting the building industry as well as the simulation tools of tomorrow.

Presenter: Dru Crawley

Attendance:

Architect:	1	Electrician:	
Engineer:	3	Contractor:	
Mech. Engineer:	7	Other*:	
Elec. Engineer:	1	None Specified:	
Total (In-Person):	**12**		
Total (Online):			
*If 'Other' was noted:			

4.2 Session 2: The State of Autodesk Simulation Software (07/30/20)

Title: The State of Autodesk Simulation Software

Date: 07/30/20

Description: In this presentation will we review the state of Autodesk simulation software, Insight and how it compares to the traditional energy model workflow of EnergyPlus and Open Studio. Insight is a cloud-based analysis tool which evolved from a previous Autodesk software, Green Building Studio, and focuses on energy and environmental performance as well as improving BIM workflow integration. Insight is an overlay type of integration with Revit models of various detail from conceptual massing to detailed Architectural models so that design decisions can be analyzed to measure the impact on the overall building performance through the design process. Insight simulation and analysis focuses on the

following three areas: energy, daylighting, and solar analysis. We will review in detail the workflow, types of simulation engines, simulation parameters, and results analysis for Autodesk Insight which will then be compared against EnergyPlus and Radiance models.

Presenter: Dylan Agnes

Attendance:

Architect:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	15
Total (In-Person):	**0**		
Total (Online):	**15**		
*If 'Other' was noted:			

4.3 Session 3: Utilizing Grasshopper and Ladybug in the Design Process (08/26/20)

Title: Utilizing Grasshopper and Ladybug in the Design Process

Date: 08/26/20

Description: As we look to design more sustainable buildings, energy models must be nimble enough to influence design rather than simply document performance. Utilizing energy simulation tools to explore hundreds of options during early design helps the design team focus on the features that have the greatest impact on performance. This presentation will introduce Grasshopper visual scripting and the many plugins that can be used to inform design decisions through parametric energy modeling.

Presenter: Ryan Schwartz

Attendance:

Architect:	2	Electrician:	
Engineer:	9	Contractor:	
Mech. Engineer:		Other*:	5
Elec. Engineer:		None Specified:	12
Total (In-Person):	**0**		
Total (Online):	**28**		
*If 'Other' was noted:	Energy Consulting/Manager/Modeler		

4.4 Session 4: Insight Daylighting Analysis (09/30/20)

Title: Insight Daylighting Analysis

Date: 09/30/20

Description: In this presentation will we review the state of Autodesk simulation software, Insight and how it compares to the traditional model workflow of Daylighting with Radiance. Insight is a cloud-based analysis tool which evolved from a previous Autodesk software, Green Building Studio, and focuses on energy and environmental performance as well as improving BIM workflow integration. Insight is an overlay type of integration with Revit models of various detail from conceptual massing to detailed Architectural models so that design decisions can be analyzed to measure the impact on the overall building performance through the design process. Insight simulation and analysis focuses on the following three areas: energy, daylighting, and solar analysis. We will review in detail the workflow, types of simulation engines, simulation parameters, and results analysis for Insight's Daylighting (via Revit Model) which will then be compared against Radiance models (SketchUp).

Presenter: Dylan Agnes

Attendance:

Architect:	2	Electrician:	
Engineer:	3	Contractor:	
Mech. Engineer:		Other*:	4
Elec. Engineer:		None Specified:	
Total (In-Person):	**0**		
Total (Online):	**9**		
*If 'Other' was noted:	Designer, Sustainability Specialist, Director, and Building System Analysist		

4.5 Session 5: Performance Modeling for Codes and Standards (10/28/20)

Title: Performance Modeling for Codes and Standards

Date: 10/28/20

Description: Do you ever wonder what happens if you design an efficient building, but it doesn't meet all the prescriptive requirements of the IECC or ASHRAE 90.1? This session will explore the performance compliance paths for the IECC and ASHRAE 90.1. We'll discuss building systems that often require performance based compliance, like mass walls, high window to wall ratios, and economizers, as well as strategies to keep your energy targets on track as you progress through the design. This session will help you not only comply with code, but also employ strategies to make your building as efficient and economical as possible. Remember, energy code is the lowest building efficiency allowed by law.

Presenter: Tim Johnson

Attendance:

Architect:	2	Electrician:	
Engineer:	3	Contractor:	
Mech. Engineer:		Other*:	6
Elec. Engineer:		None Specified:	15
Total (In-Person):	**0**		
Total (Online):	**26**		
*If 'Other' was noted:	Energy Manager/Modeler and Designer		

4.6 Session 6: High Performance Classrooms (11/18/20)

Title: High Performance Classrooms

Date: 11/18/20

Description: Student enrollment in Ada County is projected to grow by 1,000 students per year for the next ten years and at least six capital projects are planned in the West Ada District alone to meet this demand. This session will cover a variety of issues facing the design of an efficient, healthy, and productive classroom environment. A quick look at the state of the last 50 years of school design will give an introduction to the problems faced by designers. This session will highlight several case studies of high performance schools in the Northwest to address daylighting, natural ventilation, and integration of mechanical systems. Each passive strategy will be addressed in detail with regional examples and performance research.

Presenters: Damon Woods

Attendance:

Architect:		Electrician:	
Engineer:		Contractor:	
Mech. Engineer:		Other*:	
Elec. Engineer:		None Specified:	15
Total (In-Person):			
Total (Online):	**15**		
*If 'Other' was noted:			

5. Website Maintenance and Statistics

The Google site "BSUG 2.0" was retired this year and is being integrated into the new idlboise.com website. Each month, details about the upcoming presentations were posted to the 'EVENTS and NEWS' pages. These pages also included links to both webinar and in-person registration, however, due to Covid-19 restrictions operations moved to online only. Monthly emails linked to these pages as well as directly to the registration sites. If the monthly session included a webinar recording, the video was edited and posted to the YouTube channel with a link from the BSUG 2.0 video archive.

While the launch of the new idlboise.com website was planned for the second half of the year the incorporation of BSUG into the infrastructure was a reaction to the social distancing requirements per the Covid-19 pandemic. Therefore, we were unable to track our typical user data, but, we have been migrating content throughout the year to the development website which will be posted before the end of the calendar date. The IDL will build out the necessary structure and tools to track user data as it relates to BSUG content going forward into 2021. Content that will be migrated consists of training and modeling resources as well as the introduction of a blog to discuss past lecture topics and emerging building technologies or practices.

6. Other Activities and Suggestions for Future Improvements

We saw a increase in average attendance for each session this year, however, overall attendance is down from 2019. We believe this reduction is due to the switch to online webinar only format for 5 of the 6 sessions. Despite the decrease in attendance this year was successful for the BSUG task with 6 sessions completed and 105 total attendees – 12 in-person and 93 online. Feedback was provided by attendees via the ZOOM platform by conducting polls at the end of lecture or when the Q&A portion started. We received 72 responses with a response rate of 68% while in 2019 we receive 77 evaluations with a response rate of 52%. The ZOOM platform does not allow participants to give written comments as a form of feedback for polling. The IDL will investigate other methods of online evaluations if the webinar only format continues into 2021.

The IDL held its second round table discussion where participants review the topics and feedback for the year. Once the review of the year is complete the discussion shifts to what participants would like to presented at BSUG next year in the form of topics or preferred speakers. The following suggestions were made at this year round table:

- Passive Design Strategies
  - Climate design tools
- OpenStudio with Revit?
- Software tutorial to help with early design workflow
- The state of OpenStudio
  - Big Ladder?
  - Where is the program going?
- Revit with Dynamo
  - Exporting the Revit model properties for energy modeling
  - Possibly pair with OS in Revit?
- Autodesk University speakers
  - Ian Molloy
- Data Visualization
  - Carlos Duarte – Berkley

- LLLCs with live demo
- Air Quality for EE
    - Tam Duffy
- IBPSA Partnership

2020 Task 4: New Construction Verifications

Summary of Projects

Idaho Power Company External Year-End Report

December 31, 2020

Prepared for:
Idaho Power Company

Author:
Dylan Agnes

Report Number: 2001_004-01

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Prepared for:
Idaho Power Company

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Acronyms and Abbreviations

AC	Air Conditioning
NCV	New Construction Verification
HVAC	Heating, Ventilation, and Air Conditioning
IDL	Integrated Design Lab
IPC	Idaho Power Company
UI	University of Idaho
VRF	Variable Refrigerant Flow
HP	Heat Pump

1. Introduction

The University of Idaho Integrated Design Lab (UI-IDL) had two roles for the New Construction Verification (NCV) task in 2020. The primary role was to conduct on-site verification reports for approximately 10% of projects that participated in Idaho Power Company's (IPC) New Construction Program. However, due to the Covid-19 pandemic the NCV task was delayed for the first half of the year, in addition, no site-visits were conducted this year for any project. The verified projects were randomly selected from the entire pool of projects, and at least four projects were required to be outside the Boise/Meridian/Eagle/Kuna area. The purpose of the application reviews and audits is to assist IPC in program quality assurance, the review also looks to capture any inconsistences in the application of code incentive measures. The secondary role was to review the photo controls design and function for every project whose application included incentive L3: Daylight Photo Controls within the New Construction Program. Once each review was concluded, a letter of support for the incentive was submitted to Idaho Power. This review and letter are intended to increase energy savings and quality of design through the inclusion of additional design and commissioning recommendations.

2. 2020 New Construction Verification Projects

The UI-IDL completed thirteen New Construction Verification projects in 2020. A detailed report for each project was submitted to IPC, including claimed and actual installation for each specific incentive the project applied for. All of the projects reviewed in 2020 were

finalized and paid in 2020 and resided under the 2018 program format. The specific incentives for this program are outlined in Table 1 and 2.

Table 3 summarizes the thirteen projects and respective qualified incentive measures which were verified by UI-IDL. For the projects listed, more than 69% were located outside the capital service area.

Table 1: 2016 New Construction Program Specific Incentives

Lighting	L1	Interior Light Load Reduction
	L2	Exterior Light Load Reduction
	L3	Daylight Photo Controls
	L4	Occupancy Sensors
	L5	High Efficiency Exit Signs
Air Conditioning	A1	Efficient Air-Cooled AC & Heat Pump Units
	A2	Efficient VRF Units
	A3	Efficient Chillers
	A4	Air Side Economizers
	A5	Direct Evaporative Coolers
	A6	Evaporative Pre-coolers on Air-cooled Condensers
Building Shell	B1	Reflective Roof Treatment
Controls	C1	Energy Management Control System
	C2	Guest Room Energy Management System
	C3	HVAC Variable Speed Drives
	C4	Kitchen Hood Variable Speed Drives
	C5	Onion/Potato Shed Ventilation Variable Speed Drives
Appliances with Electric Water Heating	W1	Efficient Laundry Machines
	D1	EnergyStar Undercounter Dishwashers
	D2	EnergyStar Commercial Dishwasher
Refrigeration	R1	Head Pressure Controls
	R2	Floating Suction Controls
	R3	Efficient Condensers
Other	P1	Smart Strip Power Strips

Table 2: 2018 New Construction Program Specific Incentives

Lighting	L1	Interior Light Load Reduction
	L2	Exterior Light Load Reduction
	L3	Daylight Photo Controls
	L4	Occupancy Sensors
	L5	High Efficiency Exit Signs
Air Conditioning	A1	Efficient Air-Cooled AC & Heat Pump Units
	A2	Efficient VRF Units
	A3	Efficient Chillers
	A4	Air Side Economizers
	A5	Direct Evaporative Coolers
	A6	High-Volume Low-Speed Fan
Building Shell	B1	Reflective Roof Treatment
Controls	C1	Energy Management Control System
	C2	Guest Room Energy Management System
	C3	HVAC Variable Speed Drives
	C4	Kitchen Hood Variable Speed Drives
	C5	Onion/Potato Shed Ventilation Variable Speed Drives
	C6	Dairy Vacuum Pump Variable Speed Drives
	C7	Wall or Engine-Block Heater Controls
Appliances with Electric Water Heating	W1	Efficient Laundry Machines
	D1	EnergyStar Undercounter Dishwashers
	D2	EnergyStar Commercial Dishwasher
Refrigeration	R1	Head Pressure Controls
	R2	Floating Suction Controls
	R3	Efficient Condensers
	R4	Refrigerator and Freezer Strip Curtains
	R5	Automatic High-Speed Doors
Office Equipment	P1	Smart Strip Power Strips
Compressed Air Equipment	CA1	Air Compressor VSDs
	CA2	No-Loss Condensate Drain
	CA3	Low-Pressure Drop Filter
	CA4	Cycling Refrigerated Compressed Air Dryer
	CA5	Efficient Compressed Air Nozzle

Table 3: Project Summary

IPC Project #	Facility Description	Location	Incentive Measures	UI-IDL Site-Visit Date
18-047	Medical (Non-Hospital)	Boise, ID	L1	-
18-150	Industrial – Mid	Payette, ID	R5a, R5b	-
18-172	Retail (Non-Food)	Caldwell, ID	L1, L2	-
18-177	Other	Nampa, ID	CA1, CA2, CA4	-
18-186	School	Parma, ID	L1, L2, L5, A1, B1	-
18-203	Other	Pocatello, ID	L1, A1, B1	-
18-234	Office Building	Meridian, ID	L1, L2, L5	-
18-245	Other	American Falls, ID	CA1, CA2	-
18-282	Recreational Facility	Meridian, ID	L1, L2, L5, A1, A4, B1	-
18-295	Other	Hailey, ID	L1, L2, L4, L5, A1, W1, D1	-
18-384	School	Caldwell, ID	B1	-
18-401	Manufacturing	Caldwell, ID	CA1	-
18-446	Retail	Meridian, ID	A6	-

3. 2020 Photo Controls Review Projects

In 2020, the UI-IDL received at least six inquiries regarding the New Construction photo controls incentive review, however, only two qualified for an incentive. Documentation was received and final letters of support were submitted to IPC for photo controls incentive applications for two projects.

2020 TASK 5: ENERGY RESOURCE LIBRARY

SUMMARY OF EFFORT AND OUTCOMES

IDAHO POWER COMPANY EXTERNAL YEAR-END REPORT

December 31, 2020

Prepared for:
Idaho Power Company

Authors:
Dylan Agnes

Report Number: 2001_005-05

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Idaho Power Company

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ACRONYMS AND ABBREVIATIONS

AC	Air Conditioning
AIA	American Institute of Architects
AHU	Air Handling Unit
Amp	Ampere
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers
BOMA	Building Owners and Managers Association
BSU	Boise State University
CO2	Carbon Dioxide
CT	Current Transducer
Cx	Commissioning
DCV	Demand Control Ventilation
EE	Energy Efficiency
EEM(s)	Energy Efficiency Measure(s)
fc	Foot-Candle
HVAC	Heating, Ventilation, and Air Conditioning
IAC	Industrial Assessment Center
IBOA	Intermountain Building Operators Association
IDL	Integrated Design Lab
Int.	International
IPC	Idaho Power Company
kW	Kilowatt
kWh	Kilowatt-Hour
M&V	Measurement and Verification
OSA	Outside Air
PG&E	Pacific Gas and Electric Company
PPM	Parts Per Million
RPM	Rotations Per Minute
RTU	Rooftop Unit
ERL	Energy Resource Library

TPS	Third Party Service
UI	University of Idaho
USGBC	U.S. Green Building Council
Verif.	Verification
VOC	Volatile Organic Compound
3P	Third Party

1. Introduction

The Energy Resource Library (ERL) is a resource supported by Idaho Power Company (IPC) and managed by the University of Idaho Integrated Design Lab (UI-IDL). The ERL at the UI-IDL is modeled after the Lending Library at the Pacific Energy Center, which is supported by Pacific Gas and Electric (PG&E). In the past years interest in these types of libraries has grown. Recently, the Smart Building Center which is a project of the Northwest Energy Efficiency Council has started a lending library and they cite other lending libraries spanning a large range of tools, including non-energy efficiency related tools.

The primary goal of the ERL is to help customers with energy efficiency (EE) needs, through the use of sensors and loggers deployed in buildings of various types. Loans are provided to individuals or businesses at no charge to the customer. Over 900 individual pieces of equipment are available for loan through the ERL. The equipment is focused on measuring parameters to quantify key factors related to building and equipment energy use, and factors which can affect worker productivity.

The loan process is started when a customer creates a user account. Then the user has access to submit a resource questionnaire and fill out a form describing their intent and project information. Customers can also add tools to their “cart” and complete a checkout process if they don’t require the IDL assistance. When completing a resource questionnaire or the checkout process, the customer includes basic background information, project and data measurement requirements, and goals. When a request is submitted, UI-IDL staff members are alerted of a request via email. The customer and a staff member communicate to verify and finalize equipment needs. An approval email is sent and tools are picked up at the UI-IDL or shipped at the customer’s expense. In addition, this year because

of the Covid-19 pandemic we added a contactless pick-up and drop-off system. Initially, the IDL closed the ERL due to health and liability concerns at the end of March 2020, however, it was reopened mid May 2020 with the new contactless procedure. For more details on this process please see: http://www.idlboise.com/content/energy-resource-library-contact-less-pick-drop

2. Marketing

Marketing for the ERL was done at various UI-IDL and IPC activities throughout 2020, as well as on the new idlboise.com website. The flyer layout was retired during 2019 and replaced with a brochure format. The new brochure for the ERL, Figure 1 and 2, reflects the changes to the ERL overall structure as it relates to checking out tools and new categories/organization. In addition, a catalog was created that contains the full directory of tools available for check out as well as information about other Idaho Power sponsored programs. It's intended use was for distribution at various lectures so firms would have an on-hand reference for the ERL, however, due to Covid-19 the catalog has only been made available as a pdf for download and view on the idlboise.com website. You can find the catalog here: http://www.idlboise.com/content/erl-catalog-2020

The ERL was promoted in presentations given by the UI-IDL staff, including the Lunch and Learn series and lectures to professional organizations such as the American Institute of Architects (AIA), ASHRAE, and the City of Boise.

The ERL flyer and program slides direct potential users to the ERL website for more information about the library. The main UI-IDL website hosts the ERL portal where customers can submit a resource questionnaire for assist or a request for specific tools, all online. In

2020, the ERL home page had 1,169 visitors. Changes and progress on the ERL homepage can be found in Appendix D. (http://www.idlboise.com/about-erl)

Energy Resource Library

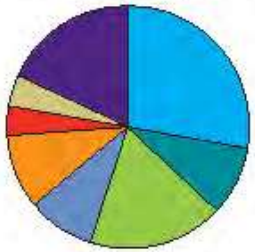
The Energy Resource Library is a free resource for Idaho Power customers. The library provides users with an easy way to assess and explore a building or systems energy performance.

These free tools and guides are available to help individuals or businesses learn more about their energy use patterns and identify opportunities for energy-saving improvements.

Typical uses for the Energy Resource Library

- Preliminary investigation: audit or study to identify energy efficiency measures (EEMs)
- Pre-implementation: baseline measurements of EEMs
- Post-implementation: verification measurements of EEMs
- Literature review

Resource Loans By Industry



28% Commercial Real Estate
9% Food Processing
18% Industrial
9% Education
10% Residential
4% Office
4% Wastewater
18% Other

Contact Us

Visit **idlboise.com** and select "Energy Resource Library" to learn more.

Integrated Design Lab
306 S. 6th Street Boise, ID 83702
208-429-0220

idl@uidaho.edu

Hours:
Monday through Thursday 8 a.m. to 4 p.m.
and Friday 10 a.m. to 3 p.m.



IDAHO POWER.
An IDACORP Company

INTEGRATED idl DESIGN LAB

Energy Resource Library

The library provides users with free tools and guides to help individuals and businesses identify opportunities for energy-saving improvements.

Energy Resource Library

Sponsored by:

FIGURE 1: ERL BROCHURE FRONT

Resource Categories

Flow Meters

Flow meters measure the velocity of a fluid with ultrasound to calculate flow rate of liquids or suspended solids traveling through a pipe by attaching to the outside. Flow data allows you to see the loads and demands on the associated system, and helps identify operational and control issues.

Data Loggers

Collecting data over an extended period of time is essential for tracking performance of a building, space or system to identify trends or anomalies. Data loggers are portable and have built in sensors that can measure and record temperatures, light levels, electrical current and more.

Current Transformers (CT)

CT's are typically used to measure alternating current. They can be easily and safely installed by slipping over electrical power wiring without interrupting service. When used in conjunction with a voltage meter, power (kW) and energy (kWh) can be calculated for a variety of applications.

Guides

A variety of guides are available to provide a better understanding of building systems and their performance, as well as the standards and codes that govern those energy performance criteria (i.e., ASHRAE handbooks and standards).

Other

Other resource categories include light, air, energy, sound, temperature and more. A complete listing of tools, guides, literature and instructions is available at idlboise.com/erl.

How to use the Energy Resource Library

First, if you do not already have one, you will need to create an account at idlboise.com. After you have an account, fill out the loan request form with the information about the location and type of project you are working on. You do not need to know what specific tools you will need. Simply describe the information you want to collect and the IDL will make sure you have the appropriate resources for your project.

If you require a tutorial or need to know how to use a specific tool, contact the IDL to set up an appointment.



Loan Request Status

You will receive the following email updates with the status of your resource loan.

Pending

Your loan request has been received and is being reviewed by the IDL. Please note that all requests require one business day for processing.

Additional Review (if applicable)

If there is a problem or clarification is needed, the IDL will contact you for additional information to accurately fulfill your request.

Approved

Once your loan request is approved, an approval email will be sent, and the resource may be picked up from the Integrated Design Lab. To request a specific pick-up time, email the IDL or mention it in the note section of the loan request form. Please note, if resources are to be shipped, the customer is responsible for all shipping charges.

Your resource loan will typically be provided in an Idaho Power mesh bag unless the tool has its own housing/storage case.

You will also receive a printed copy of your loan request form. Please save this as it's required when you return the resources.

Completed

When you are done with your resources, please return or ship them to the Integrated Design Lab at 306 S. 6th Street Boise, ID 83702. Please include your printed loan request form so that the IDL can process your return in a timely manner.

Figure 2: ERL Flyer Back

3. New Tools & Tool Calibration Plan

In 2020, thirty-four new tools were added to the ERL to replace old data logging models, to create fill gaps in tool kits as well as additional analog connectors for the XC power logger series as it was discovered the previous series connectors are not compatible.

While the goal of the ERL is energy efficiency promotion due to the Covid-19 pandemic we would like to recommend a temporary shift in our outlook when adding new tools to the library in the coming year. Specifically, we should consider, adding tools that deal with indoor environment or air quality and HVAC efficiency. While these tools will not directly measure or assist in EEM's they will add to a holistic building diagnostic as well as verifying the function of an HVAC upgrade or retrofit which may have EEM's.

Equipment items included in the tool loan program are typically distributed with a manufacturer guaranteed calibration period between 1 and 3 years. While many items may remain within recommended tolerances for years after the guaranteed calibration period ends, verifying the item is properly calibrated after initial and subsequent periods is recommended. Calibration services are available on most tools, sometimes from the manufacturer, and from various certified calibration services nationwide.

Third party (3P), certified tool calibration is ideal, but an extensive 3P calibration program would be expensive. Based on research and pricing from quotes, formal calibration would be cost prohibitive for much of the library tools. In several cases, cost of calibration can well exceed 30% of the item cost. As a certified calibration is typically only valid for 1-2 years, an alternative measurement and verification plan for most sensors and loggers is recommended. This will be possible with most of the tool loan inventory. A few exceptions to this must be made on a case by case basis to allow for factory calibration of items that

cannot be compared or tested in any other way. An example of one item in this category would be the Shortridge Digital Manometer and Air-Data Multimeter which would have to be recalibrated by the manufacturer.

The IDL will perform the following to ensure items are within specified calibration tolerances:

1. Equipment will be cross-checked against new equipment of the same type for accuracy in a test situation where data is logged. The IDL plan would cross-check older items against multiple newer items at the end of each calibration period (i.e. every two years) to ensure readings are within specified tolerances.
2. Those items found to be out of tolerance will be assessed for factory re-calibration or replacement.

Calibration tracking columns have been added to an inventory spreadsheet which will allow the IDL to determine which items are due for calibration testing. Updates to calibration and references to testing data will be maintained in the inventory spreadsheet and has been expanded to include tool use, quotes, and budget estimates, please see Appendix C for more details.

4. 2020 Summary of Loans

In 2020, loan requests totaled 17 with 13 loans completed, 0 loans are on-going. The first quarter had the highest volume of loans at 6 total. Loans were made to 7 different locations and 10 unique users and 3 new ERL users. A wide range of tools were borrowed, as listed in Figure 8. The majority of tools were borrowed for principle investigations or audits, although loans were also made for determining baselines before EEMs were implemented. Tools were borrowed to verify these EEMs as well. The four loans that were not fulfilled because they requested tools the ERL does not have, such as, a 0-zone meter.

Table 1 and the following figures outline the usage analysis for ERL in 2020.

TABLE 1: PROJECT AND LOAN SUMMARY

	Request Date	Location		Project	Type of Loan	# of Tools Loaned
1	1/9/2020	Salmon	ID	SETT	Verification of EEMs	13
2	1/13/2020	Boise	ID	ESLI	Verification of EEMs	1
3	1/30/2020	Boise	ID	RVDW	Audit	1
4	1/31/2020	Boise	ID	GASTR	Audit	3
5	2/19/2020	Boise	ID	TSAND	Audit	1
6	3/4/2020	Boise	ID	THPEW	Audit	11
7	6/2/2020	Eagle	ID	NHHBK	Baseline measurement of EEMs	11
8	6/11/2020	Boise	ID	CLMDI	Audit	1
9	6/15/2020	Meridian	ID	EAKM	Verification of EEMs	1
10	6/23/2020	Hailey	ID	HEADT	Audit	8
11	6/24/2020	Rexburg	ID	READT	Audit	8
12	7/15/2020	Boise	ID	IESDR	Verification of EEMs	5
13	9/15/2020	Sun Valley	ID	SVCSSR	Audit	19

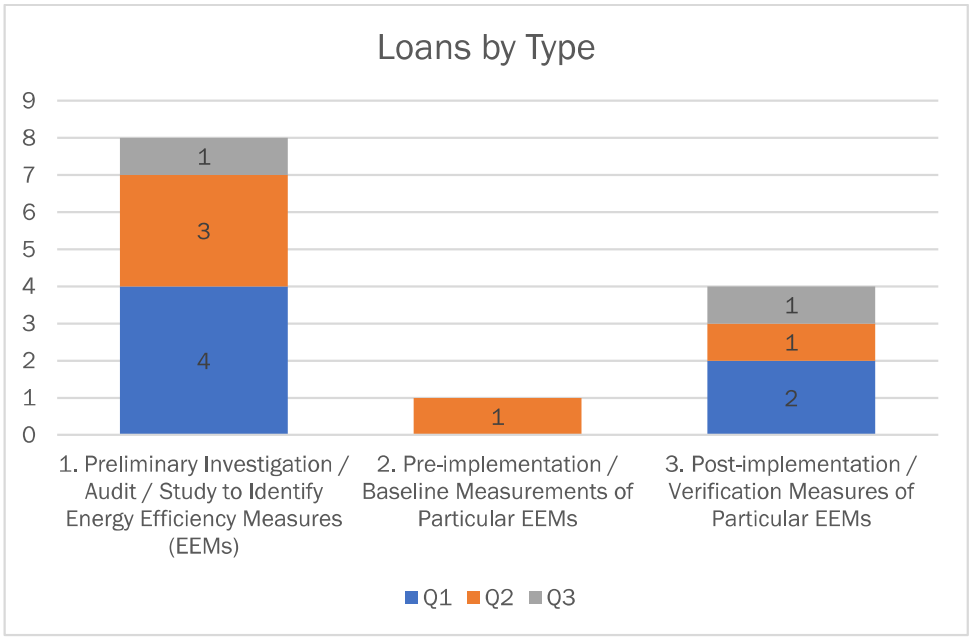


FIGURE 3: LOANS BY TYPE

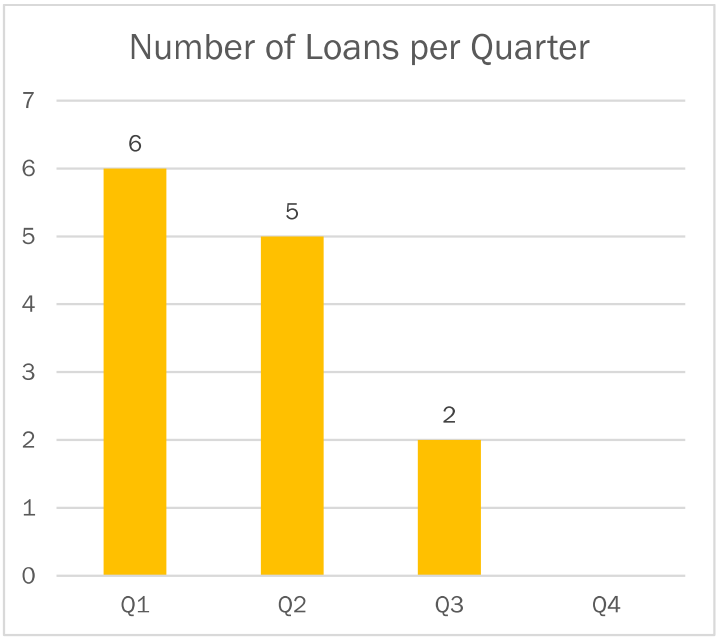


FIGURE 4: NUMBER OF LOANS PER QUARTER

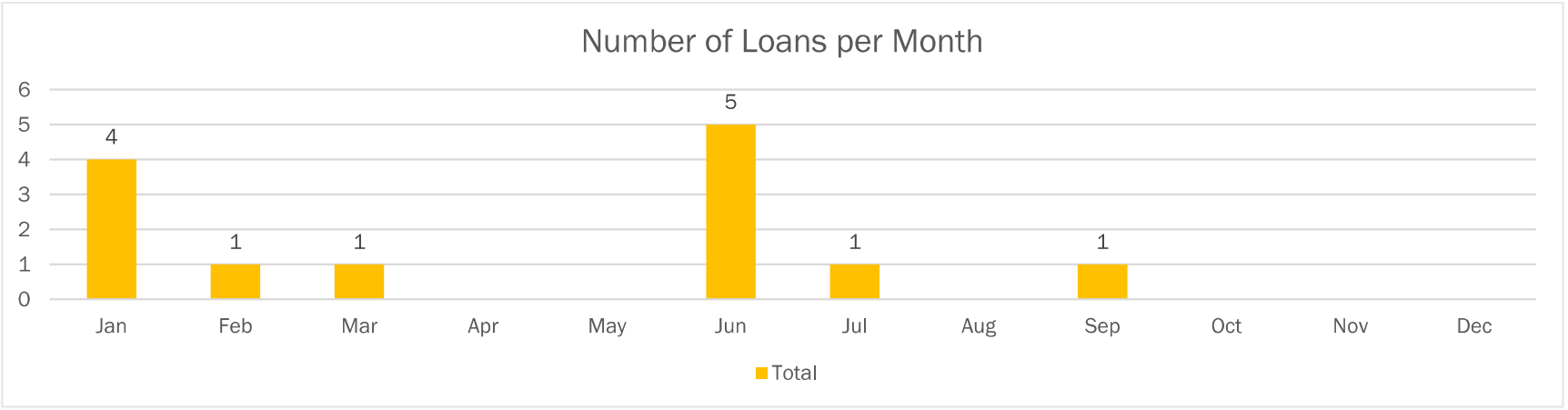


FIGURE 5: NUMBER OF LOANS PER MONTH

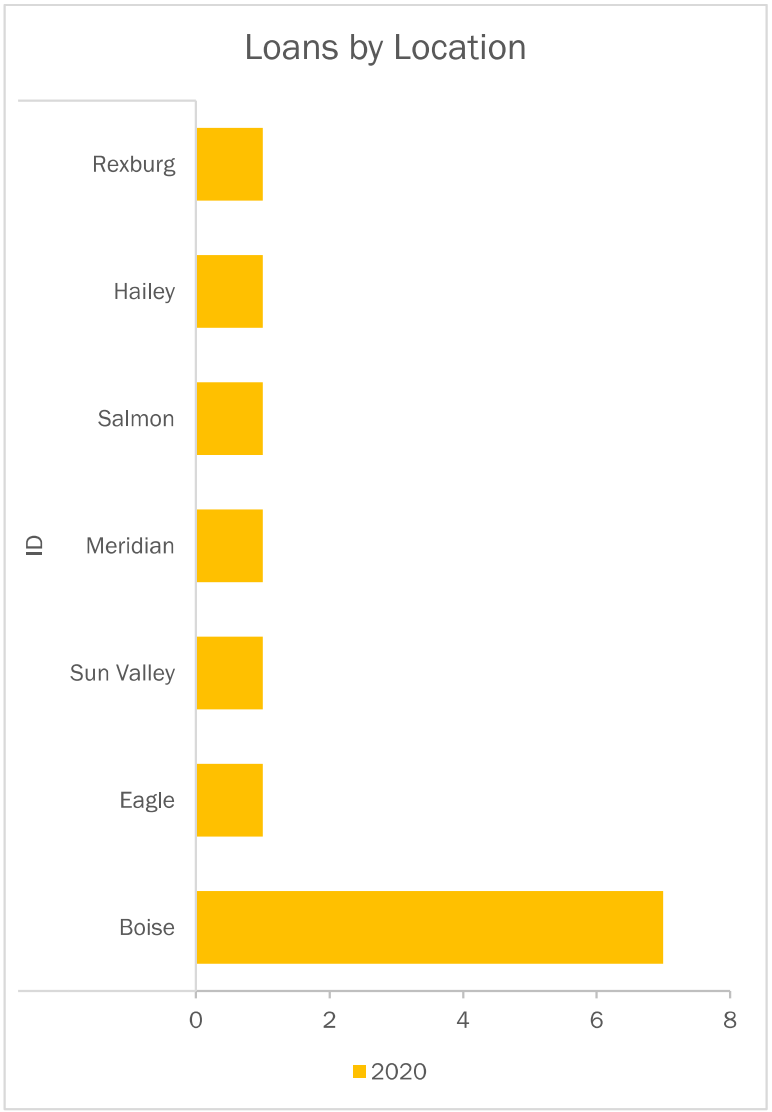


FIGURE 6: NUMBER OF LOANS BY LOCATION

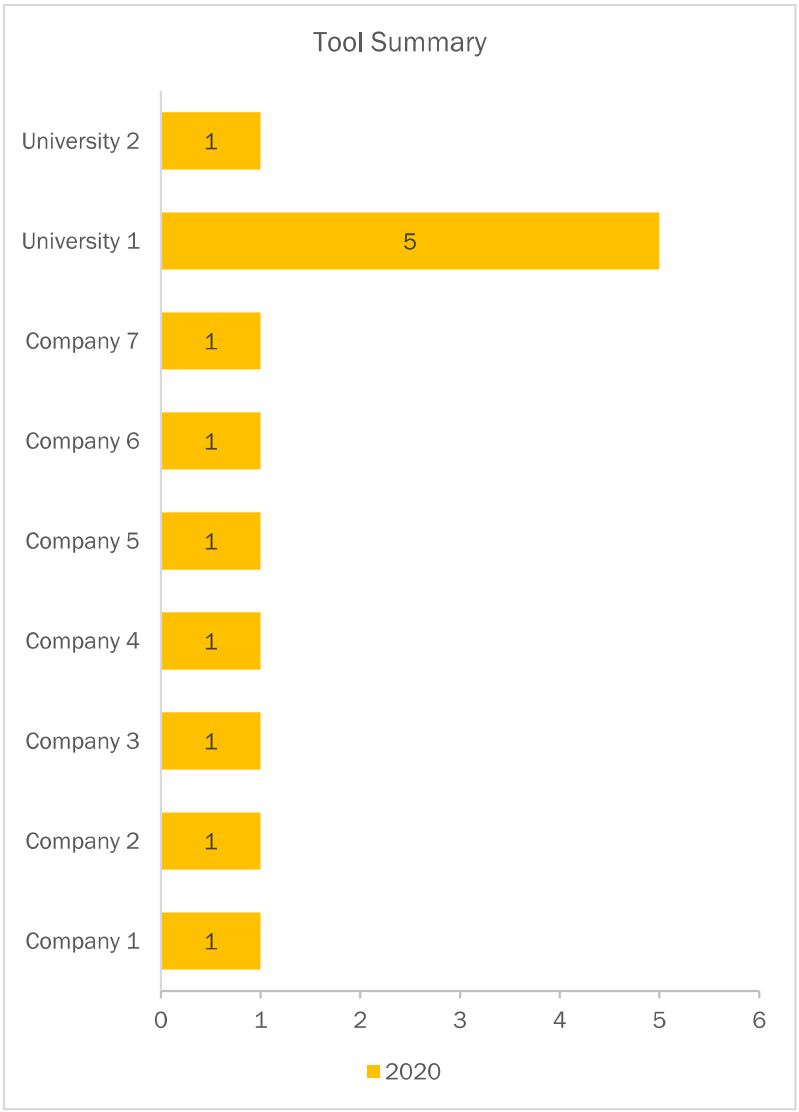


FIGURE 7: NUMBER OF LOANS BY USER

TOTAL TOOLS LOANED: **83**	Q1=30	Q2=29	Q3=24	Q4=00

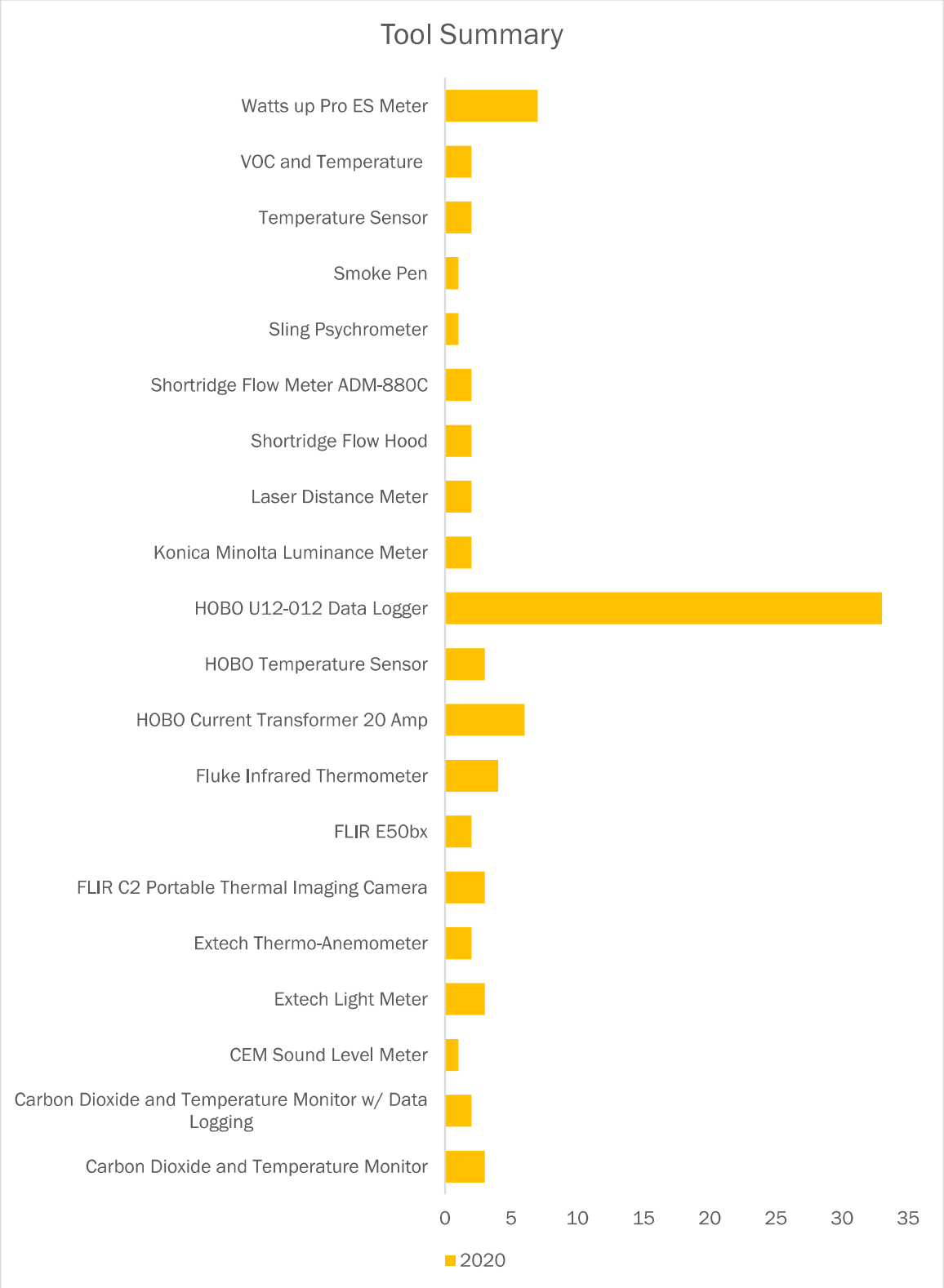


FIGURE 8: SUMMARY OF TOOLS LOANED

5. Appendices

APPENDIX A: Equipment List

The equipment in the library is tracked via excel, website, and in ERL Catalog. The website inventory is organized through several webpages but a complete listing can be found here: http://www.idlboise.com/erl

In addition, the ERL Catalog can be found on the idlboise.com website and is available for download here: http://www.idlboise.com/content/erl-catalog-2020

APPENDIX B: Website Progress

The new idlbosie.com website was launched in July of this year. ERL online platform was reorganized to account for two types of uses, returning and new customers. Customers can fill out a request form if they are new and unfamiliar with the ERL while returning customers can add tools to their cart and checkout to complete a request. The application process has been streamlined by populating fields from a user profile information. In addition, tools can now be sorted and view according to categories. Only a minor portion of development remains for the ERL website and moving forward the majority of work will shift to maintenance.

2020 Task 6: Building Energy Analytics Case Study

Summary of Work

Idaho Power Company External Year-End Report

December 31, 2020

Prepared for:
Idaho Power Company

Author:
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Report Number: 2001_001-06

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Acronyms and Abbreviations

API	Application Programming Interface
ASHRAE	American Society of Heating, Refrigeration, and Air-conditioning Engineers
BACnet	Building Automation Control network
BAS	Building Automation System
BEMS	Building Energy Management System
CDD	Cooling Degree Days
DCV	Demand Control Ventilation
DDC	Direct Digital Control
DOAS	Dedicated Outdoor Air System
EMS	Energy Management System
HDD	Heating Degree Days
HVAC	Heating Ventilation and Air Conditioning
IDL	Integrated Design Lab
IPC	Idaho Power Company
NOAA	National Oceanic and Admospheric Administration
NCDC	National Climatic Data Center
PBC	Predictive Building Controls
UI	University of Idaho

1. Introduction

The original goal of this task was to implement a technology that uses weather forecasting to improve building efficiency. Known as Predictive Building Control (PBC) this product integrates with a Building's Automation System (BAS) to reset thermostats and minimize HVAC energy consumption. This concept was explored in 2019 and the plan was to implement the technology at a site in 2020 that would serve as a case study. The plan was to compare operations under the new controls to the baseline performance recorded the year before – particularly for the cooling season. However, due to the COVID-19 pandemic, the building occupancy and operations changed dramatically. The outdoor airflow at the site was increased and the building occupancy dropped by more than 50%. Implementing the predictive control technology at the site and having it serve as a case study was no longer viable. The shift in occupancy and airflow made a direct comparison with past operations infeasible. The predictive controls rely on occupant feedback through thermostat adjustments and with several floors fully unoccupied, there could not be any feedback.

Therefore, the IDL turned our attention to building analytic strategies for future sites. The lab developed a tool to normalize operational history based on weather and locate anomalies in building energy usage. Rather than use weather forecasts, the lab applied historical records of weather and utility bills to develop a template that any building operator or owner can use. The user may enter the latest usage in Excel and receive visual feedback from the spreadsheet. Unlike a full analytic software package e.g. BuildingIQ, SkySpark, or EnergyCap, the IDL spreadsheet is a simplified method to

identify when building operations drift from normal performance. This tool will be made available as a free resource to Idaho Power customers.

2. Work Summary

2.1 Importing Data

The analysis began at the monthly level as even owners without Energy Management Systems (EMS) are familiar with their monthly utility bills. The IDL began by using a set of municipal buildings as a pilot for the tool. The buildings were split into three categories based on their heating source: geothermal, gas, or electric. Differentiating the building heating types allowed the correlations between use and weather patterns to show up more clearly. The more records the user has, the better the spreadsheet can identify trends.

The user can then import weather history – specifically the monthly Heating Degree Days (HDD) and Cooling Degree Days (CDD) with a base of 65°F. Instructions are provided in the user guide (see appendix) on how to collect this information from weather.gov. The spreadsheet template is currently set up for Boise, but users may follow the instructions to find this information for any location in the US. The user then matches the months of weather history to the months of utility history. The spreadsheet separates the combined utility and weather data into two different columns: heating and cooling seasons. This does not mean that the energy used during these different seasons is necessarily used directly for HVAC. For example, gas consumption may be tied to domestic hot water production in either the heating or the cooling season. Similarly the electrical use may be tied to lighting in the evenings, showing an inverse trend with the outdoor temperature. However, differentiating the seasons may provide

unexpected insights on energy use patterns. The spreadsheet default assumes a cooling season of May through September and a heating season of October through April, but the user can alter these months if desired.

One of the challenges of performing analytics is accounting for operation anomalies. For example, if a boiler at the site is shut down for repairs or if a tenant moves out of a space for a month. Including such anomalies adversely impacts the weather to usage correlation. Therefore, if the owner knows when these events occurred, they may remove those months from the analysis. The analytics workbook includes a sheet called “Regression Visualization” that allows the user to quickly identify certain months they wish to exclude. This is a subjective determination made at the discretion of the user. Once the user is satisfied with their selections, they can click on the “finished figures” sheet to see trends in their energy consumption differentiated by energy source and heating or cooling season.

The tool uses linear regressions to predict how historical usage changes based on the HDD and CDD in a year. These “expected usages” are shown as black outlines on the charts, while the actual use is shown as a solid color-coded bar. The tool generates separate charts for overall usage as well as seasonal and source uses. These allow a user to quickly and easily identify during what season their use might be trending upward or downward and which systems may need to be recommissioned. Examples of these regressions and total consumption profiles are shown in figures 1 – 6.

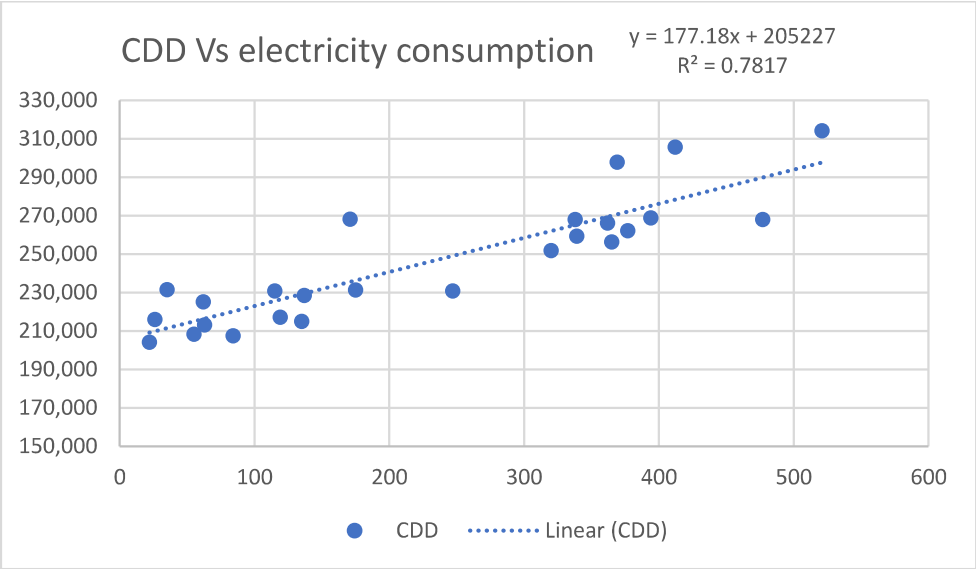


Figure 1: Regression for summer electrical use

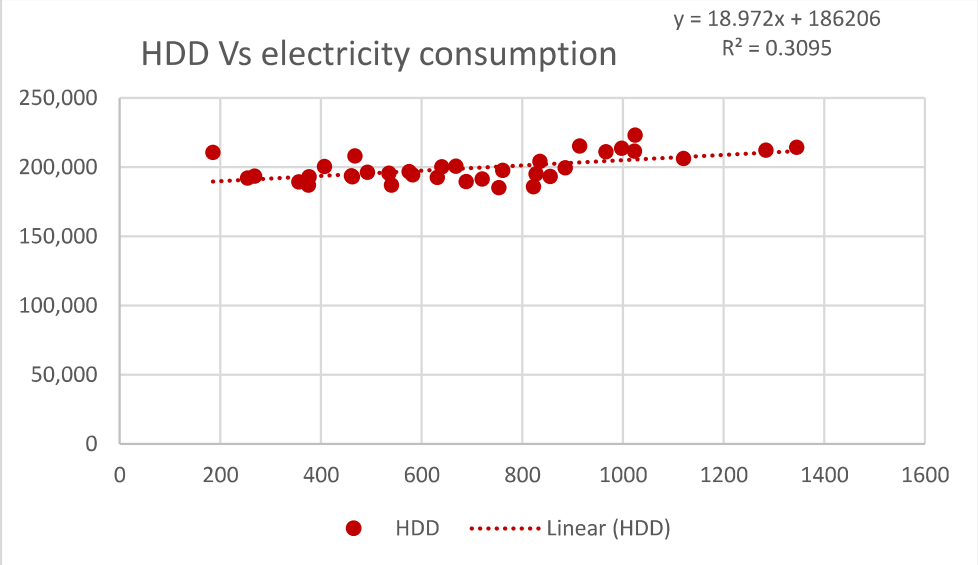


Figure 2: Linear regression for winter electrical use

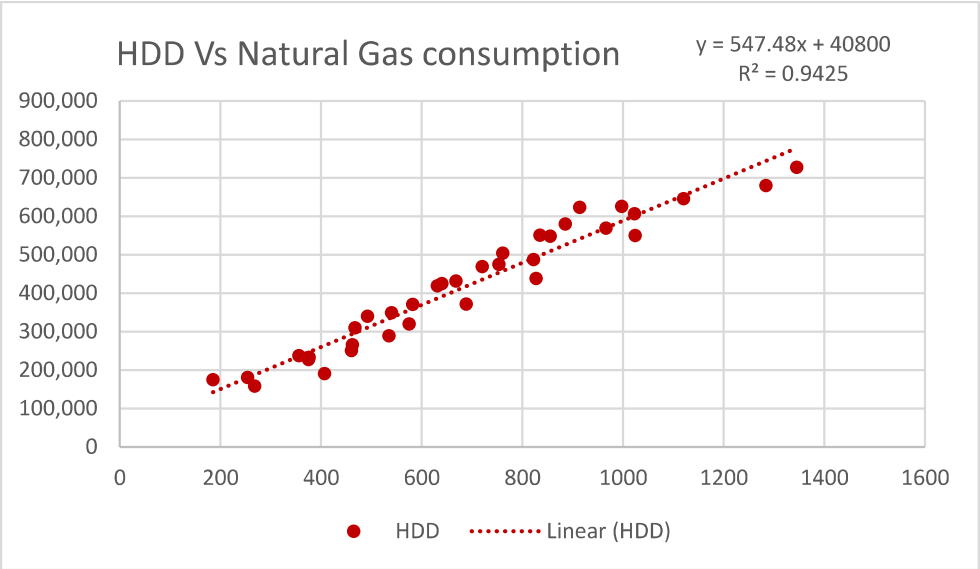


Figure 3: Regression for natural gas consumption during winter

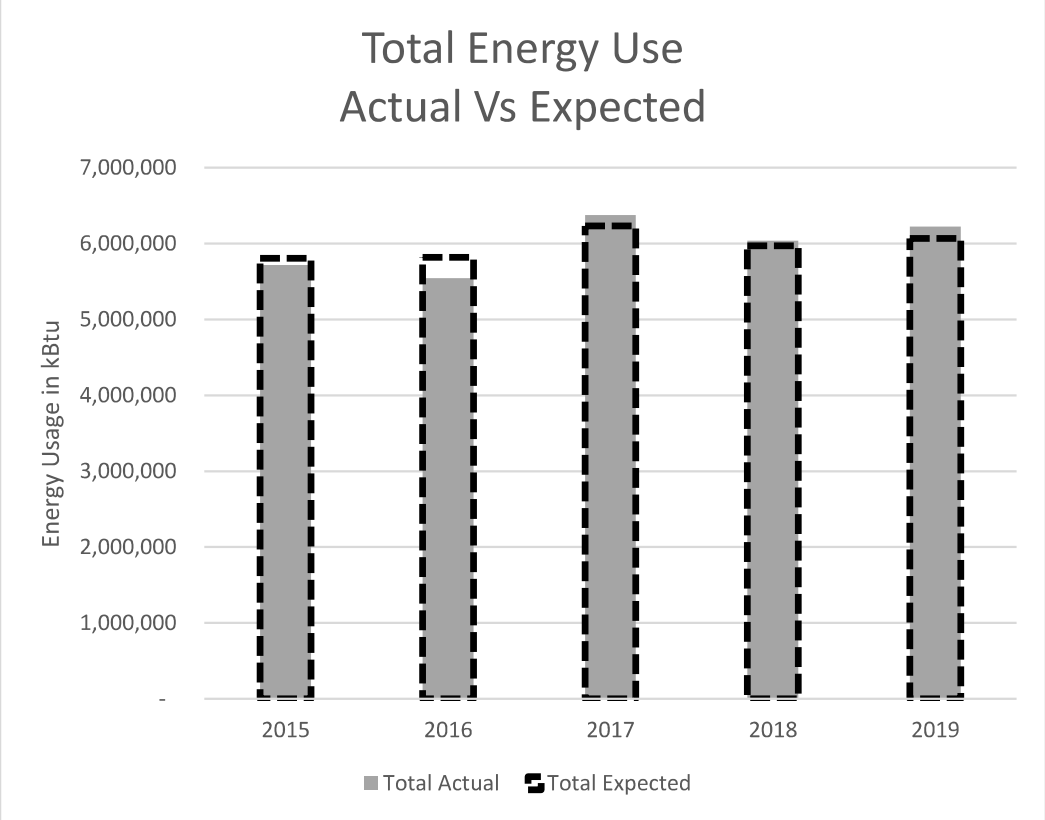


Figure 4: Expected vs actual total consumption based on the previous regressions

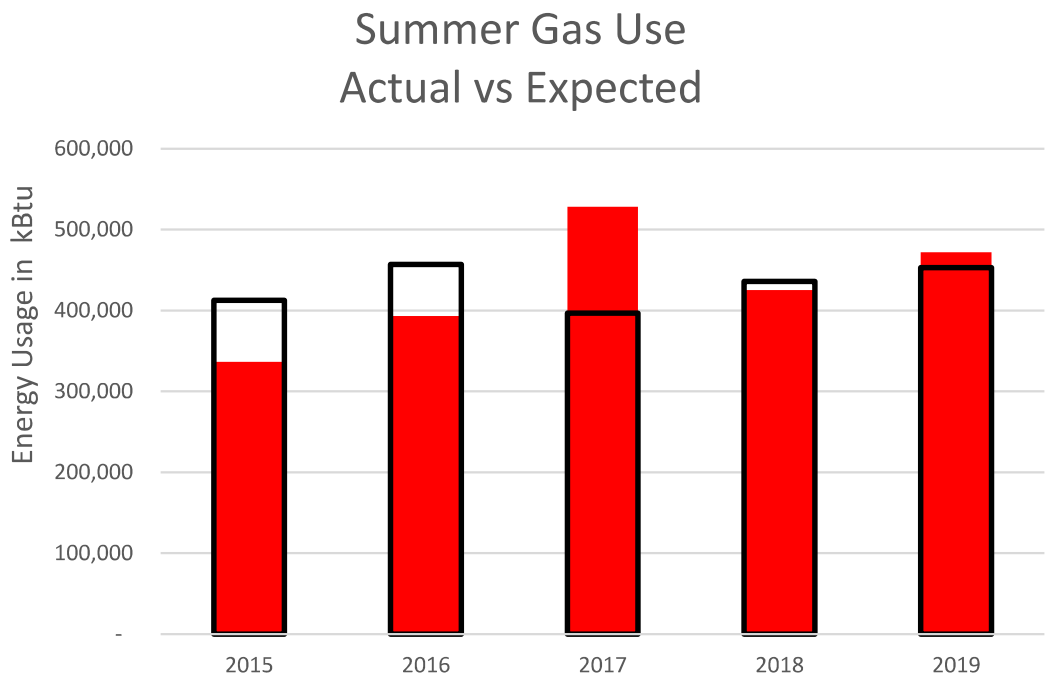


Figure 5: Summer gas consumption vs expected based on regression for that year

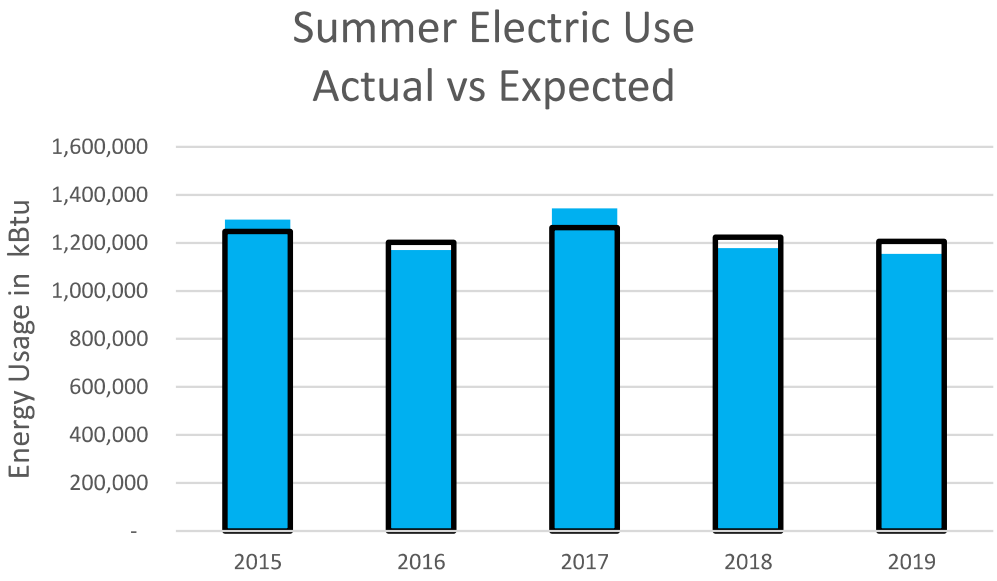


Figure 6: Annual difference between actual consumption vs weather normalized expected use

From the example charts shown, one can see from the total energy use (figure 4) that when normalized for weather the total energy use for this example site has been creeping up over the last three years. If occupancy or usage have stayed the same, it's an indication that there are operational savings to be gained. The second item of note occurs in 2017, when one can see the summer gas usage spiking well beyond what was anticipated for this building based on the weather. The summer electrical use also shows a spike that same year. This could be due to a one-time use, or it could be that a heater was left on all summer requiring extra cooling to compensate. While this seems to have been corrected the next year, the summer of 2019 shows a similar if smaller rise in summer gas and it may be worth a nighttime walkthrough at this site to ensure that non-essential equipment is shutoff and thermostat setbacks are in place.

2.2 Hourly electricity analysis

After putting together monthly templates for each energy source, the IDL developed an hourly analytics sheet for electrical consumption to identify daily anomalies. This can help building managers identify specific building events that cause energy spikes. The goal for this tool is to provide recent analysis for actionable operational improvements.

The first sheet in the workbook allows a user to copy and paste in hourly historical data received from Idaho Power. This is converted from a block format into a single column so it can be lined up with the hourly temperature. Temperature data can be accessed from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Collection (NCDC) site. The spreadsheet indexes the time to

ensure that the hour of consumption matches the hour of recorded energy use. From this, regressions are developed for both heating degree days and cooling degree days. With thousands of data points, the correlations do not stand out as clearly as the monthly trends. However, they do provide a helpful average to compare against. One of the advantages of having more granular data is that occupied vs. unoccupied daily hours can be analyzed separately as can weekends vs weekdays. An example of the hourly regressions and finished charts are shown in figures 7 - 10.

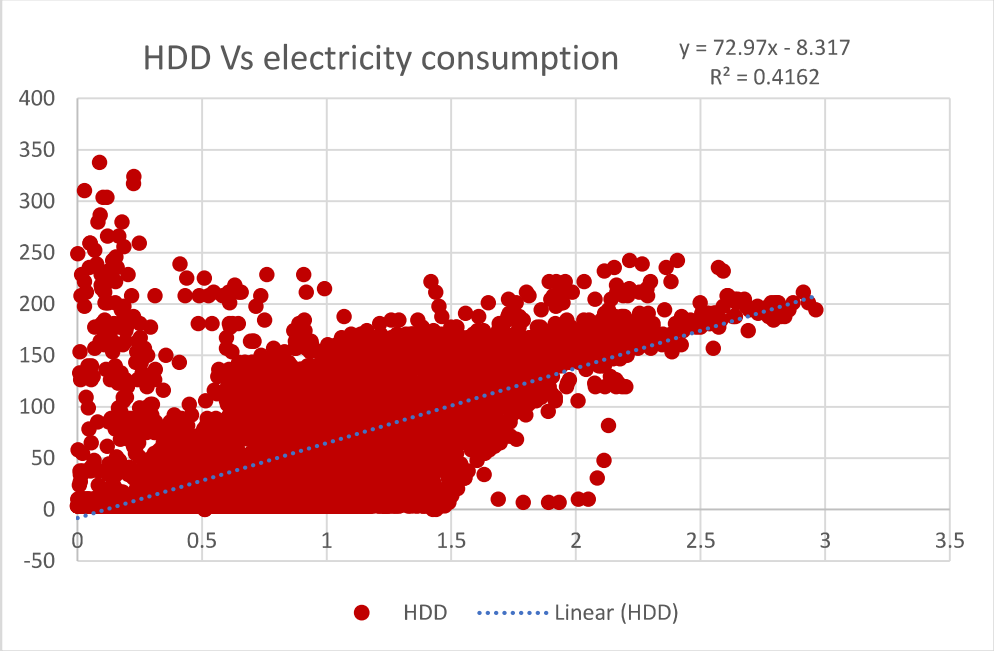


Figure 7: Linear regression of electricity use vs heating degree days

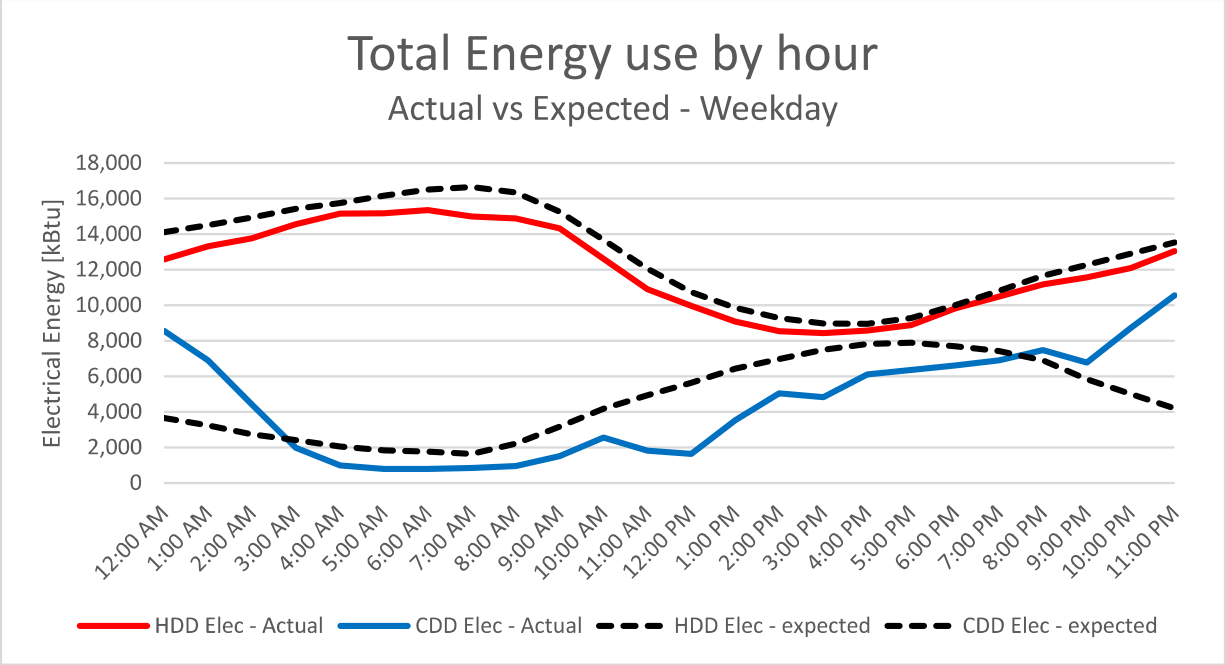


Figure 8: Weekday electricity trends for summer and winter

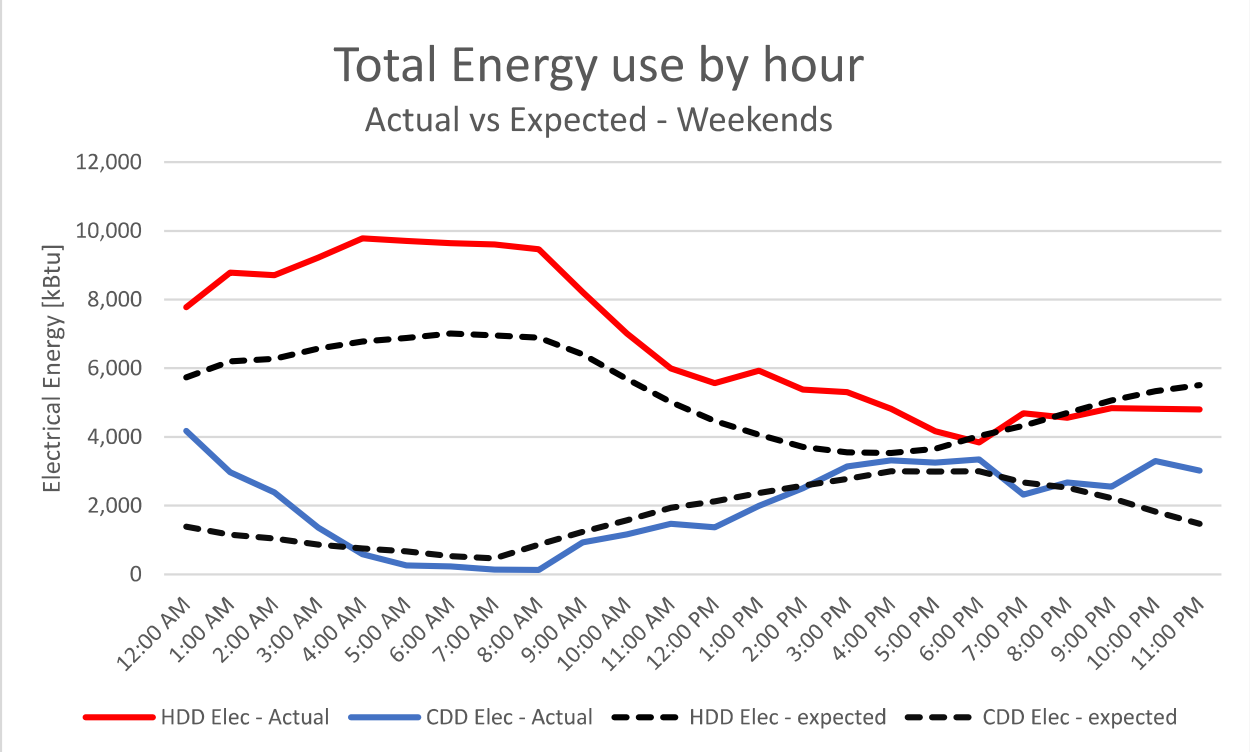


Figure 9: Weekend electricity trends for summer and winter

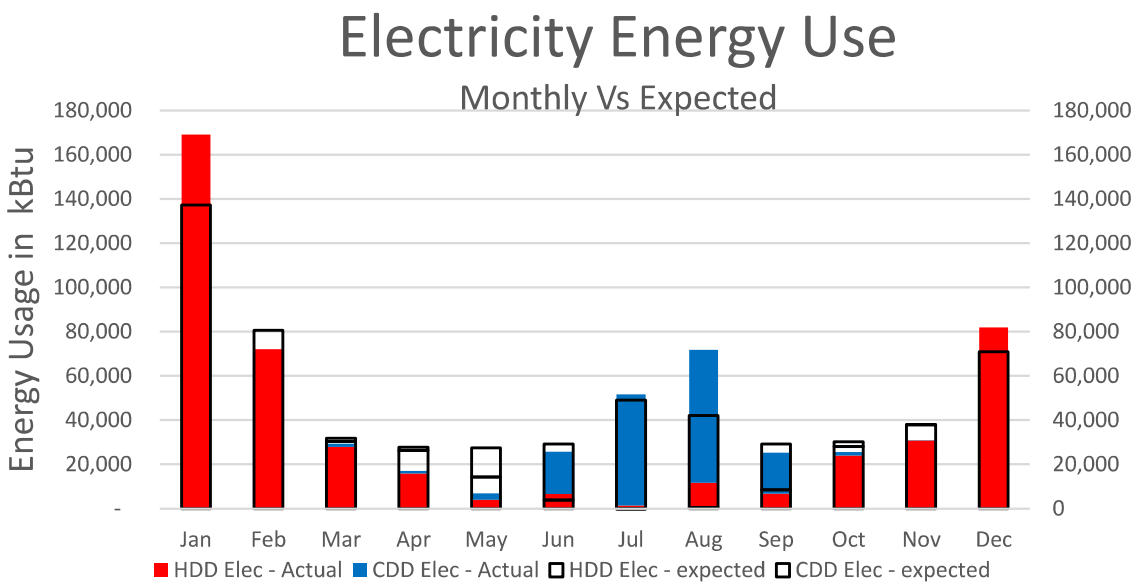


Figure 10: Monthly trends for energy use for both cooling degree days and heating degree days

The red bars indicate any electricity use that occurs during Heating Degree Days when the outdoor temperature is below 65°F. The blue icons indicate any electricity use that occurs during Cooling Degree Days when the outdoor temperature is greater than 65°F. Individual buildings will vary on when they switch from heating to cooling modes depending on their balance point. Electricity consumption during either period is not necessarily tied to heating or cooling – it may be tied to lighting or plug loads.

The user has the option to narrow the timeline of data under observation. However, even these year-long profiles shown in the examples above provide some insight. For example, in figure 8 one can see a large uptick in electricity during summer weekday evenings for this site. This information may lead the operator to ensure proper thermostat setbacks are being followed in the evenings and that lights are being turned

off when not in use. The fan energy may also be reduced if the HVAC system allows for a change in outdoor air flow. If not, this building may be a candidate for Demand Control Ventilation (DCV).

2.3 Summary and next steps

The next steps for the IDL will be to share these resources with clients either upon request or by inclusion on the IDL website. With feedback from users, the tools can be modified and improved in terms of ease of use and providing information on potential operational changes. Users should be aware that these tools do not guarantee savings, but are instead intended merely to start discussions on potential areas of investigation – such as particular hours or days when the energy use trends differently.

3. APPENDIX A – USER GUIDE

Instructions for using the weather normalization spreadsheet

There is an accompanying step by step guide that shows the results of each section for all of the following utility connections:

- Electricity
- Electricity and Natural Gas
- Electricity, Natural Gas and Geothermal

1. STEPS TO NORMALIZE ENERGY USAGE WITH RESPECT TO WEATHER.

1. Input energy information into spreadsheet.

    a. Input the date of the billing cycle, electricity usage in kWh, Natural Gas Usage in Therms, and geothermal usage in gallons of water (if applicable).
        i. Note: The Boise city geothermal system uses hundreds of gallons as the units on their billing information.

2. Add the Heating Degree Days (HDD) and Cooling Degree Days (CDD) for each month in the adjacent columns.
    a. Go to the website and collect Heating Degree Days (HDD) and Cooling Degree Days (CDD) : https://w2.weather.gov/climate/xmacis.php?wfo=boi
        i. Select the "NOWData" tab and select the following options:
            1. Boise area
            2. Monthly Summarized Data
            3. Variable: year, HDD/CDD base 65
            4. Summary: Sum
        ii. Copy data table into excel sheet
        iii. Match up the dates to the dates of the energy bills (see excel sheet for example)

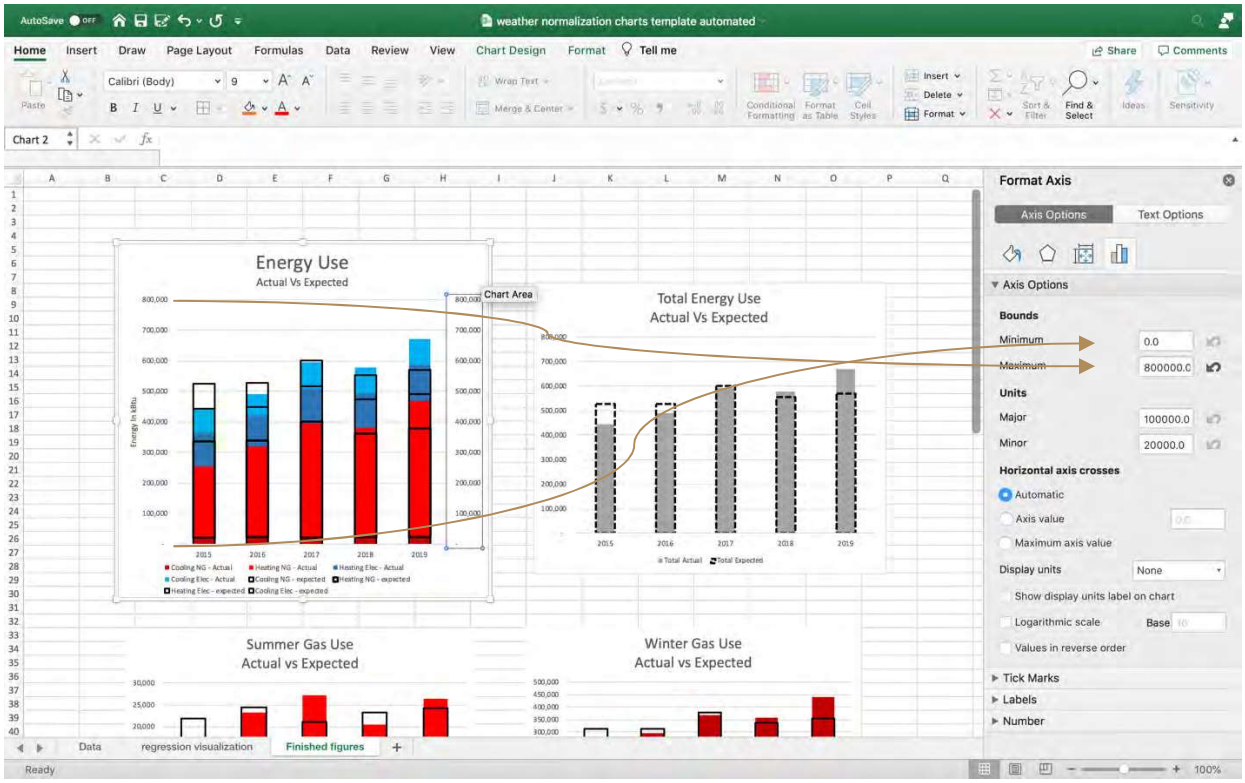
3. Separate the combined Data table into two different columns: cooling and heating Seasons.
    a. The cooling season is normally May through September
    b. The Heating Season is normally October through April
        i. There now should be two similar lists with the format shown above. See excel sheet for example.

4. Copy the data into the spreadsheet template
    a. Copy the created data lists into the "Data" sheet in the provided templates. These areas will be marked by white boxes
    b. Look over the gray cell and make sure they auto generated. There are 4 charts in the "Data" sheet: Heating season table, Summer Season table, Regression table, and Yearly summary table.
    c. Save the file as a separate document before making any adjustments.

5. Correct model for outlying data points
    a. Click on the "Regression Visualization" sheet and check each graph for outlying points within the set.
        i. If there are no outlying points, then proceed to step 6.
    b. If there is an outlier that needs to be taken out, follow the following steps:
        i. Find all outlying points. One easy way to do this is hover the cursor over the point. Then locate that point in the "Data" sheet in the gray "actual energy usage" column for the respective season and energy type. Record this value and the respective date on a scrap piece of paper.
            1. Note: This will be a subjective determination. In some instances, the data will closely match the trend line in the graphs. in other instances, it will not resemble the trend line. This is the result of weather not playing a big role in the energy consumption of a building.
        ii. After writing the value of the outlier point on a piece of paper, delete the outlying data points within the set, CAUTION: these values will be put back into the actual usage set at the end of this process.
        iii. Go to the "Regression Visualization" sheet. Record the equation shown in the top right-hand corner of the graph on the scrap piece of paper. The equation should be in the form "Y = Mx + B", where M is the slope of the line and B is the y-intercept of the line. The values for the equation will be different for each building, season, and energy type.
        iv. Go to the "Data" Sheet and locate the regression table. Input the recorded values from the recorded equation into the regression table for the respective energy type and season. Also Change outlier status to Yes to keep track of changes made to the model.
            1. At this point, the expected data table should fill back with numbers.
        v. Put the outlying data point deleted in step i. back into the actual energy use column.
        vi. Repeat the process for all the charts in the "Regression Visualization" sheet if there is significant outliers.

6. Adjust axis on the finished charts.
    a. On the "finished figures" sheet, you may need to readjust the minor axis to match the primary axis on the energy use, actual Vs expected. Select the right label column and

change it to match the left hand axis as shown in the picture below. Repeat for all applicable charts.



2020 TASK 7: RTU CONTROL RETROFITS FOR SMALL COMMERCIAL FACILITIES

SUMMARY OF WORK

IDAHO POWER COMPANY EXTERNAL YEAR-END REPORT

December 31, 2020

Prepared for:
Idaho Power Company

Author:
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Report Number: 2001_001-07

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Acronyms and Abbreviations

ASHRAE	American Society of Heating, Refrigeration, and Air-conditioning Engineers
ACH	Air Changes per Hour
BPA	Bonneville Power Administration
CBECS	Commercial Building Energy Consumption Survey
DOAS	Dedicated Outdoor Air System
DOE	Department of Energy
EMS	Energy Management System
HEPA	High Efficiency Particulate Air
HVAC	Heating Ventilation and Air Conditioning
IDL	Integrated Design Lab
IECC	International Energy Conservation Code
IPC	Idaho Power Company
NEEA	Northwest Energy Efficiency Alliance
NPBI	Needle Point Bipolar Ionization
MERV	Minimum Efficiency Reporting Value
PNNL	Pacific Northwest National Laboratory
RTU	Rooftop Unit
UI	University of Idaho
UVGI	Ultraviolet Germicidal Irradiation
VHE	Very High Efficiency

1. Introduction

The goal of the 2020 Rooftop Unit (RTU) task was to assess the energy savings of a variety of control upgrades in a case study. RTU's are used as the primary HVAC system in more than 40% of all commercial buildings (Hart et al., 2008). RTU's are also the most common HVAC system in small commercial buildings (<50,000ft^2) and 90% of the commercial buildings are in this category (Barnes and Parrish, 2016). The IDL had located a facility to use as a case study in 2020 and had collected data in 2019 that could serve as a baseline comparison. The site considered used gas heating and Direct Expansion (DX) refrigerant coils for cooling. The focus of the control upgrades was to minimize the cooling electrical consumption during the summer by improving the scheduling implementing night flush capabilities. However, with the arrival of COVID-19, the building shut down its operations and did not allow visitors for much of the summer. Many employees in the building began working from home and the summer energy use would not have been a realistic point of comparison for measuring savings from the control upgrades.

In lieu of a control study at a site, the IDL redirected our research efforts to study the impact of COVID-19 precautions on virtual RTU's. The American Society of Heating and Refrigeration Engineers (ASHRAE) published a list of recommendations that building operators could make at their sites to reduce the spread of COVID-19 in buildings. The main recommendations were to increase outdoor air flow as much as possible and to filter or treat any return air.

The IDL modeled these specific recommendations for a typical small office in climate zone 5B. While scientific study on the most efficacious mitigation strategies for

COVID are still ongoing, one can compare the mitigation strategies based on their energy impact for RTU's. The three studies carried out for RTU's in this study included upgrading the filter ratings, increasing the percentage of Outdoor Air, and increasing the amount of time that RTU's are in ventilation mode.

2. Work Summary

2.1 Literature Review

While the COVID-19 virus is a recent phenomenon, the IDL looked to past resources on HVAC mitigation of other flu-like viruses including common influenza and SARS. A selection of these resources is available in the bibliography. As this is a matter of immediate concern, many journals are allowing pre-publication of some studies while the peer-review process is ongoing. One of the most widely referred-to guides was a position document developed by ASHRAE that outlines some of the major HVAC operational changes that can be made. The main recommendations include:

- Increase outdoor air ventilation
- Disable demand-controlled ventilation (DCV)
- Further open minimum outdoor air dampers as high as 100% (if possible) to limit re-circulation
- Improve central air filtration to MERV-13 or the highest compatible with the filter rack and seal the edges of the filter to limit bypass
- Keep systems running longer hours, if possible 24/7
- Consider portable room air cleaners with HEPA filters
- Consider UVGI (ultraviolet germicidal irradiation)

2.2 Preparing the energy model

The IDL used the Department of Energy's (DOE) prototype building model developed by Pacific Northwest National Lab (PNNL). Specifically, we used the small office prototype as its default HVAC system is a set of packaged RTU's. This prototype model is based on the DOE reference building, which serves as an approximation of a typical small office. The model choices were informed by the Commercial Building Energy Consumption Survey (CBECS) and code requirements from ASHRAE's 90.1 standard. There are five zones in the building (four perimeter zones and a core). Each zone has its own associated RTU. The RTU's are air-source heat pumps with gas furnace back-ups. The geometry and zone layout of the prototype model is shown in figures 1 and 2.

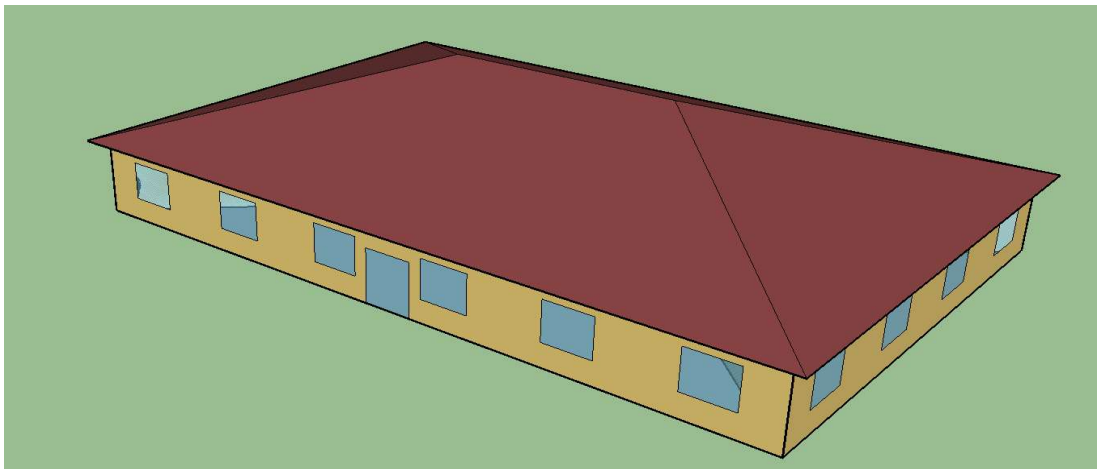


Figure 1: View of the small office prototype model geometry from PNNL

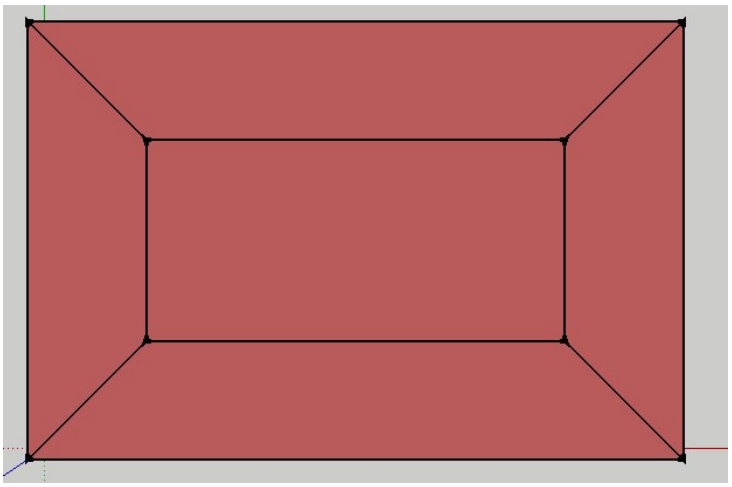


Figure 2: Top view of prototype model showing the partitions between zones; each zone has its own RTU

More details on the models are available in the Appendix and online through the PNNL prototype scorecard. Since the IDL could not do site visits during the summer due to COVID, the single-story prototype served as the case study for this analysis. In 2021, the scope of this research will be expanded to include different building types and mitigation strategies.

2.3 Increasing filter ratings

The ASHRAE ventilation standard for Acceptable Indoor Air Quality (standard 62.1) requires filtration of the supply air to remove particulates before passing across the heating and cooling coils. The standard requires a Minimum Efficiency Reporting Value (MERV) of 8 or greater upstream of any cooling coil or devices with wetted surfaces unless those coils provide sensible cooling only (62.1-5.8).

One of the COVID-19 mitigation recommendations was to increase the MERV filter rating to 13 or higher. As the MERV filter rating increases, the amount of pressure drop across the filter can also increase. According to International Energy Conservation

Code 2018 (IECC), fan power limitation pressure drop adjustments vary depending on the MERV rating.

Table 1: Excerpt of IECC 2018 Table C403.8.1 (2) Fan Power Adjustment

MERV Filter Rating	Pressure Adjustment
9 – 12	0.5" H_2O
13 – 15	0.9" H_2O
16+	2x clean filter pressure drop at design condition

The pressure drop across a filter varies greatly depending on the manufacturer and shape of the filter. There is not a linear relationship between MERV ratings and pressure drops or fan power increases. In general, high-MERV filters do tend to have a higher pressure drop. One way to reduce pressure drops is to increase the face area of the filter, but this is not necessarily feasible with the hardware constraints of RTU's where the filter is located inside a metal case of fixed dimensions. To study the effects of increased pressure drops, the IDL ran a sensitivity analysis on the prototype model. The baseline assumption is for a fan generating a pressure rise of 2.5"H_2O. The fan has an 85% motor efficiency and a total efficiency of 56% based on ASHRAE 90.1-2010 baseline code assumptions. Because each RTU filter replacement is unique and manufacturer-specific, the IDL looked at the increase in energy versus a relative increase in filter pressure drop. The baseline (MERV 8) was assumed to have a pressure drop of 0.5" as part of the total 2.5" of pressure rise that the supply fan must overcome. The DIL tracked electricity costs and energy consumption across a range of increases and filter pressure drops from 0.5" (baseline) up to 3" (a 500% increase). These results are shown in figures 3 and 4.

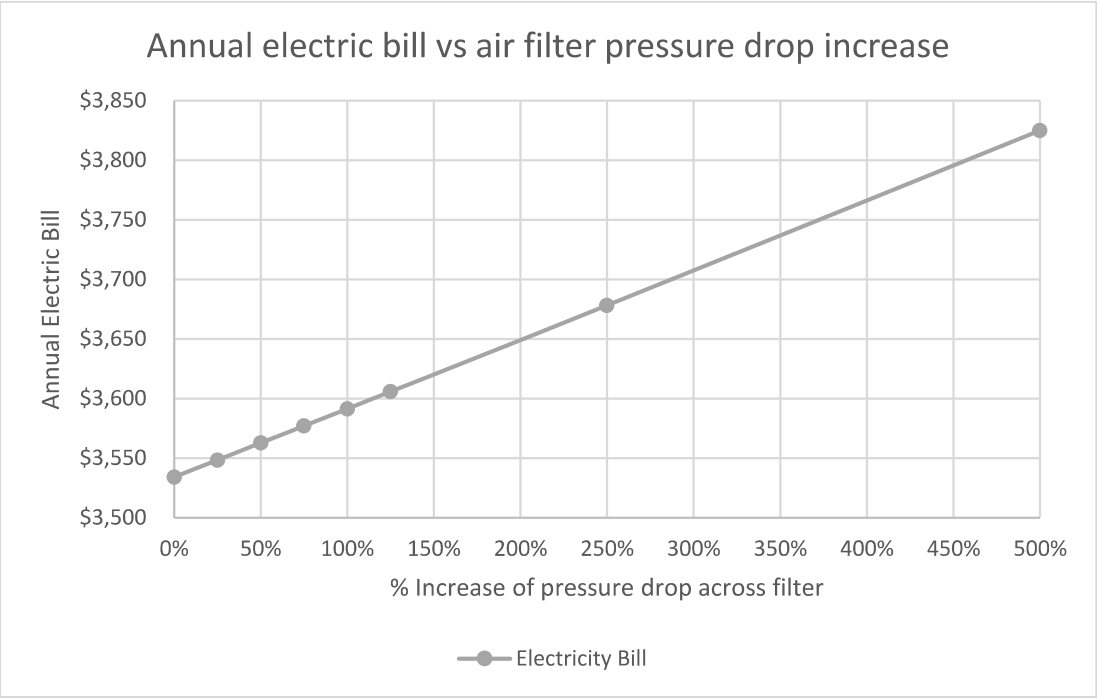


Figure 3: Simulation results showing effect of filter pressure drop increase vs bills

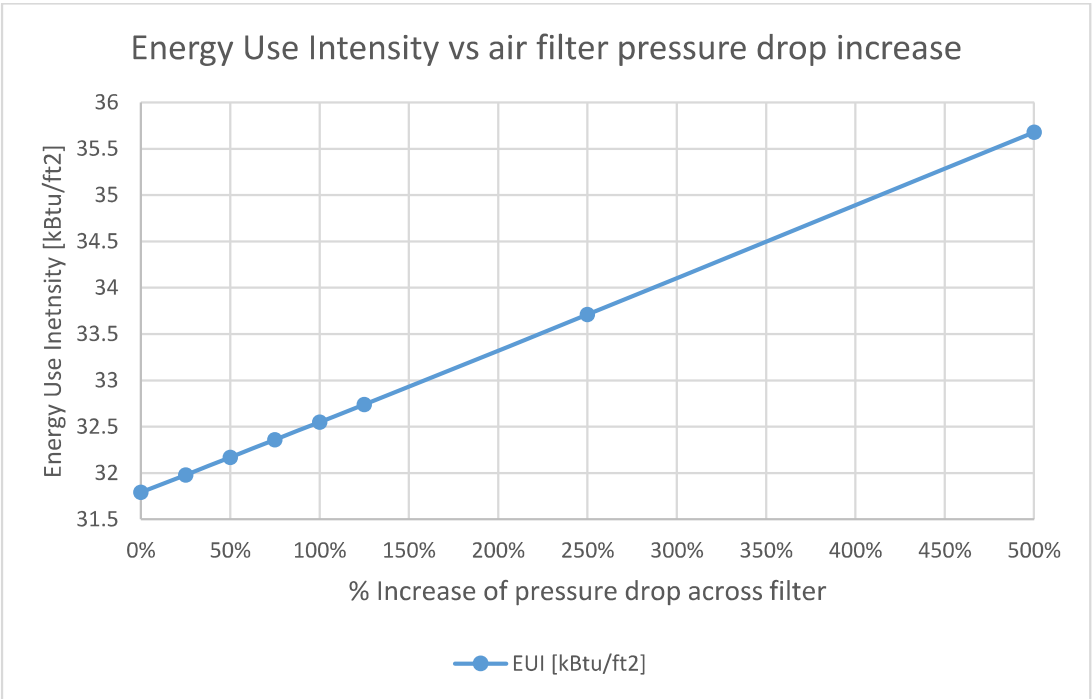


Figure 4: Simulation results showing effect of filter pressure drop increase vs annual energy

One can see from figures 3 and 4 that increasing the pressure drop across the air filter has a very linear relationship with both total annual electric bills and overall energy use. The impact remained relatively small. Even doubling the pressure drop across the filter (a 100% increase) resulted in an additional 1,260 kWh or approximately $57 in electrical costs over the course of the year. Not considered were the additional costs of the filters or the effect on the air distribution and diffuser velocity if the fans are of a fixed capacity. These are questions the IDL hopes to explore in 2021 under the wider Indoor Air Quality research scope.

2.4 Increasing the fraction of outdoor air

A second recommendation from ASHRAE includes increasing the fraction of outdoor air. Outdoor air rates are specified in Standard 62.1. Based on the occupancy and usage, for the prototype model, the minimum outdoor air provided is 0. 85 cfm/ft2 of occupied zones. The specific fraction of outdoor air delivered to each zone depends on the capacity of the RTU that manages that zone. The baseline average is an outdoor air fraction of 14%. This ratio was increased fractionally for each zone. In general, there was once again a linear relationship between electricity consumption and increasing fractions of outdoor air. However, there is a negligible change with a 25% increase to the outdoor air fraction.

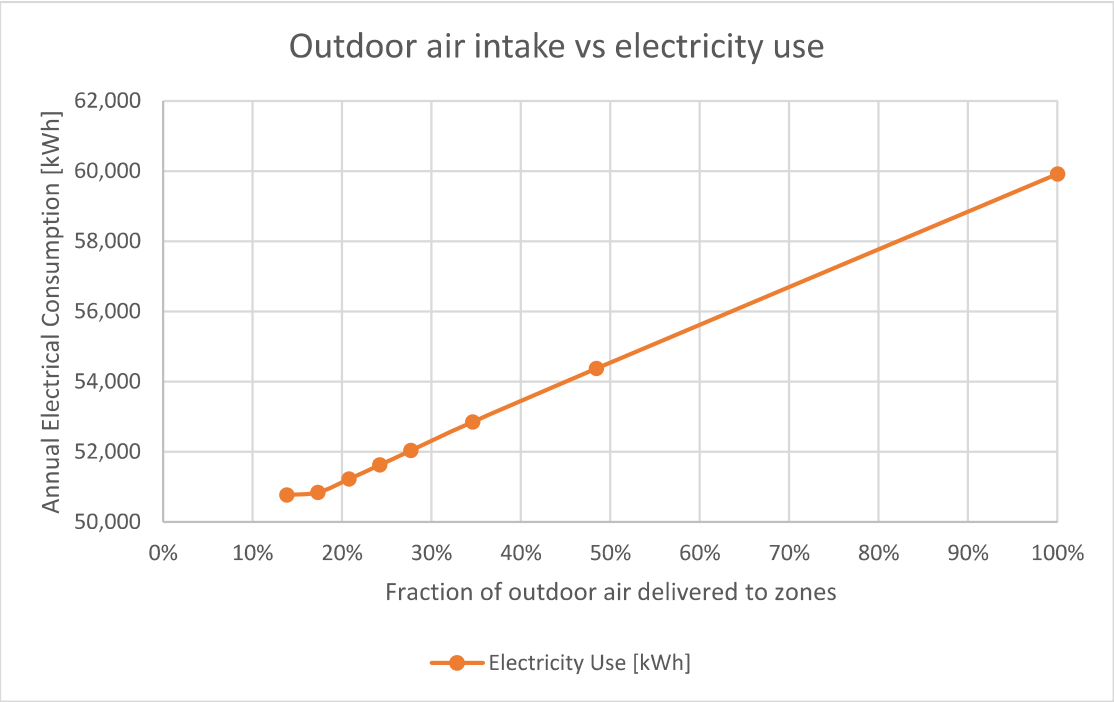


Figure 5: The effect of increasing the fraction of outdoor air on annual electricity use

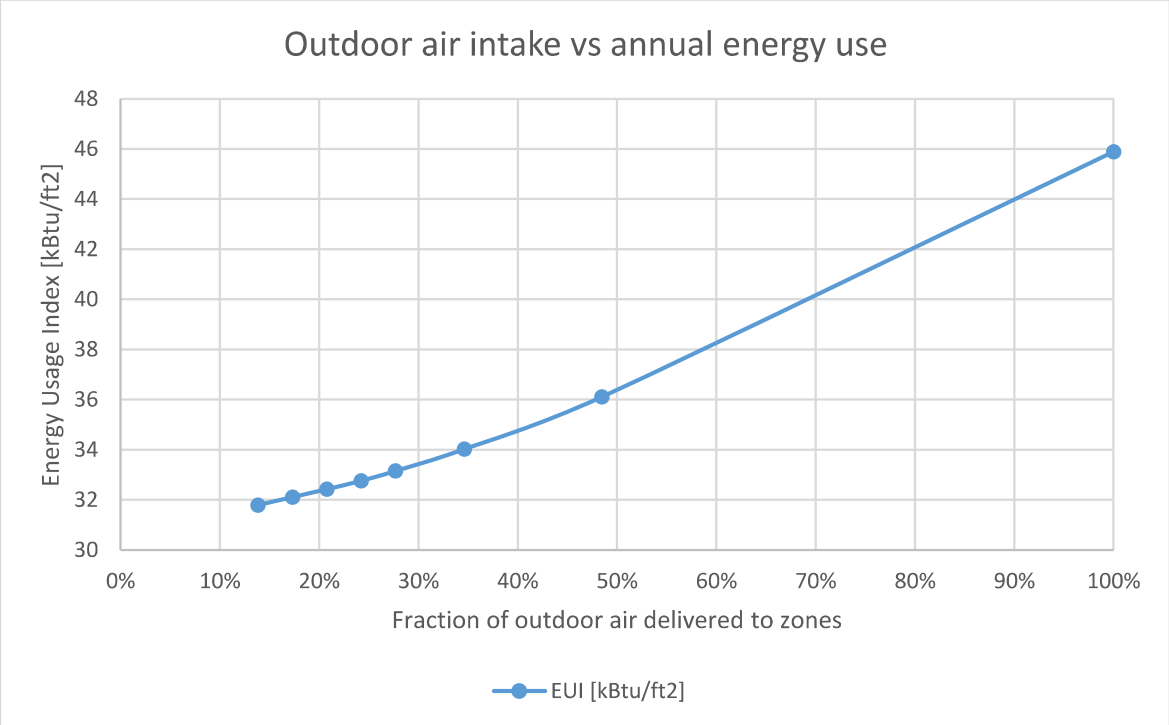


Figure 6: The effect of increasing the fraction of outdoor air on total energy use

While the electrical use increased linearly, the overall energy use increased in a slightly more parabolic manner. This was due to the increased heating demands, which relied on the gas backups in the RTUs. Switching from the baseline 62.1 required minimum ventilation rate to 100% outdoor air during occupied hours increases the annual electricity use by 9,146 kWh and increases annual electrical costs by $405 for a typical small office in Boise. The simulation engine automatically upsizes the RTU equipment to account for the increased load. However, for retrofits, this may not be an option for some owners and supplemental equipment may be required to handle the extra heating and cooling loads. One future research option would be to lock in the baseline RTU size and explore the increase in discomfort in the interior zones.

2.5 Increasing the ventilation operation time

The ASHRAE recommendations from Scheon et al. include increasing the ventilation time from only during occupied hours to running 24/7. The IDL ran a sensitivity analysis by changing the outdoor air fraction during evenings and weekends from 0% (OA damper closed) up to 100% (OA damper fully open and no recirculation). The results are shown in figures 7 and 8.

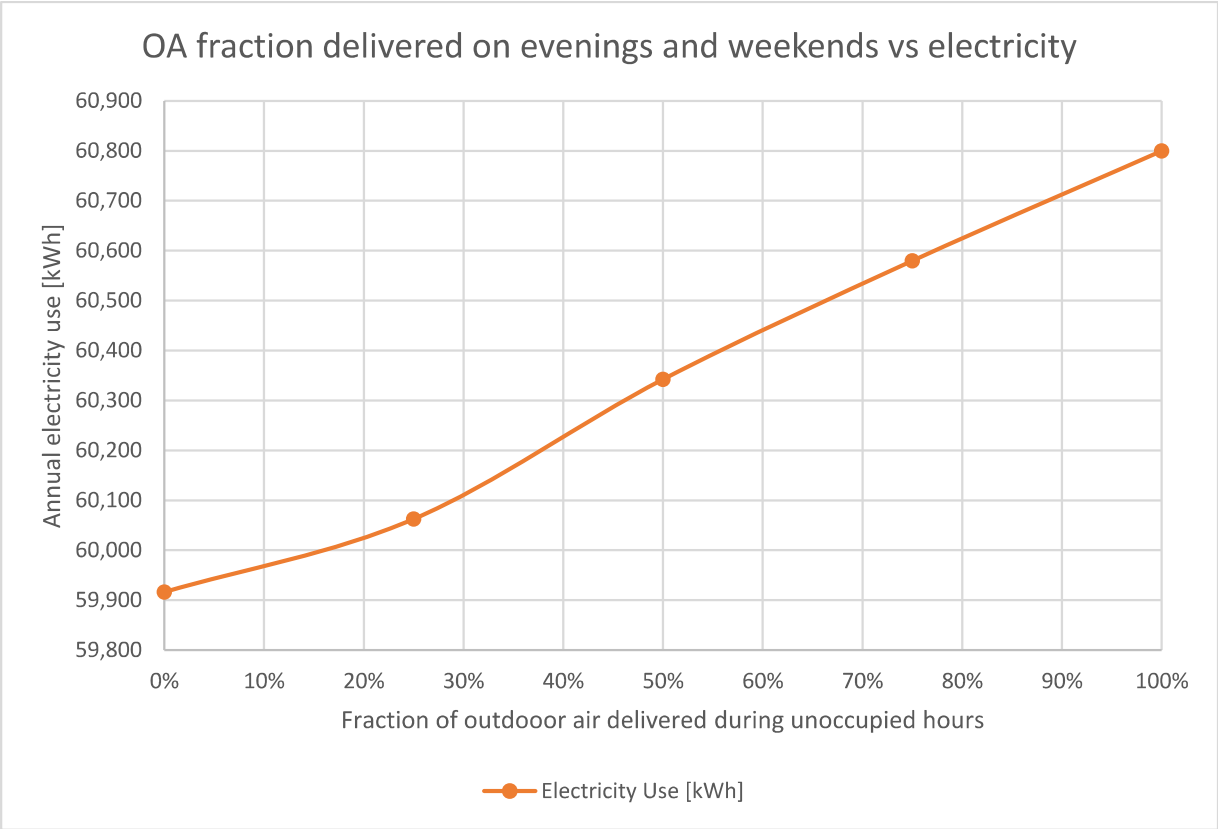


Figure 7: The effect of increasing the outdoor air ratio during unoccupied hours on electrical consumption

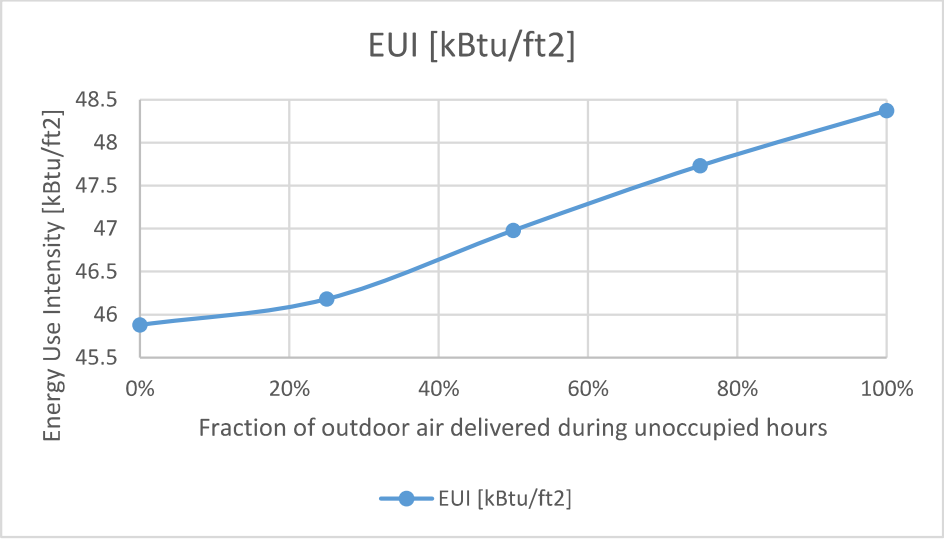


Figure 8: The effect of increasing the outdoor air ratio during unoccupied hours on annual energy use

As one can see from figures 7 and 8, there is once again a non-linear trend. Increasing the outdoor air fraction by 25% during the unoccupied hours has proportionally smaller effect than completely opening the outdoor air damper. Yet even increasing the outdoor air fraction during unoccupied hours would only increase the electricity use by 880 kWh, and increase the annual energy bill by $108. This is due to the thermostat setbacks reducing fan operation during these times. The effect would be much greater if the fans are kept on 24/7.

2.6 Increasing fan operation time

The prototype model assumes RTU fans without variable speed drives. They are on/off devices that are fully loaded during occupied hours and fully off on evenings and weekends. One of the ASHRAE recommendations includes increasing the Air Changes per Hour (ACH) of each room. As the fans in the model could not increase in capacity, the IDL modeled the effects of turning these fans on 24/7, without changing the outdoor air fraction. Turning on the fans to be on constantly, increased the electricity use by 9,900kWh, and raised the annual electricity bill by $450.

2.7 Combining the strategies

Some building owners may wish to implement all of the strategies, or some combination thereof. While the IDL did not run a full parametric analysis of every possible combination, the IDL did look at two of the most likely combinations. Combination 1 included an upgrade of the filter to one that increased the pressure drop by 0.5” H2O and increased the fan operation to 24/7 without changing the outdoor air fraction. This strategy could be used by those RTUs that are not set up to increase the

current outdoor air fraction due to hardware constraints. The second combination (Combination 2 in the table) increases the outdoor air fraction, adding outdoor air during unoccupied hours, and running the fans constantly. The idea of combination #2 is to block any recirculation of the air and simply run as much fresh air through the building as possible. Not considered is whether the heating and cooling coils are capable of handling this increased load and what sort of supplemental equipment would be required. For the simulation, EnergyPlus automatically up-sizes the coils to meet the increased load from the outdoor air. The results of each individual mitigation strategy and the combinations are compiled in the following table.

Table 2: List of energy impacts of different HVAC strategies for COVID mitigation

	EUI [kBtu/ft^2]	Electricity Use [kWh]	Electricity Bill	Gas Bill	Energy Bill
Baseline small office prototype 90.1-2010	31.8	50,800	$ 3,530	$ 120	$ 3,660
Increasing filter effectiveness (2x pressure drop)	32.6	52,100	$ 3,590	$ 120	$ 3,720
Increasing OA fraction to 100%	45.9	59,900	$ 3,940	$ 420	$ 4,370
Increasing OA time to 24/7	34.3	51,700	$ 3,570	$ 190	$ 3,770
Increasing fan time to 24/7	37.8	60,700	$ 3,980	$ 120	$ 4,100
Combination 1: Increasing filter drop and fan time	39.8	64,000	$ 4,130	$ 120	$ 4,250
Combination 2: Increasing OA fraction and fan time	68.7	81,200	$ 4,880	$ 760	$ 5,650

Adding filtration and increasing the amount of air changes per hour without adjusting the outdoor air had the smallest energy impact. This scenario (Combination 1) only increased the electricity bills by about $600 per year. The second scenario of increasing the outdoor airflow as much as possible (Combination 2) had a significant impact on the energy consumption – more than doubling the EUI and increasing the electricity bills by $1,350 (38%) per year. Some of the energy impacts are ranked in the following table:

Table 3: Ranking the energy impacts (increases over baseline) of each mitigation strategy

	EUI [kBtu/ft^2]	Electricity Use [kWh]	Electricity Bill	Gas Bill	Energy Bill
Increasing filter effectiveness (2x pressure drop)	2%	2%	2%	-1%	2%
Increasing OA time to 24/7	8%	2%	1%	55%	3%
Increasing fan time to 24/7	19%	19%	13%	-3%	12%
Combination 1: Increasing filter drop and fan time	25%	26%	17%	-4%	16%
Increasing OA fraction to 100%	44%	18%	11%	242%	19%
Combination 2: Increasing OA fraction and fan time	116%	60%	38%	516%	54%

3. Discussion

Of the mitigation strategies that were studied, the measure with the largest energy impact was increasing the outdoor air fraction, while upgrading the filters had the least impact on energy. Combining the outdoor air fraction increase with the fan schedule caused the most significant energy expenses. Which strategy is most effective at preventing the spread of the virus is still an area of ongoing research and beyond the scope of this study. However, the findings do point to which strategy has the lowest energy impact on existing RTUs.

In 2021, the IDL will expand the scope of this research to include different building types and further mitigation strategies such as UVGI, NBPI, and adding in-room HEPA filters. As peer-reviewed research emerges, we will be able to quantify the predicted impact each of these measures might have on a building's energy use.

During the 1918 pandemic, many New York residents were encouraged to leave their windows open as much as possible. The radiators installed in the buildings during this time were significantly over-sized to account for the increased heating load of the cold air. That legacy lives on as some of these radiators are still in place over 100 years later. As we look to the future of building designs, it is important to be mindful of the long-term impact some of these strategies might have on business owners and IPC ratepayers. If filtration is effective, it has a much smaller energy impact than increasing outdoor airflow.

4. BIBLIOGRAPHY

Anderson, K., & Johanning, P. (2011). Unitary HVAC premium ventilation upgrade. *ASHRAE Transactions*.

ASHRAE Board of Directors, *ASHRAE Position Document on Infectious Aerosols*. Atlanta: ASHRAE, April 14, 2020

ASHRAE. 2019a. ANSI/ASHRAE Standard 62.1-2019, *Ventilation for Acceptable Indoor Air Quality*. Atlanta: ASHRAE.

Azimi, P., and B. Stephens. 2013. HVAC filtration for controlling infectious airborne disease transmission in indoor environments: Predicting risk reductions and operational costs. *Building and Environment* 70:150–60.

Barnes, E., & Parrish, K. (2015). Small buildings, big impacts: developing a library of small commercial building energy efficiency case studies. *International Conference on Sustainable Design, Engineering and Construction.*

Breuker, M., Rossi, T., & Braun, J. (2000). Smart Maintenance for Rooftop Units. *ASHRAE*, November.

BOMA. 2020. *Managing through Pandemics: Preparing your buildings, tenants, and staff*, Washington, DC: Building Owners and Managers Association International,

Chang, Ailsa. (2020, December 10). *How Spanish Flu Pandemic Changed Home Heating*. NPR https://www.npr.org/2020/12/10/945136599/how-spanish-flu-pandemic-changed-home heat-radiators

Corsi, Richard; Van Den Wymelenberg, Kevin; Parhizkar, Hooman; Safe Air Spaces Risk Estimation Platform, https://safeairspaces.com/

Cetin, K., Fathollahzadeh, M., Kunwar, N., Do, H., & Tabares-Velasco, P. (2018). Development and validation of an HVAC on/off controller in EnergyPlus for energy simulation of residential and small commercial buildings. *Energy & Buildings, 183*, 467-483.

Cowan, A. (2004). *Review of recent commercial roof top unit field studies in the pacific northwest and california.* Prepared for Northwest Power and COnservation Council and Regional Technical Forum. New Buildings Institute.

EIA. (2012). *Commercial Building Energy Consumption Survey - E1. Major fuel consumption by end use.* Washington, D.C.: U.S. Energy Information Administration.

Hart, R., Morehouse, D., Price, W., Taylor, J., Reichmuth, H., & Cherniack, M. (2008). Up on the Roof: From the past to the future. *ACEEE Summer Study on Energy Efficiency in Buildings.*

Jacobs, P., Smith, V., Higgins, C., & Brost, M. (2003). Small commercial rooftops: Field problems, solutions and the role of manufacturers. *National Conference on Building Commissioning.*

Li, Yuguo, D. Ph, Hua Qian, D. Ph, Jian Hang, D. Ph, Xuguang Chen, and M. Sc. 2020. *"Running Title : Aerosol Transmission of SARS-CoV-2 Evidence for Probable Aerosol Transmission of SARS-CoV-2 in a Poorly Ventilated Restaurant."* 1–19.

Pantelic, J., and K.W. Tham. 2013. Adequacy of air change rate as the sole indicator of an air distribution system's effectiveness to mitigate airborne infectious disease transmission caused by a cough release in the room with overhead mixing ventilation: A case study. *HVAC&R Research* 19(8):947–61.

PNNL, DOE. "Commercial Prototype Building Models." *US Department of Energy* (2018): 25-50.

Scheon, Lawrence "Guidance for Building Operations during the COVID-19 Pandemic", ASHRAE Journal, May 2020.

Thronton, B., Wang, W., Huang, Y., Lane, M., & Liu, B. (2010). *50% Energy Savings for Small Office Buildings.* Richland: Pacific Northwest National Laboratory.

Wang, W., et al. (2013). *Advanced Rooftop Control (ARC) Retrofit: Field-Test Results*. Richland: Pacific Northwest National Laboratory.

Wiggins, M., & Brodrick, J. (2012). HVAC fault detection. *ASHRAE*, 78-80.

RESEARCH/SURVEYS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
2020 Idaho Power Weatherization Assistance for Qualified Customers Program Survey	Residential	Idaho Power	Idaho Power	Survey
2020 Idaho Power Weatherization Solutions for Eligible Customers Program Survey	Residential	Idaho Power	Idaho Power	Survey
2020 Retrofits Program Survey	Residential	Idaho Power	Idaho Power	Survey
Commercial ESK Survey 2020	Residential	Idaho Power	Idaho Power	Survey
Irrigation Hardware Maintenance Survey, 2020	Residential	Idaho Power	Idaho Power	Survey
Idaho Power Small Business Direct Install Customer Survey	Commercial	DNV GL	DNV GL	Survey

2020 Idaho Power Weatherization Assistance for Qualified Customers Program Survey

Job Number.
Answered: 94

Agency/contractor name:

Answer Choices	Percent	Responses
Metro Community Services	1.06%	1
Eastern Idaho Community Action Partnership	0.00%	0
El Ada Community Action Partnership	70.21%	66
South Central Community Action Partnership	17.02%	16
Southeastern Idaho Community Action Agency	11.70%	11
	Answered	**94**

Idaho Power program name:

Answer Choices	Percent	Responses
Weatherization Assistance for Qualified Customers	100.00%	94
Weatherization Solutions for Eligible Customers	0.00%	0
	Answered	**94**

How did you learn about the weatherization program(s)?

Answer Choices	Percent	Responses
Agency/Contractor flyer	21.59%	19
Idaho Power employee	3.41%	3
Idaho Power web site	14.77%	13
Friend or relative	38.64%	34
Letter in mail	6.82%	6
Other	14.77%	13
	Answered	**88**

What was your primary reason for participating in the weatherization program?

Answer Choices	Percent	Responses
Reduce utility bills	79.55%	70
Improve comfort of home	30.68%	27
Furnace concerns	39.77%	35
Water heater concerns	5.68%	5
Improve insulation	14.77%	13
Other	5.68%	5
	Answered	**88**

If you received any energy efficiency equipment upgrade as part of the weatherization, how well was the equipment's operation explained to you?

Answer Choices	Percent	Responses
Completely	92.94%	79
Somewhat	5.88%	5
Not at all	1.18%	1
	Answered	**85**

Which of the following did you learn about from the auditor or crew during the weatherization process? (Check all that apply)

Answer Choices	Percent	Responses
How air leaks affect energy usage	73.56%	64
How insulation affects energy usage	66.67%	58
How to program the new thermostat	36.78%	32
How to reduce the amount of hot water used	20.69%	18
How to use energy wisely	52.87%	46
How to understand what uses the most energy in my home	41.38%	36
Other	1.15%	1
	Answered	**87**

Based on the information you received from the agency/contractor about energy use, how likely are you to change your habits to save energy?

Answer Choices	Percent	Responses
Very likely	73.56%	64
Somewhat likely	24.14%	21
Not very likely	0.00%	0
Not likely at all	2.30%	2
	Answered	**87**

How much of the information about energy use have you shared with other members of your household?

Answer Choices	Percent	Responses
All of it	62.92%	56
Some of it	13.48%	12
None of it	0.00%	0
N/A	23.60%	21
	Answered	**89**

If you shared the energy use information with other members of your household, how likely do you think household members will change habits to save energy?

Answer Choices	Percent	Responses
Very likely	53.93%	48
Somewhat likely	17.98%	16
Somewhat unlikely	3.37%	3
Very unlikely	0.00%	0
N/A	24.72%	22
	Answered	**89**

What habits are you and other members of your household most likely to change to save energy? (check all that apply)

Answer Choices	Percent	Responses
Washing full loads of clothes	70.59%	60
Washing full loads of dishes	57.65%	49
Turning off lights when not in use	61.18%	52
Unplugging electrical equipment when not in use	54.12%	46
Turning the thermostat up in the summer	52.94%	45
Turning the thermostat down in the winter	56.47%	48
Other		4
	Answered	**85**

How much do you think the weatherization you received will affect the comfort of your home?

Answer Choices	Percent	Responses
Significantly	94.32%	83
Somewhat	5.68%	5
Very little	0.00%	0
Not at all	0.00%	0
	Answered	**88**

Rate the Agency/Contractor based on your interactions with them.

	Excellent	Good	Fair	Poor	Responses
Courteousness	95.51%	4.49%	0.00%	0.00%	89
Professionalism	97.73%	2.27%	0.00%	0.00%	88
Explanation of work to be performed on your home	93.18%	6.82%	0.00%	0.00%	88
Overall experience with Agency/Contractor	93.18%	6.82%	0.00%	0.00%	88
				Answered	**89**

Were you aware of Idaho Power's role in the weatherization of your home?

Answer Choices	Percent	Responses
Yes	80.68%	71
No	19.32%	17
	Answered	**88**

Overall how satisfied are you with the weatherization program you participated in?

Answer Choices	Percent	Responses
Very satisfied	98.88%	88
Somewhat satisfied	1.12%	1
Somewhat dissatisfied	0.00%	0
Very dissatisfied	0.00%	0
	Answered	**89**

How has your opinion of Idaho Power changed as a result of its role in the weatherization program?

Answer Choices	Percent	Responses
Improved	89.77%	79
Stayed the same	10.23%	9
Decreased	0.00%	0
	Answered	**88**

How many people beside yourself live in your home year-round?

Answer Choices	Percent	Responses
0	34.83%	31
1	22.47%	20
2	12.36%	11
3	10.11%	9
4	7.87%	7
5	5.62%	5
6 or more	6.74%	6
	Answered	**89**

How long have you been an Idaho Power customer?

Answer Choices	Percent	Responses
Less than 1 year	5.75%	5
1 - 10 years	24.14%	21
11 - 25 years	28.74%	25
26 years or more	41.38%	36
	Answered	**87**

Please select the category below that best describes your age:

Answer Choices	Percent	Responses
Under 25	1.14%	1
25 - 34	12.50%	11
35 - 44	18.18%	16
45 - 54	10.23%	9
55 - 64	18.18%	16
65 - 74	29.55%	26
75 or older	10.23%	9
	Answered	**88**

Select the response below that best describes the highest level of education you have attained:

Answer Choices	Percent	Responses
Less than High School	8.99%	8
High School graduate or GED	44.94%	40
Some College or Technical School	31.46%	28
Associate Degree	4.49%	4
College Degree (including any graduate school or graduate degrees)	10.11%	9
	Answered	**89**

2020 Idaho Power Weatherization Solutions for Eligible Customers Program Survey

Job #:

Answered: 11

Agency/Contractor Name:

Answer Choices	Percent	Responses
Metro Contractor Services	9.09%	1
Home Energy Management	0.00%	0
Savings Around Power	36.36%	4
Power Savers	54.55%	6
Energy Solutions	0.00%	0
	Answered	**11**

Idaho Power program name:

Answer Choices	Percent	Responses
Weatherization Solutions for Eligible Customers	100.00%	11
	Answered	**11**

How did you learn about the weatherization program(s)?

Answer Choices	Percent	Responses
Agency/Contractor flyer	18.18%	2
Idaho Power employee	0.00%	0
Idaho Power web site	9.09%	1
Friend or relative	18.18%	2
Letter in mail	54.55%	6
Other (please specify)	0.00%	0
	Answered	**11**

What was your primary reason for participating in the weatherization program?

Answer Choices	Percent	Responses
Reduce utility bills	81.82%	9
Improve comfort of home	27.27%	3
Furnace concerns	27.27%	3
Water heater concerns	0.00%	0
Improve insulation	9.09%	1
Other (please specify)	9.09%	1
	Answered	**11**

If you received any energy efficiency equipment upgrade as part of the weatherization, how well was the equipment's operation explained to you?

Answer Choices	Percent	Responses
Completely	77.78%	7
Somewhat	22.22%	2
Not at all	0.00%	0
	Answered	**9**

Which of the following did you learn about from the auditor or crew during the weatherization process? (Check all that apply)

Answer Choices	Percent	Responses
How air leaks affect energy usage	72.73%	8
How insulation affects energy usage	45.45%	5
How to program the new thermostat	9.09%	1
How to reduce the amount of hot water used	18.18%	2
How to use energy wisely	54.55%	6
How to understand what uses the most energy in my home	54.55%	6
Other (please specify)	0.00%	0
	Answered	**11**

Based on the information you received from the agency/contractor about energy use, how likely are you to change your habits to save energy?

Answer Choices	Percent	Responses
Very likely	80.00%	8
Somewhat likely	20.00%	2
Not very likely	0.00%	0
Not likely at all	0.00%	0
	Answered	**10**

How much of the information about energy use have you shared with other members of your household?

Answer Choices	Percent	Responses
All of it	72.73%	8
Some of it	9.09%	1
None of it	0.00%	0
N/A	18.18%	2
	Answered	**11**

If you shared the energy use information with other members of your household, how likely do you think household members will change habits to save energy?

Answer Choices	Percent	Responses
Very likely	45.45%	5
Somewhat likely	27.27%	3
Somewhat unlikely	9.09%	1
Very unlikely	0.00%	0
N/A	18.18%	2
	Answered	**11**

What habits are you and other members of your household most likely to change to save energy? (check all that apply)

Answer Choices	Percent	Responses
Washing full loads of clothes	70.00%	7
Washing full loads of dishes	40.00%	4
Turning off lights when not in use	80.00%	8
Unplugging electrical equipment when not in use	50.00%	5
Turning the thermostat up in the summer	70.00%	7
Turning the thermostat down in the winter	70.00%	7
Other (please specify)		1
	Answered	**10**

How much do you think the weatherization you received will affect the comfort of your home?

Answer Choices	Percent	Responses
Significantly	81.82%	9
Somewhat	18.18%	2
Very little	0.00%	0
Not at all	0.00%	0
	Answered	**11**

Rate the Agency/Contractor based on your interactions with them.

	Excellent	Good	Fair	Poor	Responses
Courteousness	81.82%	18.18%	0.00%	0.00%	11
Professionalism	72.73%	27.27%	0.00%	0.00%	11
Explanation of work to be performed on your home	81.82%	9.09%	9.09%	0.00%	11
Overall experience with Agency/Contractor	81.82%	18.18%	0.00%	0.00%	11
				Answered	**11**

Were you aware of Idaho Power's role in the weatherization of your home?

Answer Choices	Percent	Responses
Yes	100.00%	11
No	0.00%	0
	Answered	**11**

Overall how satisfied are you with the weatherization program you participated in?

Answer Choices	Percent	Responses
Very satisfied	100.00%	11
Somewhat satisfied	0.00%	0
Somewhat dissatisfied	0.00%	0
Very dissatisfied	0.00%	0
	Answered	**11**

How has your opinion of Idaho Power changed as a result of its role in the weatherization program?

Answer Choices	Percent	Responses
Improved	72.73%	8
Stayed the same	27.27%	3
Decreased	0.00%	0
	Answered	**11**

How many people beside yourself live in your home year-round?

Answer Choices	Percent	Responses
0	18.18%	2
1	27.27%	3
2	27.27%	3
3	9.09%	1
4	18.18%	2
5	0.00%	0
6 or more	0.00%	0
	Answered	**11**

How long have you been an Idaho Power customer?

Answer Choices	Percent	Responses
Less than 1 year	0.00%	0
1 - 10 years	45.45%	5
11 - 25 years	18.18%	2
26 years or more	36.36%	4
	Answered	**11**

Please select the category below that best describes your age:

Answer Choices	Percent	Responses
Under 25	0.00%	0
25 - 34	9.09%	1
35 - 44	18.18%	2
45 - 54	9.09%	1
55 - 64	36.36%	4
65 - 74	27.27%	3
75 or older	0.00%	0
	Answered	**11**

Select the response below that best describes the highest level of education you have attained:

Answer Choices	Percent	Responses
Less than High School	0.00%	0
High School graduate or GED	18.18%	2
Some College or Technical School	54.55%	6
Associate Degree	18.18%	2
College Degree (including any graduate school or graduate degrees)	9.09%	1
	Answered	**11**

2020 Retrofits Program Survey

How did you learn about the Retrofits program?

Answer Choices	Responses	Percent
Idaho Power employee	7	17.95%
Contractor	19	48.72%
Equipment supplier	7	17.95%
Other business owner	1	2.56%
Other (please specify)	5	12.82%

Overall, how satisfied are you with the Idaho Power Retrofits incentive program?

Answer Choices	Responses	Percent
Very satisfied	35	89.74%
Somewhat satisfied	3	7.69%
Neither satisfied nor dissatisfied	0	0.00%
Somewhat dissatisfied	1	2.56%
Very dissatisfied	0	0.00%

How satisfied are you with the contractor that you hired to install the equipment?

Answer Choices	Responses	Percent
Very satisfied	35	89.74%
Somewhat satisfied	2	5.13%
Neither satisfied nor dissatisfied	1	2.56%
Somewhat dissatisfied	0	0.00%
Very dissatisfied	1	2.56%

How satisfied are you with the equipment that was installed?

Answer Choices	Responses	Percent
Very satisfied	34	87.18%
Somewhat satisfied	2	5.13%
Neither satisfied nor dissatisfied	2	5.13%
Somewhat dissatisfied	1	2.56%
Very dissatisfied	0	0.00%

How likely are you to recommend the contractor who installed your equipment to other business owners?

Answer Choices	Responses	Percent
Very likely	35	89.74%
Somewhat Likely	1	2.56%
Neither likely nor unlikely	2	5.13%
Somewhat unlikely	0	0.00%
Very unlikely	1	2.56%

How likely are you to recommend Idaho Power's Retrofits program to other business owners?

Answer Choices	Responses	Percent
Very likely	35	92.11%
Somewhat Likely	2	5.26%
Neither likely nor unlikely	0	0.00%
Somewhat unlikely	1	2.63%
Very unlikely	0	0.00%

COMMERCIAL ESK SURVEY 2020

Restaurant ESK

Which of the following best describes the water heating source you use at your business?

Water Heating Source	Responses	Percent
Electric	20	54.05%
Gas	17	45.95%
Other fuel source	0	0.00%

Of the items included in the kit you received, have you installed the following items at your business:

Item / Answer	Responses	Percent
Pre-rinse spray valve		
Yes	25	73.53%
No	9	26.47%
LED lightbulb #1		
Yes	34	94.44%
No	2	5.56%
LED lightbulb #2		
Yes	32	91.43%
No	3	8.57%
LED lightbulb #3		
Yes	28	90.32%
No	3	9.68%
LED exit sign #1		
Yes	16	57.14%
No	12	42.86%
LED exit sign #2		
Yes	16	55.17%
No	13	44.83%
Kitchen aerator #1		
Yes	21	63.64%
No	12	36.36%
Kitchen aerator #2		
Yes	16	51.61%
No	15	48.39%
Bathroom aerator #1		
Yes	24	75.00%
No	8	25.00%
Bathroom aerator #2		
Yes	19	63.33%
No	11	36.67%

Since receiving the kit, have you gone to Idaho Power's website to look for information about energy efficiency programs or to find other ways to save?

Answer	Responses	Percent
Yes	7	18.92%
No	30	81.08%

Office ESK

Which of the following best describes the water heating source you use at your business?

Water Heating Source	Responses	Percent
Electric	154	61.60%
Gas	93	37.20%
Other fuel source	3	1.20%

Of the items included in the kit you received, have you installed the following items at your business:

Item / Answer	Responses	Percent
LED lightbulb #1		
Yes	236	90.42%
No	25	9.58%
LED lightbulb #2		
Yes	218	88.98%
No	27	11.02%
LED exit sign #1		
Yes	75	35.21%
No	138	64.79%
LED exit sign #2		
Yes	59	28.92%
No	145	71.08%
Power Strip		
Yes	230	93.50%
No	16	6.50%
Kitchen aerator		
Yes	87	39.91%
No	131	60.09%
Bathroom aerator #1		
Yes	111	50.23%
No	110	49.77%
Bathroom aerator #2		
Yes	61	31.61%
No	132	68.39%

Since receiving the kit, have you gone to Idaho Power's website to look for information about energy efficiency programs or to find other ways to save?

Answer	Responses	Percent
Yes	84	31.58%
No	182	68.42%

Retail ESK

Which of the following best describes the water heating source you use at your business?

Water Heating Source	Responses	Percent
Electric	15	60.00%
Gas	10	40.00%
Other fuel source	0	0.00%

Of the items included in the kit you received, have you installed the following items at your business:

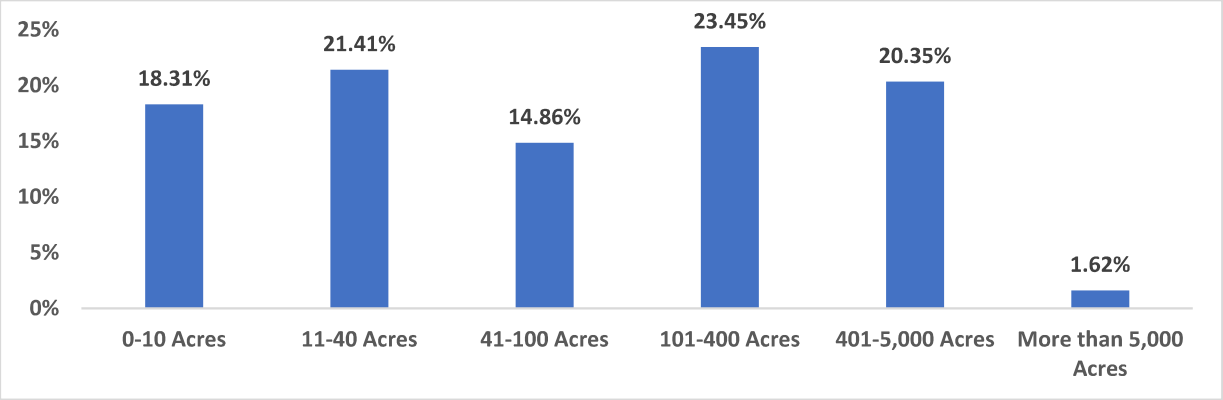
Item / Answer	Responses	Percent
LED lightbulb #1		
Yes	23	85.19%
No	4	14.81%
LED lightbulb #2		
Yes	21	84.00%
No	4	16.00%
LED exit sign #1		
Yes	7	36.84%
No	12	63.16%
LED exit sign #2		
Yes	2	11.76%
No	15	88.24%
BR30 reflector LED lightbulb #1		
Yes	13	65.00%
No	7	35.00%
BR30 reflector LED lightbulb #2		
Yes	12	60.00%
No	8	40.00%
Bathroom aerator		
Yes	9	50.00%
No	9	50.00%

Since receiving the kit, have you gone to Idaho Power's website to look for information about energy efficiency programs or to find other ways to save?

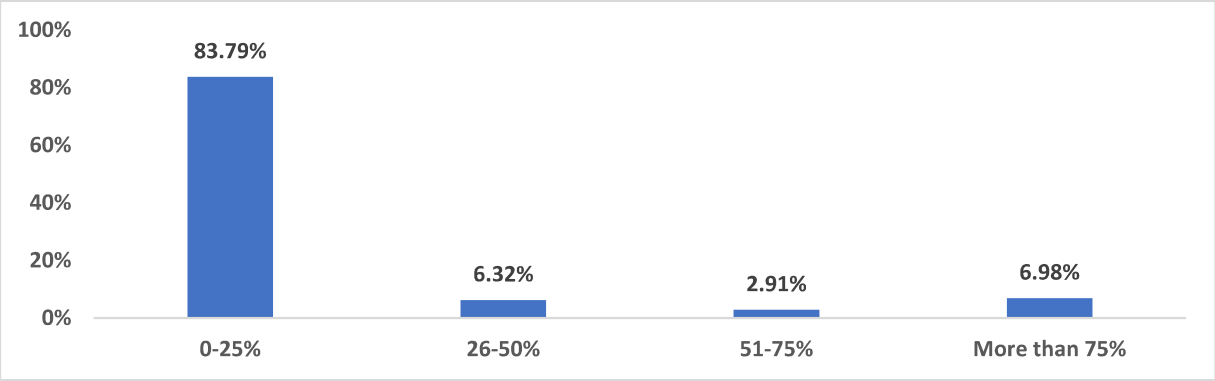
Answer	Responses	Percent
Yes	4	15.38%
No	22	84.62%

IRRIGATION HARDWARE MAINTENANCE SURVEY, 2020

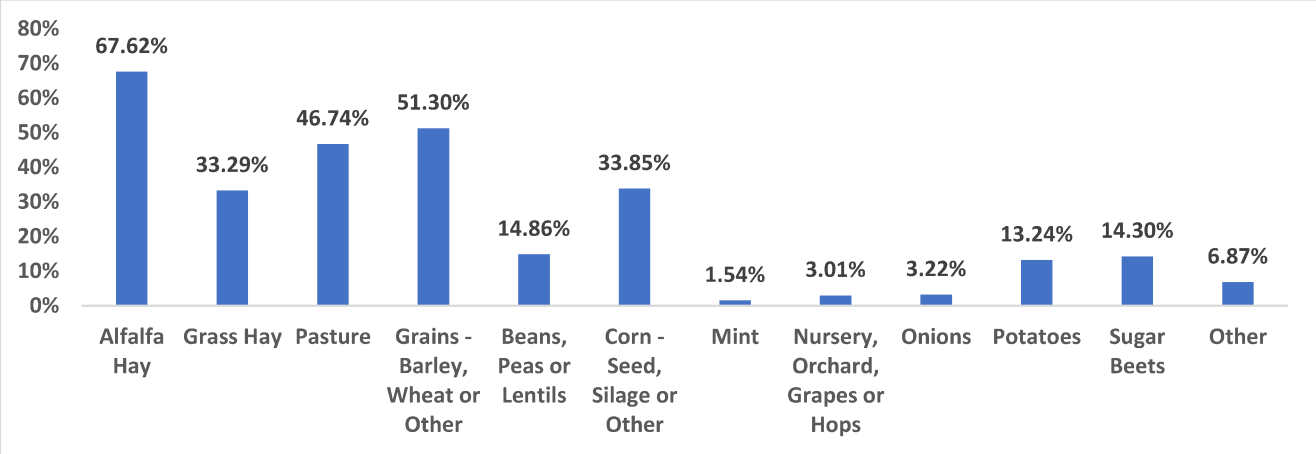
Approximately how many total acres do you water with some type of sprinkler irrigation? (select the best response)



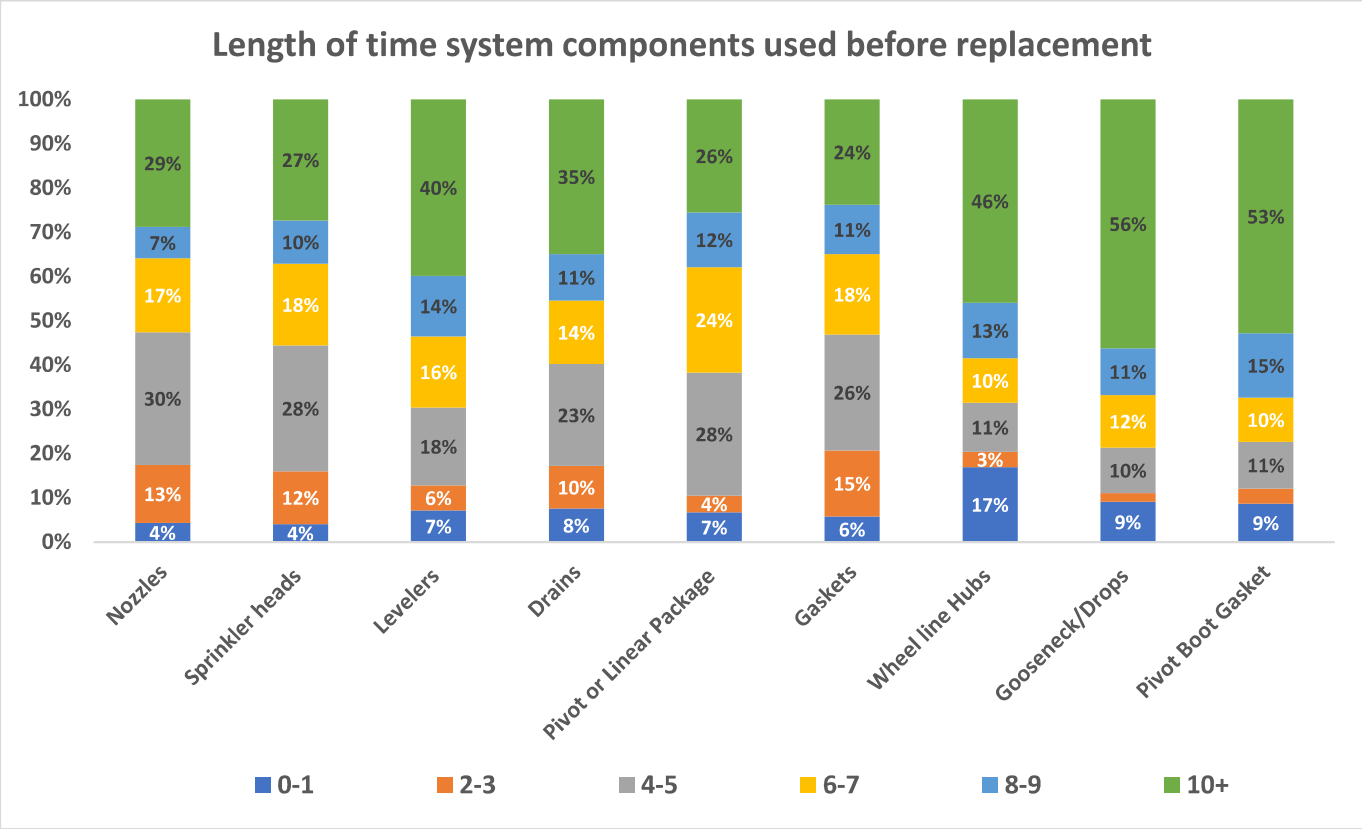
What is the approximate percentage of your acreage irrigated with a lift greater than 200 ft? (We are defining lift as the amount of elevation from the pumping water level either in a well or from surface water to the highest elevation in the irrigated field) (select one)



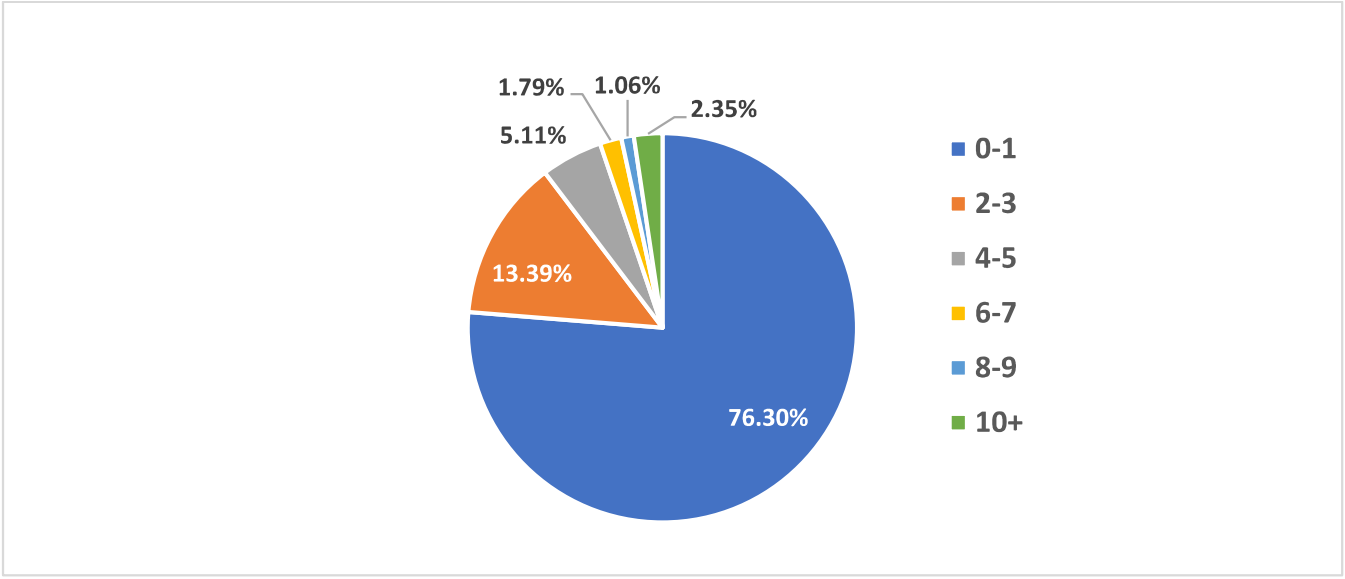
Which of the following crops are typically in your rotation? (Select all that apply)



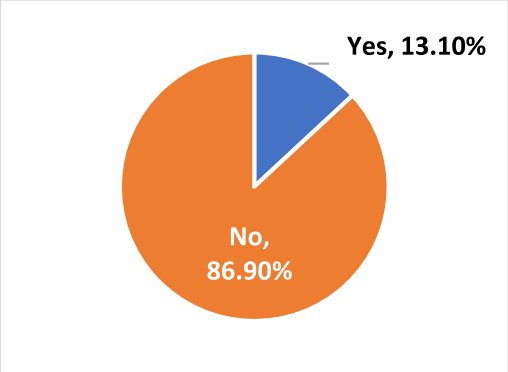
How long (in years) do you typically use or operate each of the following sprinkler irrigation system components before replacing them? (Select the appropriate number of years for each component you replace)



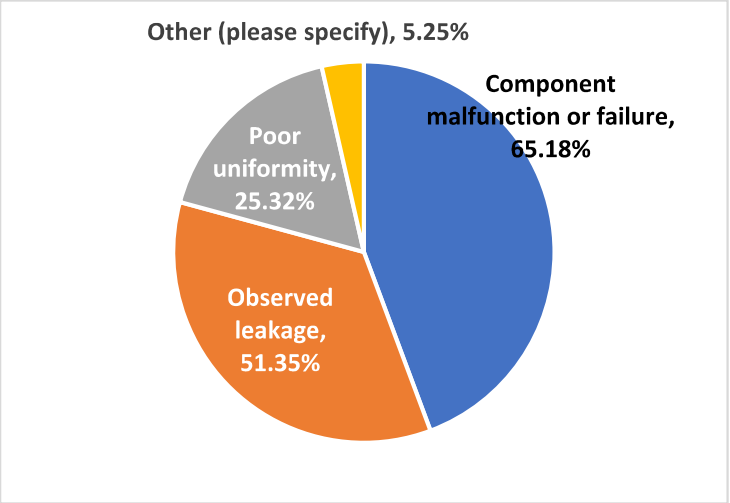
How long (in years) do you typically continue to irrigate with small cracks, breaks and splits in your aluminum hand lines and wheel lines?



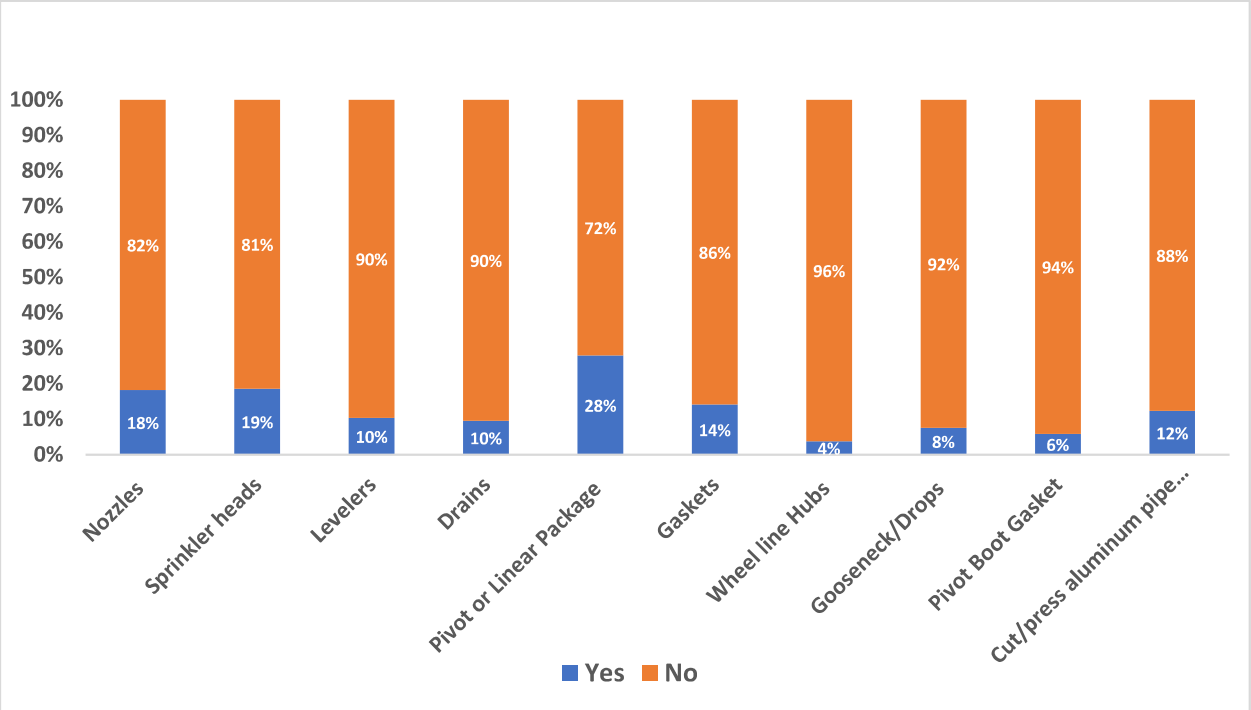
Do you typically replace your irrigation components on a predetermined schedule?



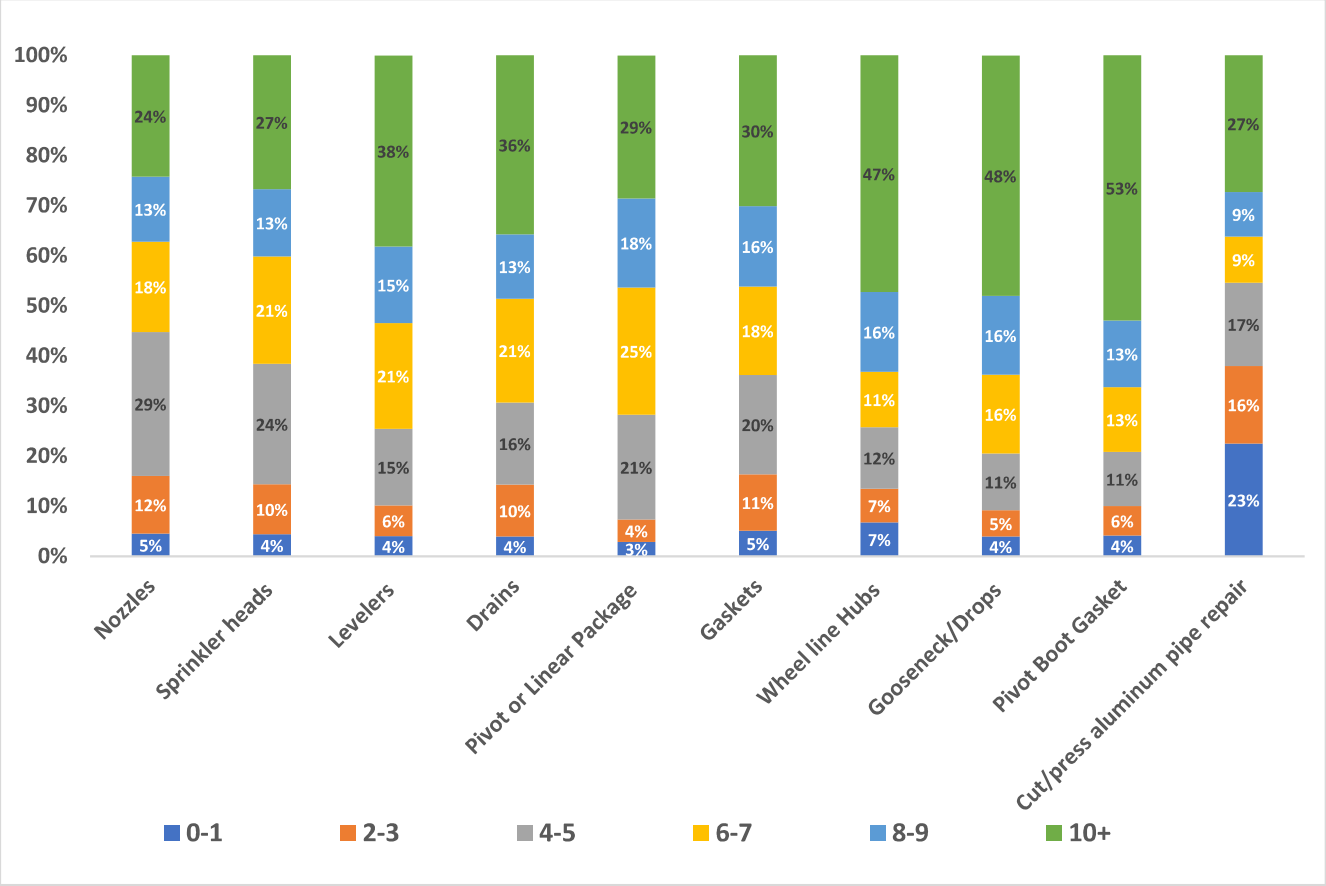
What description below most accurately answers the question "What triggers the replacement of your irrigation components?"



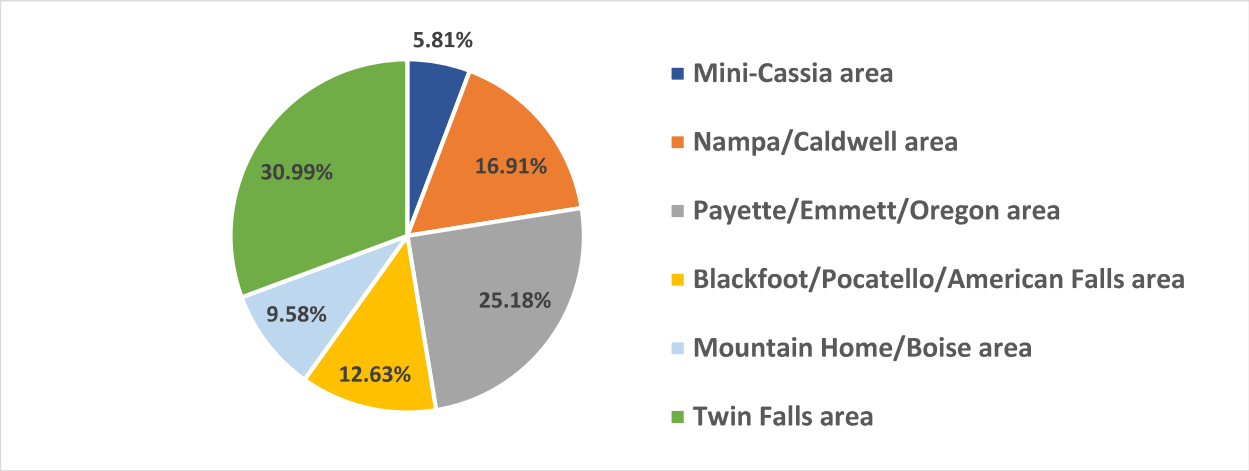
Indicate if you have you received any rebates/incentives from the Idaho Power irrigation menu efficiency program on the maintenance components listed below.



If you answered "Yes" to any of the components listed in the previous question, how frequently (in years) would you have replaced your irrigation components without Idaho Power's irrigation efficiency program?



What is the general location of your farming operation?



Idaho Power Direct Install Customer Survey

Idaho Power Direct Install Customer Survey

Overall, how satisfied are you with the program?

	Response percent	Response total
Very satisfied	88.89%	24
Somewhat satisfied	7.41%	2
Somewhat dissatisfied	0%	0
Very dissatisfied	3.7%	1
If somewhat or very dissatisfied, why?		0

Statistics based on **27** respondents;

How easy was it to participate in the program?

	Response percent	Response total
Very easy	92.59%	25
Somewhat easy	7.41%	2
Somewhat difficult	0%	0
Very difficult	0%	0
If somewhat or very difficult, why?		0

Statistics based on **27** respondents;

Based on your experience with this Direct Install program, how likely are you recommend this program to other small businesses?

	Response percent	Response total
Very likely	92.59%	25
Somewhat likely	7.41%	2
Not very likely	0%	0
Not likely at all	0%	0
If not very likely or not likely at all, why?		0

Statistics based on **27** respondents;

How satisfied are you with the equipment that was installed?

		Response percent	Response total
Very satisfied		100%	26
Somewhat satisfied		0%	0
Somewhat dissatisfied		0%	0
Very dissatisfied		0%	0
If somewhat or very dissatisfied, why?			0

Statistics based on **26** respondents;

How satisfied are you with the customer service provided by the company installing the equipment?

		Response percent	Response total
Very satisfied		92.31%	24
Somewhat satisfied		7.69%	2
Somewhat dissatisfied		0%	0
Very dissatisfied		0%	0
If somewhat or very dissatisfied, why?			1

Statistics based on **26** respondents;

How did you learn about Idaho Power's Small Business Direct Install Program?

		Response percent	Response total
Idaho Power Energy Advisor		34.62%	9
Idaho Power Customer Service		3.85%	1
Email from Idaho Power		0%	0
Postal Mailing from Idaho Power		23.08%	6
Vendor or Contractor		38.46%	10
Idaho Power Website		0%	0
Other Business Owner or Employee		0%	0

Statistics based on **26** respondents;

How, if at all, has your opinion of Idaho Power changed since participating in this program?

	Response percent	Response total
More favorable opinion of Idaho Power	48.15%	13
No change in opinion of Idaho Power	51.85%	14
Less favorable opinion of Idaho Power	0%	0

Statistics based on **27** respondents;

Which of the following best describes your business?

	Response percent	Response total
Agriculture, Forestry and Fishing	11.11%	3
Finance, Insurance and Real Estate	14.82%	4
Manufacturing	0%	0
Mining	0%	0
Public Administration	0%	0
Retail Trade	14.82%	4
Services	29.63%	8
Transportation, Communications, Electric, Gas and Sanitary Services	3.7%	1
Wholesale Trade	0%	0
Other (please specify)	25.93%	7

Statistics based on **27** respondents;

EVALUATIONS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
Idaho Power Educational Distributions Impact and Process Evaluation	Residential	DNV GL	Idaho Power	Impact and Process
Idaho Power Weatherization Programs Analysis	Residential	Nexant, Inc.	Idaho Power	Other (Billing Analysis)
Irrigation Efficiency Rewards	Irrigation	Tetra Tech	Idaho Power	Impact and Process
Rebate Advantage PY2019 M&V Report	Residential	ADM Associates, Inc	Idaho Power	Impact

DNV·GL

FINAL REPORT

Idaho Power Educational Distributions

Impact and Process Evaluation

Date: February 5, 2021



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1 EXECUTIVE SUMMARY

DNV GL conducted an impact and process evaluation for the Educational Distributions effort administered through Idaho Power Company's (IPC's) Residential Energy Efficiency Education Initiative. This effort seeks to use low-cost and no-cost channels to deliver energy efficiency items with energy savings directly to customers. As with the broader initiative, the goal of Educational Distributions is to change customer behavior and create awareness of and demand for energy efficiency programs in IPC's service area.

The key objectives of the impact evaluation were to:

- Determine and verify the energy (kWh, kW) impacts attributable to the 2019 Educational Distributions effort.
- Provide credible and reliable program energy and non-electric/non-energy (e.g. avoided emissions, water savings, transmission/distribution benefits) impact estimates and ex-post realization rates attributed to each of the effort's four programs for the 2019 program year. The four programs are Welcome Kits, Energy-Savings Kits (ESK), Student Energy Savings Kits (SEEK), and Giveaways—including Giveaway Kits and LEDs.
- Report findings and observations and provide recommendations that enhance the effectiveness of future ex-ante savings analysis and the accurate and transparent reporting of program savings.

The key objectives of the process evaluations were to:

- Evaluate program design including program mission, logic, and use of industry best practices.
- Evaluate program implementation including quality control, operational practice, outreach, and ease of customer participation.
- Evaluate program administration including program oversight, staffing, management, training, documentation, and reporting.
- Report findings, observations, and recommendations to enhance program effectiveness.

1.1 Key Findings

1.1.1 The program's overall savings realization rate is 97.2%.

Welcome Kits had an RR of 100%. ESK savings decreased due to reductions in savings to water heating measure savings (RR=96.9%)because the vendor sent electric kits to approximately 1000 customers without confirmed electric water heating. SEEK savings decreased due to lower LED savings because of a lower assumed baseline wattage for "Other" bulbs (RR=96.5%). This decrease was slightly counteracted by a 101% realization rate for showerheads due to a slight reduction in post-install flow rates to match the response options on the student surveys. If the program claimed evaluated savings for nightlights for welcome kits and ESK, realization rates would increase to 106.7%

1.1.2 The realization rate for number of kits was 100%.

DNV GL verified the program tracking accounte for all of the delivered kits. The kits delivered to customers without confirmed electric water heating slightly reduced the savings realization rate, but this did not affect the realization rate for the number of kits sent.

1.1.3 Lifetime non-energy impacts (NEIs) for the 2019 program measures are approximately $1.16 million.

Almost all of these savings come from the LEDs. Additional NEIs for which DNV GL could not assign a monetary value include increased customer satisfaction and increased knowledge and awareness of energy efficiency.

1.1.4 Idaho Power reported that they plan to stop sending ESKs because they will not remain cost-effective in 2021.

1.1.5 Program materials are well-produced and contain the recommended information.

1.1.6 QA/QC processes are satisfactory with a few opportunities to improve.

1.1.7 Participants are satisfied with the Welcome Kits.

1.1.8 IPC could claim a small amount of savings from the Welcome Kit nightlights.

Based on survey responses, DNV GL estimates approximately 12 kWh annual savings per year per kit from the nightlights. Across all welcome kits and ESKs this would add 1,025,700 kWh to evaluated savings.

1.2 Recommendations

1.2.1 For SEEK lighting saving calculations, assume 13W for baseline wattage for "Other" bulbs.

The SEEK program's savings calculations are based on the difference in wattage between a baseline bulb and the LED bulb included in the kit. Students are instructed to replace incandescent bulbs and to note the wattage of the replaced bulb on their survey form. The form provides responses for 40W, 60W, 100W, and "Other." The interview with the program vendor confirmed that they assumed a 40W baseline for the "Other" option. However, DNV GL recommends a more conservative assumption of 13W to cover the possibility that students did not perfectly follow the instructions and replaced a (60W equivalent) CFL rather than an incandescent.

1.2.2 Ask the SEEK vendor to provide a spreadsheet or code used to calculate savings.

Putting the supporting calculations into a standardized calculator would document assumptions such as which point-value within the ranges of each response option on the student survey the calculation used. It would also facilitate QA/QC by Idaho Power and help evaluators verify program savings.

1.2.3 Continue to not claim savings from the shower timers.

DNV GL did not find sufficient evidence that this measure results in measurable savings.

1.2.4 Consider additional research to better estimate the number of Welcome Kit recipients who take kit measures with them when they move.

Some people will take the LEDs with them when they move; however, there are no readily available estimates of how common this is. Additional research would be needed to estimate a frequency and establish a discount factor for energy savings claims if a customer moved out of Idaho Power service area.

1.2.5 For SEEK, if practical, consider allowing students to take pictures of the replaced/baseline equipment as a way of confirming/vetting the answers they provide on the survey.

This would provide an opportunity to vet the answers the students provided on their surveys as well as help determine the best wattage assumption to use for the "Other" category.

2 INTRODUCTION

2.1 Program overview

Designated as a specific program in 2015, the Educational Distributions effort is administered through the Residential Energy Efficiency Education Initiative. It seeks to use low-cost and no-cost channels to deliver energy efficiency items with energy savings directly to customers. As with the initiative, the goal of the Educational Distributions effort is to change behavior and create awareness of and demand for energy efficiency programs in IPC's service area.

Idaho Power selects items for distribution if the initial analysis indicates the measure is either currently cost-effective or expected to be cost-effective. Typically, selected items have additional benefits beyond traditional energy savings, such as educating customers about energy efficiency, expediting the opportunity for customers to experience newer technology, or allowing Idaho Power to gather data or validate potential energy savings resulting from behavior change.

Idaho Power recognizes the need to educate and guide customers to promote behavior change and awareness and plans program activities accordingly. Items may be distributed at events and presentations, through direct-mail, or during home visits conducted by energy advisors.

The Educational Distributions effort is made up of four programs: Welcome Kits, Energy-Saving Kits (ESK), Student Energy Savings Kits (SEEK), and Giveaways.

- ***Welcome Kits**:* Idaho Power uses a vendor to mail Welcome Kits to brand-new customers between 35 and 45 days after electric service begins at their residence. Each kit contains four LED lightbulbs, a nightlight, a greeting card, and a small flipbook containing energy-saving tips and information about Idaho Power's energy efficiency programs. The kits are intended to encourage first-time customers to adopt energy-efficient behaviors early in their new homes. In 2019, Idaho Power sent 30,099 Kits with savings of 1,040,221 kWh.
- ***Energy-Saving Kits**:* Idaho Power works with a kit vendor to offer two versions of its free ESKs: one for homes with electric water heaters and one for homes with alternate-source water heaters. Customers enroll at www.idahopower.com/save2day, by calling 800-465-6045, or by returning a postcard. A kit is sent directly to the customer's home. Each ESK contains nine LED lightbulbs (six 800-lumen lightbulbs and three 480-lumen lightbulbs), a digital thermometer (to check refrigerator, freezer, and water temperatures), a shower timer, a water flow-rate test bag, an LED night light, and educational materials. In addition, the kit for homes with electric water heaters contains a high-efficiency showerhead with a thermostatic shower valve and three faucet aerators—one for the kitchen and two for bathrooms. Idaho Power also gives away limited quantities of energy kits at presentations and small events to gather interest in energy efficiency.

  In 2019, Idaho Power sent 41,710 ESKs with savings of 7,484,734 kWh. This sub-program is currently scheduled to sunset at the end of 2020. It has very high saturation rates, and it is projected to not remain cost-effective in 2021.
- ***Student Energy Efficiency Kits**:* The SEEK program provides fourth- to sixth-grade students in schools in Idaho Power's service area with quality, age-appropriate instruction regarding the wise use of electricity. Each child who participates receives a take-home kit. The products in the kit are selected specifically to encourage energy savings at home and engage families in activities that support and reinforce the concepts taught at school.

Once a class enrolls in the program, teachers receive curriculum and supporting materials. Students receive classroom study materials, a workbook, and a take-home kit containing the following: three LED lightbulbs, a high-efficiency showerhead, an LED nightlight, a furnace filter alarm, a digital thermometer for measuring water and refrigerator/freezer temperatures, a water flow-rate test bag, and a shower timer.

At the conclusion of the program, students and teachers return feedback to Idaho Power's vendor indicating how the program was received and which measures were installed. The vendor uses this feedback to provide a comprehensive program summary report showing program results and savings.

Unlike most residential programs offered by Idaho Power, SEEK results are reported on a school-year basis, not by calendar year. For the 2018-2019 school year, Idaho Power sent 10,053 Kits with a savings of 2,113,543 kWh.

- ***Giveaways:*** Giving away energy efficiency measures is an effective way to connect Idaho Power with its customers and begin productive conversations around energy efficiency. Idaho Power field staff and energy efficiency program specialists seek opportunities to educate customers about about savings opportunities and offer customers free Giveaway Kits or a free lightbulb to use immediately in their own homes. In 2019, Idaho Power gave away 12,946 LED lightbulbs with a savings of 111,853 kWh and 720 kits with a savings of 55,123 kWh.

2.2 Evaluation overview

DNV GL conducted an impact and process evaluation for this program. Table 2-1 lists the evaluation tasks.

The key objectives of the impact evaluation were to:

- Determine and verify the energy (kWh, kW) impacts attributable to the 2019 program.
- Provide credible and reliable program energy and non-electric/non-energy (e.g. avoided emissions, water savings, transmission/distribution benefits) impact estimates and ex-post realization rates attributed to each program for the 2019 program year.
- Report findings and observations and provide recommendations that enhance the effectiveness of future ex-ante savings analysis and the accurate and transparent reporting of program savings.

The key objectives of the process evaluations were to:

- Evaluate program design including program mission, logic, and use of industry best practices.
- Evaluate program implementation including quality control, operational practice, outreach, and ease of customer participation.
- Evaluate program administration including program oversight, staffing, management, training, documentation, and reporting.
- Report findings, observations, and recommendations to enhance program effectiveness.

Table 2-1. Evaluation Tasks by Program

Task	Education Distributions
Program staff interviews	✓
Tracking system review	✓
In-depth Interviews	2*
Welcome Kit recipient surveys	153
Non-energy impacts	✓
Program theory review	✓
Program materials review	✓
Reporting	✓

* DNV GL had several detailed conversations with program staff as part of the regular evaluation check-ins that provided information DNV GL needed from a program staff interview.

2.3 Layout of report

The remainder of this report is organized into the following sections:

- Section 3 Methods – describes the evaluation activities in detail
- Section 4 Impact findings – reports findings relevant to verification of program savings
- Section 5 Process findings – reports findings relevant to program processes and materials
- Section 6 Key findings and recommendations – lays out the key findings and provides recommendations for program improvement

3 METHODS

This section provides detailed descriptions of the methods DNV GL used to evaluate the program.

3.1 Data collection

3.1.1 Surveys

To conduct the surveys, DNV GL started by drafting instruments and providing them to IPC for review. After revising the instrument based on feedback, DNV GL programmed the survey into its online survey administration platform and conducted several test runs to verify the accuracy of the programming. Next, DNV GL conducted a "soft launch" of the survey where DNV GL sent email invitations to only 50 Welcome Kit participants. After reviewing the outcomes of the soft launch to verify respondents were able to understand the survey and ensure there were no programming errors, DNV GL conducted a full launch of the survey to the entire primary sample.

The soft launch occurred on November 30, 2020. The response rate for the soft launch was low enough that DNV GL decided to release both the primary and backup samples on December 2. DNV GL sent reminder emails on December 7 and December 10. DNV GL sent two reminders to participants who had not yet responded. One occurred on December 9th and the other was after December 10th. The maximum number of touches any participant received was three. DNV GL ended data collection on December 28. At that time, 153 participants responded for a final response rate of 5.5%. This is within the typical range DNV GL saw for residential surveys in 2020.

The survey instrument can be found in APPENDIX C. It was designed to check program awareness, experience, and satisfaction. The survey also asked measure verification questions to gather information on installation rates and uses for the Welcome Kit's LED nightlight.

3.1.2 Survey sampling

Using statistical results from prior surveys DNV GL completed for Idaho Power evaluations last year to estimate expected variances, DNV GL determined that 100 completed surveys would be large enough to provide 90/10 statistical precisions.[1] DNV GL generated a primary sample of 300 customers and a backup sample of 100. DNV GL stratified the samples by region, and then selected a sample in each region proportional to the percentage of the participant population. Out of the 400 selected customers, 313 (22%) were missing email addresses, and approximately 33% were listed as inactive customers. DNV GL retained the customers without email addresses but filtered out the inactive customers. The final primary sample contained 190 customers and the backup sample contained 62.

Because of low initial response rates, to achieve the target of 100 responses, DNV GL selected an additional sample of 2,800 from the population of active accounts, stratified by region and proportionally allocated.

3.1.3 In-depth interviews

DNV GL uses in-depth interviews to obtain a fuller, richer, and more tangible understanding of the complex issues associated with program delivery than close-ended surveys provide. Such interviews help devise solutions to participation barriers and allow us to explore how various market factors could impact future program design and delivery. DNV GL design semi-structured interviews to be flexible. This allows the interviewer to probe for depth and go "off script" when interesting and useful information comes up. When

[1] 90% confidence that the true value is within 10% of the value derived from the survey responses.

interviewers have the flexibility and training to persist and politely probe a little deeper, more relevant information can surface.

DNV GL's process for developing and fielding the in-depth interviews was similar to that of the surveys. DNV GL first designed instruments and provided them to Idaho Power for review. After revising the instruments, DNV GL conducted phone calls with the program managers and the program vendors using those instruments as guides. Sampling for the in-depth interviews was unnecessary because of their qualitative nature and the very limited number of respondents to contact. The interview guides can be found in APPENDIX A and APPENDIX B. DNV GL conducted an in-depth interview with the SEEK program vendor. During the evaluation, DNV GL had several conversations with the IPC program manager and were able to answer all questions from the interview guide during those conversations.

3.2 Tracking system and project file review

The tracking system review verifies the tracking data broadly. During the tracking system review DNV GL:

- Confirmed that the database savings match program reporting
- Confirmed that the database includes all variables needed to calculate and evaluate program savings
- Verified that the required variables contain usable data in consistent formats
- Checked the accuracy of any programmed formulas used to calculate savings and incentives
- Confirmed that the line-by-line records match specifications from the reference material such as the Regional Technical Forum (RTF) savings workbooks

3.3 Program theory review

The program theory review is the primary means of determining if the program design meets industry best practices. It provides a check that the program has been well thought out, is reasonably designed to achieve its goals given reasonable assumptions, and has considered short and long-term consequences of the program. Questions DNV GL explored during this task included:

- Has the program enumerated the market barriers it is trying to overcome?
- Is the program designed to effectively lower those market barriers?
- Will lowering those market barriers lead to the outcomes the program seeks?
- Are assumptions and external factors considered and accounted for?
- Have negative consequences and unintended consequences been considered?
- Are key stakeholder interests reflected or taken into account?

The program did not have a written logic model, so DNV GL produced one.

3.4 Program materials review

The information gathered during the program materials review was used to assess program design, administration, and implementation. DNV GL reviewed the following materials:

- Marketing materials and websites
    - **ESK Marketing Materials**. DNV GL evaluated all ESK marketing and education materials, including marketing postcards and emails, ordering instructions, educational guides, and kit packaging.
    - **SEEK Marketing Materials and Website**. DNV GL also reviewed SEEK program content sheets, which are used to recruit new teachers and schools for the program. The program website was

tested and reviewed to ensure there were working hyperlinks and appropriate and necessary program information.

- Participant instructions, tools, worksheets
  - **Welcome Kit Materials**. DNV GL assessed the Welcome Kit educational booklet, greeting card, and kit packaging.
  - **2018-2019 SEEK Student and Teacher Materials**. DNV GL looked at the teacher lesson plans and student workbooks, including measure installation instructions.
- **2018-2019 SEEK report by Resource Action Programs (RAP)**. RAP implemented the program and prepared this report on the program outcomes. Rather than reimplement the data collection and analysis represented in this report, DNV GL received the raw survey data from Idaho Power and vetted the calculations and conclusions made in the report. DNV GL also reviewed the formulas and assumptions used for energy savings calculations and verified that ex ante savings calculations applied those formulas accurately.

3.5 QA/QC review

DNV GL reviewed quality assurance and quality control practices as described during in-depth interviews and discussions with program managers.

3.6 Non-energy impacts

DNV GL maintains a database of non-energy impacts (NEIs) published in publicly available reports. NEIs are associated with specific measures in specific contexts. DNV GL assigns rankings of confidence and plausibility for each value, which DNV GL used to discount values from lower quality or older studies. Each value in the database is assigned a multi-level categorization to match with the measure for which NEIs are sought. The lower levels of categorization classify broad aspects like sector (residential or non-residential), and the higher levels of categorization capture detailed measure characteristics from the study. DNV GL used the highest categorization possible to identify NEI matches for these residential measures. Once all potential studies were identified, DNV GL chose the most applicable NEI types and values based on study confidence. In the case of these measures for Idaho Power, there was only a single NEI for each measure in residential contexts.

4 IMPACT FINDINGS

This section provides detailed findings on Education Distribution program savings.

4.1 Impact summary

The ex-post savings values for all measures utilized the same deemed values and custom calculation methodologies as ex-ante. The overall Realization Rate (RR) for electric savings (kWh) is 97.2%. (Table 4-1).

Key impact findings

1. *The Overall program's overall RR=97.2%.*
2. *ESK savings decreased due to reductions in savings to water heating measure savings to customers, RR=96.9%.*
3. *SEEK savings decreased due to lower LED savings, RR=96.5%.*
4. *Welcome Kits had an RR of 100%.*
5. *The RR for number of kits was 100%.*
6. *Lifetime NEIs for the 2019 program measures are approximately $1.16 million.*

Table 4-1. Impact evaluation summary

Kit Type	Tracked Ex-Ante Savngs (kWh)	Verified Ex-Post Savings (kWh)	RR% (kWh)	Tracked Quantity of Kits	Verified Quantity of Kits	RR% (Kits)
Energy Savings Kits (ESK)	7,484,734	7,255,455	96.9%	41,710	41,710	100%
Welcome Kits (WK)	1,040,221	1,040,221	100%	30,099	30,099	100%
Giveaway Kits (GK)	166,977	166,977	100%	13,666	13,666	100%
Student Energy Efficiency Kits (SEEK)	2,113,566	2,040,467	96.5%	10,053	10,053	100%
Total	**10,805,498**	**10,503,120**	**97.2%**	**95,528**	**95,528**	**100%**

There are two types of kits for which ex post savings differed from ex ante savings. Ex post savings for ESK were lower than ex ante savings because approximately 1,000 records received electric kit savings; however, it is unknown if those customers had an electric water heater because the customer did not specify their water heater type when they signed up for a kit. While some customers may have an electric water heater, the number is unknown. Programmatically, the customer should have received the non-electric version of the kit so any electric savings associated with the water saving kit items should not have been included. For SEEKs, the showerhead ex post savings were greater than the ex ante savings because of a miscalculation by the vendor. However, LED ex post savings were lower than ex ante savings in the SEEKs because of an assumption the vendor made about the wattage of the "other" replaced bulbs. The details of

the savings adjustments for ESK are summarized in Table 4-2 and SEEK in Table 4-3. Additional details are discussed in the following sections.

Table 4-2. ESK savings adjustment

Quantity of Records Impacted	Tracked (kWh)	Verified (kWh)	RR% (kWh)	Details
1,014	310,882	78,460	25%	Records with unknown water heaters that received electric kit savings. Savings adjusted to reflect the non-electric kit savings.

Table 4-3. SEEK savings adjustments

Kit Measures	Tracked (kWh)	Verified (kWh)	RR% (kWh)	Details
Showerhead	926,688	936,659	101.1%	Values for baseline and efficient showerhead flowrates from survey responses were higher than the ex ante values. For verified savings, DNV GL used the responses that had values for both the baseline and efficient cases. Additionally, DNV GL found that the ex ante calculations assumed the largest bin for the efficient case to have a range of 1.6gpm to 1.8 gpm instead of the 1.6 to 1.75 that was indicated on the survey instrument. These minor changes resulted in greater verified savings.
LED	760,331	677,274	89.1%	Ex ante savings assigned a baseline value of 40 watts to responses of "Other" in the student surveys. This aligns with the lowest wattage option in the survey. However, for verified savings, DNV GL assigned a value of 13 watts for this response. There may be several reasons why "Other" is used, but DNV GL think it is reasonable to take a more conservative estimate and assign a wattage that is consistent with a 60 watt equivalent CFL. This resulted in reduced evaluated savings.

4.2 Tracking data review

Idaho Power provides tracking data for all four distribution channels (ESK, Welcome Kits, SEEK, and Giveaways). Evaluation review of 95,528 records found that tracked quantities of kits distributed, in all channels, were accurate. The only errors identified were in the ESK data:

- 1,014 electric kits were sent to households with an unknown water heater fuel type, which led to a potential overestimation of electric savings by 232,422 kWh.

4.3 Savings calculation review

Ex ante savings values and calculation methods were provided and reviewed. All of the program kits used a selection of the measures detailed in Table 4-4.

Table 4-4. Educational Distributions measures and ex ante savings

Measure	Kit Type	Energy Savings	Calculation Type	Savings Source
LED Bulb	ESK, Welcome Kit, Giveaway	8.6 kWh per unit	Deemed	Regional Technical Forum
	SEEK	50.3 kWh per unit	Custom Calculation	Resource Action Plan, student survey
LED Nightlight	SEEK	28.5 kWh per unit	Custom Calculation	Resource Action Plan. No savings claimed for ESK, Welcome Kit, and Giveaway
Showerhead	ESK	147.8 kWh per unit	Deemed	Regional Technical Forum (With reduced installation rate)
	SEEK	233.8 kWh per unit	Custom Calculation	Resource Action Plan, student survey
Shower Timer*	ESK, Giveaway	N/A	N/A	No savings claimed for this measure
	SEEK	84.9 kWh per unit	Custom Calculation	Illinois Super Savers Program; no savings claimed for this measure
Faucet Aerators	ESK	27.0 kWh per unit	Deemed	Regional Technical Forum
FilterTone Alarm	SEEK	78.2 kWh per unit	Custom Calculation	Resource Action Plan, student survey

*Idaho Power has not claimed savings for shower timer measures in any kit offering.

All of the ex ante deemed savings values were reviewed and no errors were identified. The SEEK ex ante savings are calculated with inputs from student survey responses. DNV GL used the raw student responses to verify the SEEK savings calculations and identified some discrepancies in the inputs used for ex ante savings for the LED bulb, showerhead, and shower timer measures. Ex ante and ex post savings calculations and realization rates are in Table 4-5.

The realization rate for LEDs was less than 100% because the SEEK vendor assumed a baseline of 40W for the "Other" type of bulb in the student surveys. DNV GL used an assumption of 13W for this case because it is both more conservative and would cover situations where students replaced CFLs rather than incandescent bulbs.

The realization rate for showerheads is greater than 100% because the ex ante calculations used a range for the post-install flow rates that was wider than the option listed in the survey. The ex post calculation used the midpoint of the range listed on the survey. This reduced the post-install flow rate slightly, resulting in slighting increased savings.

Table 4-5. Ex ante and ex post inputs for SEEK measures

Measures	Ex ante input values	Ex post input values	Ex ante savings	Ex post savings	Realization rate
LED Bulb	First LED Baseline Wattage: 58.6	First LED Baseline Wattage: 53.57	50.9 kWh per unit	45.7 kWh per unit	89.8%
	Second LED Baseline Wattage: 57.7	Second LED Baseline Wattage: 52.5	50.0 kWh per unit	44.6 kWh per unit	89.3%
	Third LED Baseline Wattage: 57.7	Third LED Baseline Wattage: 51.69	49.9 kWh per unit	43.8 kWh per unit	87.7%
Showerhead	Baseline Gallons per Minute: 2.0	Baseline Gallons per Minute: 2.0	233.8 kWh per unit	336.4 kWh per unit	101.1%
	Efficient Gallons per Minute: 1.3	Efficient Gallons per Minute: 1.25			
Shower Timer*	Average Gallons per Minute: 1.65	Average Gallons per Minute: 1.66	85.0 kWh per unit	85.9 kWh per unit	101.2%

* Idaho Power has not claimed savings for shower timer measures.

Ex ante savings are calculated for the Shower Timer measure. However, the program does not claim these savings due to uncertainty in savings concerns. DNV GL reviewed this measure to assess if savings should be claimed in the future. Based on its review, DNV GL found limited TRM coverage of this measure outside of Idaho and only one impact evaluation.[2] That impact evaluation conducted participant surveys and found that only 21% of respondents that had the shower timer installed actually used the timer. The impact evaluation calculates savings similar to the ex ante savings but applies the 21% usage factor, reducing savings. Therefore, DNV GL agree with the decision to not claim savings for this behavioral measure.

[2] Elementary Energy Education GPY4 Evaluation Report, Nicor Gas Company, Navigant. 2016.

4.4 Non-energy impacts

Table 4-6 shows the NEI, value, and unit for each of the measures for which DNV GL had residential values in its NEI database. Table 4-7 shows the application of those NEIs to the measures distributed by the program. The resulting total lifetime NEIs for the program measures distributed in 2019 are $1,161,279.90.

The kits also produce customer satisfaction and increased awareness and education about energy and energy efficiency. These NEIs are real, but not readily convertible to a monetary value.

Table 4-6. NEIs per measure

Measure	NEI	Value	Unit
Faucet aerator	Avoided pollution - Societal	$2.55*10^{-5}$	$/kWh/yr
LED	Lighting quality and lifetime - Participant	3	$/installed measure/lifetime
Low flow showerhead	Avoided pollution - Societal	$2.55*10^{-5}$	$/kWh/yr

Table 4-7. Program NEI estimates by measure

Measure	2019 verified results (kWh or installed measures)	Measure life (years)*	Lifetime NEI value
Faucet aerator	1,501,335 kWh	10	$383
LED	386,654 installed	n/a	$1,159,962
Low flow showerhead	3,666,717 kWh	10	$935
Total NEIs			$1,161,280

* Measure lives are based on RTF estimates retrieved 12/09/2020: https://nwcouncil.app.box.com/v/Aeratorsv1-0; https://nwcouncil.app.box.com/v/ResComShowerheadsv4-3; Measure life is n/a for LEDs because the NEI is already in lifetime units.

5 PROCESS FINDINGS AND TARGETED RECOMMENDATIONS

This section provides detailed findings on program operations and materials. The evaluation included in-depth interviews, review of program logic and materials, QA/QC review, and program participant surveys.

Key process findings

1. *Program materials are well-produced and contain the recommended information*
2. *QA/QC processes are satisfactory with a few opportunities to improve*
3. *Participants are satisfied with kit programs*
4. *IPC could claim a small amount of savings from the Welcome Kit nightlights (12 kWh/kit). If these evaluated savings are added to the program, realization rate will increase to 106.7%.*

5.1 In-depth interviews

The in-depth interview with the SEEK vendor and conversations with program staff revealed the following:

SEEK

- According to vendor staff, the SEEK program has been successful and highly regarded among participating schools and teachers.
- The SEEK program's success relies on teachers to not only administer the program but provide accurate information in the materials that are returned and later used to calculate energy savings. There is continuous outreach effort throughout the program year to ensure teachers have support from program administrators and their Education and Outreach Energy Advisors (EOEAs)
- The ex ante savings calculations for the SEEK kits use the midpoints in the ranges for showerhead flow rate and assumed 40W for baseline wattage of "Other" bulbs. This informed DNV GL's impact evaluation.
- Idaho Power decides the measures to include in SEEK-based on cost-effectiveness determined using savings calculated by RAP based on the survey results, practicalities on shipping and box size, leftover supplies from the previous program year, and whether or not the measure is self-installable. The measures are reviewed on an annual basis during a kickoff meeting between the utility and vendor staff.
- As a result of the COVID-19 pandemic, the SEEK program has boosted its online presence by putting materials onto the website and allowing for the survey to be done using an online scantron. The program has also implemented direct-to-student shipping, which can be done through an enrollment using a teacher's identification code. However, this option has not yet been utilized. The original enrollment target for the 2021 program year was 10,000 participants, and the fall 2020 semester has so far done better than expected. At the time of the interview, 9,800 kits had been sent to teachers. Due to this, the target participant goal for the 2021 program year has been updated to 12,500.

ESK

- Idaho Power reported they plan to stop sending the ESKs in 2021 because lighting baseline changes and reduced savings from the thermostatic shower valve and showerhead combination units prevent the kits from achieving cost-effectiveness.

Overall

- QA/QC processes are generally good. Idaho Power may wish to consider minor improvement opportunities as practicable.

5.2 Program logic review

To support the process evaluation, DNV GL developed logic models for the SEEK and Welcome Kit programs using program materials and information gathered during the in-depth interviews. The logic models are shown in Figure 5-1 and Figure 5-2.

Figure 5-1. SEEK program logic model

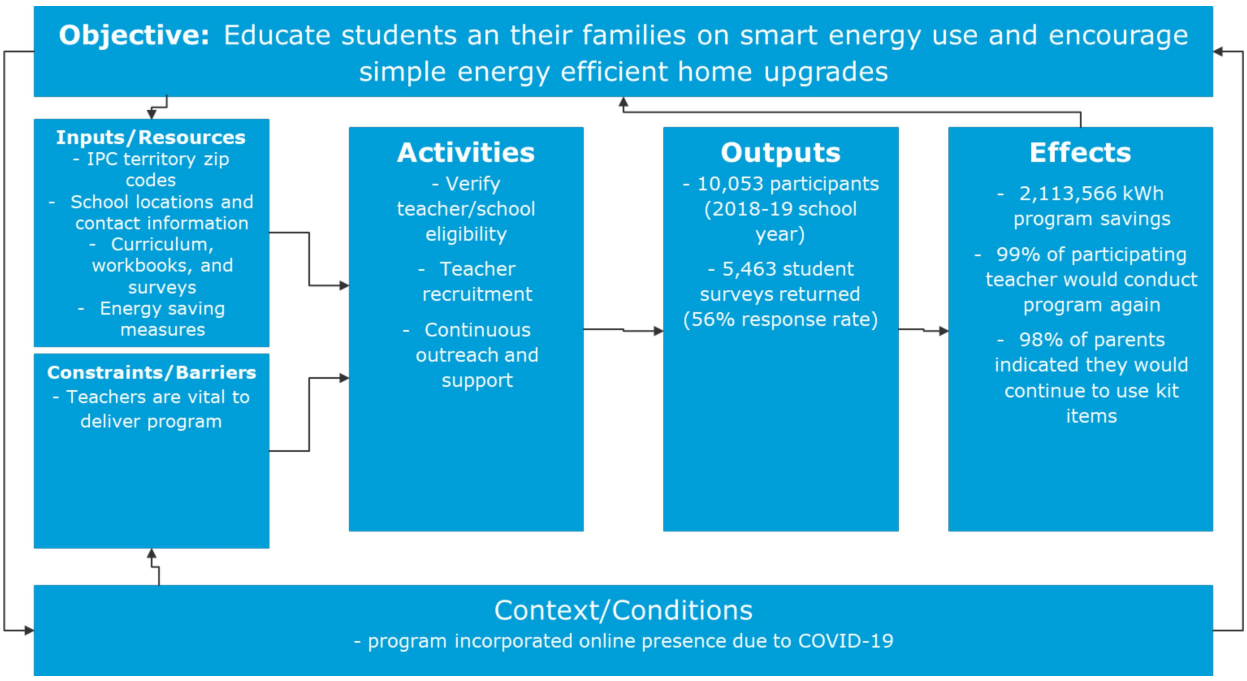
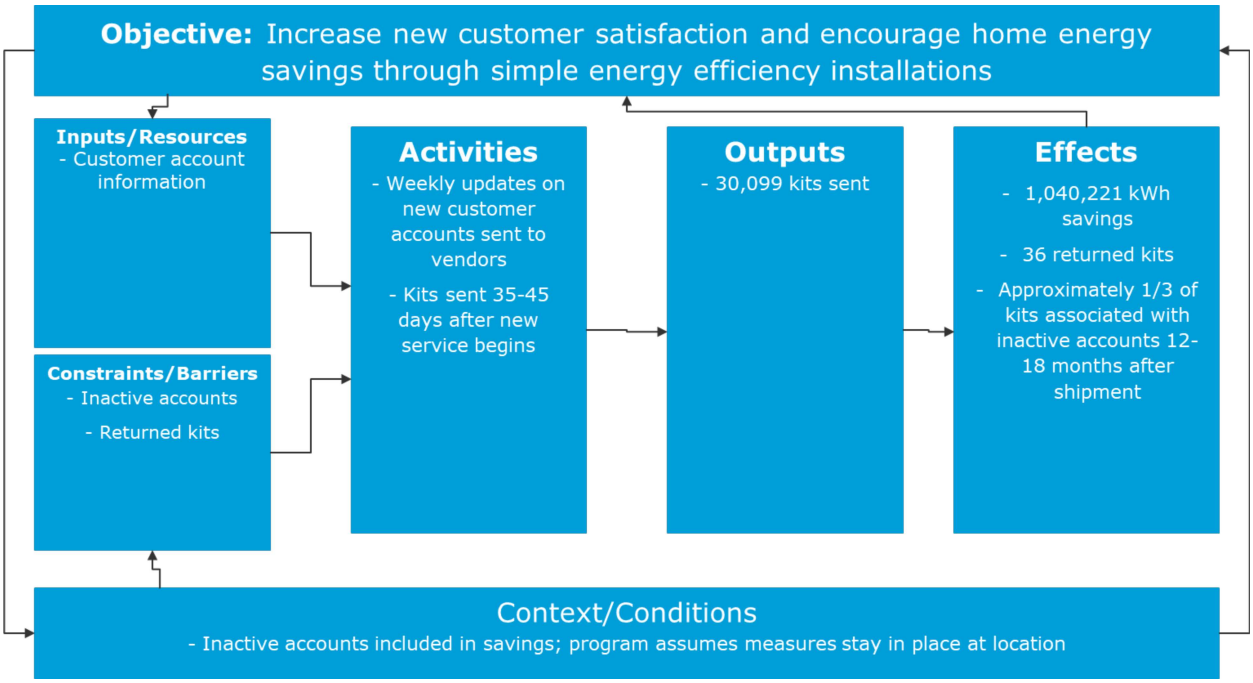


Figure 5-2. Welcome Kits program logic model



5.3 Program materials review

5.3.1 Marketing materials and websites

The marketing materials were visually appealing and user-friendly. The various flyers, flipbooks, and guides displayed utility branding and conveyed the appropriate and relevant information.

The SEEK program website is also visually appealing and conveys the necessary program information for program participants, including program overview, contact information, and working links to further information for students, parents, and teachers.

With the closing of the ESK program, the website now redirects customers to learn more about other energy efficiency programs through Idaho Power. The landing page also allows customers to request a free copy of the *30 Simple Things You Can Do to Save Energy* booklet. This is a good way to continue to provide information to interested customers after the program ends.

5.3.2 Participant instructions, tools/worksheets

DNV GL reviewed the instructions and worksheets/books for the 2018-2019 SEEK program. The materials used for both teacher instruction and student learning were comprehensive and intuitive. Like the marketing materials, the guides and student workbooks were visually appealing, engaging, and displayed appropriate utility branding. The teacher book included extensive information as well as tips and relevant, grade-appropriate graphics. Overall, all instructions and guides were clear, succinct, and easy to understand.

5.3.3 2018-2019 SEEK report

The 2018-2019 SEEK Report by RAP included a thorough evaluation of the program, DNV GL evaluated the report to assess and verify the findings. A random sampling of program satisfaction survey data and energy savings calculations were vetted. Raw survey data were analyzed to confirm satisfaction percentages and calculations were correct. DNV GL found the report information to be accurate and complete.

5.4 QA/QC review

DNV GL assessed the quality assurance and control mechanisms related to program delivery and energy savings calculations.

5.4.1 Energy Saving Kits and Welcome Kits

The quality control processes for the ESK and Welcome Kits programs are satisfactory with a few opportunities to improve. The program staff interview revealed that address information is provided by the utility's customer information system. This current customer information is sent to both vendors every week. Processes for identifying new customers have been automated and allow the vendor to ship Welcome Kits promptly. Shipment deliveries for the ESK program arrive promptly with most kits arriving in less than half the business days that are stated on the website.

Approximately 140 ESKs were returned due to undeliverable mail. Idaho Power investigated these situations. The vendor validates addresses with software and reported this quantity is similar to what they expected to see. Idaho Power determined that some kits were being forwarded by the USPS and asking for postage due on delivery. ESKs are supposed to be free to customers and are not supposed to be shipped

outside of the IPC service area, so the vendor implemented a code on the shipping label to cease forwarding. This caused kits to be returned. The vendors refunded Idaho Power all costs for returned kits.

During the evaluation, DNV GL found that approximately one-third of Welcome Kits were associated with accounts that went inactive 12 to 18 months after the kits shipped. These situations are most likely due to renters moving out between the time that IPC shipped the kit and the evaluation. IPC assumes the measures stay behind and remain installed per RTF installation rates. This assumption may be overly optimistic – it is likely that some people take at least some of the measures with them when moving. Thus, the assumption could result in a slight overestimation of energy savings, particularly if customers move out of the Idaho Power service area.

There were 36 Welcome Kits that Idaho Power could not verify delivery to the customers' address. Part of Idaho Power's QA process was to negate any savings resulting from these kits. DNV GL approves of this conservative approach.

5.4.2 Student Energy Efficiency Kits

Overall, the SEEK program has good quality control in its program design and implementation. The vendor researches and verifies participant eligibility before sending out any marketing materials for the program year. The vendor tracks each school's participating grades and rules the following grades ineligible for subsequent years until students who participated are no longer in the program eligible grades. DNV GL learned that program outreach is proactive and continuous, and the outreach team guarantees a response within two business days. While the ideal program implementation would include installation verification, DNV GL understands the difficulty in doing so.

DNV GL found an opportunity to improve quality assurance for the SEEK ex ante savings calculations. As already mentioned in the impact section, when completing the survey, students are given the option to select "other" for the wattage of the incandescent bulb they replaced (see APPENDIX B). The energy calculations use savings assumptions for a 40-watt incandescent. However, since the vendor does not get the student workbooks back, there is no process in place to ensure that the lightbulb being replaced is really an incandescent.

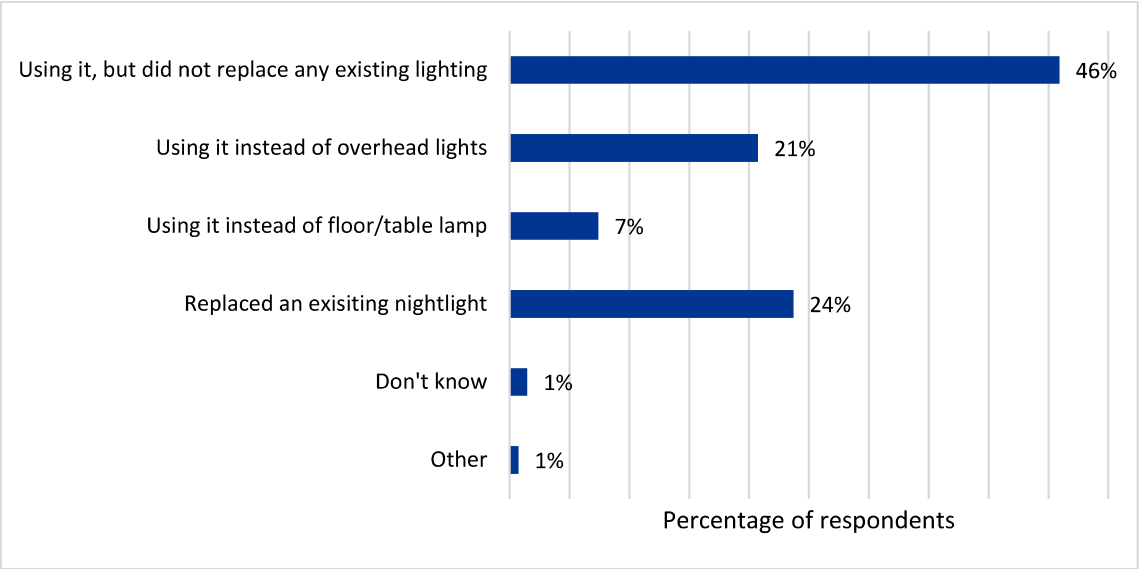
5.5 Program participant surveys

DNV GL sent surveys to Welcome Kit recipients. The surveys asked about nightlight installations and satisfaction with the program.

5.5.1 LED nightlight installations

Almost all (92%) of respondents stated they installed the included LED nightlight. Nearly half of these (42% of all respondents; 46% of those who installed) said the nightlight did not replace any existing lighting. Of those who did replace existing lighting, 23% said they replaced an old nightlight with the new LED nightlight (Figure 5-3), 21% said it replaced overhead lights, and 7% said it replaced a floor or table lamp.

Figure 5-3. Welcome Kit LED nightlight use



An overwhelming majority of the respondents who used the new kit nightlight to replace an existing nightlight replaced a nightlight with an incandescent bulb. Figure 5-4 displays the full results of the type of nightlight bulbs that were replaced with the kit's LED nightlight. Figure 5-5 displays the type of bulbs in floor/table and overhead lights that were replaced with the LEDs. Approximately half (55%) of the floor/table and overhead lamps were CFLs or LEDs.

Figure 5-4. Welcome Kit LED nightlight bulb type replacement for existing nightlights

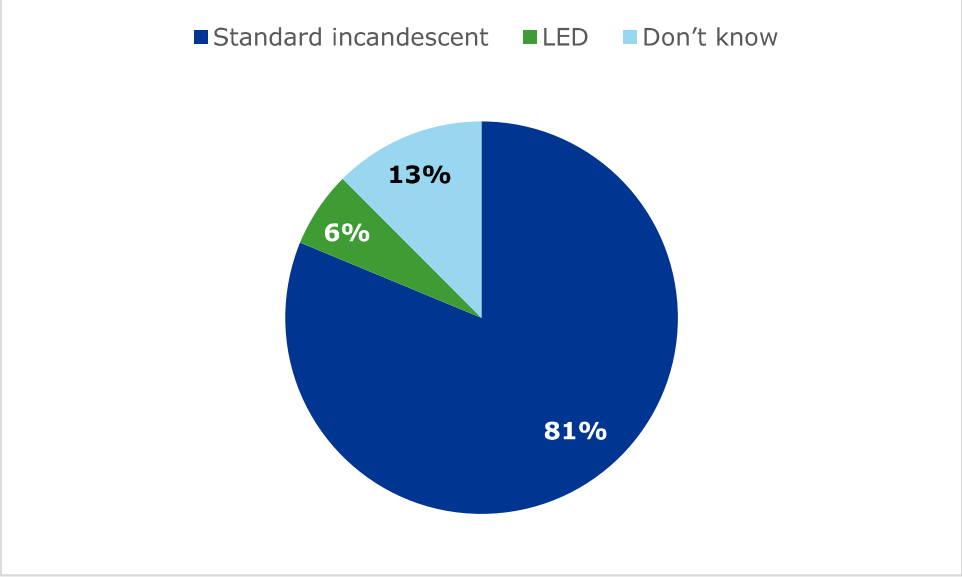
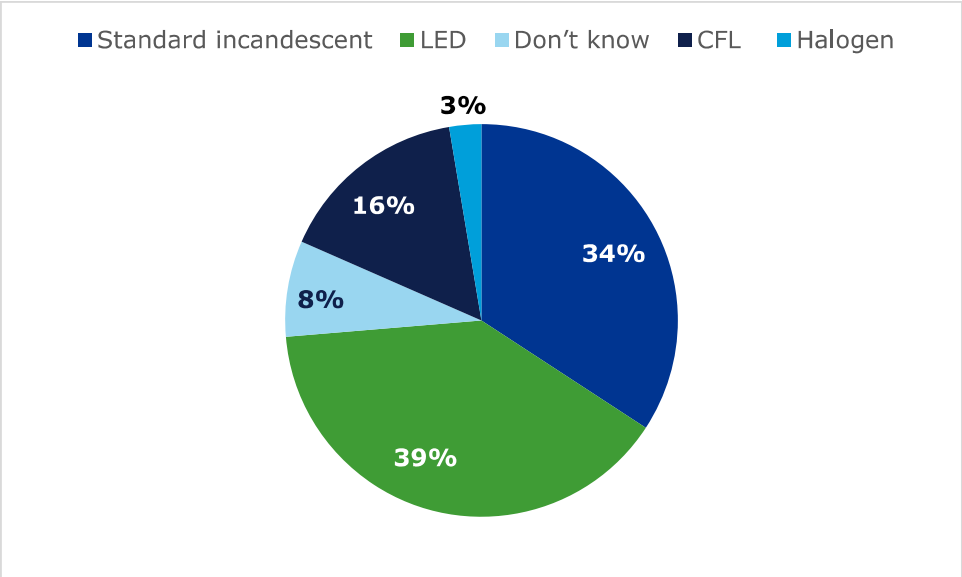


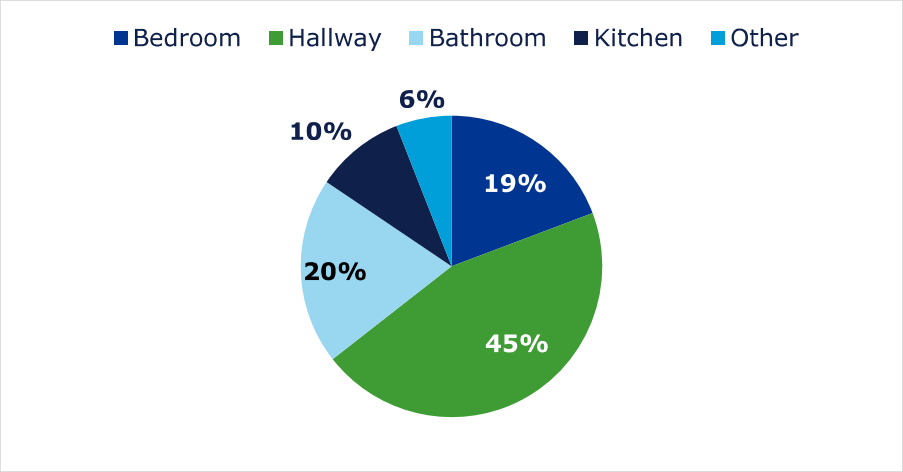
Figure 5-5. Bulb type in overhead/floor/table lighting



The 42% of respondents who said the nightlight did not replace existing lighting would represent a new load (approximately 0.5W per kit). The 17% of respondents who said it replaced an incandescent nightlight would save approximately 4W per kit. A conservative savings estimate for the 26% of respondents who said it replaced a table, floor, or overhead lamp is 15W per kit (assumes a 15.5W average for standard A-form bulbs which would skew towards existing CFLs or LEDs). Weighting these savings by the installation percentages results in an estimated 4.4W saved per kit. Assuming an 8-hour/day hours of use (2,920 hours per year), DNV GL estimates 12 kWh savings per year per kit from the nightlights. Across all welcome kits and ESKs this would add 1,025,700 kWh to evaluated savings. This would increase the realization rate to 106.7%.

More specific hours of operation estimates could be calculated from the respondents' answers to installation location questions. Figure 5-6 shows the frequency of installation locations for the 92% of respondents who reported installing the nightlight. Those reporting the installation location as "Other", stated it was installed in places such as the basement, garage, dining room, and in pantries/closets.

Figure 5-6. Welcome Kit LED nightlight installation location



5.5.2 Satisfaction

Overall, participants had a positive experience with the Welcome Kit program. 94% of respondents reported being satisfied (4 or 5 on a five-point scale) with the energy-saving measures in the kit and 97% reported that they were pleased to receive the Welcome Kit.

Unprompted verbatim responses indicated that the kits were good for developing customer relationships and positive brand imaging according to 22% of respondents who opted to provide additional comments. Including more information on where to buy similar lightbulbs, as well as the possible inclusion of smart power strips, were suggested for inclusion in future Welcome Kits.

"It was fantastic being able to change bulbs out with energy efficient bulbs since my apartment light bulbs were mediocre at best. These were much brighter and a very welcome gift as a new Boise resident!"

5.5.3 Additional educational effects

A majority of respondents who read the educational booklet (80%) indicated that it helped them learn new information regarding different energy-saving tips and Idaho Power account information. Nearly one-third of respondents would consider participating in other Idaho Power programs, such as energy-efficient lighting, energy-efficient products, heating and cooling efficiency, and rebate advantage programs between now and the end of 2021.

6 KEY FINDINGS AND RECOMMENDATIONS

6.1 Key findings

6.1.1 The program's overall savings realization rate is 97.2%.

Welcome Kits had an RR of 100%. ESK savings decreased due to reductions in savings to water heating measure savings (RR=96.9%)because the vendor sent electric kits to approximately 1000 customers without confirmed electric water heating. SEEK savings decreased due to lower LED savings because of a lower assumed baseline wattage for "Other" bulbs (RR=97%). This decrease was slightly counteracted by a 101% realization rate for showerheads due to a slight reduction in post-install flow rates to match the response options on the student surveys. If the program claimed evaluated savings for nightlights for welcome kits and ESK, realization rates would increase to 106.7%

6.1.2 The realization rate for number of kits was 100%.

DNV GL verified the program tracking accounte for all of the delivered kits. The kits delivered to customers without confirmed electric water heating slightly reduced the savings realization rate, but this did not affect the realization rate for the number of kits sent.

6.1.3 Lifetime non-energy impacts (NEIs) for the 2019 program measures are approximately $1.16 million.

Almost all of these savings come from the LEDs. Additional NEIs for which DNV GL could not assign a monetary value include increased customer satisfaction and increased knowledge and awareness of energy efficiency.

6.1.4 Idaho Power reported that they plan to stop sending ESKs because they will not remaincost-effective in 2021.

6.1.5 Program materials are well-produced and contain the recommended information.

6.1.6 QA/QC processes are satisfactory with a few opportunities to improve.

6.1.7 Participants are satisfied with the Welcome Kits.

6.1.8 IPC could claim a small amount of savings from the Welcome Kit nightlights.

Based on survey responses, DNV GL estimates approximately 12 kWh annual savings per year per kit from the nightlights. Across all welcome kits and ESKs this would add 1,025,700 kWh to evaluated savings.

6.2 Recommendations

6.2.1 For SEEK lighting saving calculations, assume 13W for baseline wattage for "Other" bulbs.

The SEEK program's savings calculations are based on the difference in wattage between a baseline bulb and the LED bulb included in the kit. Students are instructed to replace incandescent bulbs and to note the wattage of the replaced bulb on their survey form. The form provides responses for 40W, 60W, 100W, and "Other." The interview with the program vendor confirmed that they assumed a 40W baseline for the "Other" option. However, DNV GL recommends a more conservative assumption of 13W to cover the possibility that students did not perfectly follow the instructions and replaced a (60W equivalent) CFL rather than an incandescent.

6.2.2 Ask the SEEK vendor to provide a spreadsheet or code used to calculate savings.

Putting the supporting calculations into a standardized calculator would document assumptions such as which point-value within the ranges of each response option on the student survey the calculation used. It would also facilitate QA/QC by Idaho Power and help evaluators verify program savings.

6.2.3 Continue to not claim savings from the shower timers.

DNV GL did not find sufficient evidence that this measure results in measurable savings.

6.2.4 Consider additional research to better estimate the number of Welcome Kit recipients who take kit measures with them when they move.

Some people will take the LEDs with them when they move; however, there are no readily available estimates of how common this is. Additional research would be needed to estimate a frequency and establish a discount factor for energy savings claims if a customer moved out of Idaho Power service area.

6.2.5 For SEEK, if practical, consider allowing students to take pictures of the replaced/baseline equipment as a way of confirming/vetting the answers they provide on the survey.

This would provide an opportunity to vet the answers the students provided on their surveys as well as help determine the best wattage assumption to use for the "Other" category.

APPENDIX A. PROGRAM STAFF INTERVIEW GUIDE

INTRODUCTION

These are our outstanding process-related questions for the kits. For each question, we will want to know if the answer is the same for all types of kit or if there are different answers for different kits. By type of kit, we mean Energy Saving Kits, Welcome Kits, School Kits, and Giveaways.

KIT CONTENT

K1. How do you decide what energy savings measures are included in the kits? *Self-install, shipping, cost-effectiveness?*

K2. What other measures have you thought about including in the kits? *Smart power strips?*

K3. Are the cost-effectiveness tests based only on energy savings? Can you include any non-energy impacts?

KIT QUALITY CONTROL

Q1. Where do you get the customer address information from? ***The service and mailing address information comes from our Customer Information system.***

Q2. (For Welcome Kits) **What is the process for how a customer should receive a Welcome Kit?** *New account event? Move out event? Start service triggered by a stop service in a building?*

Q3. There were ~140 ESK kits returned due to undeliverable mail? How does that happen?

Q4. Were any Welcome Kits returned?

Q5. Under what conditions is somebody eligible for a second kit?

Q6. How do you recalculate energy savings if someone receives a second kit? Is this accurate?

Q7. Why are they so many inactive accounts?

Q8. How do you calculate energy savings if an account goes inactive?

Q9. Who oversees packing and sending the kits?

Q10. When a kit is requested to be sent, how long of a period is it before the kit is shipped to the customer?

COVID-19

C1. Has the COVID-19 pandemic resulted in any changes to the timing of deliveries?

C2. Has the COVID-19 pandemic resulted in any changes to the volume of kits being requested?

C3. Are there any other changes that were made as a result of the COVID-19 pandemic?

C3a. How long will any of the changes implemented as a result of the COVID-19 pandemic continue?

THANK YOU AND TERMINATE

END. Those are all the questions I have for you today. Thank you for your time.

APPENDIX B. SEEK VENDOR INTERVIEW GUIDE

INTRODUCTION

We are conducting a process evaluation of the school kit program for Idaho Power. We have a few questions about how you administer the program.

KIT CONTENT

K1. How do you decide what energy savings measures are included in the kits?

K2. What other measures have you thought about including in the kits?

PARTICIPANT SELECTION

PS1. How are schools recruited to participate in the program?

PS2. Does recruitment for the program happen year-round? *(Teachers request the month they would like to receive their materials)*

PS3. How do you determine what grades qualify to participate in the program?

PS4. How do you ensure a school that participates in the program for two consecutive years does not do the program with the same group of students?

ENERGY CALCULATIONS

EC1. What wattage do you assume for the OTHER selection when you calculate the savings?

[PROBE: Do you ever look in the student workbooks to determine that wattage?]

[PROBE: Are you able to confirm they replace an *incandescent* bulb rather than a CFL or other technology?]

EC2. When you do the energy savings calculations, what value from within each range do you use?

10. If you answered "yes" to question 9, what was the wattage of the incandescent bulb you replaced?
(Found in the box on page 11 of the Student Workbook)

- ○ 40-watt
- ○ 60-watt
- ○ 75-watt
- ○ 100-watt
- ○ Other

1. What is the flow rate of your old showerhead?
(Found on page 5 of the Student Workbook in the box "What is the flow rate of your old showerhead?")

- ○ 0 - 1.0 GPM
- ○ 2.1 - 2.5 GPM

3. If you answered "yes" to question 2, what is the flow rate of your new showerhead?
(Found on page 6 of the Student Workbook in the box labeled, "What is the flow rate of your new High-Efficiency Showerhead?")

- ○ 0 - 1.0 GPM
- ○ 1.1 - 1.5 GPM
- ○ 1.6 - 1.75 GPM

EC3. How did you calculate the flow rates that you used in the shower timer savings calculation?

QUALITY CONTROL

QC1. Please describe your quality control process. [PROBES: Accuracy of info in handouts, Accuracy of lessons teachers deliver, Student at-home activities, Accuracy of student calculations, Accuracy of energy-saving calculations, Validity of survey responses]

COVID-19

C1. How, if at all, has COVID affected the program?

THANK YOU AND TERMINATE

END. Those are all the questions I have for you today. Thank you for your time.

APPENDIX C. **PROGRAM PARTICIPANT SURVEY INSTRUMENT**

EMAIL INVITATION



DNV GL is contacting you on behalf of Idaho Power Company. Your household received a Welcome Kit from Idaho Power in 2019 that included an LED nightlight, four LED lightbulbs, and an educational booklet. We would like to ask some questions about your experience with the kit.

Your responses will help Idaho Power continue to provide Welcome Kits that are useful to new customers. It will only take you about 5 minutes to respond to all of our questions.

Your responses will be kept confidential and only reported in aggregate.

To complete the questionnaire, please click the following link. <<Link to survey>>

DNV GL is a research firm operating on behalf of Idaho Power Company. If you wish to confirm the legitimacy of this survey, you can contact me at cseverson@idahopower.com or call our Customer Care Team at (800) 488-6151.

INTRODUCTION

[WEB SURVEY INTRO]



Thank you for agreeing to answer our short questionnaire about Idaho Power's Welcome Kit!

Your responses will help Idaho Power continue to provide Welcome Kits that are useful to new customers. It will only take you about 5 minutes to respond to all of our questions.

For confirmation purposes, please enter the email address where you received the invitation:

_____

NIGHTLIGHT QUESTIONS

NL1. According to program records, the kit was sent to <address>. Which of the following best describes this address?

1	Primary residence	NL2
2	Secondary residence or vacation home	
3	Long term residential rental property	
4	Short term residential rental property such as Airbnb	
5	Prefer not to answer	

NL2. The kit included an LED nightlight. Have you installed it at <address>?

1	Yes	NL5
2	No	NL3
3	Don't know	Next Section

NL3. Did you install it somewhere else?

1	Yes	NL4
2	No	Next Section
3	Gave Away	Next Section
4	Other	Next Section

NL4. Which of the following best describes where you installed it?

1	Primary residence	NL5
2	Secondary residence or vacation home	
3	Long term residential rental property	
4	Short term residential rental property such as Airbnb	
5	Prefer not to answer	

NL5. Where did you install the LED nightlight?

1	Bedroom	NL6
2	Hallway	
3	Bathroom	
4	Kitchen	
5	Other (Specify_____)	
6	Don't know	

NL6. Which of the following best describes how you are using the nightlight?

1	Using it, but did not replace any existing lighting	Next Section
2	Using it instead of overhead lights	NL7
3	Using it instead of floor/table lamp	NL7
4	Replaced an existing nightlight	NL8
5	Other (Specify_____)	Next Section
6	Don't know	Next Section

NL7. You stated you

1	Standard incandescent 	Next Section
2	Compact Fluorescent 	Next Section
3	LED 	Next Section

4	Halogen 	Next Section
5	Don’t know	Next Section

NL8. What type of bulb was in the nightlight that you replaced?

1	Standard incandescent 	Next Section
2	LED 	Next Section
3	Don’t know	NL9

NL9. Approximately how old was the nightlight that you replaced?

1	Less than 1 year	Next Section
2	12 to 24 months	
3	25 to 36 months	
4	Over 36 months	
5	Don't know	

Education Book



EB1. Did you read the educational booklet included with the kit?

1	Yes	EB2
2	No	Next Section
3	Don't know	Next Section

EB2. How would you describe the educational value of the booklet?

1	I learned a lot of new information	EB3
2	I learned a few new things	EB3
3	I didn't really learn anything new	Next Section
4	Don't know	Next Section

EB3. Which topic(s) did you learn something new about? [Select all that apply]

1	Cooling	Next Section
2	Heating	Next Section
3	Home Electronics	Next Section
4	Insulation and weatherization	Next Section
5	Kitchen Appliances	Next Section
6	Lighting	Next Section
7	Washer and Dryer	Next Section
8	Water Heating	Next Section
9	Windows, Doors, Skylights	Next Section
10	Other (Specify___)	Next Section
11	Don't know	Next Section

SATISFACTION

Next, I have a few questions about how satisfied you were with different aspects of your Welcome Kit. For all of these questions, use a 5-point scale where 5 means 'very satisfied' and 1 means 'very dissatisfied.'

S1. How satisfied or dissatisfied were you with the…?

a. Process for requesting an Energy Savings Kit
b. Wait time to receive your kit
c. Energy-saving measures that were included in your kit
d. Energy Savings Kit program as a whole

1	Very dissatisfied	S2
2	Somewhat dissatisfied	
3	Neither satisfied nor dissatisfied	
4	Somewhat satisfied	
5	Very satisfied	
-97	[Don't know]	

[S2 IS ONLY ASKED FOR ANY PROGRAM ASPECT THAT THE RESPONDENT RATES AS LESS THAN A 3]

S2. Why do you say that?

	[RECORD VERBATIM]	S3
-97	[Don't know]	

S3. What, if any other, additional tips and information would be helpful for Idaho Power to include in future Welcome Kits?

	[RECORD VERBATIM]	S4
-97	[Don't know]	

S4. Do you have any additional comments about your experience with the program?

	[RECORD VERBATIM]	END
-97	[Don't know]	

THANK & TERMINATE

END. Those are all of the questions I have for you today. Thank you for your time.

About DNV GL

Driven by our purpose of safeguarding life, property, and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. We provide classification, technical assurance, software, and independent expert advisory services to the maritime, oil & gas, and energy industries. We also provide certification services to customers across a wide range of industries. Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, we empower our customers' decisions and actions with trust and confidence. We continuously invest in research and collaborative innovation to provide our customers and society with operational and technological foresight. Operating in more than 100 countries, we are dedicated to helping our customers make the world safer, smarter, and greener.

IPC Weatherization Programs Analysis

Date: March 25, 2020

To: Idaho Power Company

From: Tyler Lehman and George Jiang, Nexant, Inc.

Executive Summary

This report presents an energy savings analysis of two weatherization programs for Idaho Power Company (IPC), the Weatherization Assistance for Qualified Customers (WAQC) and the Weatherization Solutions for Eligible Customers (WSOL). Both the WAQC and the WSOL provide financial assistance through CAP agencies to qualifying customers with limited incomes in IPC's service territory to help fund weatherization improvements to their electrically heated residence. This analysis estimated the electric energy savings of these programs by calculating the change in energy usage for program participants before and after the project completion date and relative to a matched comparison group. Program descriptions, the analysis methodology and findings from the WAQC and WSOL programs in 2018 are documented in this report.

The methods used in this study are based on the industry guidelines set forth in the National Renewable Energy Laboratory's (NREL) Uniform Methods Project (UMP) Chapter 8, for using whole building consumption data to estimate energy savings.

This approach leveraged a matched control group to serve as the baseline that treatment participants are measured against. This methodology differs from the "Two Stage Approach" methodology used in the previous analysis. The previous approach used past participants in the program as the control group and only produced a weather-normalized estimate. While the approach is verified by the UMP, it lacks the same level of transparency as the matched control method and requires the assumption that the past participants used as the control group are identical to the current treatment customers in the scenario without the weatherization project. As the control customers have already underwent a weatherization project, the assumption is vulnerable to omitted variable bias.

In this analysis, the matched control group acts as the counterfactual, which represents what the electric usage would have been in the absence of the weatherization measures. Control customers were selected by inspecting 12 months of pre-period usage data as well as key demographic characteristics such as geographic location, dwelling type, and heating system. Matching customers on these key observable characteristics minimizes the likelihood of creating a control group that does not accurately represent the treatment group in the absence of the weatherization program.

Additionally, a main advantage of using a matched control group is that it allows for a straightforward comparison of the treatment and control group usage to estimate energy savings. By matching participants on location, variations in weather are accounted for as both treatment and control customers experienced the same conditions. The careful design and implementation of a matched

control group then allows for simple, easily interpretable models to sufficiently estimate project savings.

Lastly, a differences-in-differences econometric model was used to estimate savings and the results from these models are reported. The transparency of this approach eliminates the need to specify overly complex weather incorporated models or perform model mining activities.

Table 1 presents the estimated kWh savings per project and savings per square foot for the WAQC and WSOL projects completed during 2018. The results are segmented by home type and weatherization measure type. All segments inspected yielded positive savings. Generally, WSOL projects had larger estimated savings than the estimated savings for the corresponding WAQC project. Annual estimated savings were 1,482 kWh/project for projects that received only weatherization improvements, while projects that received weatherization and heat pumps experienced annual savings of 1,885 kWh/project. Manufactured homes had the largest estimated kWh savings for the different home types that received weatherization and heat pump projects.

Table 1: kWh Savings by Program Type, Home Type, and Weatherization Project for 2018

		All			WAQC			WSOL		
Type	Measures	Customers	kWh/project	kWh/SqFt	Customers	kWh/project	kWh/SqFt	Customers	kWh/project	kWh/SqFt
All Home Types	Weatherization only	77	1,482	1.09	36	1,489	1.16	41	1,471	1.03
All Home Types	Weatherization and Heat Pump	144	1,885	1.43	94	1,762	1.44	50	2,117	1.43
Single Family	Weatherization only	53	1,424	0.99	20	1,023	0.75	33	1,647	1.11
Single Family	Weatherization and Heat Pump	73	1,604	1.06	35	1,170	0.79	38	2,001	1.29
Manufactured	Weatherization only	19	1,325	1.06	14	1,752	1.47	5	128	0.09
Manufactured	Weatherization and Heat Pump	59	2,357	2.04	47	2,320	2.06	12	2,510	2.01
Multi-family	Weatherization only	5	2,730	3.05	2	4,167	3.77	3	1,766	2.37
Multi-family	Weatherization and Heat Pump	12	1,199	1.37	12	1,199	1.37	-	-	-

*Note: Savings estimates for small sample sizes (n<10) can yield unexpected results. For example, WAQC Multi-family weatherization only projects savings are very high due to the very small sample size (n=2) for that segment.

Program Overviews

The two programs that were evaluated for this study are the Weatherization Assistance for Qualified Customers (WAQC) and the Weatherization Solutions for Eligible Customers (WSOL). Both programs are focused on providing financial assistance to community action partnership (CAP) agencies and contractors for energy efficiency improvements to customers' dwellings that qualify.

The WAQC program exists to serve customers whose income is less than 200% of federal poverty level, while WSOL participants have incomes between 175%-250% of federal poverty level. There is an overlap in the programs to service the customers who qualify for WAQC, but may not be selected in a timely manner due to their higher income.

Weatherization projects performed vary in terms of size and actions taken. Of particular interest are projects for which dwellings received a furnace replacement in the form of an electric heat pump system installation. Electric heat pumps are more efficient than older heating systems and therefore offer the potential to have larger energy savings than other types of weatherization measures.

Table 2 shows the customer counts, heat pump replacement counts and average home size for the different home types across the two programs in 2018. A total of 280 projects out of 332 completed for the two programs were used for this study. The WAQC program completed 42 more projects than WSOL and 59 more heat pump replacements. Average home sizes are larger for customers in WSOL at 1,425 square feet compared to the average home sizes for WAQC participants of 1,214 square feet.

Table 2: 2018 Project Characteristics by Program

Program	Home Type	Customers	Heat Pump Replacements	Average Square Feet
WAQC	All	161	119	1,214
	Manufactured	75	60	1,110
	Multi-family	22	19	923
	Single-family	64	40	1,435
WSOL	All	119	60	1,425
	Manufactured	18	12	1,282
	Multi-family	4	0	753
	Single-family	97	48	1,479

Figure 1 provides a view at the pattern of project completion dates over the course of 2018. The WAQC program provides more projects than the WSOL for all months. The peak period for project completion dates is during fall while the winter months have the lowest number of completed projects.

Figure 1: 2018 Project Completions by Program

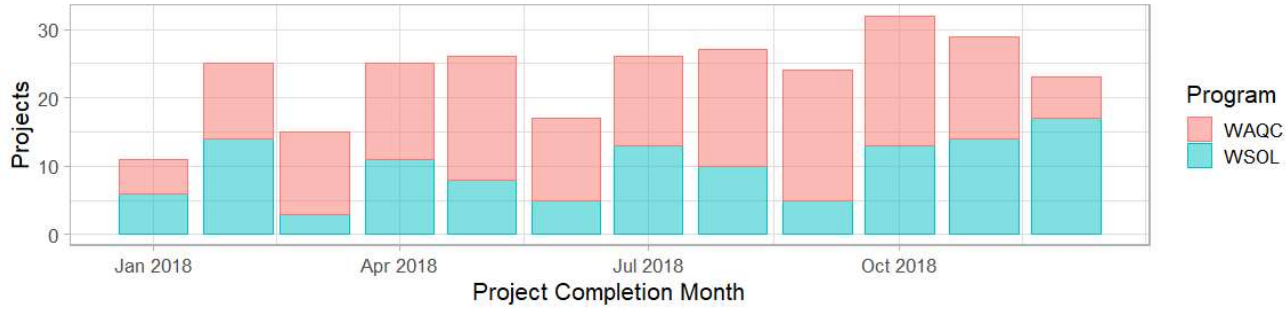
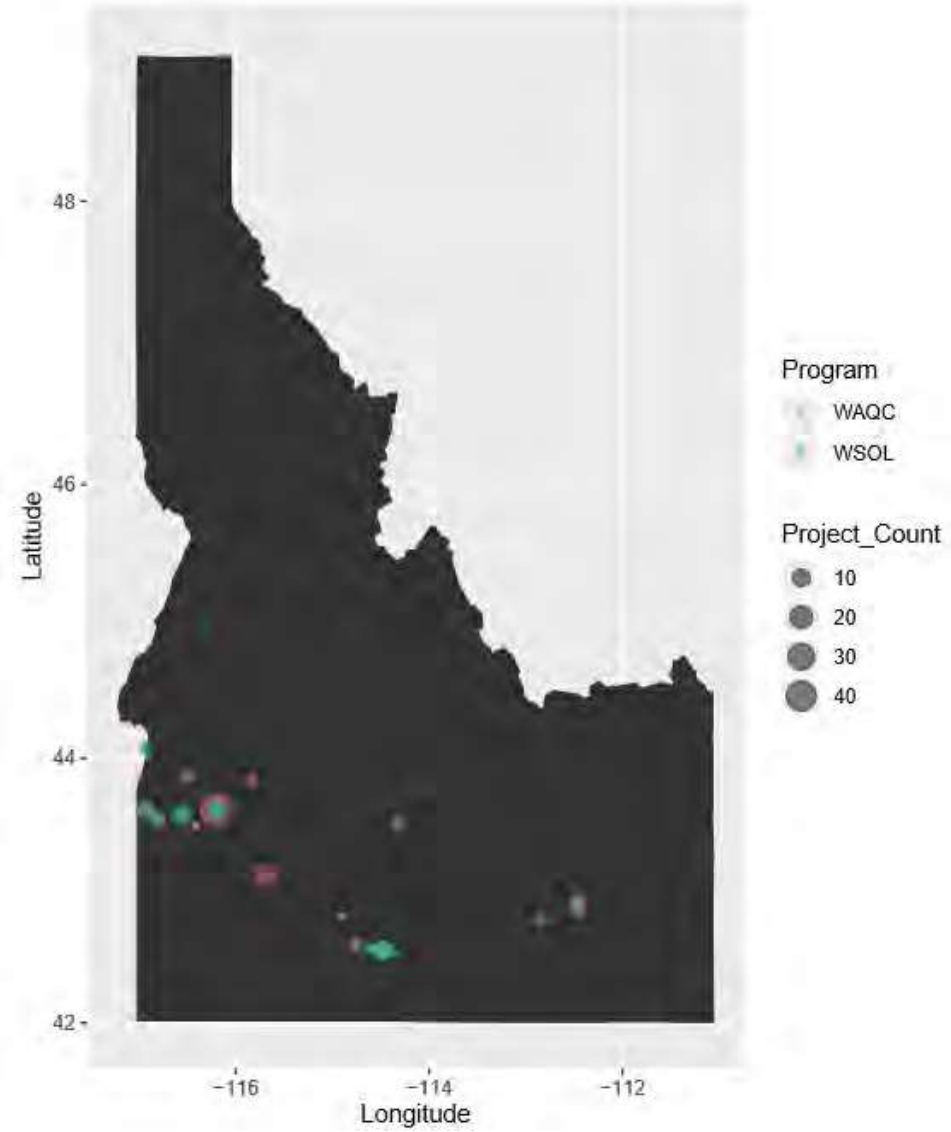


Figure 2 shows the distribution of the size and locations of projects completed in 2018 by Program relative to location in Idaho. The two programs operate in the same service areas with a correlation between population densely of an area and the number of projects completed.

Figure 2: 2018 Project Counts by Location in Idaho



*There were 3 projects in Eastern Oregon that are not included in this map. These projects were included in the analysis.

Methodology

The methods used in this study are based on the industry guidelines set forth in the National Renewable Energy Laboratory's Uniform Methods Project Chapter 8, for using whole building consumption data to estimate energy savings.

This approach leveraged a matched control group to act as the counterfactual, which in this case refers to what the electric usage would have been in the absence of the weatherization measures. Matched control customers were selected by inspecting 12 months of pre-treatment usage data as well as key demographic characteristics such as geographic location, dwelling type, and dwelling heating system. A main advantage of using a matched control group is that it allows for a straightforward comparison of the treatment and control group usage to estimate energy savings. By matching participants on location, variations in weather are accounted for as both treatment and

control customers experienced the same conditions. A differences-in-differences econometric model was used to estimate savings and the results from these models are reported.

All customers in IPC's service territory were considered as potential matches for the control group. A series of screens were applied to filter out customers that would make poor matches. The process to select the sample of customers that would be the best potential match for each treatment customer used multiple filters. The first screen selected all customers which had usage data that spanned the same timeframe of the corresponding treatment customer were kept. Next, customers were filtered by geographic location, average annual electrical usage, home type and heating system types. For each treatment customer, the ten closest control customers were selected to create the pool of potential control customers.

Once the pool of potential control customers was compiled, the closest matching customer was selected for each treatment customer. Customers were once again filtered through a similar set of criteria consisting of geographic location, average monthly usage in the 12 month pretreatment period, dwelling type and dwelling heating system type. The matching process went through three iterations to ensure that the best possible matches were found. The pretreatment usage variable was tested at different levels of granularity to account for seasonal variation. The final configuration used the rolling monthly daily average usage as the key variable to match treatment and control customers on. After applying the filters, the nearest neighbor in terms of pretreatment usage was selected to be included in the matched control group.

Matches were validated by inspecting key characteristics of the treatment and matched control groups. Tests were run at two different stages during the matching implementation. The first set of tests were run after the control to treatment customer matching to check for initial match quality. Standard data validation practices were then performed on the data to ensure quality. Tests were run again on the processed data and confirm the validity of the matches.

The first data validation test removed treatment customers and the matching control customer with less than 75% of data in either the pre-treatment period or post-treatment period. This resulted in the largest reduction of customers from the analysis (21%). Although this comprises a substantial portion of the group, the high churn and variance in project timing associated with the participants in these programs is unavoidable. Most importantly, the quality of the matches remained robust after accounting for these factors. The tables and figures in the rest of this section demonstrate the results of the matching tests pre and post processing.

The first characteristic inspected is pre-period average daily usage. Figure 3 presents the accuracy of the matches across the groups for the post-processing data. Overall, the matches show similar patterns of electrical usage in the pre-period at the average daily level. These visual tests are supported by a t-test and the results are seen in Table 4. The high p-values indicates the two groups are not statistically significantly different from each other, which is ideal.

Figure 3: Box Plot of Pre-Period Average Daily kWh Usage by Treatment and Control

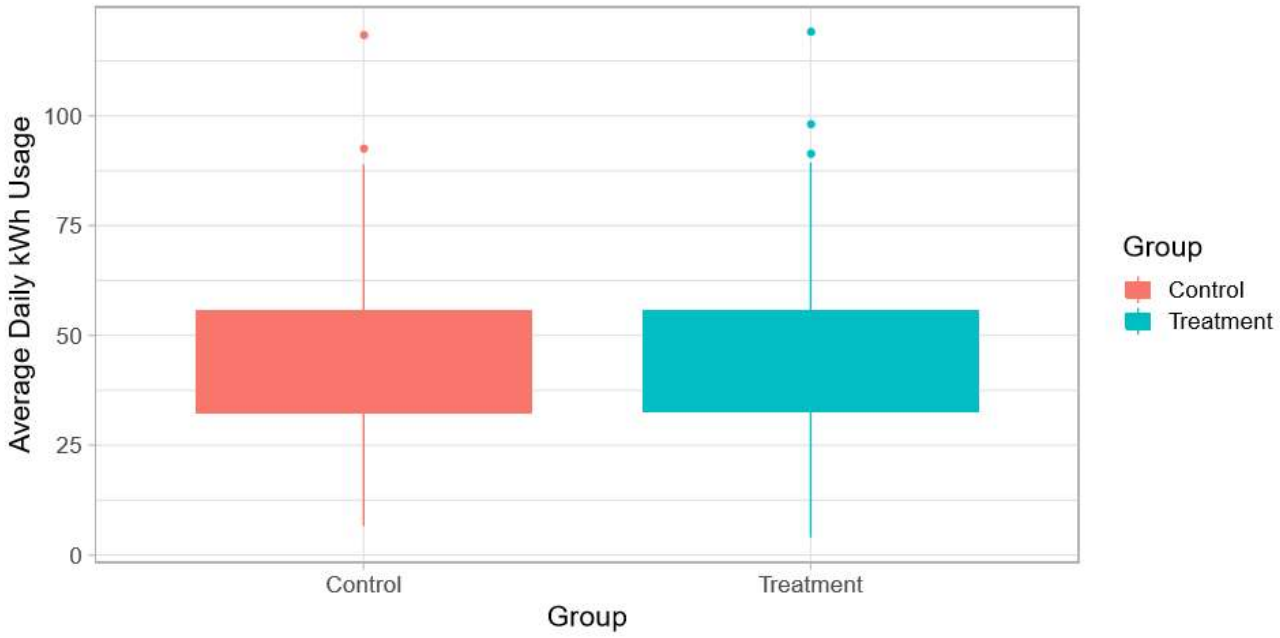


Table 3: Pre-Treatment Average Daily kWh Usage T-Test

	Customer Count		Average Daily kWh Usage		P-value
	Treatment	Control	Treatment	Control	
Post-Match Raw	280	280	44.76	44.39	0.95
Post-Match Post Processing	221	221	44.72	44.61	0.95

To validate the location mapping for treatment and control customers, the Pearson's Chi-squared test was run on the city-level distribution of the two groups. As seen in Table 4, the p-value of 1 means the null hypothesis stating the frequency distribution of city location in the two groups fails to be rejected. Ensuring that customer locations are the same across the treatment and control groups is critical as the methodology accounts for the largest driver in electrical usage– weather. Using the matched-control design and these tests support the direct comparison techniques used for measuring savings across treatment and control customers. Additionally, estimates do not need to be transformed or weather-normalized as the weather is structured into the setup.

Table 4: Pre-Treatment City-Level Chi-Squared Test

	Customer Count		Chi-squared	Degrees of Freedom	P-value
	Treatment	Control			
Post-Match Raw	280	280	0	94	1
Post-Match Post Processing	221	221	0	43	1

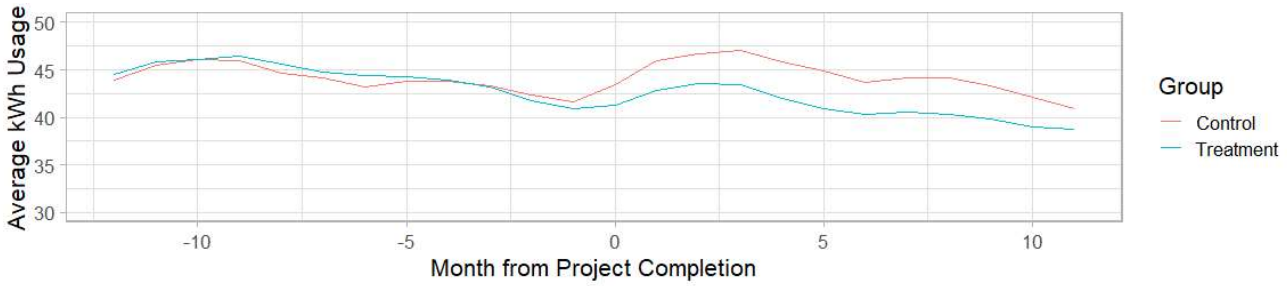
Figure 4 shows the quality of the matching for all customers in the pre-treatment kWh usage patterns and also helps visualize the modeling approach. The figure is based on projects completed from 2015 to 2019 in order to smooth out noise from smaller sample sizes for the individual years. For the treatment group, kWh usage is displayed relative to each customer's project completion date with 0 representing the month the project was completed. As control customers didn't receive the weatherization project, their kWh usage is relative to the matched treatment customer's project completion date. If a treatment customer had a project completion date of 6/1/2018, month "0" would be 6/2019 for that customer and the matched control customer.

Overall, the treatment and control customers exhibit similar kWh usage trends in the pre-treatment period leading up to the project completion date. KWh usage begins to diverge with treatment customers using less kWh than the control group starting around two months prior to the project completion date. The difference in usage is maintained through the full post-treatment period and represents the savings that are estimated.

Possible reasons why the usage begins to diverge prior to the project completion date include:

- Weatherization projects were being implemented in phases during the time period leading up project completion date. A job may be started while the agency waits for ordered materials to arrive.
- Treatment customers may have begun shifting their energy consumption between the initial meeting with the auditor and completion of the weatherization. During the initial visit, the auditors provide energy efficiency education information to the customer.

Figure 4: Average Daily kWh Usage Relative to Project Completion Date by Treatment Status



A relatively straightforward differences-in-differences model was then used to estimate average savings. The model structure used is:

$$kW_{i,t} = \alpha_i + \delta \text{treat}_i + \gamma \text{post}_t + \beta(\text{treatpost})_{i,t} + v_i + \varepsilon_{i,t}$$

In the above equation, the variable $\text{kW}_{\text{i,t}}$ equals daily electricity usage. The index i refers to customers and the index t refers to the time period of interest. The estimating database would contain electricity usage data during both the pretreatment and post-treatment periods for both treatment and control group customers. The variable treat is equal to 1 for treatment customers and 0 for control customers, while the variable post is equal to 1 for days after the weatherization project has been implemented and a value of 0 for days prior to the project completion date. The treat post term is the interaction of treat and post and its coefficient β is a difference-in-differences estimator of the treatment effect that makes use of the pretreatment data. The primary parameter of interest is β, which provides the estimated daily demand savings. The parameter a_i is equal to mean daily usage for each customer. The v_i term is the customer fixed effects variable that controls for unobserved factors that are time-invariant and unique to each customer. Possible examples of short-term time-invariant unobserved factors that are unique for each customer but are correlated with usage are frugalness, tolerance of temperature changes, and household temperature preferences.

Results

This section discusses the savings estimates from the difference-in-difference models on the matched-control group for projects completed in 2018, projects completed in 2016 through 2018, and compares the results to the prior analysis.

Table 5 and Table 6 present the customer counts, the estimated daily kWh savings, annual kWh project savings and annual kWh savings per square foot for the WAQC and WSOL programs for different home types and by project measure type. The customer counts are the number of treatment customers analyzed for each group. The outputs of the models are daily kWh estimates and represent the average daily impact of receiving a weatherization project. The annual kWh/project estimate is calculated by scaling the average daily kWh estimate by 365, the number of days in a year. The annual kWh/square foot estimate is calculated by scaling each segment by the average dwelling size used in the analysis.

For all home types for both programs, weatherization projects that involved replacing heat pumps had more annual savings (1,885 kWh) and annual savings per square foot (1.43 kWh) than projects without heat pump replacements (1,482 annual kWh savings per project and 1.09 annual kWh savings per square foot). Of segments that had more than 10 customers, heat pump replacement projects for manufactured homes had the largest estimated savings. Generally, WSOL projects had larger estimated savings than the estimated savings for the corresponding WAQC project.

One downside to the difference-in-differences model is that it can produce unexpected results for small sample sizes. Since the model produces an average effect, groups with small counts are more susceptible to the influence of outliers or abnormal behaviors. This phenomena is apparent for some customer segments with less than 10 customers. For example, the multifamily weatherization-only segment for WAQC only has 2 customers, showing annual savings that are nearly twice as large as

the next highest savings per segment. Additionally, the lowest savings reported are 128 kWh for weatherization-only projects on manufactured homes with the WSOL program. This estimate is about 10x lower in magnitude compared to the other home types that received weatherization only projects in the WSOL program.

Table 5: Savings by Home Type, and Weatherization Project for 2018

		All			
Type	**Measures**	**Customers**	**Daily kWh**	**kWh/project**	**kWh/SqFt**
All Home Types	Weatherization only	77	4.06	1,482	1.09
All Home Types	Weatherization and Heat Pump	144	5.16	1,885	1.43
Single Family	Weatherization only	53	3.90	1,424	0.99
Single Family	Weatherization and Heat Pump	73	4.40	1,604	1.06
Manufactured	Weatherization only	19	3.63	1,325	1.06
Manufactured	Weatherization and Heat Pump	59	6.46	2,357	2.04
Multi-family	Weatherization only	5	7.48	2,730	3.05
Multi-family	Weatherization and Heat Pump	12	3.28	1,199	1.37

Table 6: Savings by Program Type, Home Type, and Weatherization Project for 2018

		WAQC				WSOL			
Type	**Measures**	**Customers**	**Daily kWh**	**kWh/project**	**kWh/SqFt**	**Customers**	**Daily kWh**	**kWh/project**	**kWh/SqFt**
All Home Types	Weatherization only	36	4.08	1,489	1.16	41	4.03	1,471	1.03
All Home Types	Weatherization and Heat Pump	94	4.83	1,762	1.44	50	5.80	2,117	1.43
Single Family	Weatherization only	20	2.80	1,023	0.75	33	4.51	1,647	1.11
Single Family	Weatherization and Heat Pump	35	3.20	1,170	0.79	38	5.48	2,001	1.29
Manufactured	Weatherization only	14	4.80	1,752	1.47	5	0.35	128	0.09
Manufactured	Weatherization and Heat Pump	47	6.36	2,320	2.06	12	6.88	2,510	2.01
Multi-family	Weatherization only	2	11.42	4,167	3.77	3	4.84	1,766	2.37
Multi-family	Weatherization and Heat Pump	12	3.28	1,199	1.37	-	-	-	-

Table 7 and Table 8 present the kWh savings for the same segments for projects completed in 2016 and 2017 in addition to the 2018 project year. The exact same methodologies and validations were used to generate these results. The larger sample sizes across the three project years provide more stability and offer a useful comparison of the savings to only the projects completed in 2018. The savings estimates for the different segments are generally smaller for the three year analysis than the 2018 analysis. For all projects on both programs, manufactured dwelling types were found to have the largest annual savings per project for projects that involved heat pump replacements with an estimated 2,076 kWh. Multifamily homes have the smallest sample sizes of the different home types and present unexpected savings estimates on the whole. Weatherization-only projects were found to have larger savings of 1,982 kWh/project, compared to weatherization and heat pump projects with savings of 1,171 kWh/project.

Table 7: Savings by Home Type, and Weatherization Projects for 2016-2018

		All			
Type	Measures	Customers	Daily kWh	kWh/project	kWh/SqFt
All Home Types	Weatherization only	292	2.76	1,009	0.71
All Home Types	Weatherization and Heat Pump	479	4.35	1,588	1.23
Single Family	Weatherization only	180	2.76	1,007	0.62
Single Family	Weatherization and Heat Pump	223	3.39	1,238	0.82
Manufactured	Weatherization only	68	1.05	383	0.31
Manufactured	Weatherization and Heat Pump	203	5.69	2,076	1.76
Multi-family	Weatherization only	44	5.43	1,982	2.25
Multi-family	Weatherization and Heat Pump	53	3.21	1,171	1.47

Table 8: Savings by Program Type, Home Type, and Weatherization Projects for 2016-2018

		WAQC				WSOL			
Type	Measures	Customers	Daily kWh	kWh/project	kWh/SqFt	Customers	Daily kWh	kWh/project	kWh/SqFt
All Home Types	Weatherization only	140	1.85	674	0.52	152	3.61	1,316	0.87
All Home Types	Weatherization and Heat Pump	307	3.76	1,374	1.17	172	5.39	1,969	1.32
Single Family	Weatherization only	77	1.74	635	0.45	103	3.52	1,284	0.73
Single Family	Weatherization and Heat Pump	94	1.68	612	0.43	129	4.64	1,695	1.08
Manufactured	Weatherization only	50	1.36	495	0.40	18	0.18	67	0.05
Manufactured	Weatherization and Heat Pump	167	5.27	1,924	1.65	36	7.63	2,784	2.19
Multi-family	Weatherization only	13	4.33	1,581	1.65	31	5.89	2,151	2.53
Multi-family	Weatherization and Heat Pump	46	2.51	917	1.26	7	7.69	2,806	2.26

As a final form of validation, the findings from this study were compared to the WAQC savings reported in IPC's DSM 2018 Annual Report. Average savings for WAQC weatherization-only projects are comparable between the two studies – both studies showed an average of 1.16 kWh/square foot. However, the savings from WAQC weatherization and heat pump projects for single family and manufactured dwelling types differ by a large margin across studies. While both studies conclude that heat pump projects result in larger savings than non-heat pump projects, the previous analysis reported savings that are roughly two to three times larger than the savings in this study.

In terms of applying and utilizing the estimated savings going forward, the results for the 2018 project year should be used, as these results may be more reflective of the current program designs and measures. The estimated daily impacts from 2018 were found to be statistically significant in all segments except for weatherization-only projects on manufactured homes in the WSOL program (n = 5). This segment's results were also not statistically significant in the 2016-2018 analysis. Caution should be exercised in using results from groups that have small customer counts (n < 15) as they are more susceptible to the influence of the impacts of outliers. For segments with the small customer counts, the savings estimates from the project years 2016-2018 will provide a more stable estimate.

Appendix

Table A-1 provides a summary of the different R code files and a brief description of the purpose for each file. The code is commented inline as well and clear divisions are made for the different functions.

Table A-1: Code Overview

File	Description of Steps
1. Data Management	1. Load, clean and combine all treatment demographic data 2. Data Checks *Note: To recreate the map, you will need to enter a google maps API key
1.a Treatment vs Full Data Comparison	1. Inspect customers *QC only - not used in data flow
2. Control Customer Sampling	1. Manage Control Customer Data 2. Pull control sample using screen logic 3. Combine treatment and control accounts to have AMI data pulled 4. Data and mapping checks * This code file is dense and can be refactored to be more efficient.
3. Create Matching Data Set	1. Manage AMI data by treatment group (for matching) 2. Perform matching 3. Create matching mapping data 4. Data Checks
4. Post Matching Processing	1. Combine matched demographic data with AMI data 2. Make key segments 3. Data Checks
5. Create Analysis Dataset	1. Data validations to remove outliers, customers with a lot of missings or poor matches 2. Data Checks
6. Savings Analysis	1. Run diff-in-diff on segments 2. Compile results

Embedded R code:



WAQC_WSOL_EVAL_CODE_20200219.zip

Idaho Power Company

Idaho Power Company
Irrigation Efficiency Rewards Program

2019 Impact and Process Evaluation Results



TETRA TECH

February 22, 2021



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The Tetra Tech evaluation team was made up of the following individuals: Kimberly Bakalars, Mark Bergum, Graham Thorbrogger, and Laura Meyer.

1.0 EXECUTIVE SUMMARY

Tetra Tech is pleased to provide Idaho Power Company (Idaho Power) with this report covering the evaluation of current processes and 2019 program impacts for the Irrigation Efficiency Rewards (IER) program. This section of the report consists of an introduction describing the program, evaluation activities, and key findings and recommendations. Both the program's impact and process evaluations are detailed in separate sections, along with their respective findings and recommendations.

1.1 PROGRAM DESCRIPTION

Idaho Power launched the IER program as a pilot program in 2003 and included it as a full program in the 2004 Energy Plan. The IER program is designed to encourage the replacement or improvement of inefficient irrigation systems and components. It is funded through the Energy Efficiency Rider on monthly bills to Idaho Power customers, as approved by the Idaho Public Utilities Commission and the Public Utility Commission of Oregon.

The eligible irrigation sector is comprised of agricultural irrigation customers (or producers) operating water-pumping or water-delivery systems to irrigate agricultural crops or pasturage. End-use electrical equipment primarily consists of agricultural irrigation pumps and center pivots. The irrigation sector does not include water pumping for non-agricultural purposes, such as the irrigation of lawns, parks, cemeteries, golf courses, or domestic water supply.

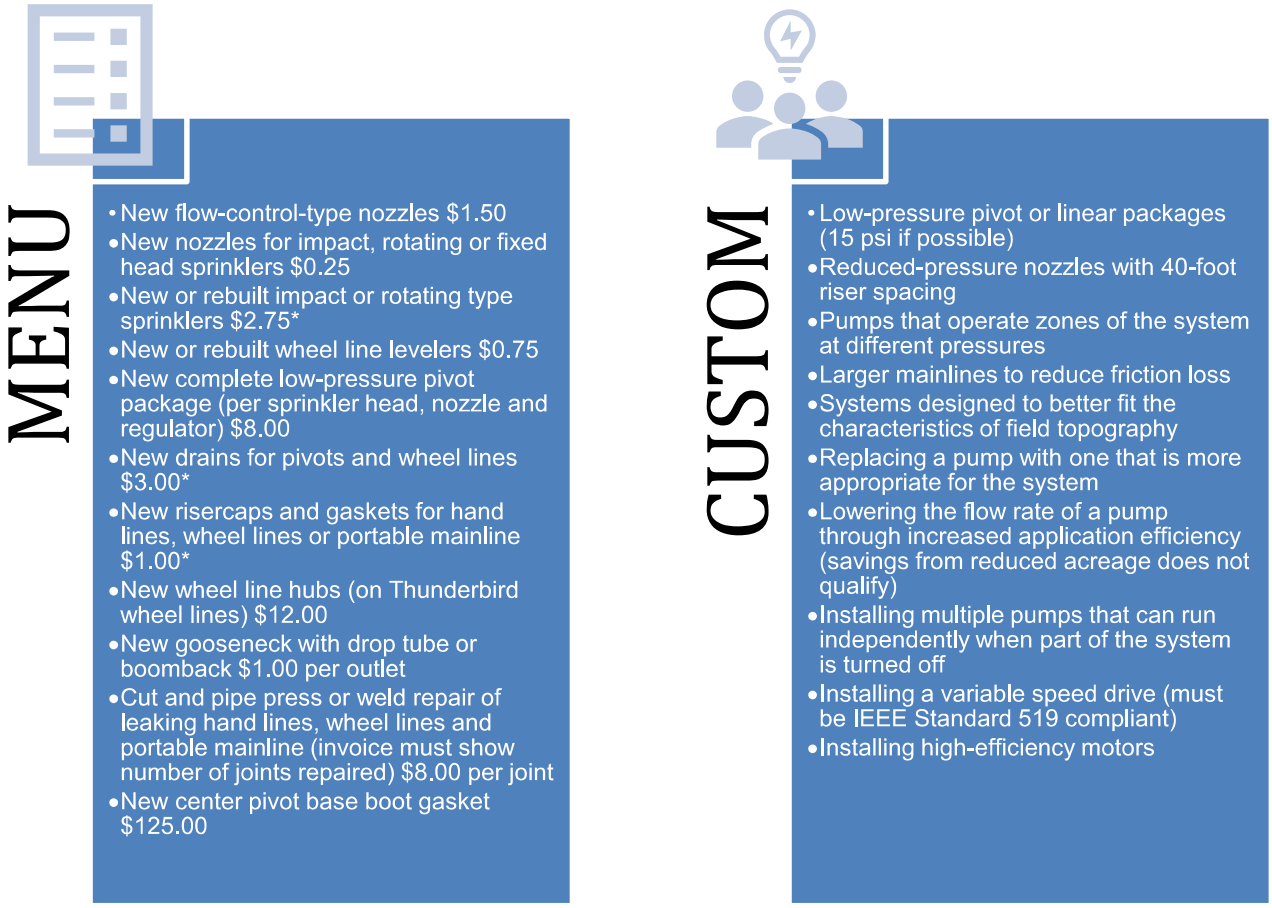
The program is delivered by Idaho Power staff, including a program specialist, principal engineer, program leader, and analysts. Critical support for the program comes from agriculture representatives (ag reps), and the customers work with vendors, distributors, and installation contractors to purchase and install equipment.

Customers have two options for receiving incentives through the Irrigation Efficiency Rewards program: *Menu* incentives and *Custom* incentives. If a customer is repairing or replacing irrigation system parts, they can apply for incentives on specific components through the *menu* incentive option. Customers who apply with supporting invoices within one year of purchase can receive incentives.

The *Custom* incentive is for extensive retrofits of existing systems or the installation of new irrigation systems. To participate, customers submit a project proposal to Idaho Power before starting a project. The customer works with an ag rep to determine the project's energy savings and applicable incentive estimate.

In addition, customers may also benefit from a Green Rewind through the Green Motors Initiative, which pays service centers two dollars per horsepower (hp) for motors 15 to 5,000 hp receiving a Green Rewind from a verified service center. The Green Motors Practices Group certifies the shop is qualified to perform the Green Rewind under the guidelines and eligible for the incentive (one dollar to the center and one dollar to the customer). If a Green Rewind was done as part of an irrigation project, the savings are also recorded by the IER program.

Figure 1. Menu Incentives and Potential Qualifying Custom

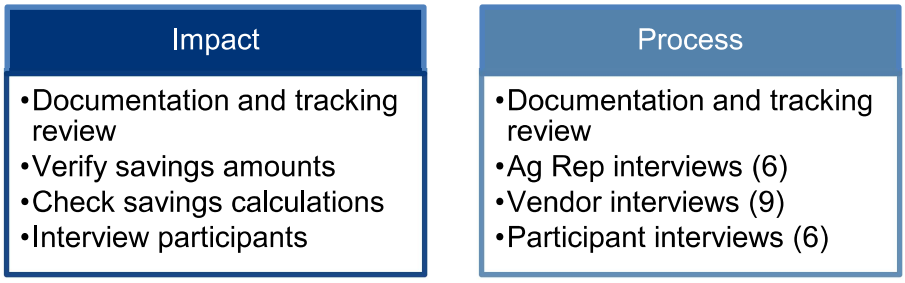


* These Menu incentive options are limited to the lesser of the incentive or 50 percent of invoice cost.

1.2 METHODOLOGY

The evaluation team conducted several evaluation activities, shown in Figure 2, to address the evaluation objectives. The evaluation objectives included verifying energy impacts attributable to the 2019 program, providing estimates of realization rates, suggesting enhancements to the savings analysis and reporting, evaluating program design (including implementation, management, outreach, and quality control), and program tracking.

Figure 2. Impact and Process Evaluation Activities



1.3 FINDINGS AND RECOMMENDATIONS

The IER program is a well-managed program with comprehensive support from Idaho Power staff, including a highly knowledgeable group of ag reps and responsive program staff. Communication between Idaho Power staff is working well, and vendors rely heavily on ag reps for Custom incentive project design and application support, which they feel is provided. The program provides valuable support to the market, encouraging the use of more efficient equipment and system designs and sometimes lower-cost construction.

IER program materials are professional, informative, and educational. An electronic program manual, which is best practice, has been developed. Vendors heavily use the program brochure, and marketing messages appear to be reaching customers. The Menu option of the program is streamlined and easily understood. The Custom option savings are highly customized and calculated by the ag reps and program engineer.

In 2019, the IER program had 1,114 participants with claimed savings of 10,118,160 kWh and a budget of $2,661,263 with the inclusion of the Green Motors Initiative projects. Excluding the Green Motors initiative, the IER program had 1,080 projects and 10,073,455 kWh of savings.[1] The program's overall realization rate, excluding the Green Motors savings, was 97.4 percent, with a relative precision of 7.8 percent at 90 percent confidence.

Table 1: Program Realization Rate

Program option	Projects	kWh			Peak kW		
		Claimed	Evaluated	Realization rate (%)	Claimed	Evaluated	Realization rate (%)
Menu	924	4,355,031	4,355,031	100	852.3	852.3	100
Custom	156	5,718,424	5,456,520	95.42	1,482.3	1,476.0	99.58
TOTAL	**1,080**	**10,073,455**	**9,811,551**	**97.40**	**2,334.6**	**2,328.3**	**99.73**

1.3.1 Impact Recommendations

The following impact recommendations are provided for Idaho Power's consideration:

- **Formalize data collection of system operating conditions for custom projects.** The program did a good job collecting documentation for equipment, although the system operating

[1] Demand-Side Management 2019 Annual Report (idahopower.com)

parameters were stored in multiple locations throughout the custom calculations. A single location to collect operating parameters of the existing and proposed systems would create transparency in the energy efficiency calculations.

- **Streamline custom calculations.** The current calculator focuses on the energy savings associated with equipment. A more streamlined approach would develop a comparable baseline and improved energy models with all equipment accounted for in a single calculation. Concurrently, the program can develop baseline operating assumptions that can be used to normalize equations and provide a quality assurance (QA) point to describe components of the custom systems.
- **Increase documentation for critical system components.** The program collected the pump make, model, and trim; and specific pump curves for the installed systems. However, invoices were needed to provide details to confirm operating parameters for necessary components, such as nozzles, filters, or end guns. Collecting a make and model or specification sheets of critical components of the irrigation systems outside the pump would support QA and review by individuals other than the Idaho Power representative.

1.3.2 Process Recommendations

Tetra Tech has a few process recommendations for Idaho Power's consideration:

- **Continue to develop the electronic program manual.** In response to 2016 evaluation recommendations, Idaho Power has a good draft program manual available electronically. Program staff should continue updating and expanding this document to serve as a guide for consistency and a resource for redundancy. This reference document is particularly important given the significant amount of program knowledge that is retained by experienced Idaho Power staff. While this is beneficial now, a risk exists if staffing changes.
- **Continue creating an electronic filing system for all project records.** Although Idaho Power is making the transition over to electronic files, a few projects are still in paper form that needed to be scanned for evaluation. Electronic project files should include calculators, maps, system descriptions, and program applications.
- **Consider a more systematic method for reviewing vendor activity levels**. Idaho Power tracks the vendors working with participating producers. Given that some vendors are highly active, and others are not, reviewing vendor participation levels can help focus ag rep outreach efforts and the types of Menu and Custom projects they are supporting. For instance, vendors driving more Menu projects to the program will need a more frequent refresh of Menu applications and brochures.

2.0 INTRODUCTION

2.1 PROGRAM OVERVIEW

The Irrigation Efficiency Rewards (IER) program is designed to encourage the replacement or improvement of inefficient irrigation systems and components. It is funded through the Energy Efficiency Rider on monthly bills to Idaho Power customers, as approved by the Idaho Public Utilities Commission and the Public Utility Commission of Oregon. The eligible irrigation sector is comprised of agricultural customers operating water-pumping or water-delivery systems to irrigate agricultural crops or pasturage. End-use electrical equipment primarily consists of agricultural irrigation pumps and center pivots.

Customers have two options for receiving incentives through the IER program: *Menu* incentives and *Custom* incentives. If a customer is repairing or replacing irrigation system parts, they can apply for incentives on specific components through the Menu incentive option. Customers who apply with supporting invoices within one year of purchase may receive incentives. The Custom incentive is for extensive retrofits of existing systems or the installation of new irrigation systems. To participate, customers submit a project proposal to Idaho Power before starting a project. The customer works with an ag rep to determine the project's energy savings and applicable incentive estimate.

2.1.1 Menu Incentives

The Menu incentive option's total incentive amount is calculated by multiplying the qualifying items purchased by the pre-determined incentive amount. The incentive paid is the lesser of the incentive or the actual amount paid, unless otherwise restricted by the 50 percent cost limitation on particular items (noted in Figure 1 above). All measures are limited to a two-per-acre quantity and three years between invoice date and incentive eligibility.

The Menu incentive application process is outlined below.

1. Customers review the sprinkler parts covered by the Menu incentive to determine which apply to their system. Idaho Power agricultural representatives and the program specialist are available for assistance.
2. Customers purchase and install the parts on their irrigation system.
3. Customers complete the Menu incentive application within one year from the date of purchase and mail or email it to Idaho Power, including receipts and invoices showing proof of purchase. The program specialist reviews each receipt and item to verify applicability. The data entry program has built-in safeguards to check for limitations.
4. Idaho Power pays customer incentives by check once they have determined that customers have complied with the Irrigation Efficiency Rewards program's terms.

2.1.2 Custom Incentives

Although there are examples of eligible projects in Figure 1, Idaho Power considers all proposals to reduce an irrigation system's energy use. Compared with Menu incentive projects, Custom incentive projects and applications are more involved. Idaho Power agricultural representatives are available to conduct free energy evaluations to help customers determine the changes or improvements that can make their system more energy efficient. Necessary customer steps for a Custom Incentive application are outlined below.

1. Customers determine how or if their irrigation system could be more energy efficient. Customers can request an evaluation or planning assistance from an Idaho Power ag rep in their area.
2. Customers develop a plan with their ag rep to address their specific needs and provide the most energy savings and the largest incentive.
3. Customers contact irrigation equipment or pump dealers to obtain an itemized bid to modify or install the irrigation system.
4. Customers work with their ag rep to complete the Custom incentive application, which should include the following supporting documentation:
    - an itemized bid from the supplier (including make, model, and specifications of all the equipment);[2]
    - a drawing of the irrigation system, including the location of water sources and pumps;
    - a topographical map of the irrigated area with intake/well elevation, critical pressure locations, and elevations showing mainline pipe lengths, sizes, and pressure ratings;
    - an aerial photo or map of the irrigated area (acres) showing mainline pipe lengths, sizes, and pressure ratings; and
    - the make and model of the pump (noting the number of stages and impeller diameter(s))
5. Idaho Power reviews customer applications and documentation, calculating energy (kWh) and demand (kW) savings based on the proposed improvements or new system.

    Idaho Power calculates the average annual estimated energy savings based on past energy usage data for the service location and compares it to the calculated energy usage of the system with the proposed changes submitted.

    The estimated incentive is calculated by:
    - multiplying the average annual energy savings estimate by $0.25 per kWh or $450 per kW;
    - calculating the maximum payment of 75 percent of the total project cost of a system retrofit or 10 percent of the total new system cost;
    - comparing the two incentives (choose the larger of the kW or kWh incentive) and
    - comparing the larger of the two incentives above with the maximum payment (choose the smaller).
6. Qualifying projects receive a letter or a discussion along with an Irrigation Efficiency Rewards Program Agreement, which must be signed by the customer and returned to Idaho Power.
7. After the customer installs the pre-approved system, they submit the following to Idaho Power:
    - copies of invoices,
    - a map of the installed system,
    - a verbal description of any changes to the pre-approved design, and
    - additional documentation as requested by the customer's ag rep.

[2] This item is listed on the website as a requirement but has since been dropped.

When the installation information has been submitted, Idaho Power calculates energy and demand savings for the installed irrigation system. Upon verification, the incentive check is mailed to the customer. The incentive can change if the final invoices vary from the original estimate.

2.1.3 Marketing and Outreach

Idaho Power uses a wide variety of marketing and outreach methods to inform irrigation vendors and customers about IER opportunities. The primary methods include the Idaho Power ag reps and irrigation vendors.

Idaho Power's ag reps offer customer education, training, and irrigation-system assessments and audits across the service area. Ag reps also engage agricultural irrigation equipment dealers in training sessions to share expertise about energy-efficient system designs and increase awareness about the program. Ag reps and the irrigation segment coordinator, a licensed agricultural engineer, participate in annual training to maintain or obtain their Certified Irrigation Designer and Certified Agricultural Irrigation Specialist accreditation.

In 2019, Idaho Power provided ten workshops promoting the IER program. Approximately 200 customers attended workshops in American Falls, Blackfoot, Caldwell, Eden, Gooding, Leadore, Mountain Home, Parma, Picabo, and Salmon, Idaho. The company displayed exhibits at regional agricultural trade shows, including the Idaho Irrigation Equipment Association Winter Show, Eastern Idaho Agriculture Expo, Western Idaho Agriculture Expo, and the Agri-Action Ag Show.

In addition to the ag rep outreach and Idaho Power workshops, promotional outreach included:

- a fall edition of Irrigation News (an Idaho Power newsletter), mailed to all irrigation customers in Idaho Power's service area;
- numerous ads in print agricultural publications to reach the target market in smaller farming communities;
- radio advertising to promote its presence at the Agri-Action show and to show support of Future Farmers of America and Ag Week conferences;
- collaboration with the Twin Falls County Pest Abatement District on a TV commercial and digital ads to promote irrigation equipment efficiency while educating the public on mosquito abatement;
- a new tabletop display to showcase at irrigation-specific trade shows and highlight specific equipment incentives; and
- the distribution of program brochures, Menu applications, and postage-paid envelopes to irrigation vendors.

Throughout 2019, changes to program brochures and other marketing collateral made the materials more consistent with each other and other Idaho Power publications. In 2019, a campaign geared towards irrigation customers included marketing the efficiency program. The utility's customer solutions advisors were trained to answer questions, walk customers through the Menu application, and refer interested customers to ag reps for assistance.

2.1.4 Tracking and Reporting

Idaho Power uses their CLRIS system to manage all the applicant's data, create vendors, and pull reports for all pending and paid projects. The annual IER budget is based on expected kWh savings for the year, which are built up and claimed using Regional Technical Forum (RTF) inputs. The program incentives are the largest portion of the program expenses.

Savings are calculated based on inputs from the RTF, a few of which have changed significantly with an update in March 2018. Idaho Power continued to work with the RTF on assumptions and conducted an irrigation hardware survey of its customers in 2020 to collect results to provide information to the irrigation subcommittee.

Quality control (QC) is conducted monthly to review the expenditures of the program for accuracy. The review is designed to make corrections and ensure all payments and accruals have been correctly charged and budgeted. Program activities, marketing, budgets, and goals for the upcoming year are reported annually and posted on Idaho Power's website.

2.2 EVALUATION OVERVIEW

The evaluation goals for the 2019 IER program include:

- reviewing program documentation regarding allocation methods;
- comparing RTF savings to program tracked savings for Menu measures;
- verifying whether reported savings and tracked savings match and discuss with Idaho Power any variances between RTF savings and program tracked savings that emerge based on the data and program documentation;
- identifying ways Idaho Power can improve the project approval and application process, if any;
- providing feedback on program processes and effectiveness; and
- evaluating communication effectiveness between program staff, ag reps, customers, and vendors or installation contractors.

2.2.1 Evaluation Activities

The evaluation activities for the IER Program are summarized in Table 2. Researchable issues and the sampling strategy are also discussed in this section.

Table 2. Irrigation Efficiency Rewards Program Evaluation Activities

Activity	Objective
Program manager interviews	Understand key delivery options, how savings are claimed, and how the program is tracked.
Review marketing materials	Assess brochures, publications, table toppers, etc., to inform communications with ag reps and vendors.
Interview agricultural representative staff	Determine outreach methods and participation barriers and identify communication methods that work best when reaching out to participants.
Interview vendors and installation contractors	Investigate program awareness and understanding, interactions with customers, application assistance, and their markets.
Analyze the tracking database: Menu measures	Review the program tracking system to document participation, data availability, and savings. This task includes replicating the impacts of prescriptive measures using the RTF deemed savings for the Menu measures.
Analyze the tracking database: Custom measures	Review the program tracking system to document participation, data availability, and savings. This task will inform the sampling for the engineering review.

Activity	Objective
Engineering review and calculations	Review measures and engineering assumptions, calculations, and models used to estimate equipment or measure savings for accuracy and consistency with prescriptive sources and engineering calculations. For measures where a program manual or RTF workbook exists, impact results from the program will be compared to RTF unit energy savings impacts. Additionally, the Tetra Tech team will take more site- or territory-specific analyses into account if Idaho Power provides scope and documentation. For the measures where a program manual or RTF workbook does not exist, the Tetra Tech team will (1) review the existing measure and site-specific analyses, (2) check them for consistency and accuracy, and (3) apply engineering calculations based on equipment and documented or standard operating conditions.
Virtual site reviews	Assess equipment and operating parameters of the irrigation system to verify equipment installed, program assumptions, and calculation methods. Identify the non-energy benefits and assess the quantity and value. Review the application process from the participant's perspective.

2.2.2 Sampling

Sampling was conducted at the *project ID* level. The tracking data[3] was uploaded by Idaho Power and downloaded by Tetra Tech on September 2, 2020. Tetra Tech reviewed the data and confirmed that the *project ID* provided a sufficient level of comprehensiveness per customer for sampling. A random number between 0 and 1 was assigned to each project.

The sampling was stratified to ensure that the sample would meet the evaluation goals. The stratum was selected to isolate the outlier project with savings equal to approximately 15 percent of the Custom incentive program. The remaining projects were stratified by *Idaho Power service region* and *project type* (new or existing). The results of the stratification are summarized in Table 3.

Table 3. PY2019 Irrigation Custom Stratification Summary

Sampling stratum	Number of project IDs		Total kWh savings percentage	
	New	Existing	New (%)	Existing (%)
Outlier project (Southern)	1	0	14.36	0.00
Canyon	27	16	10.91	7.90
Capital	3	9	0.96	4.72
Eastern	2	7	0.66	4.96
Southern	10	31	16.50	24.87
Western	36	15	9.99	4.18
TOTAL	**79**	**78**	**53.38**	**46.62**

[3] Custom Program: 2019_IrrigationCustom_ICI_DB_Download.xlsx and Menu Program: 2019_IrrigationMenuProgram_DB_Download.xlsx.

Fifteen 15 project desk reviews were completed, with eight of them also receiving a follow-up site-verification phone call. The outlier project was sampled for certainty. That project is in the Southern region and will reduce the normal random sample from that region down to zero. In addition, the small number of projects from the Capital and Eastern regions necessitated the combination of those two regions to ensure an adequately distributed sample. The number of sampled projects from each of the stratification groups is summarized in Table 4.

Table 4. PY2019 Irrigation Custom Sample Summary

Sampling stratum	Number of sampled project IDs	
	New	Existing
Outlier project[4]	1*	0
Canyon	3	2
Capital	1	1
Eastern		
Southern	0*	3
Western	3	1
TOTAL	**8**	**7**

*See footnote.

[4] The outlier project is in the *Southern-New* stratum and will be the sampled from there (*).

3.0 IMPACT EVALUATION RESULTS

The goals for the impact evaluation of the IER program include:

- provide feedback on program processes and effectiveness;
- evaluate communication effectiveness between program staff, ag reps, customers, and vendors or installation contractors; and
- collect qualitative information on the application process and any areas for improvement.

3.1 METHODOLOGY

The impact methodology consisted of the four primary evaluation activities shown in Figure 3. Each activity is explained in more detail below.

Figure 3. Process for Verifying Program



- **Program Tracking Review**
  The first step in evaluating the IER program was to review the program documentation and energy savings tracking system provided by Idaho Power; Tetra Tech determined that the tracking data was complete for each project. Idaho Power supplied the tracking system to the evaluation team in separate Excel spreadsheets for the Menu and Custom components, along with a data dictionary.

  A separate spreadsheet was provided that documented the quantity and energy savings associated with participants who also participated in the Green Rewind program. This information did not identify individual customers and was not included in the evaluation.

- **Verify Savings Amounts and Documentation**
  To verify the savings amounts, the evaluation team took a different approach for Menu and Custom portions of the program. The Menu program savings were verified using a census approach to recalculate savings based on tracking system data. We used the Agricultural Irrigation Hardware V4.1[5] workbook from the RTF as the basis for energy savings.

  Custom savings and documentation were verified by sampling 15 projects for a detailed review of claimed savings and documentation. The evaluation team reviewed the submitted documentation to verify the tracking system data entries for participant information, expected documentation, savings, and other data entry points.

[5] https://rtf.nwcouncil.org/measure/irrigation-hardware

- **Check Savings Calculations**
  A professional engineer with Tetra Tech reviewed the savings calculations for the 15 Custom projects sampled and recalculated the savings based on the documentation and additional verification information collected. The engineer examined the project descriptions and drawings, invoices, and engineering calculations and assumptions. Although the submitted calculations were reviewed, the evaluated savings reported results from a new calculation using the documentation. Since these are custom projects with many variables per growing season, this approach was expected to provide different savings for each project. The overall realization rate of the sample will provide the best indication of the accuracy of the project savings.

- **Interview Customers**
  Once the kWh savings were recalculated for each of the 15 sampled Custom projects, the evaluation team called the participant to verify the project equipment's installation. We were able to reach participants and verify the installations of 7 of the 15 projects. The verification phone calls included confirmation of baseline and post-install conditions, operating parameters, and discussion of the non-energy benefits realized since installation. Information from the verification phone calls was also used to refine evaluated savings calculations.

3.2 IMPACT REVIEW RESULTS

Because the Menu application and savings process are streamlined and prescriptive, a census review of the projects in the Menu tracking data was completed. The evaluation team took a more detailed look at the Custom projects, which, by nature, result in more variability in savings and will have the greatest impact on the program savings. The Green Motors component was not evaluated. Overall, the savings claimed across the two program options were accurate.

Table 5: Program Realization Rate

Program option[6]	Projects	kWh			Peak kW		
		Claimed	Evaluated	Realization rate (%)	Claimed	Evaluated	Realization rate (%)
Menu	924	4,355,031	4,355,031	100	852.3	852.3	100
Custom	156	5,718,424	5,456,520	95.42	1,482.3	1,476.0	99.58
TOTAL	**1,080**	**10,073,455**	**9,811,551**	**97.40**	**2,334.6**	**2,328.3**	**99.73**

3.2.1 Menu Option Review

The evaluation team found that the menu program tracked all the necessary project information to use the RTF calculator to claim first-year energy savings and non-energy benefits. The information was well organized and included guidance to understand each of the data entry points. The evaluation team confirmed that the claimed savings matched the RTF energy savings and non-energy benefits expected with minimal additional support from Idaho Power.

[6] The Green Motors component was removed from the impact review section; therefore, the kWh savings in this section is 44,705 kWh lower than the overall program.

The evaluation team identified the following items for clarification by Idaho Power, and they responded to each.

1. The *gooseneck* measure used the energy savings from the previous version of the RTF calculation (V3.3).
    - The energy savings from Version 3.3 was used because the measure was removed from the Version 4.1 energy savings. RTF is reconsidering the removal of this measure. For the 2020 program, the utility used the previous version savings to provide consistency of measures from year-to-year until a final decision is provided.
2. The *gooseneck* measure energy savings is multiplied by two.
    - The *gooseneck* measure for the IER program requires that a drop tube also be installed. The drop tube, although not listed, has equal savings to the gooseneck; therefore, the energy savings appears to be doubled but are two measures combined.
3. The *flow control* measure used the same savings as the *wheel and hand nozzle replacement* measure.
    - These measures are the same because the RTF calculator does not differentiate between the low-flow control and nozzle install. The program used the *wheel and hand nozzle replacement* measure for new flow control nozzles and new nozzles installed on impact, rotating, and fixed-head sprinklers.
4. After these above adjustments, the evaluation found three projects that did not match the RTF Version 4.1 calculator.
    - These three projects were originally entered in 2018 but not paid until 2019. Therefore, the previous year's assumptions (RTF calculator Version 3.3) were used, although they were logged under the evaluated year.

The evaluation team found these to be reasonable responses, and the resulting realization rate for the Menu program is 100 percent for all projects.

Table 6. Menu Option Realization Rates by Idaho Power Region

Idaho Power region	Projects	kWh			Peak kW		
		Claimed	Evaluated	Realization rate (%)	Claimed	Evaluated	Realization rate (%)
Eastern	229	1,093,839	1,093,839	100	214.1	214.1	100
Southern	516	2,012,259	2,012,259	100	393.82	393.82	100
Western	42	98,928	98,928	100	19.33	19.33	100
Canyon	58	431,577	431,577	100	84.43	84.43	100
Capital	79	718,428	718,428	100	140.59	140.59	100
TOTAL	**924**	**4,355,031**	**4,355,031**	**100**	**852.27**	**852.27**	**100**

3.2.2 Custom Option Review

Overall, findings from the Custom option impact evaluation show the program savings calculations are reasonable. The tracking system review found that the tracking system accurately reflected the applications and documentation. The evaluation found just one transcription error of a customer name in the desk reviews.

3.2.2.1 Documentation

The evaluation team reviewed the provided documentation for each sampled project compared to each project's expected documentation as detailed in the program manual. The expected documentation per project was:

- Project description
- Pump curve
- Cost estimate
- Final invoices
- Drawing of system
- Topographic map
- Aerial
- Calculations
- Product specification sheets
- Make and model of pump
- Map of the new system

The documentation provided to the evaluation team was inconsistent. Some of the inconsistencies are a result of limited access to the files during the pandemic. The IER program staff worked remotely during the evaluation, and the documentation was partially in physical files. About half of the sampled projects had paper files that needed to be scanned, and about half were fully saved digitally. The projects with paper files were less complete than the digital files. In the past year, the program has switched to digital files, which will support the accessibility of the documentation.

The documentation provided always included an aerial, pump curve, calculation spreadsheet, and final invoices. The calculation spreadsheet many times included the project description and other notes regarding the assumptions and values used in the calculations; these were the critical pieces of information required to evaluate each project. However, many of the Custom calculation components were documented by notes in the calculator, which were difficult to locate and identify. The evaluation team recommends identifying critical assumptions and operating conditions and making them easy to find for individuals accessing the files. A cover page of existing and proposed operating conditions on the calculations may be an easy location to put all the information.

There were two items consistently missing from the project documentation: (1) the cost estimate and (2) the make and model of the pump. The cost estimate was eliminated as a requirement for project submittal by the project team, although not formally removed from the required documentation list. Idaho Power removed it because the final invoice contains the necessary information to identify the project equipment. The evaluation team recommends removing the cost estimate from the required documentation list.

The other documentation consistently missing from the projects was the Product Specification Sheets. It appears that the program staff is identifying equipment installed based on conversations with the participant and inspection of the invoice. The documentation and notes available to the evaluation team required a discussion with program staff to confirm or collect additional detail for about half of the projects. Of note, program staff always had more detailed information about the project to support the analysis, but the information was not reproducible without their input. The evaluation team recommends that Idaho Power (1) include the equipment Product Specification Sheets with the application or (2) collect the make and model of critical energy savings components (e.g., flow control devices, distributors, filters) separately so their impact on the system can be identified from manufacturers' product specifications.

3.2.2.2 Custom Savings Calculation

The energy savings realization rates for each project are shown in the table below. The interim overall realization rate is 95.42 percent for electricity consumption and 99.58 percent for peak demand. While the overall realization rates are high, there is a good deal of variability in the individual project realization rates.

The variability of individual project results was expected based on the evaluation approach of developing new energy efficiency calculations built from the documentation available. The nature of individual irrigation systems leads to variable results when the evaluation calculation method is applied. This approach to the savings calculation is detailed and provides informative results confirming the general approach to existing calculation. The custom option's confidence and precision were calculated separately from the whole program to evaluate the current methods of energy savings calculation. The results were very similar; the relative precision of ±7.5 percent at 90 percent confidence means the program should have confidence in the current method of calculating energy savings, although improved documentation and simplified and annotated calculations could increase accuracy.

Table 7. Sampled Project Realization Rates

Project ID	Acres	kWh			Peak kW		
		Claimed	Evaluated	Realization rate (%)	Claimed	Evaluated	Realization rate (%)
2444	864	958,545	894,238	93	-3.7	0	0
2448	175	11,614	7,225	62	2.8	3.19	114
2466	58	33,281	18,066	54	16.6	9	54
2468	33	9,956	12,695	128	5	-2.5	-50[7]
2474	135	14,887	15,223	102	-6.1	-2.7	44
2476	33	8,914	3,464	39	4.5	1.732	38
2493	123	57,709	44,651	77	18.5	17.1	92
2504	283	212,428	249,289	117	145.8	154.3	106
2508	18	9,090	6,425	71	4.6	5.4	117
2512	58	30,988	24,874	80	-0.1	0	100
2525	75	14,901	12,431	83	-1.1	5.9	536[8]
2536	39	14,842	11,264	76	6.4	7.3	114
2545	76	7,209	3,163	44	2.9	3.5	121
2549	165	33,156	53,769	162	9.9	2.3	23
2559	34	19,799	14,687	74	6.7	7.28	109
TOTALS	**2,169**	**1,437,319**	**1,371,464**	**95.42**	**212.7**	**211.8**	**99.58**

[7] Project evaluated peak kW went from positive to negative, the realization rate is an estimation.
[8] Project evaluated peak kW went from negative to positive, the realization rate is an estimation.

The evaluation did identify several items that could mitigate risk in project calculations and improve the highly qualified staff's efficiency and effectiveness to focus on the support for participants and vendors.

- Develop a data collection sheet for existing and proposed systems that will consistently collect and organize the project's critical information. The single location for equipment and operations values and assumptions will ease calculation adjustments throughout the project and support QA. The existing program calculator has the information entered throughout the calculator, sometimes in multiple locations, making it difficult to identify whether the best values were used.
- Design a single calculation that creates a comparable energy model of the pre-install conditions, baseline condition (if it varies from pre-install), and post-install condition. The energy savings will be the difference in consumption and peak demand between these two models. The evaluation team used a calculation method similar to the variable frequency drive (VFD) calculation submitted. The pre-/post-model approach will look at the project from a system level, including interactive effects and adjustments to water pumped, hours, pressure, or crop rotation.
- Develop standard assumptions that each system uses to calculate savings; these standard assumptions should be adjusted for each project. Each adjustment should include a description of why the value was changed from the standard assumption. This process will help identify the assumption made in the calculations for more transparency.
- Irrigation system energy consumption is highly variable based upon winter and summer weather conditions, groundwater conditions, crop rotations, and producer operating conditions. This complexity makes it difficult to determine annual energy savings based on the past year's conditions. The current process of reviewing the past five years of operations on existing systems addresses those concerns but only provides electric consumption. Creating a set of normalized operating conditions for the energy efficiency calculations will reduce the reliance on assumed typical values from the participants. The evaluation team recommends using proposed inches of water on the irrigated field as the primary metric for the energy model approach.
- The use of AMI data is very powerful and was used in some projects to determine operating hours and energy consumption. The information obtained from these analyses is currently simplified. A best practice is to develop a regression analysis with independent variables to create a statistical energy model of the current system. Examples of independent variables are water records and flow meter reading, temperature, crop-growing stage, or groundwater level.
- Formalize the QA process for calculations to create expected boundaries on results such as kWh/inch of water or kWh/acre irrigated. In addition, the development of the standard assumptions will also provide a foundation for QA operating conditions and the changes attributed to the upgraded system. The current QA process is highly dependent on the individual staff and their expertise and training.

3.2.3 Non-Energy Benefits

Upgraded irrigation systems typically provide additional benefits in areas outside energy efficiency, although many of these benefits are not easily tracked or valued. The current project documentation identifies non-energy benefit categories as water use reduction, labor savings, maintenance savings, and yield improvements. Currently, an IPC ag rep works with the applicant to estimate the monetary value in each of these categories. Table 8 shows the amount of non-energy benefits claimed by the IER program in 2019.

Table 8: Claimed Non-Energy Benefits by State

Program option	Idaho				Oregon			
	Labor	Maintenance	Water	Yield	Labor	Maintenance	Water	Yield
Menu[9]	$348,379			$348,379	$1,212			$1,212
Custom	$378,921	$153,538		$1,600,301	$130,277	$46,030		$492,580
TOTAL	**$727,300**	**$153,538**	**$0**	**$1,948,680**	**$131,498**	**$46,030**	**$0**	**$493,792**

The evaluation identified that the non-energy benefit values are inconsistently estimated for projects. The Menu option non-energy benefits are prescriptively calculated at $2 per acre. The custom option savings is self-reported by the producer based on estimates of value created. The claimed results varied from zero to $5,250 per acre. Most of the non-energy benefits claimed are based upon yield improvement estimates; they account for 75 percent of all the custom project non-energy benefits claimed. The highest yield benefits per acre are attributed to projects categorized as "New" in the tracking system. The "New" category includes both newly irrigated fields and projects that upgrade an irrigation system from flood or hand lines to a pivot. Table 9 details the per acre average value of non-energy benefits for systems categorized as New or Existing.

Table 9: Claimed Non-Energy Benefits per Acre by Project Type

Project Type	Project	Area (ac.)	Labor	Maintenance	Water	Yield	TOTAL
Existing	78	13,862	$12	$9	$0	$32	$53
New	78	7,005	$49	$11	$0	$235	$295
Total	**156**	**20,867**	**$24**	**$10**	**$0**	**$100**	**$134**

Overall, the non-energy benefits claimed are reasonable. The USDA NASS provides an annual press release[10] detailing the cash rent expense and cash value of agricultural land, separating between irrigated and non-irrigated. The values for Idaho and Oregon cropland are extracted from that press release in Table 10.

Table 10: 2019 USDA Land Value Statistics from USDA NASS

Cropland type	Idaho Cropland		Oregon Cropland	
	Average Land Value per acre	Average Cash Rent Expense per acre	Average Land Value per acre	Average Cash Rent Expense per acre
Irrigated	$ 6,020	$ 216	$ 5,290	$ 215
Non-Irrigated	$ 1,650	$ 56	$ 2,220	$ 95
Difference	**$ 4,370**	**$ 160**	**$ 3,070**	**$ 120**

The difference in the annual rent expense is an approximation of the annual value provided by an irrigation system, but it does not differentiate between a flood irrigation system and a pivot system. While the majority of "New" projects will adjust from a flood system to a pivot system, the difference in

[9] The Menu savings tracks the non-energy benefits as a single line. This value is equally separated into yield and labor savings equally.

[10] https://www.nass.usda.gov/Statistics_by_State/Idaho/Publications/Crops_Press_Releases/2020/CASHRNT.pdf

value can be approximated by the difference in the average between irrigated and non-irrigated. This is because the flood systems will receive a significantly lower rent than the average irrigation system and the pivot system will receive a higher than average rent. Although the average non-energy benefits of $295 per acre for new irrigation system project types is high, the evaluation team does not recommend adjusting the claimed non-energy benefits at this time.

However, the high value of the yield improvements estimates is a natural spot to review as part of quality assurance. Requesting yield information from past participants at project locations will help develop estimates. This information will require a significant amount of effort from program staff and customers. We found that during verification calls, participants had difficulty answering questions directly about the value generated from the project in non-energy benefit categories but could provide examples of non-energy benefits that occurred. And even the yield benefit improvements were still only talked about in generalities. Some producers may have available records, but they will not be available immediately or easily accessible. If collected, plan multiple contacts with surveyed participants.

As a starting point, the yield data collected for past projects and the implementation team's engineering experience could be used to create a menu of standardized non-energy benefits for project types that can be calibrated using the USDA NASS data. Focusing the effort on the yield improvements from various project types will have the most significant impact. But the improvement in labor and maintenance categories are important to the overall performance of the improvement. The program also claimed zero water reduction benefits; but these values can also be significant and are not captured in the current process because the improvement provides limited value to the producer.

Given the amount of effort to collect primary data to calculate non-energy benefits from projects, we suggest prioritizing the following project types and sources of information:

- Flood irrigation to pivot irrigation projects.
- Wheel line to pivot irrigation projects.
- Regional water reduction benefits value.[11]
- Reductions in inches of water pumped through increased distribution efficiency, leak reduction, and other reasons will reduce the calculated water use, but the non-energy benefits can be similarly estimated as the Menu program value, currently $2 per acre.
- Utilize the annually published USDA NASS difference in average cash rent expenses for Idaho to determine the average value of non-energy benefits internalized by the producer for “New” irrigation projects claimed.

Creating standardized non-energy benefits by project type will generate more transparent results per project. The approach will recognize the small benefits of simple projects and limit the excessive values claimed by other projects. It will also reduce the ag reps' workload by reducing the need to attribute value for each project individually before start-up. However, the approach will require the team to annually revalue and document the prescribed amount based on local information, program participation, and other resources.

[11] IPC’s Grand View Sediment Reduction Program and Natural Resources Conservation Service (NRCS) regional programs use models and other methods to account for water quality improvements from reduced sediment and nutrient loading.

4.0 PROCESS EVALUATION RESULTS

The process evaluation served as a check on the program design compared with (1) industry best practices, (2) marketing and outreach, (3) the implementation process, (4) vendor engagement, and (5) program administration and tracking.

The process evaluation sought to achieve the following goals:

- provide feedback on program processes and effectiveness;
- evaluate communication effectiveness between program staff, ag reps, customers, and vendors or installation contractors; and
- collect qualitative information on program experience and the application process, and any areas for improvement.

4.1 METHODOLOGY

The process methodology consisted of the four primary evaluation activities shown in Figure 4. Each activity is explained in more detail below.

Figure 4. Process Review Steps



- **Review Program Materials**
  Program materials provided by the IER program staff were reviewed, including the program brochure, applications, publications, and conference table toppers to inform our interviews with ag reps, vendors, and producers.

  Idaho Power also provided a program manual (in electronic format) that details (1) background information on the program, (2) contact information for all program staff, (3) examples of both the Menu and Custom applications with directions for assistance, cost-effectiveness, and RTF usage directions, (4) ag rep contacts and goals, and (5) a summary of marketing and reporting activities. This document serves as a useful source of program documentation for all parties to reference.

  In addition to the documentation we reviewed, Idaho Power presented summary survey data gathered through other research efforts. The results showed generally high levels of satisfaction that were confirmed during our process evaluation.

- **Interviews with Ag Reps**
  We spoke with all six ag reps representing the five regions in Idaho Power's service area to better understand outreach methods and participation barriers and identify communication methods that work best when reaching out to vendors and participants. The interview guide can be found in Appendix A.

  Ag reps have been working with the program for 3 to 15 years and understand the types of producers in their regions and the types of systems used and projects implemented. They all

attend Irrigation Association events and are all Irrigation Designer certified. They encourage vendors to do the same.

They described their role with the IER program as:

- promoting the Menu and Custom program components to customers and vendors;
- supporting vendors with customer meetings and customer events;
- holding training and program meetings with vendors and customers;
- working with vendors and customers to design, scope, and implement Custom projects; and
- assisting with Custom incentive calculations and applications

- **Interviews with Irrigation Vendors**
  We spoke with nine vendor staff representing all five regions and all six of the ag reps to investigate program awareness and understanding, interactions with ag reps and customers, the level of application assistance, and their markets. The interview guide can be found in Appendix B.

  The vendors we spoke with ranged in size from small, single locations with 8–15 staff to large firms with multiple locations and 30–50 employees. They have each been involved with the program for several years.

  About half of the vendors we interviewed had retail locations that focused on equipment rebated through the Menu option, such as sprinkler packages and pivots—the other half designed or installed systems that qualified for the Custom incentives.

- **Interview with Participating Producers**
  As part of the impact review, we contacted participating producers to verify the equipment installed and incentivized through the program and benefits realized from the new equipment. In addition, we asked them questions about their experience with ag reps and vendors, the application process, and the program in general. The interview guide can be found in Appendix C.

  The producers ranged in size from a cattle rancher who converted a pasture, to an expanding producer who is upgrading several fields per year, to a large dairy operation. Producers also ranged in their experience with irrigation. In general, they fell into three categories:

  - those who are inexperienced with irrigation technology and relied upon the vendors and ag reps to design and install the system that worked;
  - those who are experienced with irrigation technology and were involved in the design of the new system; and
  - those who were hands-off on the process and allowed the vendor to design the new system and work with the ag rep independently before seeking grower approval for the project design and budget.

4.2 PROCESS REVIEW RESULTS

We spoke with program staff, ag reps, irrigation vendors, and program participants to get feedback from all program stakeholder perspectives. One thing that became evident is that there are many paths for irrigation producers to access the program. Multiple paths to participation could create barriers, complicate communication, or increase dissatisfaction. However, overwhelming feedback shows that

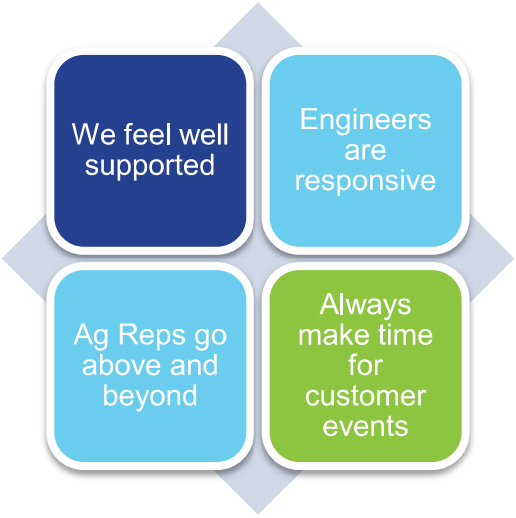
the current system for outreach, assistance, and delivery is working well and communication amongst all parties is successful. In order to maintain this high level of service, ag reps and vendors will need to continue to be flexible and route customers where they need to go depending on (1) who they have already talked with, (2) their design needs, and (3) their level of technical expertise.

4.2.1 Outreach and Relationships

The Idaho Power program staff and ag reps meet weekly to discuss projects and program requirements. As field staff, the ag reps appreciate the program staff in the office making themselves available. Ag reps report that Menu questions receive an immediate response from the program specialist and the professional engineer provides needed technical assistance on the Custom projects.

Ag reps work to build strong relationships with customers and vendors in their respective regions. They also assist each other as needed. The high level of support the ag reps provide is reflected in the positive feedback we received from vendors and producers. Figure 5 shows some of what vendors have to say about their interactions with Idaho Power staff.

Figure 5. Vendor Feedback on Idaho Power Ag Reps



The producers we spoke with all discussed how the ag reps made the process of claiming incentives easier. The producers we interviewed could not identify any potential improvements for the ag reps or the incentive process. Two of the interviewed producers relied upon ag reps to support or improve the design of their irrigation systems, and three other interviewed producers relied upon the ag reps to have enough knowledge and experience to discuss detailed improvements to their designs. One of those producers said that the ag rep motivates him to continue to improve both existing systems and new designs. The ag reps are seen as individuals working to help producers weigh their trade-offs to get the system that is right for them with the lowest long-term cost.

Vendors we spoke with are happy to refer customers to the Ag Reps for assistance and have a high level of trust that the Ag Reps will provide high-quality service to their customers.

Ag reps contact vendors frequently by phone and in person. Before COVID-19, they would visit vendor offices at least quarterly, sometimes more often. During visits, they would update vendors on the Menu and Custom components of the program and leave the program brochures. Vendors reported

handing out brochures to most of their customers who purchased Menu-eligible equipment. They appreciate that Idaho Power makes those brochures available to them. A few vendors thought they could use a few more of the brochures or have them replenished on a more regular basis. But one knew that they could go online and print them if needed.

Additional ag rep outreach methods to vendors include workshops with vendor sales staff, irrigation trade shows, mailings, and emails. Vendors feel that Idaho Power and the ag reps do a good job of attending events with vendors and producers to get the word out about the program. They specifically mentioned the Idaho Irrigation Association trade show as an advantageous place to interact with producers and vendors. One vendor mentioned an annual lunch held by the ag reps that was very informative, but he has not seen an invitation to that in a few years.

Seven of the vendors we spoke with felt very knowledgeable about the difference between the Menu and Custom incentive opportunities through the program, including the requirements. One vendor said he was a little unclear about the distinction between the two options but mostly hands out brochures to customers. The other vendor is not at all aware of the difference and does not get involved in the customer decision about applying for the program incentives.

Vendors report feeling that grower awareness of the program is dependent on how sophisticated the grower is and whether they have participated before in the program. A couple of the vendors estimated about 50 percent of the producers who come to them are aware of the program. Those with a good understanding are usually previous participants. Others come in having heard of a program but not understanding the specifics; in those cases, the vendor either explains the program or provides them with a program brochure. One vendor said they steer all their customers to the program and tell them about the opportunities available. Another vendor felt that the customers knew more about the program than he did.

Outreach to producers consists of newsletters, workshops, brochures, producer meetings, radio ads, letters, and emails. A couple of the vendors felt the radio ads worked well, and ag reps liked the newsletters for outreach on the Menu option. While most agreed that the outreach methods are successful and the brochures are particularly useful, two of the vendors and an ag rep suggested something that focused on why producers should upgrade—including benefits to crops, power savings, and water savings.

The producers generally had a relationship or contact with the ag rep before the custom project installation. Most had a relationship long enough that they do not know when it started. Only two of the interviewed producers did not have a previous relationship; one was referred to the ag rep by a neighbor and the other by the vendor.

> "The relationship with the Ag Rep motivates me to continue to improve my irrigation systems."
> Ag Producer

Some producers say their neighbors are not taking advantage of the program. Without interviewing nonparticipating producers, we cannot say whether that is a result of lack of awareness or that they are not replacing equipment. Targeted outreach to producers neighboring those who participated may help with awareness. Case studies, participant testimonials, or a process for participant referrals may raise interest for neighboring producers.

4.2.2 Menu Option Processes

Producers interested in equipment that qualifies for Menu incentives typically go straight to the vendor for their projects. Some billing questions turn into projects. Vendors report that most producers purchase their equipment, collect their invoices, and apply for the incentive on their own. Ag reps feel

the Menu option is strong, and producers are using it often. Vendors report high interest in the sprinkler pivot packs and generally feel that the Menu option covers good equipment. One vendor aggressively promotes the sprinkler package with the Menu incentive.

Both ag reps and vendors provided similar feedback on how Menu applications are handled. Because the Menu applications are straightforward and easy to complete, producers will typically fill them out themselves. Some producers send in individual applications, and others send theirs in batches at the end of the year. Those sending at the end of the year can make it hard for vendors (pulling all the associated project invoices).

Vendors provide the brochures explaining the program or an application and the supporting invoices. One vendor supplies their customers with an extra invoice stapled to a Menu application in case the customer wants to apply for the incentive. Another vendor mentioned notepads of tear-away Menu applications with prepaid envelopes that made the process quick and simple. Ag reps will answer questions if producers have any or assist on large projects with a high number of units purchased.

> "The Menu savings are easy to communicate with the brochure that IPC provides. " Vendor

The Custom producers interviewed who had completed Menu projects in the past noted the ease of use of the program and were very happy with the level of support they are given. Several producers receiving Custom incentives had not previously claimed Menu project incentives but were aware of that portion of the program. They had not participated because of the perceived administrative barrier. Their concern could be a result of the significant support they receive from the ag reps for Custom applications and Menu incentives are typically competed by the producer themselves.

4.2.3 Custom Option Processes

Based on all the process feedback, there are multiple paths to participation for producers interested in the Custom option. Ag reps said they find out about Custom projects from producers, vendors, and Idaho Power's service request system. Customers can go to either the vendor or the ag rep when they are interested in a more complex project than what is covered through the Menu component. As a result of the vendor relationships the ag reps have developed, vendors direct customers to the ag reps for Custom projects. In return, when customers come to the ag reps first, ag reps will direct the customer to vendors. This process is similar to what we heard from the producers. Some producers went to vendors first, some went to ag reps, some contact the USDA, and some do their own design and reach out to all parties separately for the components they can provide.

> "The Ag Rep was key to getting the project through" Ag Producer
>
> "The Ag Rep was really good at explaining how the large (irrigation) system worked" Ag Producer

Most customers work with an ag rep early in the project planning stage and benefit from their design assistance. Ag reps can conduct energy evaluation for producers interested in Custom projects. Ag reps indicate that the energy evaluations for retrofit projects are very specific to each grower's need and can range from simple and quick to complex. The objective is to identify how the grower will benefit from the project and how the IER program can help.

Evaluations range from pump tests to system reviews and questions such as "does this project make sense." Not all

evaluations transition to projects. Ag reps report that they can spend hours with someone, and yet the project may not qualify for the program.

Several producers mentioned that the design assistance provided by the ag reps helped them adjust the project to reduce installation costs and be more efficient. One field owner of large systems noted specifically that the ag rep was very good at explaining the dynamics of the large interconnected irrigation system. Another producer who was installing the first pivot irrigation noted how the ag rep stepped them through the small system he had and how it would work. In fact, in that example, the ag rep worked with the customer to refine the system to install a 10 hp pump instead of the planned 20 hp pump.

Vendors we spoke with have been happy with the support they and their customers get from the ag reps. Each vendor sends producers to the ag reps as soon as they can once they identify a Custom project opportunity. In some cases, the grower has already worked with an ag rep before contacting the vendor.

Most vendors send producers to the ag reps to understand the potential savings and incentives for their projects. A couple of the vendors feel comfortable from experience with several previous projects giving producers a ballpark of what they might expect, with the caveat that the ag rep will figure out the specifics.

Unlike the Menu applications, the Custom applications are more complex and typically initiated by the ag reps. Vendors are rarely involved in the Custom application process, except when supporting documentation is needed. One vendor also mentioned working with other utility programs in the area. In comparison, he said the IER process is more complicated, but Idaho Power does all the work. Other programs are easier, but the vendor is required to do most of the work.

Although the Custom application is difficult for the grower to fill out, ag reps say it is easier than Farm Service Agency (FSA) or Natural Resources Conservation Services (NRCS) applications. The most challenging area on the application is the non-energy benefits entry. Some producers have a good handle on the numbers, while others have no idea how to answer. Ag reps will try to identify benefits and a reasonable quantity to apply.

Producers feel that the Custom projects' application process is seamless, all rated the ease of use with the highest satisfaction, and no interviewed participants had recommendations on improvements. The ag reps' experience with equipment, design, and operating strategies creates an easy transition from project scoping to application and through until the check is received.

4.2.4 Incentives

Each region has its own goals for the number of projects and savings over a year. Menu projects have been a higher proportion of the program in the past. Now ag reps are more focused on Custom projects in at least three of the regions. In a couple of the regions, Menu projects are still the most common.

Ag reps understand the need for equipment to be cost-effective but know that vendors and producers would like to see higher incentives. A couple of the ag reps specifically mentioned the Menu option's importance to the overall IER program. A few others commented on the cost of equipment rising faster than the incentives, resulting in the incentives covering a lower proportion of the project cost than in the past; a message repeated by the vendors. They mentioned getting feedback from Menu customers that incentives are not increasing in line with equipment costs. Ag reps report prices are increasing 10 to 20 percent for parts and steel.

Although ag reps and vendors would like to see higher incentives, they also are keen to keep the program available to producers. They are uncertain about the level of activity next year, which they say will depend on the economy, the number of producers repairing systems, and how many decide to switch crops to those needing more irrigation.

The producers are always willing to accept higher incentives. But one producer had an interesting observation. The VFD incentive typically covers most of the incremental cost to install the VFD but does not cover the entire amount. Many of his neighbors bypass the opportunity because of the first cost difference. This producer felt that a slightly higher incentive could gain many new VFD projects.

Custom incentives vary by nature, and one of the only issues we heard of was producers comparing incentive amounts resulting in some dissatisfaction. Balancing vendor design of a system and eligibility for program incentives is a key challenge for the ag reps. Ag reps would like to fully understand why the current Menu and Custom incentive levels and options to better support vendors and producers and improve their ability to answer questions.

The vendors recognize that the incentives influence producer decisions regarding what to install and whether they can afford an energy-efficient option. But the vendors also report the program and incentives have influenced some of their sales and design practices. Vendors also believe that without the IER program, some of the projects would not happen.

> "We hope Idaho Power keeps the program, it is good for our company." Vendor

While the vendor's primary goal is to keep their customers happy, which usually means prioritizing crop growth, vendors are now also conscious of efficient options. They also realize another way to keep their customers happy is by saving them money by incorporating more energy efficiency in the projects. And the incentives and long-term savings from efficient equipment also meet that goal. Then there is the sales support that is provided by the program. One vendor said, "customers feel the efficient equipment/projects must be the right decision if Idaho Power rebates them."

The incentive caps[12] have caused a bit of confusion in the marketplace. One producer noted that others would be willing to upgrade to a VFD if more than 75 percent of the cost was provided for projects where energy savings justify it. The 10 percent cap of new system costs also can work against getting the most efficient system installed. For example, when the design is improved to reduce pump size or other equipment costs through increased efficiency, the total maximum incentive is reduced as the cost is reduced. Overall, the customer pays less money to install, but the reduced incentive is a signal that has indicated to some that they are not choosing the best option. Since program administrators develop the incentive caps to keep programs cost-effective, additional messaging to producers who see incentives reduced by the cap may help alleviate the confusion.

[12] The program limits incentives to a maximum payment of 75 percent of the total project cost of a system retrofit or 10 percent of the total cost of new system.

Producers we spoke with say they are getting what they expect from the program and the incentive. Typically, they mentioned that the irrigation system provides more benefits than they expected. Several producers noted that the new irrigation system was the "right system" and did not need much adjustment after the initial install. Additionally, a couple of the producers noted that now that they have converted from an old system and operated the pivot system for a season, they are never going back to the old way of operating. They did not remember discussing non-energy benefit improvements before the project, but that is why they are happy with the new systems.

> "I am very appreciative about how easy it was to participate. We are lucky to have the low (energy) rates and a focus on energy efficiency." Ag Producer

There were only a few suggestions for enhancements or clarifications to the incentive structure of the program. One vendor had questions regarding the fine print on the Menu application for not receiving an incentive on a service more than once every three years. Another vendor mentioned experience with another utility program that offers a VFD incentive amount per horsepower that is easy to follow. However, this vendor did understand that at this time, Idaho Power wants to measure the savings using a custom calculation.

A couple of producers had ideas about installing solar photovoltaic (PV) around the edges of their fields and whether those could coordinate with their irrigation system. One producer mentioned that filtering, when necessary, can consume 5 to 10 psi, and there may be an opportunity to install filters that have a low head loss. A second producer questioned the opportunity for incentives on telemetry. In his experience is that it identifies leaks faster and provides labor and water savings. A third producer mentioned that increasing the distribution piping size can reduce the pipe friction loss and make the pumping system more efficient. His practice is to upsize the pipe one size larger. He believes that many existing distribution pipes are undersized in his experience, creating more friction loss. The reduction in friction loss results in energy savings, even if no further equipment is installed.

APPENDIX A: AG REP INTERVIEW GUIDE

Idaho Power
Irrigation Efficiency Rewards Program Evaluation
Ag Rep Interview protocol

Introduction

Note: Because senior staff will be conducting interviews, they will be semi-structured. Therefore, the following interview protocol is only a guide to ensure certain topics are covered, but evaluators will follow the flow of the interview and modify questions as needed to fit the interviewee's circumstance.

NAME: _____

PHONE: _____

INTERVIEWER: _____

DATE COMPLETED: _____ **LENGTH:** _____

My name is _____, with Tetra Tech. Idaho Power has hired us to evaluate their Irrigation Efficiency Rewards Programs. We understand you work closely with customers to complete projects through the program. I'd like to ask you some questions about your experience with the program and your interaction with customers and irrigation vendors. The information you provide will assist us in assessing the program and finding ways for the program to serve the market most effectively. This interview should take approximately 30 minutes of your time.

Can we record the call for notetaking purposes please?

Program Background

B1. How long have you been involved with the program?

B2. Could you describe for me your role in the program? (A high-level overview of your interaction with customers.) How do you assist customers with Menu and Custom projects?

B3. About how many customers do you work with each year? How many complete Menu or Custom projects each year?

B4. What are your annual program goals (Menu and Custom)? How easy are they to meet?

B5. What type of interaction do you have with irrigation vendors? How does that differ for Menu and Custom projects? Do vendors typically provide equipment for one or the other or both?

B6. How do you stay updated on current technology and processes within the irrigation market? Are there specific trainings you attend or other learning opportunities?

Project Awareness

A1. How do you learn that customers are considering upgrading equipment? Is it mostly customers reaching out to you or are you identifying customers proactively?

A2. What type of outreach methods do you use to make customers aware of the Menu and Custom incentives and your assistance?

A3. What phase of project planning are customers typically in when you get involved? What types of support do you provide, depending on their proposed project?

A4. Do you work more with customer's who receive incentives through the Menu portion of the program or the Custom part of the program? What proportion of the customers you work with receive Menu or Custom incentives?

A5. What proportion of irrigation vendors are aware of the Menu and Custom rebates from Idaho Power? How well do they understand what is available?

A6. How are you working with irrigation vendors to increase their awareness of the Menu and Custom rebates? What more could be done?

Menu Incentives

(The menu incentive option pays an incentive for the purchase of specific replacement parts and upgraded components for an existing irrigation system. The incentive varies by the sprinkler component or part incorporated into the sprinkler system.)

M1. Who typically completes the Menu Incentive applications - customers, irrigation vendors, you?

M2. How easy or difficult are they to complete? What would make the applications easier to complete?

M3. What feedback do you hear from customers? What are typical mistakes made or assistance needed?

M4. Do you ever receive feedback from customers about savings achieved after participation with the menu incentives?

Custom Incentives

(The custom option pays an incentive based on an estimated annual reduction in energy use. For existing systems, the incentive is based on energy savings estimated by Idaho Power of the proposed modifications. For a new system, the incentive is based on the installation of a system Idaho Power determines to be more energy efficient than standard. Water source changes to an existing system will be treated as a new system. The incentive received is determined based on annual kilowatt-hour (kWh) or kilowatt (kW) savings.)

C1. Who typically completes the Custom Incentive applications - customers, vendors, you?

C2. How easy or difficult are they to complete? What are typical mistakes made or assistance needed? What would make the application easier to complete?

C3. Do all customers receiving a Custom incentive get a free energy evaluation? How comprehensive are the evaluations? Are the evaluations usually focused on a specific customer concern or an opportunity to save energy?

C4. What types of projects are you typically looking for during the energy evaluation?

C5. The incentives for the Custom option are either paid per kWh or kW. Are the projects designed to maximize either the peak kW reduction or the kWh reduction? How is the decision made to maximize one over the other?

C6. Do you guide the projects towards design or operations that increase the savings slightly? How often do the customers incorporate these adjustments? For the customers who do not incorporate the adjustment, what are typical reasons?

Vendors

V1. What types of questions do irrigation vendors have regarding the Menu and Custom incentive options? Are they all able to provide program-eligible equipment or services? Do some focus more on Menu than Custom or vice versa?

V2. From your perspective, what are the primary barriers that irrigation vendors face when working with agricultural customers on potential energy efficient upgrades? How does the Irrigation Efficiency Rewards program help them?

Program Involvement

P1. On a scale of 1 to 5 where 1 is 'not at all difficult' and 5 is 'very difficult', how would you rate the program's administrative burden (e.g., requirements, paperwork) for you? Why do you give this ranking? What would you do to improve the administration of the program?

P2. Do you feel adequately informed of program changes? How would you like to be better informed of program changes?

P3. How would you describe your interactions with Corporate Headquarters Customer Research and Energy Efficiency staff (minimal, helpful, very involved - probe to characterize)?

P4. What do you think is working best with the Menu incentives? With the Custom incentives?

P5. What do you think is most in need of improvement? Any changes for Menu or Custom incentives?

Those are all the questions I have. Thank you very much for your time today.

APPENDIX B: VENDOR INTERVIEW GUIDE

Idaho Power
Irrigation Efficiency Rewards Program Evaluation
Installation Vendor Interview protocol - DRAFT

Introduction

Note: Because senior staff will be conducting interviews, interviews will be semi-structured. Therefore, the following interview protocol is only a guide to ensure specific topics are covered, but evaluators will follow the interview flow and modify questions as needed to fit the interviewee's circumstance.

NAME: _____

COMPANY: _____

TITLE: _____ **PHONE:** _____

INTERVIEWER: _____

DATE COMPLETED: _____ **LENGTH:** _____

My name is _____, with Tetra Tech. Idaho Power has hired us to evaluate its Irrigation Efficiency Rewards program. I would like to ask you some questions about your experience with the program. The information you provide will help us assess this program and find ways for the program to serve the market most effectively. This interview should take approximately 30 minutes of your time.

Firmographics

F1. To get us started, could you briefly tell me a little bit about your business.
For instance, what areas do you serve or where do you have offices? Is your office a subsidiary or branch of a bigger company? (Other options: franchise, dealer, manufacturers rep).

F2. What types of services do you offer? Do you support customers with irrigation system design?

F3. How many employees (full-time equivalents) does your company employ?

F4. Which manufacturers do you represent? (skip manufacturers question if they do not sell equipment)? Are you a single line or multi-line dealer?

Program Awareness

A1. When did you first get involved with the Irrigation Efficiency Rewards program? How did you first hear about the program?

A2. Are you familiar with the two incentive options available through the Irrigation Efficiency Rewards program - the Menu incentives for basic replacement of worn parts and the Custom incentives for design-driven projects? Do you work with customers for both options or focus on one (which one)?

A3. What percentage of your sales or projects are eligible for Menu incentives? What percentage of your sales or projects are eligible for Custom incentives? (Probe for an explanation of why projects are/are not eligible).

A4. What proportion of your projects eligible for Menu incentives utilize and receive incentives? What proportion of your projects eligible for Custom incentives utilize and receive incentives? (Probe for an explanation of why projects are/are not receiving incentives - do they not see Menu incentives if application completed by customer?)

A5. What proportion of your customers are aware of the Menu and Custom incentive options? What do you discuss with them regarding the incentive options available (eligible equipment, incentive, application)? How much detail do they understand about what the program offers?

A6. What are the reasons you have heard why customers do not take advantage of the incentives once they learn about them? What do you think Idaho Power could do to increase awareness of the Irrigation Efficiency Rewards program opportunities? What could they do to increase participation?

A7. What has been the most effective way Idaho Power communicates with you regarding the Irrigation Efficiency Rewards program? Do you feel adequately informed of program changes? How would you like to be better informed of program changes?

A8. Are there types of workshops or training events you would like to see Idaho Power sponsor to help you in your work in the program? (Probe to characterize the current state of on-the-job training.)

Program Involvement

P1. On a scale of 1 to 5 where 1 is 'not at all active' and 5 is 'very active', how would you characterize your participation level with **Menu** incentive projects in the past 12 months? (Probe for reasons for the reported level of activity.) How do you expect that to change over the next 12 months? What could Idaho Power do to involve you more in the program?

P2. On a scale of 1 to 5 where 1 is 'not at all active' and 5 is 'very active', how would you characterize your participation level with the **Custom** incentive program in the past 12 months? (Probe for reasons for the reported level of activity.) How do you expect that to change over the next 12 months? What could Idaho Power do to involve you more in the program?

P3. Could you describe for me your interaction with the Idaho Power Ag Reps? How often do you interact with your Idaho Power Ag Rep? How often does the IPC Ag Rep interact with your office (combined contact with all the employees)?

P4. At what point do you typically involve Idaho Power in your design process? What would encourage you to reach out to the Idaho Power ag rep earlier?

P5. Do you feel you can estimate the **Menu** incentive for customers before engaging with the Idaho Power Ag Rep?

P6. Do you feel you can estimate the **Custom** incentive for customers before engaging with the Idaho Power Ag Rep?

P7. What level of assistance do you provide on applications for the **Menu** option? The **Custom** option?

P8. On a scale of 1 to 5 where 1 is 'very difficult' and 5 is 'very easy', how would you rate the **Menu** option's administrative requirements for you? Why do you give this ranking?

P9. On a scale of 1 to 5 where 1 is 'very difficult' and 5 is 'very easy', how would you rate the **Custom** option's administrative requirements for you? Why do you give this ranking?

P10. What do you think are the main benefits your customers receive by participating in the program? What is the primary benefit you receive from participating in the program?

P11. Has your participation in (or involvement with) the program affected your business practices? How? (Probe specifically about changes in sales practices as well as technical techniques and practices.)

P12. What do you think is working best with the **Custom** portion of the program? What do you think is working best with the **Menu** program?

P13. What do you think is most in need of improvement for the **Menu** or **Custom** options?

P14. Is there anything else you would like to share about your experience with the Irrigation Efficiency Rewards program or Idaho Power?

Those are all the questions I have. Thank you very much for your time today.

APPENDIX C: PARTICIPANT VERIFICATION INTERVIEW GUIDE

Idaho Power
Irrigation Efficiency Rewards Program Evaluation
Participating Customer Project Verification and Interview Protocol

Note: Because senior staff will be conducting interviews, interviews will be semi-structured. Therefore, the following interview protocol is only a guide to ensure specific topics are covered, but evaluators will follow the interview flow and modify questions as needed to fit the interviewee's circumstance.

NAME: _____

COMPANY: _____

TITLE: _____ **PHONE:** _____

INTERVIEWER: _____

DATE COMPLETED: _____ **LENGTH:** _____

My name is _____, with Tetra Tech. Idaho Power has hired us to evaluate its Irrigation Efficiency Rewards program. I would like to ask you some questions about your experience with the program. The information you provide will help us assess this program and find ways for the program to serve the market most effectively. This interview should take approximately 30 minutes of your time.

Project Information for Interviewer (note questions or specific items from desk review to verify)

Pre-Installation Equipment

B1. What type of irrigation system did you have before the project?

B2. Prior to this project, how long since you last made significant changes?

B3. Was the pre-existing equipment fully functional, fully functioning but with significant problems, or non-functional?

Post Installation Equipment

C1. Describe your new irrigation system. Including the portions that were different from the pre-installation condition.

C2. When was the installation complete?

C3. Does the equipment operation meet your expectations?

Measure Operating Conditions

D1. Did you install a VFD? How do you have it set or controlled?

D2. What crops do you grow? How many inches of water do you apply in a typical year?

D3. Was there a need to adjust operating controls or conditions after using the new irrigation system for a few months? What adjustments were required?

D4. Do you anticipate needing to make operational adjustments this next irrigation season? If so what adjustments and why?

D5. Have there been any aspects of the new system that didn't operate the way you expected they would?

D6. Do you feel that the new irrigation system has met your goals for energy reduction? For other benefits/especially labor and water savings?

Process Questions

A1. How did you first hear about the program? Prior to this project, have you previously applied for custom incentives?

A2. You applied for and received a Custom incentive. Are you also familiar with the Menu incentives for basic replacement of worn parts? Have you ever applied for Menu incentives?

A3. Could you describe for me your interaction with the Idaho Power Ag Reps? How often do you interact with your Idaho Power Ag Rep? Have they been helpful with:

- Planning your system?
- Getting power to the site?
- Addressing irrigation/pumping problems?
- Other Electrical problems?

A4. At what point did you involve Idaho Power in your design process? What would encourage you to reach out to the Idaho Power ag rep/distribution designer earlier?

A5. Could you describe for me your interaction with the vendor that assisted you with your project? How often do you interact with that vendor (often or only for this project)?

A6. At what point do you typically involve a vendor in your design process? What would encourage you to reach out to a vendor earlier/or later?

A7. How did you decide on the equipment you were going to install? What type of efficiency or energy savings were you hoping to realize?

A8. What other benefits, besides energy efficiency, were under consideration when you were planning your project (labor reduction, water savings, improved yield, maintenance reduction, etc.…)? Have you realized those benefits as a result of the project?

A9. On a scale of 1 to 5 where 1 is 'not at all satisfied' and 5 is 'very satisfied', how would you characterize your satisfaction with your experience with the Custom incentive program? Why do you say that?

A10. On a scale of 1 to 5 where 1 is 'very difficult' and 5 is 'very easy', how would you rate the administrative requirements for you to participate in an Idaho Power energy efficiency program? Why do you give this ranking?

A11. What do you think is working best with the Custom portion of the program?

A12. What do you think is working best with the Menu program?

A13. What do you think is most in need of improvement for the Menu or Custom options?

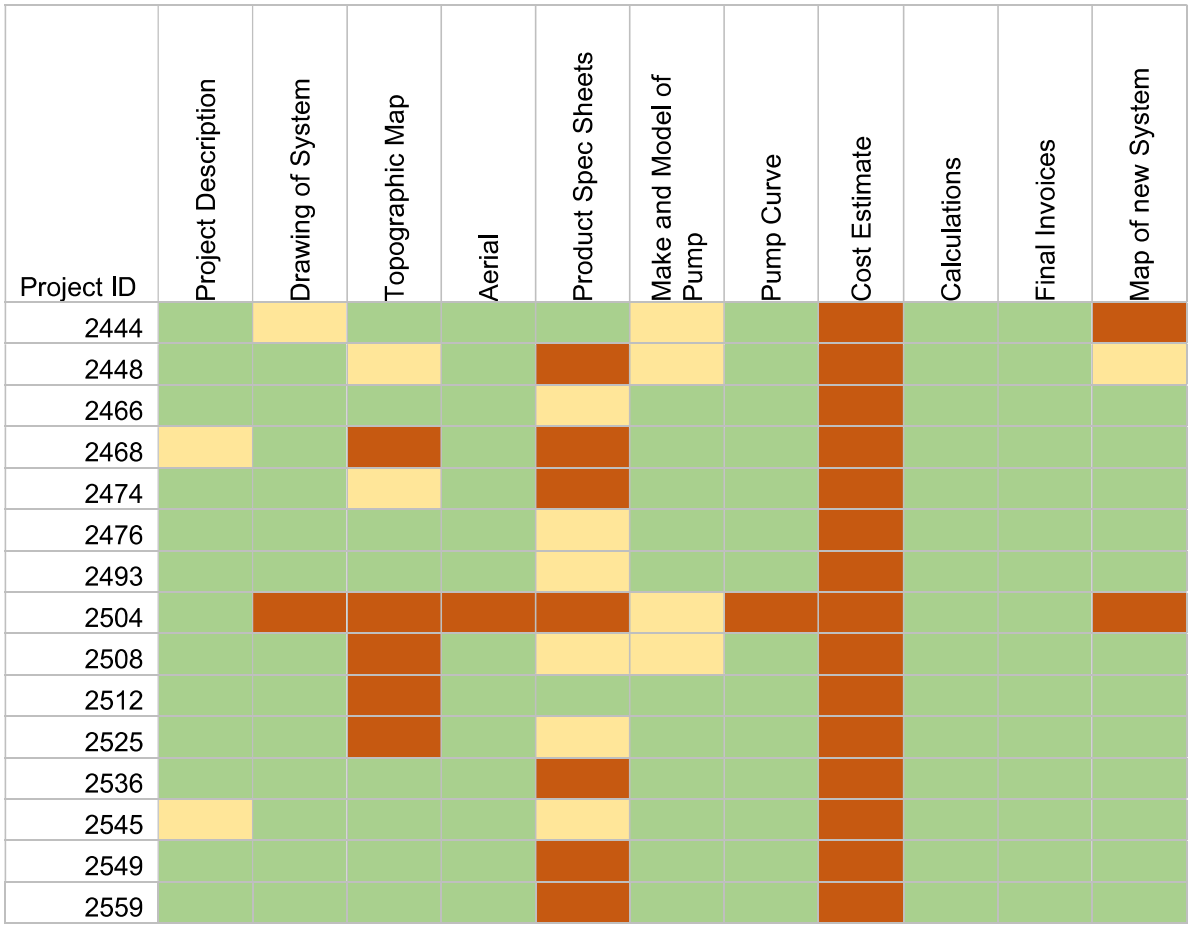
Is there anything else you would like to share about your experience with the Irrigation Efficiency Rewards program or Idaho Power?

Those are all the questions I have. Thank you very much for your time today.

APPENDIX D: INDIVIDUAL PROJECT REVIEWS

The project documentation log for each reviewed project is listed below. Green indicates the documentation was available and sufficient, yellow indicates it was available but not sufficient to recreate the project without further knowledge, and red indicates that the documentation was not included in the package delivered to Evaluation.

Figure 6: Project Documentation Log



The following pages show individual project descriptions and describe the claimed and evaluated savings' calculations.

Project ID	2444		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	958,545	894,238	93%
kW Savings	-3.7	0.0	0%
Claimed Savings Calculation Description	The VFD calculation completed on a new system connecting to canals. The peak kW reduction is calculated based on full load and added VFD efficiency loss but did not include the billing data peak reduction. The kWh calculations were completed using the increased efficiency for the time-based operations through August 2018. AMI savings from existing 5 years historical determined baseline consumption of the irrigation. The AMI data determined proposed kWh consumption from the 2018 growing season through August. Savings was calculated as the difference between 2018 season and the 5-year average. A regression analysis to one or more independent variables was not completed. This assumes that 2018 was equal to an average year. Normally this is an impactful assumption, although because the system is a soft conversion, the AMI savings is was reduced by 50% based on the assumption that a unknown fraction of time that wells will continue to supply water after the conversion to the canal based system. The assumption of 50% most likely incorporates any differences in growing seasons.		
Evaluated Savings Calculation Description	AMI meter data was only collected until the end of August for 2018. EM&V calculations determined that historically 25% of the energy consumption occurred after the August bill. Therefore, evaluated calculations assume that 25% additional consumption will occur outside the AMI data. The peak kW savings is set to zero because the system either has on the new pumping system from the canals (lower than previous kW) or the deep wells (equal to baseline kW). Therefore the annual peak demand will remain equal to the baseline unless additional control is documented for the existing deep well systems. Based on a conversation with the owner, approximately 20%-30% of the irrigation water volume is still provided by the deep wells on the new system. The AMI data was used to determine the average hours per irrigation system (2018 had 25% additional hours added to account for undocumented months). This showed that each pump had a reduction in hours ranging between 25% and 90% in 2018, which correlates to the conversation with the owner. The Evaluated saving used these variable adjustments to determine the improved average annual consumption of each existing pump based on the 5-year average. This was added to the new pump estimated average annual consumption. The total improved annual consumption is 1,618,449 kWh. Which is 36% lower than the baseline average annual consumption of 2,511,687 kWh. The VFD calculated savings is included in the AMI data and not added to the finding.		
Overall Project Notes	Overall, this was a complicated irrigation system when upgraded from wells feeding the distribution system to canals with well backup. The system map was not enough to determine the existing and new system pump locations and operating criteria without previous knowledge of the fields. But the calculations were conservative and based actual AMI data. However, the AMI data was not complete for the irrigation system for the post-install, which significantly reduced savings. The AMI data was not used to claim peak demand, which could be significant but would require additional information to confirm. In addition, the assumptions for the AMI data analysis were large and very impactful to the claimed savings. Completing a regression analysis using hour of operations or other independent variable per year (i.e. irrigation water per month) would help define annual average savings from AMI data and more certainty in claiming savings.		

Project ID	2448		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	11,614	7,225	62%
kW Savings	2.8	3.2	114%

Claimed Savings Calculation Description	The claimed savings identified the new system because it is a new pump to the meter, although an existing irrigation system is onsite. The peak kW is calculated as the difference between the theoretical baseline and the approximated peak demand in the calculator. However, the VFD calculation identifies the peak demand difference but is not included. The calculation is in two parts, an improvement for decreasing the TDH and then a second calculation for the VFD. The improvement happened on 50 acres of 175 total acres, and non-energy benefits were documented as applicable to all 175 acres. However, the claimed non-energy benefits are based on 50 acres and are correct.
Evaluated Savings Calculation Description	Evaluation adjusted the calculation to complete a baseline and post-model using the quantities entered in the base calculation, baseline 420 gpm at 188 TDH for 2,170 hours and developed associated gpm levels based on documented pump curve and project notes. The system consumed 40,293 kWh and a peak kW of 21.3 kW while delivering 10 acre-inches of water in 2,170 hours. Evaluation did not use the baseline assumption of 80% efficient pump or continuous operation. The post-install was modeled using the same water requirement and hours except a VFD efficiency was applied and the TDH was lowered to better match system needs. The addition of 3 pivot motors increased post-install consumption prior to developing savings. This created a system that consumed 32,026 kWh and 17.7 kW demand. The two models difference is the relative savings between a base system without a VFD and the installed system. The evaluation calculation adjusted undocumented assumption used in the claimed calculation; 2,900 hours of use for the VFD was adjusted to 2,170; the design TDH of 151 feet was used over the undocumented 130 feet. The hours of use at partial flow rates were adjusted to match documentation. The peak demand increased because the evaluation included the peak demand reduction from the VFD partial operation at high flow periods.
Overall Project Notes	Documentation was tough to follow, but it seemed because of scanning from paper. The baseline documentation did not reference many of the assumptions in the calculation.

Project ID	2466		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	33,281	18,066	54%
kW Savings	16.6	9.0	54%
Claimed Savings Calculation Description	The calculation is not well documented, but it appears to account for the difference in TDH between a base install and the actual install connected to a water lateral at the roadway. The calculation used 2,000 hours of use at full power for calculation.		
Evaluated Savings Calculation Description	The evaluated savings calculation used the baseline pivot and big gun system to confirm the baseline 189 TDH and 545 gpm, the evaluation identified 188.9 TDH and 533 gpm. The proposed condition evaluated subtracted the 25 psi provided by the underground lateral and found 126 TDH. The submitted calculation used 80 TDH for the design point recommended by the vendor. However, the big gun provides a critical point for the peak TDH, and it is set at 60 psi. If less pressure is needed for distribution at the gun - that is not energy efficiency, but a different operating point and should be adjusted in both baseline and new systems. The higher TDH adjustment also adjusted the pump efficiency from 79% claimed to 75% evaluated. The evaluated post kW = 23.7 kW compared to 16.7 kW claimed—this reduced energy savings from the baseline. Assumed that the big guns operate the full hours of operation and therefore responsible for system pressure requirements for the entire time. Assumed that the pivot and end gun are equal in both the baseline and post-install operation, so they were removed from the calculation.		
Overall Project Notes	An overall description of the new irrigation system's operation from the vendor or Ag. Rep. would inform an IPC calculation of TDH like the baseline.		

Project ID	2468		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	9,956	12,695	128%
kW Savings	5.0	-2.5	-50%

Claimed Savings Calculation Description	Initial application stated 270 gpm at 35 psi is the design. However, the calculation uses the baseline of 310 gpm @ 47 psi (110') and a proposed at 310 gpm @33 psi (76'). No description for the change. Evaluation used 270 gpm and the BASE SYSTEM tab in the submitted calculator TDH = 105'. Evaluation created a duplicate tab of BASE SYSTEM to show the new system with 15 psi at the critical point which resulted in TDH = 82'. Overall, this reduced savings by approximately 30%. The baseline and post-install system are expected to have similar number of pivot towers and hand guns, so they were eliminated from the equation. Documentation for the baseline or new system was not included.
Evaluated Savings Calculation Description	Evaluation confirmed system with participant, converted a flood irrigation for a pasture to a pivot system. The producer noted that he has seen an 80% reduction in the water needed to apply to the field because of the difficulty to get flood water across a pasture. The Evaluation calculation calculated savings based on a conservative 60% reduction in the volume of water pumped from the flood system and calculated from the flood system baseline as opposed to a new pivot system. Baseline was set at 300 gpm with 55 feet of head and a 70% efficient pump. The hours was calculated to be 5,000 hours based on the 60% reduction to reach 2,000 hours current. Proposed system was set to two levels, one system to match the 300 gpm @ 55 TDH and the second for the pivot system, 270 gpm and 82 TDH. In addition, the three pivot motors were added to the consumption. This was assumed to require 2,000 hours of operation for the field, or 9 inches. The difference between the two systems resulted in a decrease in annual kWh, but an increase in peak kW because of the higher TDH pressures and shorter hours of operation.
Overall Project Notes	The claimed calculation was completed based on a new system, although it was replacing a flood system. Evaluation calculated results based on the difference between the flood and pivot system because a verification phone call identified the amount of water reduction which could be translated to energy savings.

Project ID	2474		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	14,887	15,223	102%
kW Savings	-6.1	-2.7	44%

Claimed Savings Calculation Description	The calculation determined the maximum kW draw from the new system based on calculations. The baseline kW was based on historical. The kWh calculation process was acceptable. Pump Curve Efficiency estimation was acceptable.
Evaluated Savings Calculation Description	The evaluated savings determined a baseline model consumption using the VFD calculations and adjusting the hours to match the documented hours (1,751 hours from 2,000 hours). The resulting baseline consumption is 147,540 kWh and 90.7 kW. The amount of water delivered is 19 inches. The post-install calculation used the same flow conditions, although adjusted the pressure delivered with the VFD. The amount of water and hours was the same as the baseline. The resulting post-install consumption is 132,318 kWh and 93.4 kW. The calculated savings is 15,223 kWh and -2.7 Peak kW. The evaluated calculation assumed that the new pivots and end guns would have been present in both the baseline and post-install and eliminated from both models. The VFD hours of operation were adjusted from 2,000 to 1,751 hours, as identified on the datasheet. The VFD efficiency was set to 97%.
Overall Project Notes	The project was pretty simple to add a VFD to an existing pump. The calculation became more complicated by using the actual historical baseline and comparing it to the upgraded system's estimated calculation.

Project ID	2476		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	8,914	3,464	39%
kW Savings	4.5	1.7	38%

Claimed Savings Calculation Description	The calculation is completed for 16 feet less TDH and more efficient pump operation. The assumed calculation showed a reduction from 25 psi to 15 psi required pressure at the critical point.
Evaluated Savings Calculation Description	Claimed baseline proposed using a 10 hp pump to deliver 14.2 BHP. Evaluation adjusted the baseline motor size to 15 hp - which increased the baseline system's efficiency. This reduced the baseline pump electric demand from 11.9 kW to 8.7 kW. Claimed calculation does not include the TDH documentation; evaluation used the attached calculator to find 100 TDH baseline and 76.6 TDH new. The new TDH is 7.4 feet lower than claimed. This reduces the pump efficiency to 72% from 74% and ultimately reduces the pump electric demand from 7.4 kw to 6.9 kW. These changes reduce the kW savings to 1.73 kW and related kWh to 3,464 kWh.
Overall Project Notes	Overall a straightforward project, although documentation of the TDH calculation is missing. The most significant adjustment was using the 15 hp pump efficiency baseline (75%), replacing the 10 hp pump efficiency baseline (55%). The project was right on the line of what size pump is needed; evaluation defaulted to the larger pump because it is most likely selected by irrigation participants.

Project ID	2493		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	57,709	44,651	77%
kW Savings	18.5	17.1	92%

Claimed Savings Calculation Description	The calculation is multiple stage; it compares the equipment upgrades' efficiency from actual meter data to calculated equipment. Additionally, the VFD and pump removal calculation is done separately and adds kWh savings. The hours of use, 1,237 hours, are determined by dividing the 5-year historical average kW by the peak kW. This is conservative because the farm is going through continuous upgrades recently, and it is expected that the new systems will be used more often.
Evaluated Savings Calculation Description	Evaluation recalculated energy savings using a baseline energy consumption calculation and a post-install energy consumption calculation for each pump. One calculation used the AMI data to determine the average kW and average hours of the ...1512 pumps. The savings was a 95% reduction of the baseline consumption, although peak demand remained the same in both conditions. (34,255 kWh; 0 kW). The second calculation used AMI data to determine the average kW, peak kW, and average hours of the ...8453 pumps. The post-install calculation was the VFD calculation from the claimed calculation with updated hours of use and VFD efficiency. (16,310 kWh and -1.0 kW) The two separate calculations do not calculate the impact of the combined pump reduction potential at peak demand. The …1512 pump is on 5% of the time, and the …8453 pump is only at peak demand 15% of the time. The potential for coincidental peak demand to occur during the peak period is very low. Therefore, the evaluation used the …1512 pump peak demand as the amount reduced for the new system. The difference in claimed and evaluated savings is the slightly increased peak demand from the new VFD on …8453 pump.
Overall Project Notes	The energy savings calculation was broken up into parts for each pump, potentially double-counted energy savings, and one part of the calculation compared an actual baseline to a calculated post-install consumption. Evaluation created a single calculation for each meter that determined the baseline's relative energy consumption and improved savings. Although potential peak savings is zero, the likelihood that all pumps will operate concurrently has reduced significantly - therefore the coincidental peak demand of the system is much lower than claimed total peak demand reduction for each individually.

Project ID	2504		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	212,428	249,289	117%
kW Savings	145.8	154.3	106%

Claimed Savings Calculation Description	The calculation is multiple stage, it compares the efficiency of the equipment upgrades from actual meter data to calculated equipment. Additionally, the VFD calculation is done separately and adds kWh savings. 1,251 hours of operation are determined by dividing the 5-year historical average kW by the peak kW. This is conservative because the farm is going through continuous upgrades recently, and it is expected that the new systems will be used more often.
Evaluated Savings Calculation Description	The evaluation did not have the pump curve to confirm pump efficiency levels for the VFD. The evaluation confirmed that the hours of use calculation is nearly equal to the hours determination from the AMI data. The AMI data calculation was also similar to the annual historical data - therefore the historical data was confirmed for use as the baseline. This was kept for consistency instead of adjusting to AMI provided data as other evaluation calculation have. Evaluation recalculated energy savings using post-install energy consumption estimation that included new equipment and the VFD into a single system. The pivots and end gun were included in the post-install condition because they are part of the baseline AMI analysis. The total hours were 1,251 based on the average 5-year billing history and the total water was 14 inches.
Overall Project Notes	The energy savings calculation was broken up into parts and potentially double counted energy savings and compared an actual baseline to a calculated post-install consumption. Evaluation created a single calculation for each meter that determined the baseline's relative energy consumption and improved savings. For this project, it slightly increases energy savings.

Project ID	2508		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	9,090	6,425	71%
kW Savings	4.6	5.4	117%

Claimed Savings Calculation Description	The calculation process for the VFD is calculated determined the savings if the system was running at 100% for baseline and new plus the savings for the portion of time that that the system is not running at 100%. This multi-stage process increases the possibility of double counting savings. The VFD calculations did not fill in the 360 gpm at 175 TDH, that amount was not counted in the baseline or post-install system. The VFD calculation did not identify the TDH requirements for the 407 gpm and 490 gpm operating points.
Evaluated Savings Calculation Description	Evaluation adjusted savings to a baseline model and post-install model to identify the whole project savings. The baseline model assumed three-point operation at 190gpm, 407 gpm, and 360gpm. The post-install model used the same breakdown of potential flows with a TDH that varies. The evaluation calculation used the undocumented TDH provided in the submitted calculation. There is a variation between savings because the VFD improvements to peak demand reduction were not previously quantified and the claimed calculation did not include the 360 gpm operating point.
Overall Project Notes	The claimed calculation did not use the 360 gpm operating point in the VFD calculation.

Project ID	2512		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	30,988	24,874	80%
kW Savings	-0.1	0.0	~100%

Claimed Savings Calculation Description	The claimed calculation process identifies the system's historical average energy consumption and back calculates hours of operation. However, the energy savings calculation uses the engineering calculated peak demand to identify the difference and then adds "Other Savings," equal to 88.5% of the average annual consumption to represent the 5-year average of water availability. Evaluation identified that the Pivot Wheels and End Gun would continue to operate and consume electricity regardless of pump operation. Therefore, that value must be subtracted from the total consumption to identify the pump consumption. The baseline and new systems are identical operations; the system's savings when the pump is on should be zero. The component that adjusts the savings for the baseline and new systems seems to only pick up the difference between actual average consumption and engineering calculated consumption estimates.
Evaluated Savings Calculation Description	Evaluated savings is the 88.5% reduction in use of the existing pump system to deliver water. It still assumed that the Pivot Wheel motors, and End Gun continue to operate the same amount of time. The Pivot Wheels are 2 kW for 1,586 hours = 3,173 kWh/yr. The End Gun is 2.3 kWh for 55% of 1,586 hours = 2,034kWh/yr. The five-year average consumption is 33,313 kWh. The average pump consumption is the total consumption minus the pivot wheels and end gun consumption = 28,107kWh/yr. Reducing 88.5% of the pump consumption = 24,874kWh/yr. There is no further difference in the system from the baseline, so no further additional savings are available in peak kW or annual kWh.
Overall Project Notes	This project is a time-based reduction of pumped water. The claimed calculation reduced overall consumption versus only the pump consumption. This resulted in less claimed savings.

Project ID	2525		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	14,901	12,431	83%
kW Savings	-1.1	5.9	NA
Claimed Savings Calculation Description	The submitted calculation determined savings in two-part, one for the equipment's full power and a second for the adjustment using the VFD. Calculation uses 3900 hours, which is approximately what the AMI calculation finds.		
Evaluated Savings Calculation Description	The evaluation calculated savings by defining a base case using the VFD calc and compared that to the improved case to determine all the savings. The roto phase and VFD efficiency was added to the VFD calculation, and the hours breakdown was adjusted. The baseline hours and pump power time estimated were adjusted to match the historical AMI findings. The post-install hours and pump time power estimates were adjusted based on the limited post-install AMI. The adjusted annual hours of use are lower with the new pivot system and lower flow and pressure conditions. The three new pivot wheel motors were added into the post-install system and the difference identified the saving. The peak kW increased because the VFD impact was calculated and the bins that had less than 5% total run time were not used in the assessment.		
Overall Project Notes	Evaluation calculated savings from a relative baseline install and comparative post-install. Adjustments to the VFD calculation were made to make a comparative base case and post-install case to determine relative savings. The hours breakdown was also adjusted based on the AMI data. The result is that peak kw savings increased, and the kWh decreased.		

Project ID	2536		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	14,842	11,264	76%
kW Savings	6.4	7.3	114%
Claimed Savings Calculation Description	The calculation process submitted determined the project's savings for installing the system over a baseline system and then added the VFD savings.		
Evaluated Savings Calculation Description	Evaluation adjusted the calculation to model the baseline scenario and the post-install scenario. The baseline model used TDH = 179 feet and increased the lower flow by the same percentage as the conversion to 138 feet for the 470 gpm design point. The post-install model kept the TDH steady at 138 feet for the various flow levels. The motor efficiency was adjusted to 89.5%, and the single calculation eliminated potential double counting. The peak demand increased because the VFD provided some additional peak demand benefit.		
Overall Project Notes	The program's baseline system operating point was to include system losses to provide 60 psi to the end of the irrigation systems. The vendor determined the new system operating point and provided approximately 60 psi after system losses. The majority of the claimed savings resulted from this difference, although it was acceptable based on a conversation with Dan Axness, who stated this was the customer's intention. Documentation of customer's intentions of baseline or new systems would help recreate savings.		

Project ID	2545		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	7,209	3,163	44%
kW Savings	2.9	3.5	121%
Claimed Savings Calculation Description	The submitted calculation does the savings calculation in two pieces, equipment difference and then the VFD. The claimed calculator also uses the historical kW for the base case and the calculated kW for the proposed.		
Evaluated Savings Calculation Description	They evaluated savings calculated with a relative consumption model for the base case and improved condition based on the VFD calculation. The annual hour bins were determined based on the historical AMI percentages for load bins. This increased the peak kW savings. The annual kWh decreased because of the partial loading detail's addition into the baseline model.		
Overall Project Notes	Evaluated savings used a base case and post-install consumption model to determine relative savings between the two conditions. This reduced the kWh and increased the peak kW for the project.		

Project ID	2549		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	33,156	53,769	162%
kW Savings	9.9	2.3	23%
Claimed Savings Calculation Description	The calculation process used a baseline from historical records. Although it is accurate, it is mismatched to the estimated, calculated consumption of the new system. The calculation also did not account for the apparent varied hours of operation based on the better control system.		
Evaluated Savings Calculation Description	Evaluated savings were calculated based upon a baseline model for single pump operation and the New system model based on multiple pumps with a new end gun installed. The AMI Pre and post data showed a significant decrease in pump hours from the increased controls; the hour reduction was calculated to save energy. This reduced the hours by about 50%, which increased kWh savings for the project. The peak demand compared the pump at full operation baseline to two pumps simultaneous operation with an end gun. The peak demand for the baseline pumping system was 54.6kW and the post-install of 52.3 kW; as opposed to 65 kW peak from historical. The historical kW is either the result of an inefficient existing pump or additional items consuming electricity on the meter. The new end gun was included in the savings calculation, a program policy about including new equipment without a baseline, including with a new baseline, or excluding it should be defined.		
Overall Project Notes	Overall, the claimed energy savings compared the actual consumption to the modeled system, which did not capture the improvement to just the pumping system. The evaluated savings completed a comparative modeled system to determine the energy efficiency impact.		

Project ID	2559		
kWh Savings	Claimed	Evaluated	Realization Rate
kWh Savings	19,799	14,687	74%
kW Savings	6.7	7.3	109%
Claimed Savings Calculation Description	Claimed calculation determined the energy savings separately from the full power (backflush) pumping volume and then the VFD.		
Evaluated Savings Calculation Description	Evaluated savings created a baseline pump energy model and the new system pump energy model. The evaluation modeled results assume that the drip line operates 90 percent of the time and backflush 10% of the time. The baseline assumed operation at 620 gpm with 160 TDH and a 90 percent efficient roto phase. The post-install modeled operation at 620 gpm with 130 TDH and a 98 percent efficient VFD. The evaluation would have reduced TDH for the system based on the TDH calculation provided, although insufficient detail was provided to reduce the calculation value.		
Overall Project Notes	The evaluated model approach found lower annual kWh savings and an increased peak kW savings because the VFD peak demand reduction potential was included in the calculation, and it eliminated the potential for double-counting savings.		

Rebate Advantage PY2019 M&V Report

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Idaho Company



Submitted on:

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1 Executive Summary

The Rebate Advantage (RA) program encourages sales and purchase of U.S. EPA ENERGY STAR® qualified homes in conjunction with the Northwest Energy-Efficient Manufactured Housing (NEEM) Program™. All participating dealers actively promote ENERGY STAR over standard efficiency to home-buying customers. The NEEM Program collaborates with the manufactured home builders, retailers and utilities across the northwest and has certified over 240,000 of the most energy efficient manufactured homes ever built. NEEM is one of two organizations recognized by the federal EPA ENERGY STAR Program as a quality assurance provider. NEEM exceeds the ENERGY STAR savings target by 30% and offers improved indoor air quality through air sealing and ventilation fans. NEEM homes include LED lighting, ENERGY STAR refrigerator and dishwasher, smart wi-fi thermostat, added floor, ceiling, and wall insulation, high performing windows, flashing and house wrap. NEEM encourages participation in the program by highlighting the energy cost savings and higher home resale value that comes with homes that are ENERGY STAR-rated and certified trough the NEEM program.

The program provides an incentive to participants who sign a sales agreement for a new all-electric energy efficient manufactured home and initiates an Idaho Power residential account for the purchased home. All applications are submitted to Idaho Power by the dealer, including program applications, copy of the sale agreement, and ENERGY STAR Certificate of Compliance.

Incentives for the program includes the following

- $1,000 incentive to customers who purchase a new, all-electric, ENERGY STAR manufactured home and have an Idaho Power residential account
- $200 sales bonus to sales consultants for each new, all-electric ENERGY STAR manufactured home they sell to an Idaho Power customer.

1.1 Evaluation Objectives

The following activities were performed through the PY2019 EM&V effort:

- Verify program tracking data and apply the Northwest Regional Technical Forum (RTF) New Manufactured Homes and HVAC Workbook v3.4.
- Adjust program-reported gross savings using the results of evaluation research, relying primarily on tracking system and engineering desk reviews, metered data analysis, on-site verification, and equipment metering and achieve a minimum precision of ±10% of the gross realized savings estimate with 90% confidence.

1.2 Evaluation Findings

Figure 1-1 summarizes average energy savings and total participation by home certification. Table 1-1 shows total ex ante savings as well as ex ante savings for each Rebate Type and Weather Zone.

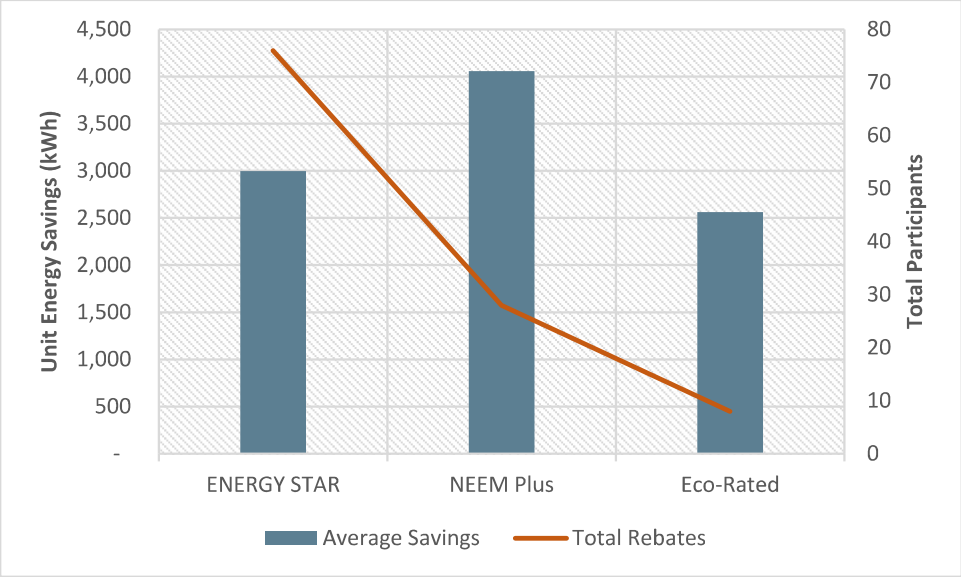


Figure 1-1 Total Participation and Savings by Rebate Type

Table 1-1 Ex Ante kWh Savings

Rebate Type	Weather Zone	Count	Ex Ante kWh
Eco-Rated	HZ 1 CZ 3	7	17,650
	HZ 2 CZ 2	1	3,573
ENERGY Star	HZ 1 CZ 3	36	82,971
	HZ 2 CZ 2	8	26,503
	HZ 2 CZ 3	13	43,089
	HZ 3 CZ 1	16	66,273
NEEM Plus	HZ 1 CZ 3	11	32,793
	HZ 2 CZ 1	1	4,171
	HZ 2 CZ 2	3	12,518
	HZ 2 CZ 3	3	12,524
	HZ 3 CZ 1	10	51,551
Total		**109**	**353,615**

Table 1-2 shows dealers program participation. There were 11 dealers that participated in PY2019. Dealer ID 452 had the most customers participate in the program, it accounted for 34.9% if participants and 39.1% of total savings.

Table 1-2 Dealer Participation

Dealer ID	Total kWh	Count
447	66,563	26
452	138,409	38
454	28,846	8
462	3,313	1
475	8,934	3
478	9,944	3
479	15,739	4
488	14,910	4
10868	7,457	2
11114	42,929	15
15154	16,573	5
Total	**353,615**	**109**

2 Impact Evaluation

The impact evaluation of the PY2019 program is intended to provide gross impact result and provide recommendations for the program.

2.1 Sampling

The program contains relatively homogenous measures, and the Evaluators conducted a simple random sample of participants. The sample size for verification surveys was calculated to meet 90% confidence and 10% precision (90/10). The sample size to meet 90/10 requirement was calculated based on the coefficient of variation of savings for program participants, defined as:

$$CV = \frac{Standard\ Deviation_x}{Mean_x}$$

Where x is the average kWh savings per participant. Without data to use as a basis for a higher value, it is typical to apply a CV of 0.5 in residential program evaluations.

The resulting sample size is estimated with the following:

$$n_0 = \left(\frac{1.645 * CV}{RP}\right)^2$$

Where:

1.645 = Z score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

RP = Required Precision, 10% in this evaluation

Through the simple random sampling process, the Evaluators' sample size for RA is 24 samples.

2.2 Evaluation Findings

2.2.1 Database review

The project tracking data base was reviewed to determine the scope of the program and ensure that there were no duplicate entries. Tracking data including the following components:

- **Participating Customer Information** – Includes all information required including customer contact information, customer identifier, location of the project, and date completed.
- **Project Specific Information** – Generally includes the rebate type (Eco-Rated, EStar, NEEM Plus), heating and cooling weather zone. Cooling equipment type was provided as 1, 2, or 3.1 defined as homes with AC, 2 defined as homes without AC, and 3 defined homes with heat pump.
- **Vendor Specific Information** – The database included dealer contact information, dealer ID, salesperson, and salesperson ID
- **Program Tracking Information** – Generally all program tracking information was provided in the database. Incentive amounts and paid dates were both included in the database.

2.2.2 Desk Review of Sampled Projects

The Evaluators reviewed project documentation provided by Idaho Power. Project documentations include the following items:

- **Program application form** – Program application includes dealer contact information, buyer contact information, sale date, manufacturer name, serial number, certificate number, heating type, and cooling type
- **ENERGY STAR certificate of compliance** – ENERGY STAR certificate of compliance includes certificate number, model number, serial number, home type, primary heating system, energy-efficient path, qualification criteria, manufacturer contact information, dealer contact information, and date entered**.**
- **Sales agreement** – Sales agreement includes dealer contact information, purchaser contact information, make, model, serial number, year of manufacture, number of bedrooms, unit size, R value for ceiling, exterior, and floors, and cost of the unit.

For each project, the Evaluators confirmed that the dealer information, buyer information, manufacturer name, and serial number is consistent throughout the documentation. Project documentation is also compared to tracking database provided by Idaho Power. Project documentation was used to verify dealer information, buyer information, equipment type, and weather zone in the database. Lastly, the Evaluators verified energy savings claimed in the databased by comparing database inputs to the RTF workbook. Energy savings are calculated based on rebate type, heating zone, cooling zone, and equipment type.

Based on the database, project documentation, and RTF workbook, the overall sample realization rate is 100%. Table 2-1 shows sampled projected and their respective savings.

Table 2-1 Sampled Project kWh Savings

Project ID	RFT Measure Name	Equipment Type	Ex Ante kWh	Ex Post kWh	Realization Rate
1256	EcoRated_electric_HZ1_CZ3	Electric Resistance	2,521	2,521	100%
1150	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1153	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1157	Estar_electric_HZ2_CZ2	Electric Resistance	3,313	3,313	100%
1160	Estar_electric_HZ2_CZ3	Electric Resistance	3,315	3,315	100%
1162	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1166	Estar_electric_HZ3_CZ1	Electric Resistance	4,142	4,142	100%
1172	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1178	Estar_electric_HZ3_CZ1	Electric Resistance	4,142	4,142	100%
1179	Estar_electric_HZ3_CZ1	Electric Resistance	4,142	4,142	100%
1180	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1184	Estar_electric_HZ3_CZ1	Electric Resistance	4,142	4,142	100%
1185	Estar_electric_HZ1_CZ4	Electric Resistance	2,305	2,305	100%
1191	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1196	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1202	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1211	Estar_electric_HZ3_CZ1	Electric Resistance	4,142	4,142	100%
1235	Estar_electric_HZ1_CZ3	Electric Resistance	2,305	2,305	100%
1244	Estar_electric_HZ2_CZ2	Electric Resistance	3,313	3,313	100%
1257	Estar_electric_HZ2_CZ3	Electric Resistance	3,315	3,315	100%
1199	NEEM2_electric_HZ1_CZ3	Electric Resistance	2,981	2,981	100%
1200	NEEM2_electric_HZ2_CZ3	Electric Resistance	4,175	4,175	100%
1217	NEEM2_electric_HZ1_CZ3	Electric Resistance	2,981	2,981	100%
1238	NEEM2_electric_HZ1_CZ3	Electric Resistance	2,981	2,981	100%

Applying sample realization rate to the population of projects, the overall saving for Rebate Advantage program is 353,615 kWh and the realization rate is 100%. Table 2-2 shows ex post savings for each rebate type as well as the overall total program savings.

Table 2-2 Ex Post kWh Savings

Rebate Type	Weather Zone	Count	Ex Ante kWh	Ex Post kWh	Realization Rate
Eco-Rated	HZ 1 CZ 3	7	17,650	17,650	100%
	HZ 2 CZ 2	1	3,573	3,573	100%
ENERGY Star	HZ 1 CZ 3	36	82,971	82,971	100%

	HZ 2 CZ 2	8	26,503	26,503	100%
	HZ 2 CZ 3	13	43,089	43,089	100%
	HZ 3 CZ 1	16	66,273	66,273	100%
NEEM Plus	HZ 1 CZ 3	11	32,793	32,793	100%
	HZ 2 CZ 1	1	4,171	4,171	100%
	HZ 2 CZ 2	3	12,518	12,518	100%
	HZ 2 CZ 3	3	12,524	12,524	100%
	HZ 3 CZ 1	10	51,551	51,551	100%
Total		**109**	**353,615**	**353,615**	**100%**

3 Conclusion

The Evaluators' conclusions for the Rebate Advantage Program are presented below. The Evaluators have found that:

- **Appropriate RTF savings estimates was applied.** The program used RTF v.3.4 for PY2019 to calculate energy savings. The new v4.1 workbook was released for QC in July 2020. Idaho power plans to review and use the v.4.1 in 2021.
- **Project documentation and tracking data contain accurate information.** Project documentation and tracking data are consistent. There are some fields in the tracking data that require references to the RTF. The tracking database should also note the RTF workbook version used.
- **ENERGY STAR manufactured homes are the most popular.** Of the 109 projects in PY2019, 76 projects or 72.4% of program projects were ENERGY STAR units.

OTHER REPORTS

Report Title	Sector	Analysis Performed By	Study Manager	Study/Evaluation Type
A/C Cool Credit	Residential	Idaho Power	Idaho Power	Other
Commercial Saving Kits Summary	Commercial/Industrial	AM Conservation Group	AM Conservation Group	Other
Energy Efficiency Potential Study	Residential, Commercial/Industrial, Irrigation	Applied Energy Group	Applied Energy Group	Other
Energy Savings Kits Summary	Residential	Franklin Energy	Franklin Energy	Other
Flex Peak Program	Commercial/Industrial	Idaho Power	Idaho Power	Other
Historical DSM Expense and Performance, 2002–2020	Residential, Commercial/Industrial, Irrigation	Idaho Power	Idaho Power	Other
Home Energy Reports Summary	Residential	Alcara	Alcara	Other
Idaho Power Energywise Program Summary Report 2019-2020	Residential	Franklin Energy	Franklin Energy	Other
Irrigation Peak Rewards	Irrigation	Idaho Power	Idaho Power	Other
Technical Reference Manual	Commercial/Industrial	ADM Associates	ADM Associates	Other

Titles appearing in blue are links to the online versions of the reports. A PDF of this supplement can be found at idahopower.com/ways-to-save/energy-efficiency-program-reports/.

A/C Cool Credit

2020 Demand Response Analysis

Prepared by: Idaho Power

December 2020

Executive Summary

This report summarizes the impact of the three A/C Cool Credit events that were called in the summer of 2020. The number of participants in 2020 was 22,444. The three three-hour events were run July 16th, July 30th, and August 5th with calculated generation level reductions of 15.6 MW, 19.4 MW and 12.4 MW respectively. Peak generator demand reduction occurred July 30th (0.86 kW/participant, 19.4 MW). For 2020, the maximum potential capacity of the program was calculated to be 31.4 MW. This calculation is based on 1.4 kw per participant which the company has achieved in the past with 65% cycling on a very hot day.

For the 2020 events, the cycling percentage was reduced to 50% from the typical 55% level. This reduction was implemented because a greater number of residents were at home due to the COVID-19 pandemic. The decrease in cycle time was intended to minimize the impact of A/C cycling to the participants, in order to mitigate a potential increase in program dropouts.

Analysis Methodology

A/C Cool Credit participants' hourly consumption data was used to estimate demand reduction for all events. Average hourly consumption of the participants during curtailment events is compared against an adjusted 3-in-10 baseline (highest three average load days in the previous ten non-weekend, non-curtailment days). The calculated difference between the adjusted baseline load and event load is the load reduction due to curtailment. The analytical approach was established through third-party evaluations from 2014-2016 and evaluated again in 2019. The program will be evaluated through a third-party impact evaluation in fall 2021.

Data Cleaning

Participants were merged with hourly consumption data for each event day and the 10 previous non-weekend days. Error codes were pulled in for all hours and any hour that had an error code, outage flag or was marked as an estimated read during the 4-7 pm event hours, or the 3 pm hour prior to the event, was removed from the analysis. Greater than 99% of all customer sites were preserved after data cleaning. Average load reduction was calculated from this data, then applied to all participants to calculate total load reduction for the program for each event.

The sub-sections below describe the project's methodology related to the sampling plan, demand reduction analysis, and updating of the predictive model.

Table 1. 2020 Summary of events and participation

Curtailment Event	Event Hours	A/C units enrolled	Sites Analyzed for Reduction*
July 16	4pm – 7pm	22,536	22,535
July 30	4pm – 7pm	22,443	22,442
Aug 5	4pm – 7pm	22,443	22,442

Notes: Customer sites may have more than one AC unit enrolled in program.

Baseline Data

The load reduction achieved during curtailment events was calculated by comparing the average load from each curtailment day against the average load developed from non-curtailment days selected for the baseline. The "previous days" approach was used, which utilizes the average load data from the previous ten non-weekend, non-curtailment days. Baseline kW was calculated as the average of the three days with the greatest demand from these previous ten non-curtailment days, as ranked by the highest hourly demand occurring during the curtailment timeframe. Curtailment days normally occur on hot, high demand days, thus selecting high demand days for the baseline ensures a similar load profile is used for the baseline days as the curtailment days.

Offset Factor

To effectively compare baseline and curtailment day loads, the baseline load was adjusted using an offset factor. The offset factor is calculated as the difference in kW between the baseline and curtailment event day load during the hour prior to the start of the curtailment. The offset factor was applied to the baseline day to "normalize" the baseline kW to the curtailment day kW. The offset factor mitigates underlying differences in load due to slight differences in outdoor temperature or other external factors.

Results

A total of three curtailment events were completed as part of the 2020 A/C Cool Credit program. Table 2 below details the characteristics of these events, including demand reduction, high temperatures, and cycling percent. The results are broken out between the Boise area and the Twin Falls/Pocatello areas to give a sense of the event in different regions of Idaho Power's service area.

Figures 1-3 show the reduction in total participant load due to the curtailment events for July 16th, July 30th and August 5th respectively. Temperature data is shown in order to understand variations in curtailment and baseline days, as temperature is a large driver in A/C load. The max total reduction numbers represent reported reduction for event and have been increased to include system losses of 9.7 % to represent load reduction at the generation level.

Table 2. 2020 Summary Results of Curtailment Events (Reduction at generator)

Event Date and High Temp	Cycling %	Region	Avg. kW Reduction per Participant	Max kW Reduction per Participant	Avg. Total kW Reduction	Max Total kW Reduction
July 16 Boise: 94° Poc/TF: 88°	50%	All	0.63	0.69	14,145	15,574
		Boise	0.76	0.69	13,065	14,580
		Poc/TF	0.33	0.35	1,135	1,201
July 30 Boise: 104° Poc/TF: 96°	50%	All	0.82	0.86	18,366	19,392
		Boise	0.79	0.83	14,980	15,709
		Poc/TF	0.55	0.56	1,907	1,940
August 5 Boise: 98° Poc/TF: 98°	50%	All	0.53	0.55	11,979	12,380
		Boise	0.53	0.55	10,086	10,504
		Poc/TF	0.56	0.61	1,928	2,091

Figure 1. July 16th 2020

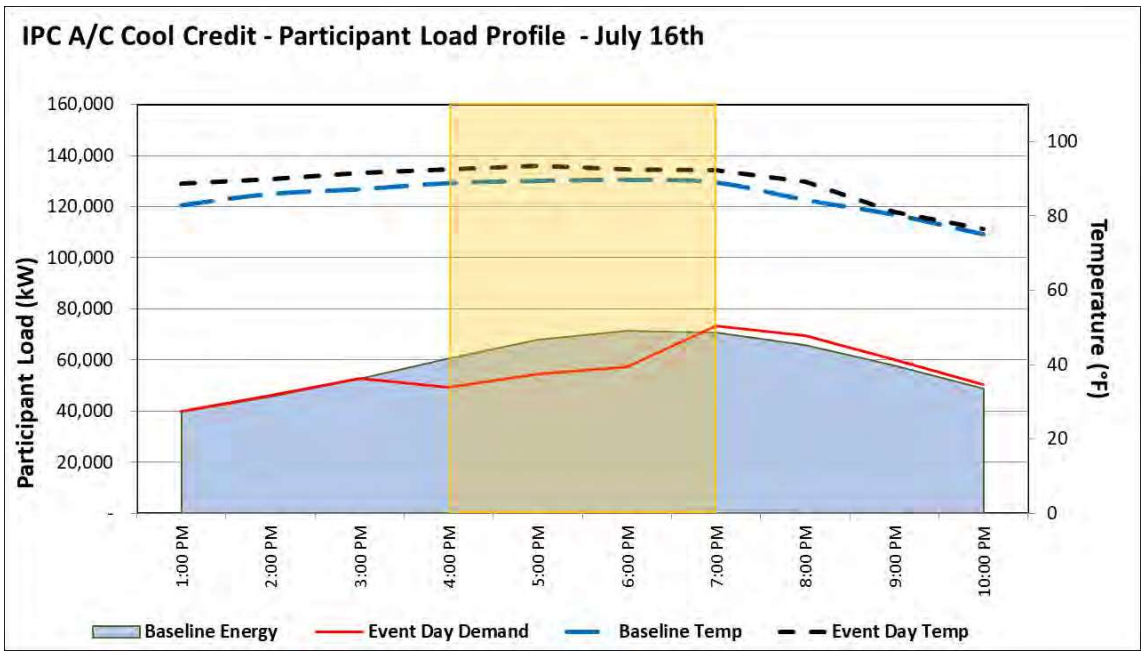


Figure 2. July 30th 2020

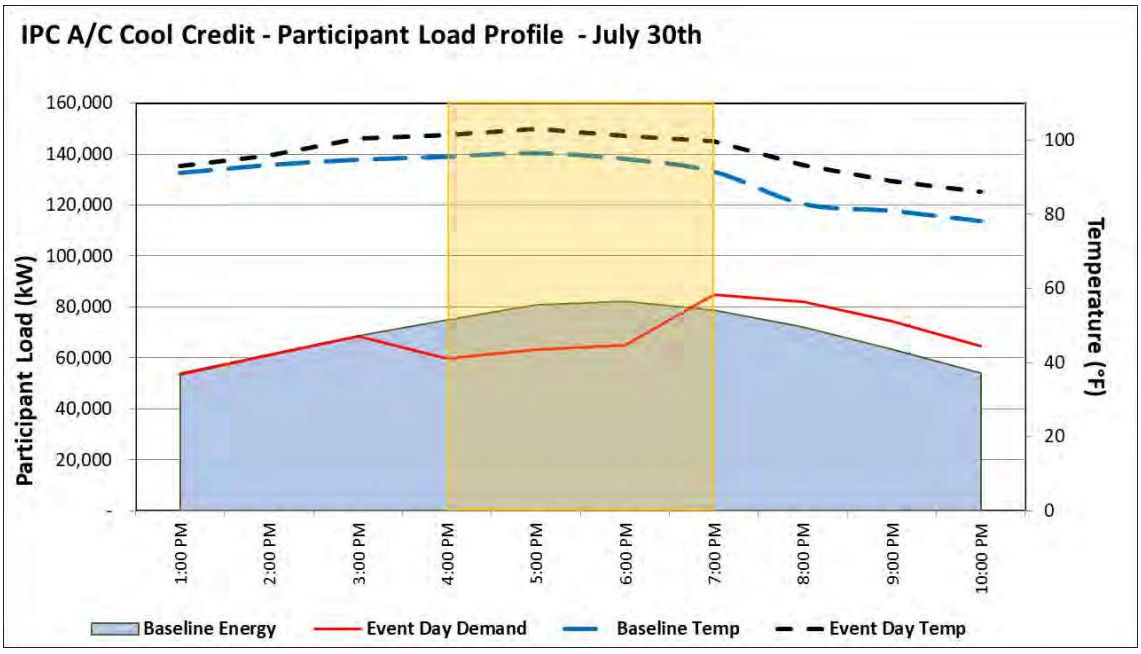
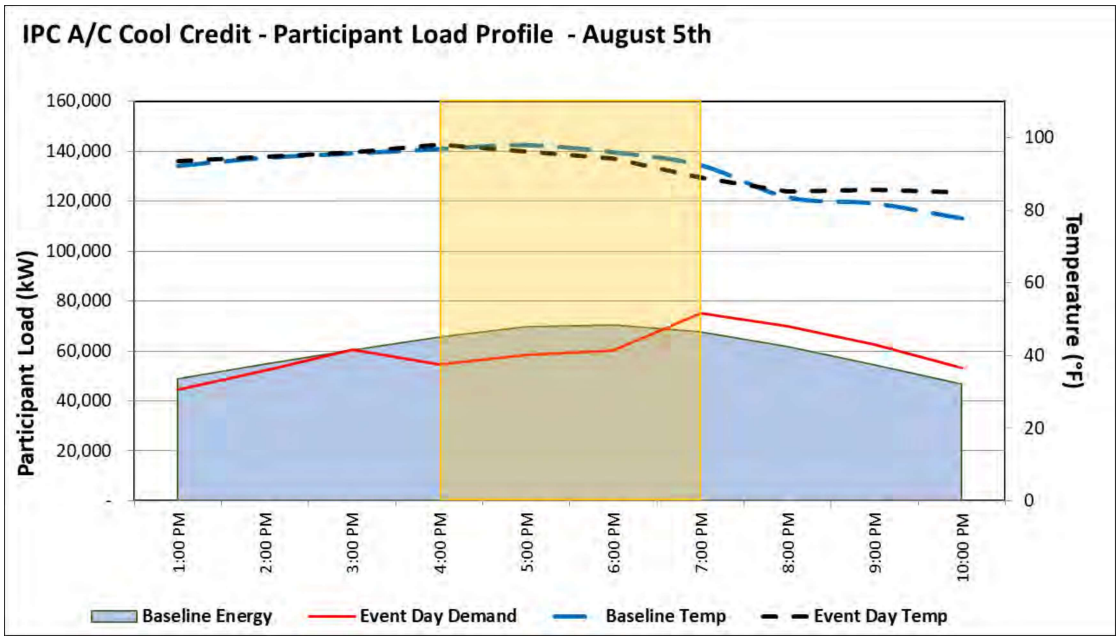


Figure 3 August 5th 2020









IDAHO POWER
COMMERCIAL ENERGY-SAVING KIT PROGRAM SUMMARY REPORT

2020

SUBMITTED BY:
AM CONSERVATION GROUP

IDAHO POWER®
An IDACORP Company

Idaho Power
Commercial Energy-saving Kit
Program Summary Report
2020

Sponsored by:

IDAHO POWER®
An IDACORP Company

Submitted by:

AM Conservation Group

February 2020

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Kit Flyers


WANT TO SAVE MORE?
IDAHO POWER
An IDACORP Company
LIKE THE PRODUCTS IN YOUR KIT?
Idaho Power can help you save even more energy and money with cash incentives for upgrading existing equipment, including:
• Lighting
• Kitchen hood VFD
We also offer incentives for new construction, major renovations, additions, expansions, change of space or custom projects.
WANT TO SAVE MORE?
IDAHO POWER
An IDACORP Company
LIKE THE PRODUCTS IN YOUR KIT?
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WANT TO SAVE MORE?
IDAHO POWER
An IDACORP Company
LIKE THE PRODUCTS IN YOUR KIT?
Idaho Power can help you save even more energy and money with cash incentives for upgrading existing equipment, including:
• Lighting
• HVAC controls
We also offer incentives for new construction, major renovations, additions, expansions, change of space or custom projects.
Contact your energy advisor to get started today.
idahopower.com/retail

Executive Summary

The Idaho Power Commercial Energy-saving Kit Program is designed to serve some of the hardest-to-reach customers within Idaho Power's service territory: small business customers. The program cost-effectively captures energy savings by providing high-quality measures and energy efficient education to Idaho Power commercial customers. As a result, small businesses develop efficient behaviors while reducing energy costs. The program acts as a first-point of contact, establishing a positive customer relationship, and encouraging participation in other programs within Idaho Power's commercial portfolio.

This report summarizes the 2020 Energy-saving Kit Program. The program reached a total of 1,379 small business within Idaho Power's service territory, 1,301 small businesses located in Idaho, and an additional 78 small businesses in Oregon. Funding was provided by Idaho Power.

The program achieved or exceeded expectations. Results are listed below.

Program Achievements

1. Provided commercial energy-saving measures and energy-efficiency education to 1,301 Idaho and 78 Oregon small businesses.
    - Affected all five regions of the Idaho Power service territory
    - Affected 71 cities & towns in Idaho
    - Affected 10 cities & towns in Oregon
2. Generated residential energy and water savings. Projected annual savings
    - 53,284 kWh Restaurant kit savings
    - 148,533 kWh Office kit savings
    - 56,550 kWh Retail kit savings
3. Supported Idaho Power with their diverse outreach and distribution methods.
    - Idaho Power customized enrollment portal
    - Idaho Power employee log-in and enrollment tracking
    - Multiple enrollment methods, including kits handed out and kits shipped directly to customers
4. Designed and provided complementary educational materials and incentives to maximize installation of targeted efficiency measures.
5. Maintained data collection and management services to collect and process audit ready data from participating small businesses.
6. Maintained tracking and reporting to summarize the program participation.

(continued on next page)

The Idaho Power Commercial Energy-saving Kit Program originally launched in June of 2018. The program launch consisted of developing an enrollment strategy designed to maximize small business customer satisfaction and engagement through the distribution of energy saving kits, while maintaining implementation ease for IPC employees.

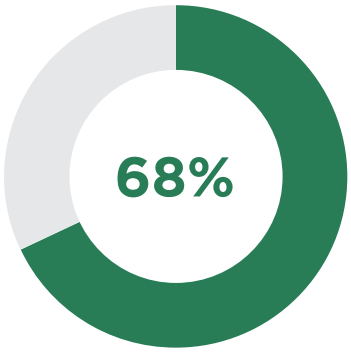
Program outreach consisted of a two-part strategy. The Idaho Power call center conducted an outreach campaign to eligible small business customers, encouraging utility customers to take part in the Energy-saving Kit Program. Enrollments were then processed by AM Conservation Group (AMCG), who shipped kits and program materials directly to participating small businesses. In addition, kits were bulk shipped to regional offices within Idaho Power's service territory to be distributed by Energy Advisors in the field to small business utility customers.

	ENROLLMENTS	%
REGIONAL OFFICES (HANDED OUT)	59	4%
CALL-CENTER (KITS SHIPPED)	1,320	80%

Of the 214 surveys received (4% response rate), customers indicated a high level of satisfaction with the program. On average, 68% of survey respondents are aware of energy efficiency programs offered by Idaho Power, and 78% are "Very Likely" to participate in additional programs in the future.

Were you aware that Idaho Power had energy efficiency and incentive programs?

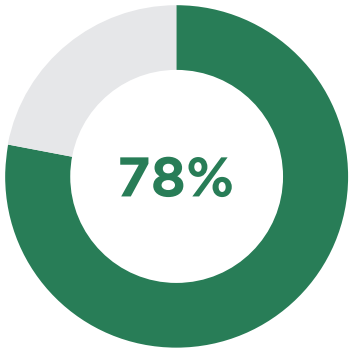
Yes - 68%



Reported businesses that were aware that Idaho Power offered energy efficiency and incentive programs.

How likely are you to participate in additional Idaho Power energy efficiency programs?

Very Likely - 78%



Reported businesses that are very likely to participate in another Idaho Power energy efficiency program.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Projected energy savings from this program are significant. Based on the reported actions, annual and lifetime resource savings are as follows:

PROJECTED ANNUAL SAVINGS	
6,122,800	gallons of water saved*
258,368	kWh of electricity saved

PROJECTED LIFETIME SAVINGS	
55,335,370	gallons of water saved*
3,305,812	kWh of electricity saved

PROJECTED ANNUAL SAVINGS PER BUSINESS	
4,440	gallons of water saved*
187	kWh of electricity saved

PROJECTED LIFETIME SAVINGS PER BUSINESS	
40,127	gallons of water saved*
2,397	kWh of electricity saved

**Based on 100% installation rate.*

Restaurant Kit



From AM Conservation Group

AM Conservation Group (AMCG), a Franklin Energy Company, has been in the business of designing and implementing energy and water efficiency programs for nearly 3 decades. We have taken this time to build an expert team of industry professionals to deliver a seamless program in line with the needs of our clients.

We designed the Idaho Power Commercial Energy-saving Kit Program in our Nevada program center from the ground up. Working in conjunction with Idaho Power, we identified goals, desired outcomes of the program, and specific customization. The result is an engaging program that delivers measurable resource savings. The Idaho Power Commercial Energy-saving Kit Program features a proven blend of innovative education, comprehensive implementation services, and hands-on activities that put efficiency knowledge to work in small businesses throughout Idaho Power's service territory.

The commercial segment is an important customer group. These customers face well-known barriers to participation in energy efficiency programs, including lack of awareness, time, and capital to explore energy saving opportunities. Our solution provides a streamlined approach, making it easy for small business customers to begin enjoying the benefits of energy efficiency education and installation of measures. The ease of the program establishes a positive customer relationship, and encourages engagement in additional energy efficiency programs.

The Idaho Power Commercial Energy-saving Kit Program is a reflection of true teamwork. On behalf of the entire implementation team at AMCG, I would like to thank you for the opportunity to design and implement this innovative program for Idaho Power. It has been a pleasure working with you. I look forward to many more years of program success.

Sincerely,



Alicia Powers
Program Manager, PMP®

Office Kit


SAVING ENERGY
Makes Good Business Sense
IDAHO POWER.
An IDACORP Company
YOUR ENERGY SAVINGS KIT
Indirect energy-saving benefits:
- Reduced operations and maintenance costs
- Increased asset value
- Improved safety
- Enhanced employee productivity
- Good return on investment
- Improved customer and employee comfort
- Enhanced public image
- Reduced waste
QUICK START GUIDE
IDAHO POWER.
START HERE
YOU HAVE THE POWER TO SAVE
Turn Off the Lights.

Idaho Power Energy-saving Kit Program Overview

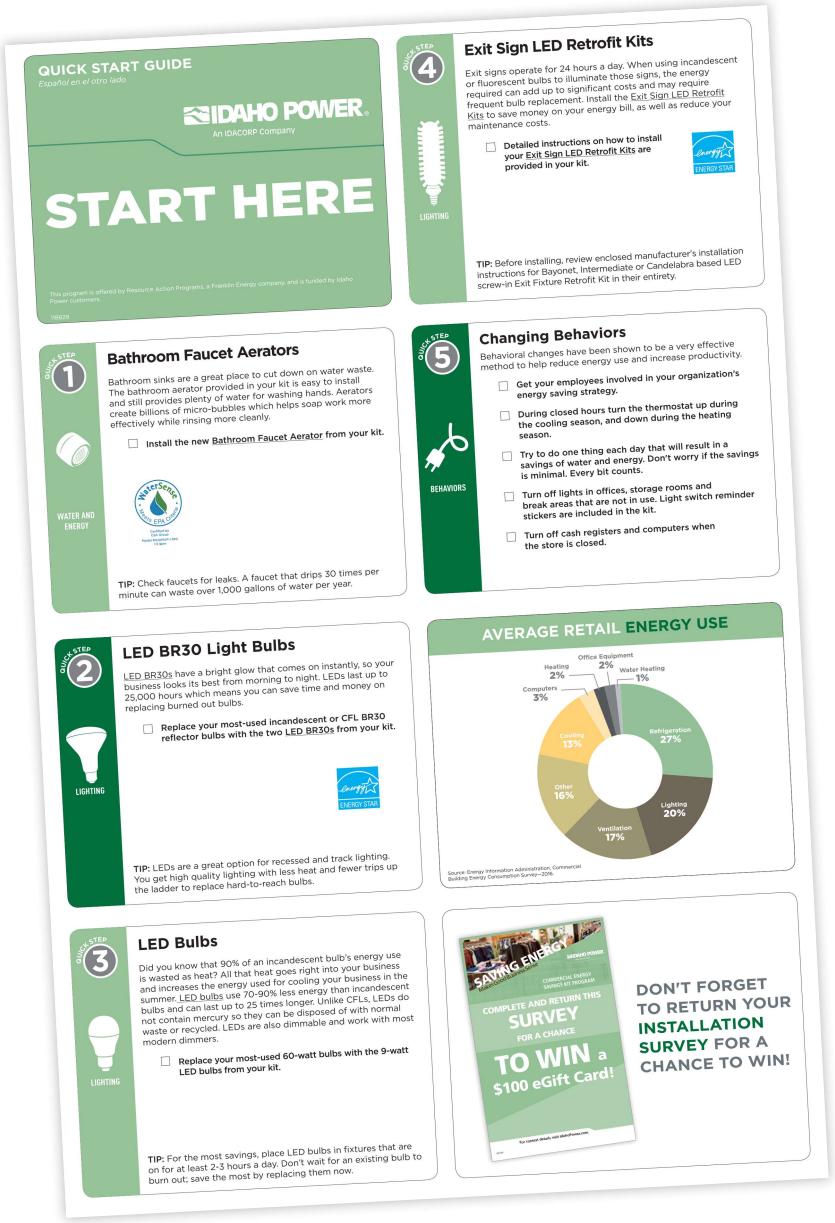
The Commercial Energy-saving Kit Program aims to cost-effectively capture energy savings in small businesses located in Idaho Power's service territory. The program achieves immediate savings through a kit of self-install measures delivered directly to a customer's door step. A hands-on educational component provides the basis for participants to make modifications in energy use, and establish sustained energy conserving behaviors, resulting in life-long behavior change and savings. A carefully designed survey allows Idaho Power to claim savings on measure installation, and is the key component of EM&V activities.

The program was designed and targeted to reach three different small business segments: restaurant, office, and retail. Three different kit types were developed for this purpose. Each kit contained energy efficiency measures specifically curated for the small business type, as well as educational materials and installation surveys. Educational materials include a Quick Start Guide, light switch reminder stickers, an illustrated installation guide, and cross promotional inserts. Each kit and accompanying materials are customized for the targeted business type, featuring prominent and recognizable Idaho Power branding to ensure program adoption.

The program was offered throughout Idaho Power's service territory, and distributed by Idaho Power employees. Kits were distributed either through Energy Advisors in the field working with small businesses, or through the Idaho Power Customer Call Center, who conducted an outreach campaign to eligible customers. Enrollments were then submitted to AMCG, and kits were shipped directly to the customer's place of business.

Kit installation surveys were received from 214 participating small businesses, representing a response rate of 4% since program inception. A monthly drawing for a $100 eGift card provided an incentive to businesses for returning their surveys.

Quick Start Guide



QUICK START GUIDE

Español en el otro lado

IDAHO POWER

An IDACORP Company

START HERE

This program is offered by Resource Action Programs, a Franklin Energy company, and is funded by Idaho Power customers.

10829

QUICK STEP 4

LIGHTING

Exit Sign LED Retrofit Kits

Exit signs operate for 24 hours a day. When using incandescent or fluorescent bulbs to illuminate those signs, the energy required can add up to significant costs and may require frequent bulb replacement. Install the Exit Sign LED Retrofit Kits to save money on your energy bill, as well as reduce your maintenance costs.

- ☐ **Detailed instructions on how to install your Exit Sign LED Retrofit Kits are provided in your kit.**

ENERGY STAR

TIP: Before installing, review enclosed manufacturer's installation instructions for Bayonet, Intermediate or Candelabra based LED screw-in Exit Fixture Retrofit Kit in their entirety.

QUICK STEP 1

WATER AND ENERGY

Bathroom Faucet Aerators

Bathroom sinks are a great place to cut down on water waste. The bathroom aerator provided in your kit is easy to install and still provides plenty of water for washing hands. Aerators create billions of micro-bubbles which helps soap work more effectively while rinsing more cleanly.

- ☐ **Install the new Bathroom Faucet Aerator from your kit.**

WaterSense

TIP: Check faucets for leaks. A faucet that drips 30 times per minute can waste over 1,000 gallons of water per year.

QUICK STEP 5

BEHAVIORS

Changing Behaviors

Behavioral changes have been shown to be a very effective method to help reduce energy use and increase productivity.

- ☐ **Get your employees involved in your organization's energy saving strategy.**
- ☐ **During closed hours turn the thermostat up during the cooling season, and down during the heating season.**
- ☐ **Try to do one thing each day that will result in a savings of water and energy. Don't worry if the savings is minimal. Every bit counts.**
- ☐ **Turn off lights in offices, storage rooms and break areas that are not in use. Light switch reminder stickers are included in the kit.**
- ☐ **Turn off cash registers and computers when the store is closed.**

QUICK STEP 2

LIGHTING

LED BR30 Light Bulbs

LED BR30s have a bright glow that comes on instantly, so your business looks its best from morning to night. LEDs last up to 25,000 hours which means you can save time and money on replacing burned out bulbs.

- ☐ **Replace your most-used incandescent or CFL BR30 reflector bulbs with the two LED BR30s from your kit.**

ENERGY STAR

TIP: LEDs are a great option for recessed and track lighting. You get high quality lighting with less heat and fewer trips up the ladder to replace hard-to-reach bulbs.

AVERAGE RETAIL ENERGY USE

Source: Energy Information Administration, Commercial Building Energy Consumption Survey—2012

QUICK STEP 3

LIGHTING

LED Bulbs

Did you know that 90% of an incandescent bulb's energy use is wasted as heat? All that heat goes right into your business and increases the energy used for cooling your business in the summer. LED bulbs use 70-90% less energy than incandescent bulbs and can last up to 25 times longer. Unlike CFLs, LEDs do not contain mercury so they can be disposed of with normal waste or recycled. LEDs are also dimmable and work with most modern dimmers.

- ☐ **Replace your most-used 60-watt bulbs with the 9-watt LED bulbs from your kit.**

TIP: For the most savings, place LED bulbs in fixtures that are on for at least 2-3 hours a day. Don't wait for an existing bulb to burn out; save the most by replacing them now.

DON'T FORGET TO RETURN YOUR **INSTALLATION SURVEY** FOR A CHANCE TO WIN!

Idaho Power Commercial Energy-saving Kit Program Materials

Program materials include a securely packaged kit filled with participant-focused measures and materials, Idaho Power energy efficiency program cross promotion, and Idaho Power branding.

A Quick Start Guide is included in each kit, and provides the educational component of the program. The Quick Start Guide identifies multiple tips and modifications in energy use that, when implemented, establish sustained energy conserving behaviors. The simple guide utilizes motivational tools and strategies intended to affect the consumer's energy use behaviors. The installation of the kit's measures, combined with the promoted behavioral changes, results in energy savings that are captured by the installation survey.

Included Educational Materials

Quick Start Guide

Survey

Light Switch Reminder Stickers

Idaho Power Small Business Program Cross-Promo

Installation Instructions

Included Efficiency Measures

Restaurant Kit

Pre-rinse Spray Valve

Three 9-watt LEDs

Two Exit Sign Retrofits

Two Kitchen Faucet Aerators

Two Bathroom Faucet Aerators

Office Kit

Two 9-watt LEDs

Two Exit Sign Retrofits

Advanced Power Strip

Kitchen Faucet Aerator

Two Bathroom Faucet Aerators

Retail

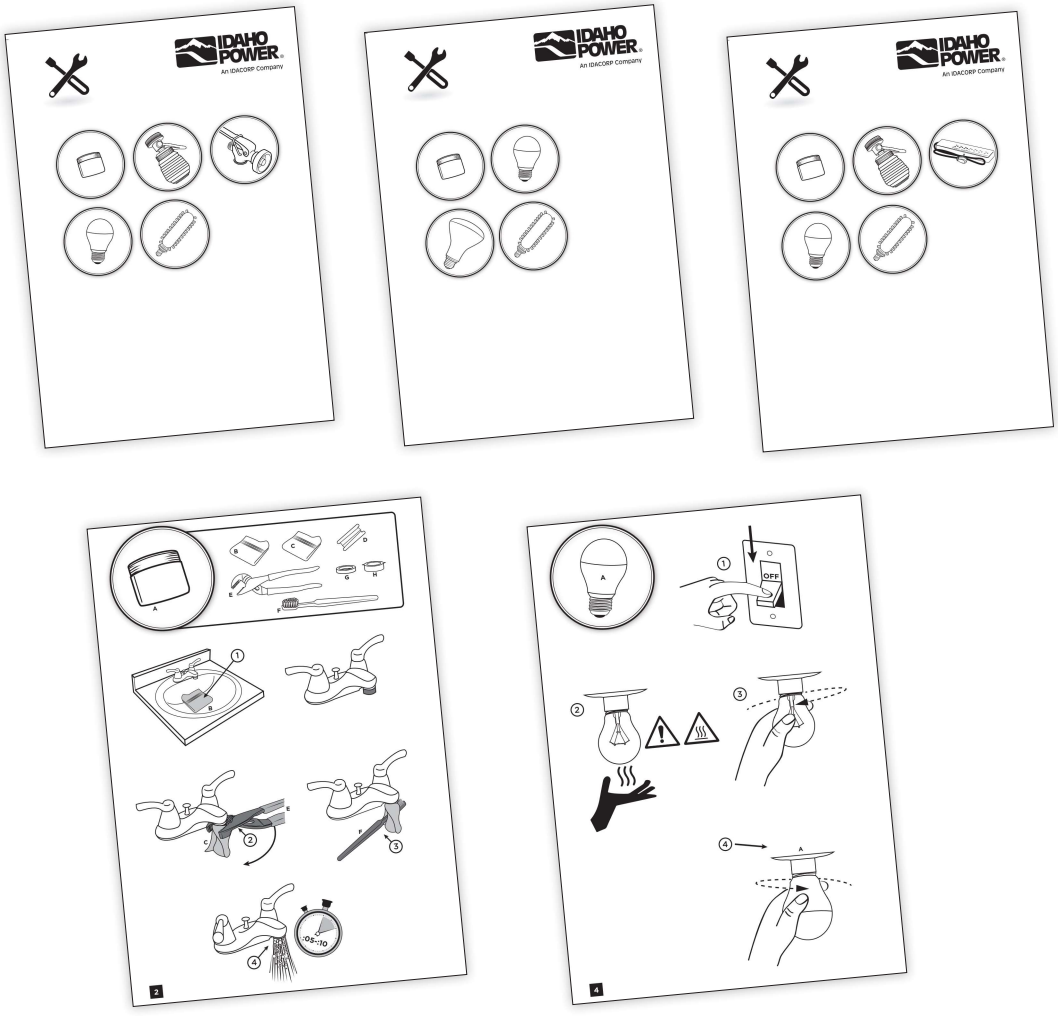
Two 9-watt LEDs

Two 8-watt LED BR30s

Two Exit Sign Retrofits

Bathroom Faucet Aerator

ILLUSTRATED INSTRUCTION GUIDES



Idaho Power Commercial Energy-saving Kit Program Implementation

An introductory outbound call campaign implemented by the Idaho Power call center, supported by the information on the Idaho Power website, merited positive results. Small business owners were able to enroll in the program with ease, resulting in a steady demand for the program.

Energy-saving kit participation was processed and tracked at the AMCG program center. The program website, a toll-free number, Idaho Power Energy Advisors in the field and the Idaho Power customer service department provided convenient methods for interested small businesses to order a kit and participate in the program.

Orders were tracked and managed from all outreach and enrollment sources. Program materials and products were packaged and addressed for individual small business delivery. All program modules receive a unique ID number to improve the accuracy of data tracking and reduce the amount of information required from respondents.

All enrollments, shipping and survey data were managed by AMCG's proprietary program database. In addition, surveys were completed either through the program website, or returned to AMCG where data was tabulated and included in the program database. This procedure allows for accurate reporting, which is an important element for tracking the measurements and goals of the program.

Home Survey


SAVING ENERGY
Makes Good Business Sense
IDAHO POWER
An IDACORP Company
COMMERCIAL ENERGY-SAVING KIT PROGRAM
COMPLETE AND RETURN THIS SURVEY
FOR A CHANCE
TO WIN a $100 eGift Card!
Complete this survey one of three easy ways:
Online at idahopower.com/businesskit
Return this pre-printed survey in the postage-paid envelope included in your kit.
Or call us at 800-465-6045
For contest details visit idahopower.com/businesskit.
118759
A0112 00000 Idaho Power Commercial Energy-saving Kit Program
ENTER YOUR SURVEY ID
SURVEY ID:
1. Please enter the 7-digit SURVEY ID number from your kit shipping label into the boxes at the top of this page.
SAVING ENERGY
YOUR ENERGY SAVINGS KIT
ENERGY SAVINGS
1. Have you installed the:
Yes
Not yet, but will
No, won't use
LED Light Bulb #1
LED Light Bulb #2
Exit Sign Retrofit LED #1
Exit Sign Retrofit LED #2
Power Strip
Kitchen Aerator
Bathroom Aerator #1
Bathroom Aerator #2
2. Prior to hearing about the Energy-saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?
Yes
No
3. How likely are you to participate in another energy efficiency program?
Very likely
Somewhat likely
Somewhat unlikely
Very unlikely
4. If you did not install some of the kit items, please tell us why.
Return this survey in the pre-paid postage envelope included in your kit. You will be entered into our monthly drawing for a chance to win a $100 dollar eGift Card. Multiple entries not eligible.
Note: Program continuation, eligibility requirements and terms and conditions apply.

Idaho Power Commercial Energy-saving Kit Program Impact

The program impacted 71 cities and towns throughout Idaho and 10 cities and towns in Oregon. As illustrated below, the program successfully educated participating small businesses about energy and water efficiency while generating resource savings through the installation of efficiency measures in small business facilities. Installation survey data was collected to track savings and gather program satisfaction data.

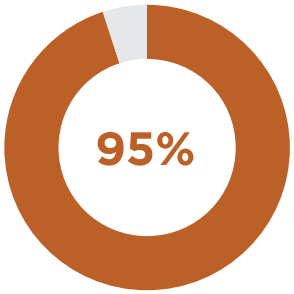
A. Small Business Survey and Retrofit Data

Upon completion of the program, participating small businesses were asked to complete a survey to assess their resource use, verify product installation, provide demographic information, and measure participation rates. Samples questions appear below and a complete summary of all responses is included in Appendix B.

Restaurants reporting that they have or will install the Pre-Rinse Spray Valve:

Yes and Not yet, but will

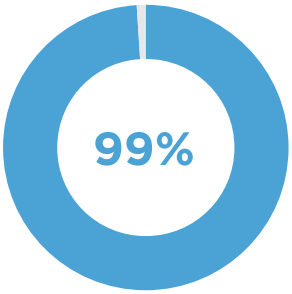
95%



Offices reporting that they have or will install the Advanced Power Strip:

Yes and Not yet, but will

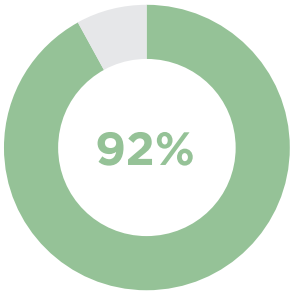
99%



Retail businesses reporting that they have or will install the LEDs and LED BR30s:

Yes and Not yet, but will

92%



B. Water and Energy Savings Summary

As part of the program, participants installed retrofit efficiency measures in their small businesses. The 1,379 participating businesses are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

	Annual	Lifetime	
Total Number of Participants:	**1,379**		
Number of Restaurant Participants:	**206**		
Number of Office Participants:	**937**		
Number of Retail Participants:	**236**		
Projected reduction from Pre-rinse Spray Valve retrofit:	**1,178,526**	**5,892,630**	gallons*
Measure Life: 5 years	**8,802**	**44,012**	kWh
Projected reduction from Advanced Power Strip installation:	**15,179**	**60,718**	kWh
Product Life: 4 years			
Projected reduction from Exit Sign LED retrofits:	**114,760**	**1,836,166**	kWh
Measure Life: 16 years			
Projected reduction from 9-watt LED Light Bulbs:	**29,133**	**378,732**	kWh
Measure Life: 13.1 years			
Projected reduction from 8-watt BR30 LED Light Bulbs:	**27,081**	**352,053**	kWh
Measure Life: 13.1 years			
Projected reduction from Kitchen Faucet Aerator retrofit:	**1,970,321**	**19,703,213**	gallons
Measure Life: 10 years	**30,839**	**308,390**	kWh
Projected reduction from Bathroom Faucet Aerator retrofit:	**2,973,953**	**29,739,527**	gallons
Measure Life: 10 years	**32,574**	**325,742**	kWh
TOTAL PROJECTED PROGRAM SAVINGS:	**6,122,800**	**55,335,370**	gallons
	258,368	**3,305,812**	kWh
TOTAL PROJECTED PROGRAM SAVINGS PER BUSINESS:	**4,440**	**40,127**	gallons
	187	**2,397**	kWh

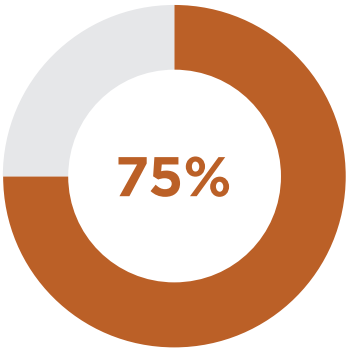
[1] *All water savings estimates are based on 100% installation rate.*

C. Participant Response

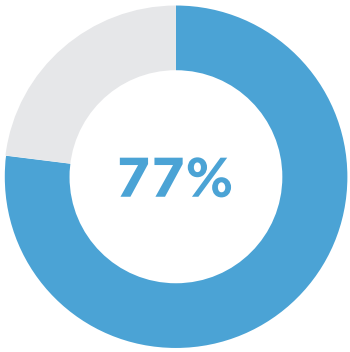
Participant response to Idaho Power's outreach methods and interpersonal communication resulted in a positive response for the program. Participants utilized the Quick Start Guide to choose which measures to install, and which savings actions to take. Illustrated instruction guides made retrofit projects easy to complete. The installation rate data and the participant satisfaction data presented in this report were provided by kit surveys.

ALL - SURVEYS RETURNED	SURVEYS	PY1-PY3 KITS	%
Restaurant	20	753	3%
Office	172	4,361	4%
Retail	22	546	4%
TOTAL	214	5,660	4%

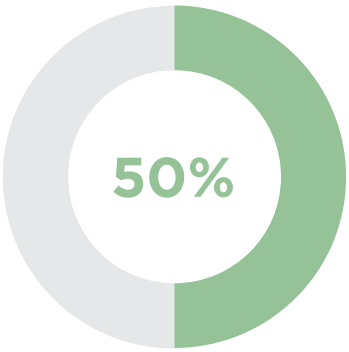
Measures Installed:



Restaurants reported installing the Pre-Rinse Spray Valves.



Offices reported installing the Advanced Power Strip.



Retail businesses reported installing the BR30 LEDs.

Retail Kit


SAVING ENERGY
Makes Good Business Sense
IDAHO POWER.
YOUR ENERGY SAVINGS KIT
Indirect energy-saving benefits:
- Reduced operations and maintenance costs
- Increased asset value
- Improved safety
- Enhanced employee productivity
- Good return on investment
- Improved customer and employee comfort
- Enhanced public image
- Reduced waste
YOU HAVE THE POWER TO SAVE
Turn Off the Lights.
WANT TO SAVE MORE
LIKE THE PRODUCTS IN YOUR KIT?
START HERE

Appendices

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Projected Savings from Pre-Rinse Spray Valve Retrofit

Pre-rinse Spray Valve retrofit inputs and assumptions:

Number of Restaurant participants:	**206**	
Deemed Savings:	**42.7**	kWh [1]
Estimated **annual** water savings:	**5,721**	gallons[2]
Measure life:	**5.0**	years[2]

Projected Electricity Savings:

Pre-rinse spray valve retrofit projects an **annual** reduction of:	**8,802**	kWh
Pre-rinse spray valve retrofit projects a **lifetime** reduction of:	**44,012**	kWh

Projected Water Savings:

Pre-rinse spray valve retrofit projects an **annual** reduction of:	**1,178,526**	gallons
Pre-rinse spray valve retrofit projects a **lifetime** reduction of:	**5,892,630**	gallons

1 Provided by Idaho Power. Regional Technical Forum (RTF). ComcookingPreRinseSprayValve_v2_4.xlsm. Adjusted for estimated electric water heat saturation and installation rates.

2 Based on Regional Technical Forum.

3 Pre-rinse spray valve water savings formula (Savings per year x Participants) .

Projected Savings from Advanced Power Strip (APS) Installation

Advanced Power Strip inputs and assumptions

Number of Office Participants:	**937**	
Deemed Savings:	**16.2**	kWh[1]
Product life:	**4**	years[2]

Projected Electricity Savings:

The APS retrofit projects an **annual** reduction of:	**15,179**	kWh[3]
The APS retrofit projects an **annual** reduction of:	**60,718**	kW[4]

1 *Provided by Idaho Power. RTF. ComSmartPlugPower_v3_4.xlsm. Adjusted for estimated installation rate.*

2 *Based on Regional Technical Forum.*

3 *Advanced Power Strip savings formula (Deemed savings x Participants).*

4 *Advanced Power Strip savings formula (Deemed savings x Participants x Product Life).*

Projected Savings from Exit Sign LED Retrofits

Exit Sign LED Retrofits inputs and assumptions		
Lamps per participant:	**2**	
Number of Restaurant Participants:	**206**	
Number of Office Participants:	**937**	
Number of Retail Participants:	**236**	
Deemed Savings:	**41.61**	kWh[1]
Product life:	**16**	years[1]

Projected Electricity Savings:		
The Exit Sign LED retrofit projects an **annual** reduction of:	**114,760**	kWh[2]
The Exit Sign LED retrofit projects an **lifetime** reduction of:	**1,836,166**	kWh[3]

1 Provided by Idaho Power. Calculated based on estimated existing fixture wattages and installation rates.

2 Exit Sign LED Retrofits savings formula (Deemed savings x Lamps per kit x Participants).

3 Exit Sign LED Retrofits savings formula (Deemed savings x Lamps per kit x Participants x Product Life).

Projected Savings from 9-watt LED Light Bulb Retrofit

9-watt LED Light Bulb retrofit inputs and assumptions:

Lamps per Restaurant participant :	**3**	
Number of Restaurant participants:	**206**	
Deemed Restaurant savings per lamp (average kWh):	**14.40**	kWh[1]
Lamps per Office participant:	**2**	
Number of Office participants:	**937**	
Deemed Office savings per lamp (average kWh):	**7.80**	kWh[1]
Lamps per Retail participant:	**2**	
Number of Retail participants:	**236**	
Deemed Retail savings per lamp (average kWh):	**11.90**	kWh[1]
Measure life:	**13.00**	years[1]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**29,133**	kWh[2]
The LED retrofit projects a **lifetime** reduction of:	**378,732**	kWh[3]

1 Provided by Idaho Power. Savings calculated based on a 9W LED replacing a 13W CFL. Hours of use vary by building type. Adjusted for estimated installation rates.

2 LED kWh savings formula (Deemed savings per lamp x Number of participants x Lamps per participant).

3 LED kWh lifetime savings formula (Annual savings x Measure Life).

Projected Savings from 8-watt BR30 Light Bulb Retrofit

8-watt LED BR30 Light Bulb retrofit inputs and assumptions:

Lamps per Retail participant:	**2**	
Number of Retail participants:	**236**	
Deemed savings per lamp (kWh):	**57.38**	kWh[1]
Measure life:	**13.0**	years[1]

Projected Electricity Savings:

The LED BR30 retrofit projects an **annual** reduction of:	**27,081**	kWh[2]
The LED BR30 retrofit projects a **lifetime** reduction of:	**352,053**	kWh[3]

1 Provided by Idaho Power. Savings calculated based on a 8W LED replacing a 13 W CFL. Hours of use vary by building type. Adjusted for estimated installation rates.

2 LED kWh savings formula (Deemed savings per lamp x Number of participants x Lamps per participant).

3 LED kWh lifetime savings formula (Annual savings x Measure Life).

Projected Savings from Kitchen Faucet Aerator Retrofit

Kitchen Faucet Aerator retrofit inputs and assumptions:		
Kitchen Faucet Aerators per Restaurant kit:	**2**	
Number of Restaurant participants:	**206**	
Deemed Savings Restaurant Kitchen Faucet Aerator 1:	**35.21**	kWh[1]
Deemed Savings Restaurant Kitchen Faucet Aerator 2:	**17.61**	kWh[1]
Kitchen Faucet Aerators per Office kit:	**1**	
Number of Office participants:	**937**	
Deemed Savings Office Kitchen Faucet Aerator:	**21.3**	kWh[1]
Kitchen Faucet Aerator per Retail kit (none):	**-**	
Number of Retail participants (not applicable):	**-**	
Kitchen Faucet Aerator (baseline x .83 throttling factor):	**2.08**	gpm
Kitchen Faucet Aerator (retrofit x .95 throttling factor):	**1.43**	gpm
Percent reduced:	**31%**	
Estimated **annual** water usage per fixture Restaurant:	**9,581**	gallons
Estimated **annual** water usage per fixture Office:	**2,500**	gallons
	10	years[3]
Measure life:		
Kitchen Faucet Aerator retrofit projects an **annual** reduction of:	**30,839**	kWh[4]
Kitchen Faucet Aerator retrofit projects a **lifetime** reduction of:	**308,390**	kWh[5]
Potential Water Savings with 100 Percent Installation:		
Kitchen Faucet Aerator retrofit projects an **annual** reduction of:	**1,970,321**	gallons[6]
Kitchen Faucet Aerator retrofit projects a **lifetime** reduction of:	**19,703,213**	gallons[6]

1 *Provided by Idaho Power. Savings calculated based on the methodology in the Illinois TRM for Commercial Measures. Gallons vary by building type. Adjusted for estimated electric water heat saturation and installation rates.*

2 *From Illinois TRM for Commercial Measures. 2019 v 7 Final, Section 4.3.2. Low Flow Faucet Aerators*

3 *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*

4 *Kitchen Faucet Aerator kWh formula (Number of participants x Deemed savings x Kitchen Faucet Aerators per kit type).*

5 *Kitchen Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*

6 *Kitchen Faucet Aerator gallons formula (Annual usage per fixture x Number of Fixtures x Participants x Percent Reduction).*

7 *All water savings estimates are based on 100% installation rate.*

Projected Savings from Bathroom Faucet Aerator Retrofit

Bathroom Faucet Aerators per Restaurant kit:	**2**	
Number of Restaurant participants:	**206**	
Deemed Savings Restaurant Bathroom Faucet Aerator 1:	**24.47**	kWh[1]
Deemed Savings Restaurant Bathroom Faucet Aerator 2:	**12.23**	kWh[1]
Bathroom Faucet Aerators per Office kit:	**2**	
Number of Office participants:	**937**	
Deemed Savings Office Bathroom Faucet Aerator 1:	**14.80**	kWh[1]
Deemed Savings Office Bathroom Faucet Aerator 2:	**7.40**	kWh[1]
Bathroom Faucet Aerator per Retail kit:	**1**	
Number of Retail participants:	**236**	
Deemed Savings Retail Bathroom Faucet Aerator:	**17.85**	kWh[1]
Bathroom Faucet Aerator (baseline x .83 throttling factor):	**2.08**	gpm[2]
Bathroom Faucet Aerator (retrofit x .95 throttling factor):	**1.43**	gpm[2]
Estimated **annual** water savings per fixture Restaurant:	**3,001**	gallons[2]
Estimated **annual** water savings per fixture Office:	**783**	gallons[2]
Estimated **annual** water savings per fixture Retail:	**1,143**	gallons
Measure life:	**10**	years[3]
Projected Electricity Savings:		
Bathroom Faucet Aerator retrofit projects an **annual** reduction of:	**32,574**	kWh[4]
Bathroom Faucet Aerator retrofit projects a **lifetime** reduction of:	**325,742**	kWh5
Potential Water Savings with 100 Percent Installation:		
Bathroom Faucet Aerator retrofit projects an **annual** reduction of:	**2,973,953**	gallons[6]
Bathroom Faucet Aerator retrofit projects a **lifetime** reduction of:	**29,739,527**	gallons[6]

1 *Provided by Idaho Power. Savings calculated based on the methodology in the Illinois TRM for Commercial Measures. Gallons vary by building type. Adjusted for estimated electric water heat saturation and installation rates.*

2 *From Illinois TRM for Commercial Measures. 2019 v 7 Final, Section 4.3.2. Low Flow Faucet Aerators*

3 *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*

4 *Bathroom Faucet Aerator kWh formula (Number of participants x Deemed Savings x Bathroom Faucet Aerators per kit type).*

5 *Bathroom Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*

6 *Bathroom Faucet Aerator gallons formula (Annual usage per fixture x Number of Fixtures x Participants x Percent Reduction).*

5 *Bathroom Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*

6 *Bathroom Faucet Aerator gallons formula (Annual usage per fixture x Number of Fixtures x Participants x Percent Reduction).*

Restaurant Survey Response Summary *

1 Have you installed the Pre-Rinse Spray Valve?	
Yes	75%
Not yet, but will	20%
No, won't use	5%
2 Have you installed the LED Light Bulb #1?	
Yes	55%
Not yet, but will	45%
No, won't use	0%
3 Have you installed the LED Light Bulb #2?	
Yes	55%
Not yet, but will	45%
No, won't use	0%
4 Have you installed the LED Light Bulb #3?	
Yes	55%
Not yet, but will	45%
No, won't use	0%
5 Have you installed the Exit Sign Retrofit LED #1?	
Yes	35%
Not yet, but will	35%
No, won't use	30%
6 Have you installed the Exit Sign Retrofit LED #2?	
Yes	35%
Not yet, but will	35%
No, won't use	30%
7 Have you installed the Kitchen Aerator #1?	
Yes	58%
Not yet, but will	26%
No, won't use	16%
8 Have you installed the Kitchen Aerator #2?	
Yes	32%
Not yet, but will	42%
No, won't use	26%
9 Have you installed the Bathroom Aerator #1?	
Yes	55%
Not yet, but will	25%
No, won't use	20%

Due to rounding of numbers, percentages may not add up to 100%
**Survey response rate of 3% with a total 20 surveys received over the three year program duration.*

Restaurant Survey Response Summary* *(continued)*

10 Have you installed the Bathroom Aerator #2?	
Yes	53%
Not yet, but will	21%
No, won't use	26%
11 Prior to hearing about the Energy-saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?	
Yes	70%
No	30%
12 How likely are you to participate in another energy efficiency program?	
Very likely	85%
Somewhat likely	10%
Somewhat unlikely	0%
Very unlikely	5%

Due to rounding of numbers, percentages may not add up to 100%
**Survey response rate of 3% with a total 20 surveys received over the three year program duration.*

Office Survey Response Summary*

1 Have you installed the LED Light Bulb #1?	
Yes	63%
Not yet, but will	33%
No, won't use	4%
2 Have you installed the LED Light Bulb #2?	
Yes	57%
Not yet, but will	39%
No, won't use	4%
3 Have you installed the Exit Sign Retrofit LED #1?	
Yes	20%
Not yet, but will	47%
No, won't use	33%
4 Have you installed the Exit Sign Retrofit LED #2?	
Yes	17%
Not yet, but will	47%
No, won't use	36%
5 Have you installed the Power Strip?	
Yes	77%
Not yet, but will	22%
No, won't use	1%
6 Have you installed the Kitchen Aerator?	
Yes	41%
Not yet, but will	41%
No, won't use	19%
7 Have you installed the Bathroom Aerator #1?	
Yes	48%
Not yet, but will	38%
No, won't use	14%
8 Have you installed the Bathroom Aerator #2?	
Yes	35%
Not yet, but will	41%
No, won't use	23%
9 Prior to hearing about the Energy-saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?	
Yes	65%
No	35%
10 How likely are you to participate in another energy efficiency program?	
Very likely	71%
Somewhat likely	26%
Somewhat unlikely	2%
Very unlikely	1%

Due to rounding of numbers, percentages may not add up to 100%
Survey response rate of 4% with a total 172 surveys received over the three year program duration.

Retail Survey Response Summary*

1 Have you installed the LED Light Bulb #1?	
Yes	80%
Not yet, but will	20%
No, won't use	0%
2 Have you installed the LED Light Bulb #2?	
Yes	76%
Not yet, but will	24%
No, won't use	0%
3 Have you installed the BR30 Reflector LED #1?	
Yes	54%
Not yet, but will	38%
No, won't use	8%
4 Have you installed the BR30 Reflector LED #2?	
Yes	46%
Not yet, but will	46%
No, won't use	8%
5 Have you installed the Exit Sign Retrofit LED #1?	
Yes	21%
Not yet, but will	54%
No, won't use	25%
6 Have you installed the Exit Sign Retrofit LED #2?	
Yes	9%
Not yet, but will	59%
No, won't use	32%
7 Have you installed the Bathroom Aerator #1?	
Yes	48%
Not yet, but will	32%
No, won't use	20%
8 Prior to hearing about the Energy-saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?	
Yes	68%
No	32%
9 How likely are you to participate in another energy efficiency program?	
Very likely	77%
Somewhat likely	18%
Somewhat unlikely	0%
Very unlikely	5%

Due to rounding of numbers, percentages may not add up to 100%
**Survey response rate of 4% with a total 22 surveys received over the three year program duration.*

Idaho Cities & Towns Served

ABERDEEN
AMERICAN FALLS
BELLEVUE
BLACKFOOT
BOISE
BRUNEAU
BUHL
CALDWELL
CAMBRIDGE
CAREY
CARMEN
CASCADE
CASTLEFORD
CHUBBUCK
COUNCIL
DIETRICH
DONNELLY
EAGLE
EDEN
EMMETT
FILER
FORT HALL
FRUITLAND
GARDEN CITY
GARDEN VALLEY
GLENNS FERRY
GOODING
GRAND VIEW
GREENLEAF
HAGERMAN
HAILEY
HAMMETT
HANSEN
HAZELTON
HOMEDALE
HORSESHOE BEND
IDAHO CITY
INDIAN VALLEY
INKOM
JEROME
KETCHUM
KIMBERLY
KING HILL
KUNA
MARSING
MCCALL
MELBA
MERIDAN
MIDDLETON
MIDVALE
MOUNTAIN HOME
MURPHY
NAMPA
NEW MEADOWS
NEW PLYMOUTH
NOTUS
OAKLEY
PARMA
PAYETTE
POCATELLO
POLLOCK
RICHFIELD
RIGGINS
SALMON
SHOSHONE
STAR
SWEET
TWIN FALLS
WEISER
WENDELL
WILDER

Oregon Cities & Towns Served

ADRIAN
HALFWAY
JORDAN VALLEY
JUNTURA
NYSSA
ONTARIO
OXBOW
RICHLAND
UNITY
VALE

Idaho Power Regions Served

REGIONS	RESTAURANT	OFFICE	RETAIL
CALL CENTER	77	518	20
CANYON WEST COC	17	6	26
CANYON WEST POC	32	18	29
CAPITAL BOC	38	40	71
EASTERN POC	4	7	35
SOUTHERN TWOC	0	13	14
UNASSIGNED	15	145	4
HEADQUARTERS	23	190	37
TOTAL	206	937	236
TOTAL ALL	1,379		

Idaho Power Enrollments

	ENROLLMENTS	%
REGIONAL OFFICES (HANDED OUT)	59	4%
CALL-CENTER (KITS SHIPPED)	1,320	80%

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An IDACORP Company

IDAHO POWER
ENERGY-SAVING KIT PROGRAM SUMMARY REPORT
2020

SUBMITTED BY:
AM CONSERVATION GROUP

Idaho Power Energy-Saving Kit Program Summary Report 2020

Sponsored by:



Submitted by:



February 2021

"Great tools! Thanks for offering and educating us!"

– Idaho Power Energy-Saving Kit Program Participant

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- Projected Savings from Kitchen Faucet Aerator Retrofit 26
- Projected Savings from Bathroom Faucet Aerator Retrofit 27
- Projected Savings from LED Night Light Installation 28
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"We used everything. Thank you so much for the kit!"

– Idaho Power Energy-Saving Kit Program Participant

Executive Summary

The Idaho Power Energy-Saving Kit Program was designed and implemented to provide Idaho Power's residential households with energy-efficiency education, measures to reduce their energy costs, and help them develop energy-efficient behaviors consistent with Idaho Power. This report summarizes the 2020 Energy-Saving Kit program. Funding was provided by Idaho Power.

The program achieved or exceeded expectations and the results are listed below.

PROGRAM ACHIEVEMENTS

1. Provided residential energy-saving measures and energy-efficiency education to 38,571 Idaho and 1,096 Oregon households.

   - Affected all five regions of the Idaho Power service territory
   - Affected 106 cities & towns in Idaho
   - Affected 17 cities & towns in Oregon

REGIONS	HOUSEHOLDS	ELECTRIC KIT	NON-ELECTRIC KIT
Canyon	10,672	3,585	7,087
Capital	15,077	5,638	9,439
Eastern	4,346	2,197	2,149
Southern	4,860	2,337	2,523
Western	4,712	2,621	2,091
TOTALS	39,667	16,378	23,289

2. Generated residential energy and water savings. Projected annual savings:

   - 169,707,793 gallons of water saved*
   - 6,169,817 kWh of electricity saved
   - 109,901 therms of gas saved

(continued on next page)

**Assuming 100% Installation.*

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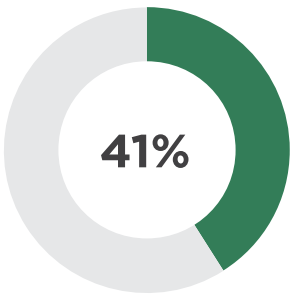
3. Idaho Power supported their customers through utilization of the following diverse marketing methods.
   - Direct Mail from Idaho Power
   - Email from Idaho Power
   - Friend or Family
   - Idaho Power employee
   - Info in bill
   - Idaho Power website
   - Direct mail from Idaho Power, Email from Idaho Power
   - Facebook/Twitter
   - Friend or Family, Email from Idaho Power
   - Direct mail from Idaho Power, Friend or Family
   - Idaho Power employee, Other: Mowla
   - Idaho Power employee, Other: CSA Hinges
   - Direct mail from Idaho Power, Info in bill, Email from Idaho Power
   - Other: Radio

OPTING-IN METHODS	HOUSEHOLDS	%
Website	**30,940**	**78%**
Postcards	**8,727**	**22%**

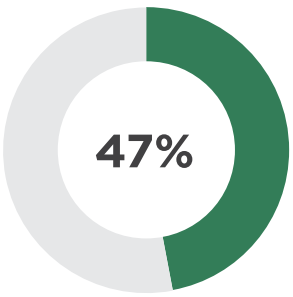
4. Designed and provided complementary educational materials and incentives to maximize installation of targeted efficiency measures (Installation rates ranged from 40 – 90 percent).
5. Maintained data collection and management services to collect and process audit ready data from participating households.
6. Maintained tracking and reporting to summarize the Program participation.
7. The Program provided customized Direct-to-Customer Program modules, which included educational materials and energy-saving products. A participant survey was included with the program materials (in-kit). The purpose of the survey was to increase educational retention and impact while serving as a data collection tool.

Since 2018, a second follow-up survey was distributed two to three months after participants' kit receipt. The objective being to determine if those initially responding they had not yet installed but will followed through. The installation responses in the follow-up surveys confirmed they did as overall installation percentages improved.

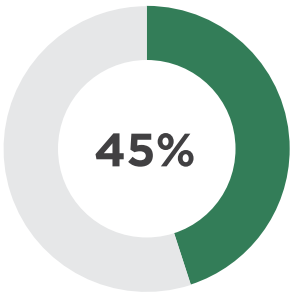
Survey responses indicated high participant satisfaction and participation in product retrofits and adoption of new energy saving behaviors. Total 9,937 households returned completed surveys and the responses were overwhelmingly positive. The increase in installation rates from the In-kit Survey results to the Follow-up Survey results show a marked improvement over time. Highlights include:



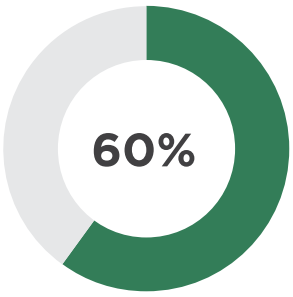
In-kit surveys reporting all 9 LED Light Bulbs installed.



Follow-up surveys reporting all 9 LED Light Bulbs installed.



In-kit surveys reporting the Evolve TSV & Showerhead installed.



Follow-up surveys reporting the Evolve TSV & Showerhead installed.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Projected energy savings from this program are significant. Based on the reported actions, annual and lifetime resource savings are as follows:

PROJECTED ANNUAL SAVINGS	
169,707,793	gallons of water saved*
6,169,817	kWh of electricity saved**
109,901	therms of gas saved

PROJECTED LIFETIME SAVINGS	
1,417,173,519	gallons of water saved*
69,411,935	kWh of electricity saved**
219,803	therms of gas saved

PROJECTED ANNUAL SAVINGS PER HOME	
10,362	gallons of water saved*
156	kWh of electricity saved**
3	therms of gas saved

PROJECTED LIFETIME SAVINGS PER HOME	
86,529	gallons of water saved*
1,750	kWh of electricity saved**
6	therms of gas saved

*Assuming 100% Installation rate.
**Totals do not include kWh savings from the Shower Timer measure at Idaho Power's request.

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"Thank you so much for LED bulbs; wasn't sure I would like, but I plan to replace all bulbs with LED."

– Idaho Power Energy-Saving Kit Program Participant

AMCG Direct-to-Customer Programs

For more than 26 years, AM Conservation Group (AMCG) has designed and implemented resource efficiency and education programs, changing household energy and water use while delivering significant, measurable resource savings for program sponsors. All AMCG programs feature a proven blend of innovative education and comprehensive implementation services.

AMCG Programs serve more than 650,000 households each year through school and adult delivered Measure Based Education Programs. Our forty-person staff manages the implementation process and program oversight for nearly 300 individual programs annually. Recognized nationally as a leader in energy and water efficiency education and program design, AMCG has a strong reputation for providing the highest level of service to program sponsors as part of a wide range of conservation and resource efficiency solutions for municipalities, utilities, states, community agencies, and corporations.

All aspects of program design and implementation are completed at the Program Center in Sparks, Nevada. These include: graphic and web design, print production, procurement, warehousing, logistics, module production, marketing, program tracking, data tabulation and reporting.

The Direct-to-Customer Program represents the leading edge of community energy efficiency education program design and implementation. The Program uses a client-directed Measure Based Education model to generate lasting residential energy savings from both retrofits and new behaviors. Initially, participants choose their personal savings target. Then they select retrofits using provided measures and energy-saving behaviors to reach their goal. The Direct-to-Customer Program is tremendously versatile, and can easily be introduced and distributed via a wide range of delivery channels, including Opt-in Direct Mail, CBO/CAA distribution, workshops, community events, affinity groups (volunteers, CAAs, CBOs, churches) or public events.

Cost-effective energy savings from the measure installations will justify program investments on their own, but the Program delivers several other important benefits as well. The educational component is designed to include each household member in order to manage household energy use. Measures, immediate savings actions and additional savings ideas for all areas of residential energy use are grouped by areas of the home and provided to participants as options to help them reach their personal savings targets. Additional rebates and program opportunities can be introduced through the Program or offered as incentives for program performance.

Participation in the Direct-to-Customer Program provides a strong, personalized pathway for participants to realize both initial and ongoing savings from new products and behavior choices in their homes.

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Idaho Power Energy-Saving Kit Program Overview

The overarching goal of this measure based program was to assist Idaho Power in providing their residential households with energy-efficiency education and reduced energy costs as well as developing energy efficiency behaviors consistent with Idaho Power's energy efficiency objectives. The energy-savings Kits empowered the Idaho and Oregon households to save energy and money.

The program created and distributed a custom educational savings module consisting of efficiency measures, educational materials, and household surveys. Educational materials included a Quick Start Guide, Survey, Installation Instructions, Mini-Home Assessment (Idaho Power provided) and other tools such as stickers and magnets as reminders for new energy-efficient conservation behaviors. All elements were customized to meet Idaho Power priorities, regional conditions and regulatory requirements.

The program was offered to eligible Idaho Power residential households as defined by Idaho Power. Those in participating households cited the categories shown in the table (at right) when asked how they heard of the program.

HEARD ABOUT PROGRAM	HOUSEHOLDS	%
Direct mail from Idaho Power	20,055	50.56%
Email from Idaho Power	14,377	36.24%
Friend or Family	1,041	2.62%
Idaho Power employee	932	2.35%
Info in bill	870	2.19%
Idaho Power website	645	1.63%
Other	483	1.22%
Direct mail from Idaho Power, Email from Idaho Power	433	1.09%
No answer	171	0.43%
Facebook/Twitter	148	0.37%
Friend or Family, Email from Idaho Power	110	0.28%
Direct mail from Idaho Power, Friend or Family	66	0.17%
Idaho Power employee, Other: Mowla	64	0.16%
Idaho Power employee, Other: CSA Hinges	51	0.13%
Other: Radio	45	0.11%
Direct mail from Idaho Power, Info in bill, Email from Idaho Power	38	0.10%
Direct mail from Idaho Power, Info in bill	34	0.09%
Info in bill, Email from Idaho Power	31	0.08%
Idaho Power website, Friend or Family	28	0.07%
Direct mail from Idaho Power, Friend or Family, Email from Idaho Power	24	0.06%
Direct mail from Idaho Power, Idaho Power website, Email from Idaho Power	21	0.05%
TOTALS	39,667	100%

Those in eligible households opting-in to receive the energy-saving kit utilized one of three primary methods:

1. AMCG developed and maintained a program website to process energy-saving kit orders as well as to provide program information, including product installation videos and instructions.
2. AMCG maintained a toll-free phone number to process the called-in kit orders and address any inquiries and issues.
3. Custom-designed direct mailers were sent to households with program information and instructions on ordering a kit.

Kit installation surveys were received from 9,937 participating households, representing an average response rate of 25% of the 39,667 energy-saving kits distributed. A monthly drawing for a $100 gift card provided the incentive for returning the household installation surveys.

ENROLLMENTS BY		%
Postcards	8,727	22%
Website	30,940	78%

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QUICK START GUIDE
Español en el otro lado
IDAHO POWER
An IDACORP Company
START SAVING NOW!
1 Install the energy-efficient products in your kit.
2 Follow the energy-saving tips provided in this Quick Start Guide.
3 For additional ways to save, visit idahopower.com/save2day.
117419
QUICK STEP 4
Shower Timer
WATER AND ENERGY
Running your shower for five minutes can use as much energy as leaving a 60-watt light bulb on for 14 hours. A shower timer reminds you to save energy and water while showering. The shower timer, set to five (5) minutes, encourages the wise use of water. It requires no assembly or maintenance. Simply rotate the shower timer half a turn when you begin your shower; then try to finish before the sand runs out.
Install the new shower timer from your kit.
TIP: The average shower is 8.2 – 10.4 minutes in length. A five-minute shower reduces energy used to pump and heat water, saves fresh water and reduces wastewater.
QUICK STEP 1
LED Lighting
LIGHTING
LED light bulbs use up to 80 percent less energy than traditional bulbs and last up to 25 times longer. For the most savings, use the LED bulbs from your kit to replace incandescent bulbs in high-use areas. Then install the LED night light in an area that lights a path and lets you avoid turning on other lights.
Replace your most-used 45-watt bulbs with the 6-watt LED bulbs from your kit.
Replace your most-used 60-watt bulbs with the 9-watt LED bulbs from your kit.
Install the new LED night light from your kit.
TIP: For the most savings, place LED bulbs in fixtures that are on for at least 2-3 hours a day.
QUICK STEP 5
Water Flow-Rate Test Bag
WATER
If your showerhead uses more than 2.5 gallons of water per minute (gpm) or your faucets use more than 1.5 gpm, you c save by installing a high-efficiency showerhead and faucet aerators. These devices save water and energy while deliv good pressure.
With a stopwatch and a helper, follow the six ste on the flow-rate test bag to measure the water of your current showerhead.
Now measure the output of your kitchen fauce bathroom faucets.
TIP: Idaho Power offers incentives for efficient showerheads by working with manufacturers and participating retailers. Go to idahopower.com/showerheads for promotion details.
QUICK STEP 2
Refrigerator/Freezer
APPLIANCE
Almost 8 percent of your electricity use goes to your refrigerator and 2 percent to your freezer. If they're even 10°F colder than necessary, the energy they use could go up by 25 percent.
Use your digital thermometer to check the temperature. Refrigerators should be set between 38° and 40°F and the freezer should be set at 0°F.
Adjust temperature, if necessary.
TIP: Make sure the door is sealed tightly. Check the gasket (rubber seal) for cracks and dried-on food.
Want to Save More?
Idaho Power offers energy efficiency incentive cost of energy efficient products and/or servi the programs and tips at idahopower.com/sa ways to use energy wisely and avoid unnece
QUICK STEP 3
Water Hea
APPLIANCE
Heating water can consumed in your heater on the hott it doesn't. It just us from your kit to ch you may be overhe
Fill a cup w farthest fro thermomet
If your hot setting on y manual to a
TIP: If your water he use a water heater b on your water heatin found at your local h
QUICK START GUIDE
Español en el otro lado
IDAHO POWER
An IDACORP Company
START SAVING NOW!
1 Install the energy-efficient products in your kit.
2 Follow the energy-saving tips provided in this Quick Start Guide.
3 For additional ways to save, visit idahopower.com/save2day.
117419
QUICK STEP 4
Water Heater
APPLIANCE
Heating water can account for 14 to 25 percent of the energy consumed in your home. Many people think placing a water heater on the hottest setting heats the water more quickly but it doesn't. It just uses more energy. Use the digital thermometer from your kit to check the water temperature. If it's over 120°F, you may be overheating your water and wasting energy!
Fill a cup with the hottest water from the faucet farthest from the water heater. Place the digital thermometer in the cup for two minutes.
If your hot water is over 120°F, lower the temperature setting on your water heater. Refer to your owner's manual to adjust the settings.
TIP: If your water heater is in a garage or unheated basement, use a water heater blanket to save an additional 4 to 9 percent on your water heating costs. Water heater blankets can be found at your local hardware store.
QUICK STEP 1
LED Lighting
LIGHTING
LED light bulbs use up to 80 percent less energy than traditional bulbs and last up to 25 times longer. For the most savings, use the LED bulbs from your kit to replace incandescent bulbs in high-use areas. Then install the LED night light in an area that lights a path and lets you avoid turning on other lights.
Replace your most-used 45-watt bulbs with the 6-watt LED bulbs from your kit.
Replace your most-used 60-watt bulbs with the 9-watt LED bulbs from your kit.
Install the new LED night light from your kit.
TIP: For the most savings, place LED bulbs in fixtures that are on for at least 2-3 hours a day.
QUICK STEP 5
Refrigerator/Freezer
APPLIANCE
Almost 8 percent of your electricity use goes to your refrigerator and 2 percent to your freezer. If they're even 10°F colder than necessary, the energy they use could go up by 25 percent.
Use your digital thermometer to check the temperature. Refrigerators should be set between 38° and 40°F and the freezer should be set at 0°F.
Adjust temperature, if necessary.
TIP: Make sure the door is sealed tightly. Check the gasket (rubber seal) for cracks and dried-on food.
QUICK STEP 2
Evolve Showerhead Plus TSV
WATER AND ENERGY
When taking a shower, you use two resources: water—and the energy to heat the water. Install the Evolve high-efficiency showerhead in your kit. It's integrated thermostatic shut-off valve (TSV) allows you to effortlessly save the hot water and energy that's used while waiting for your shower to become warm. It also lets you know when your shower's ready.
Turn on the shower to let the water warm up.
When the water reaches 95° F, the TSV reduces water flow to let you know your shower is ready.
full water flow.
Want to Save More?
Idaho Power offers energy efficiency incentives to reduce the cost of energy efficient products and/or services. Check out the programs and tips at idahopower.com/save to find more ways to use energy wisely and avoid unnecessary waste.
Installation Questions?
See the INSTALLATION INSTRUCTION BOOKLET in the bottom of your kit.
Visit idahopower.com/save2day to view installation videos.
Don't forget!
Return your survey for a chance to win a $100 gift card.
Developed in partnership:
IDAHO POWER
An IDACORP Company
RESOURCEACTION PROGRAMS
A FRANKLIN ENERGY COMPANY

Idaho Power Energy-Saving Kit Program Materials

Each participating household received an energy-saving kit containing efficiency measures for their homes and a Quick Start Guide with energy efficiency information and behavioral tips. The materials were customized for Idaho Power. Households with electric water heating received an electric kit (including water-saving measures). Households with other water heating options received a non-electric kit (excluding water-saving measures).

Included Educational Materials

Quick Start Guide

Survey

Survey Envelope (postage prepaid)

Sticker and Magnet Reminder

Mini-Home Assessment (Idaho Power provided)

Installation Instructions

Included Efficiency Measures

Six 9-Watt LEDs (800 Lumens)

Three 6-Watt LEDs (480 Lumens)

IPC branded LED Night Light

Evolve TSV & Showerhead*

Kitchen and Bathroom Faucet Aerators*

Shower Timer

Digital Thermometer



*An Electric Kit.

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INSTALLATION SURVEY
(Español en el otro lado)
Complete this survey for a chance to win a $100 Gift Card
All you have to do is...
1. Install the energy-efficient products in your kit.
2. Follow the energy-saving tips provided in the quick start guide.
3. Enter your name and address below.
4. Return this survey for a chance to win a $100 gift card.
(Postage-paid envelope included)
Fill in each bubble completely.
Use a black pen to fill in the bubble next to the correct answer.
YES
NO
Name:
Address:
IDAHO POWER
Idaho Power DTC

Idaho Power Energy-Saving Kit Program Implementation

An introductory marketing direct mailer, supported by the information on the Idaho Power website, merited positive results. Many shared their positive program experience with their family and friends though social media, word of mouth, and emails. Additional exposure through bill inserts and community events resulted in a steady demand for the program.

Participation was processed and tracked at the AMCG Program Center, which has the capacity to handle in excess of 100,000 requests per month. The program website, a toll-free phone number, and the business reply postcards provided convenient methods for interested households to order a kit and participate in the program.

Orders were tracked and managed daily from all outreach and enrollment sources. Program materials and products were packaged and addressed for individual home delivery. All Program modules received a unique ID number to improve the accuracy of data tracking and reduce the amount of information required from respondents.

All enrollments, shipping, and survey data were managed by AMCG's proprietary Program Database. In addition, all returned surveys were tabulated and included in the program database. This procedure allows for reporting, which is an important element for tracking the measurements and goals of this program.

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"We installed kit items and used the thermometer; was good to see we were already in appropriate range!"

– Idaho Power Energy-Saving Kit Program Participant

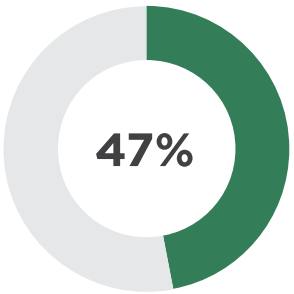
Idaho Power Energy-Saving Kit Program Impact

The program impacted 115 cities and towns throughout Idaho and 20 cities and towns in Oregon. As illustrated below, the program successfully educated those in participating households about energy and water efficiency while generating resource savings through the installation of efficiency measures in their homes. Home survey and installation information was collected to track savings and gather household consumption and demographic data. The three program elements, described on the next few pages, were used to collect this data.

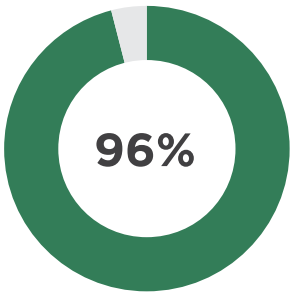
A. Home Survey and Retrofit Data

Upon completion of the program, participating households were asked to complete a home survey to assess their resource use, verify product installation, provide demographic information, and measure participation rates. Sample questions from the Follow-up Survey appear below and a complete summary of all responses is included in Appendix B.

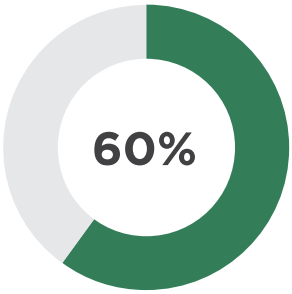
Did you install ALL 9 LED Light Bulbs?	**Yes - 47%**
Did you install the LED Night Light?	**Yes - 96%**
Did you install the Evolve TSV & Showerhead?	**Yes - 60%**
Did you use the Shower Timer?	**Yes - 57%**



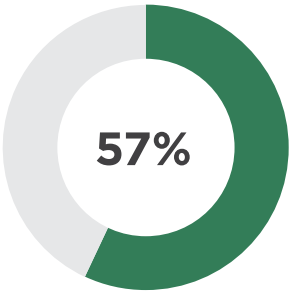
Reported households with ALL 9 LED Light Bulbs installed.



Reported households with the LED Night Light installed.



Reported households with the Evolve TSV & Showerhead installed.



Reported households who used the Shower Timer.

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B. Water and Energy Savings Summary

As part of the program, participants installed retrofit efficiency measures in their homes. Using the family habits collected from the home surveys as the basis for this calculation, 41,710 households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come. Reported water savings assume 100% installation of the product.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Total Number of Participants:	**39,667**		
Number of Electric Only Participants:	**16,378**		
Number of Non-Electric Participants:	**23,289**		
	Annual	**Lifetime**	
Projected reduction from Showerhead retrofit:	**77,814,546**	**778,145,462**	gallons
Measure Life: **10 years**	**1,878,884**	**18,788,842**	kWh
Projected reduction from Shower Timer installation:	**34,988,052**	**69,976,104**	gallons
Product Life: **2 years**	**2,399,402**	**4,798,804**	kWh
	109,901	**219,803**	therms
Projected reduction from Kitchen Faucet Aerator retrofit:	**33,084,416**	**330,844,159**	gallons
Measure Life: **10 years**	**603,366**	**6,033,655**	kWh
Projected reduction from Bathroom Faucet Aerator retrofit:	**23,820,779**	**238,207,794**	gallons
Measure Life: **10 years**	**723,252**	**7,232,525**	kWh
Projected reduction from **9**-watt LED Light Bulbs:	**1,658,874**	**21,731,249**	kWh
Measure Life: **13.1 years**			
Projected reduction from **6**-watt LED Light Bulbs:	**829,437**	**10,865,624**	kWh
Measure Life: **13.1 years**			
Projected reduction from LED Night Light:	**476,000**	**4,760,040**	kWh
Measure Life: **10 years**			
TOTAL PROJECTED PROGRAM SAVINGS*:	**169,707,793**	**1,417,173,519**	gallons
	6,169,817	**69,411,935**	kWh
	109,901	**219,803**	therms
TOTAL PROJECTED PROGRAM SAVINGS PER HOUSEHOLD*:	**10,361.94**	**86,529.10**	gallons
	156	**1,750**	kWh
	3	**6**	therms

Totals do not include kWh savings from the Shower Timer measure at Idaho Power's request.

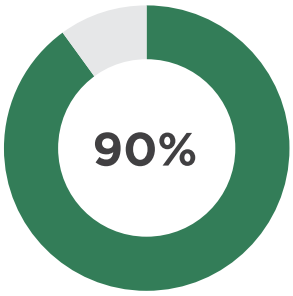
C. Participant Response

Participant response to Idaho Power's various outreach methods combined with social media and interpersonal communication resulted in an overwhelming demand for the program. Idaho Power increased the budget and the kit availability for this program in order to fulfill all residential customer orders. The participants utilized the Quick Start Guide to choose which measures and actions to take. Installation videos and text instructions made retrofit projects easy to complete. The installation rate data and the participant satisfaction data presented in this report were provided by kit surveys.

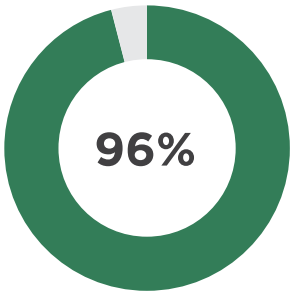
SURVEY TYPE	KITS SHIPPED	IN-KIT SURVEYS RECEIVED	IN-KIT SURVEY RESPONSE %	FOLLOW-UP SURVEYS RECEIVED*	FOLLOW-UP SURVEY RESPONSE%*
Electric	16,378	1,488	9%	2,542	16%
Non-Electric	23,289	2,749	12%	3,158	14%
TOTAL	39,667	4,237	10%	5,700	15%

Includes Q4 2018 served, excludes Follow-up Surveys from Q4 2019 due to three month survey distribution.

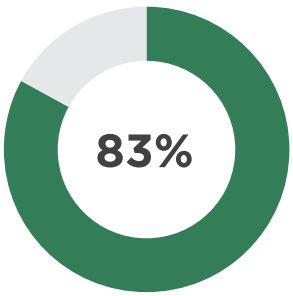
How satisfied were you with the kit ordering process? **Very Satisfied - 93%**
Did you receive your kit within 3 weeks? **Yes - 96%**
How likely would you be to tell a friend or family member to order a kit? **Very Likely - 83%**
How likely are you to participate in another energy efficiency program? **Very Likely - 77%**



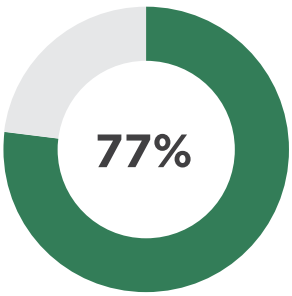
Reported households that were very satisfied with the ordering process.



Reported households that received their kits within 3 weeks.



Reported households that were very likely to tell a friend or family member to order a kit.



Reported households that were very likely to participate in another energy efficiency program.

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Participant Responses

Thank you!

Thank you, Idaho Power.

What I didn't use I gave to others who did use them.

Great kit!

Thank you, Idaho Power!

Great deal, installed all, Thank you!

We used everything. Thank you so much for the kit!

Thanks for reminding me.

Very happy with the kit. Thank you!

Thank you!

Using LED's as other bulbs burn out - will use all of them.

Used everything!

Thank you for the kit. We will probably use the bathroom faucet aerators.
All I need is attic insulation and energy windows.

Thank you! :)

Used them all - thank you. :)

Thank you.

Thank you for the info & items!! Freezer and water were at suggested temp - LED's will be replaced.

Used most items/much more aware of power use than before.

Enjoying the ones I did install.

Great items - thanks!

Participant Responses *(continued)*

Used the items I liked!

Will be installing - mostly want LED bulbs throughout the home first.

Yes, I loved it!

We did. Thanks :)

A little bit of comfort is worth more than a little bit of savings.

Thank you for the kit!

I'm replacing burned out bulbs with the LED lights. I will use the temp adjuster for the refrigerator.

Temps already lowered, already have low water pressure.

Very pleased with everything in the kit.

I haven't but I will.

Thank you!

Thank you for this program!

Thank you for the kit, we were already being very conservative.

Thank you for this great kit! loved every item.

Thanks for sending.

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*An Electric Kit.

Appendices

Appendix A

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Projected Savings from 9-watt LED Retrofit

9-watt LED Light Bulb retrofit inputs and assumptions:

Lamps per participant:	**6**	
Number of participants:	**39,667**	
Deemed savings per lamp (kWh):	**6.97**	kWh[1]
Measure life:	**13.1**	years[1]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**1,658,874**	kWh[2]
The LED retrofit projects a **lifetime** reduction of:	**21,731,249**	kWh[3]

1 *Based on Regional Technical Forum. By request. General purpose and Three-Way. 250 to 1049 lumens.*

2 *LED kWh savings formula (Deemed savings per lamp x Number of participants x Lamps per participant).*

3 *LED kWh lifetime savings formula (Annual savings x Measure Life).*

Projected Savings from 6-watt LED Retrofit

6-watt LED Light Bulb retrofit inputs and assumptions:

Lamps per participant:	**3**	
Number of participants:	**39,667**	
Deemed savings per lamp (kWh):	**6.97**	kWh[1]
Measure life:	**13.1**	years[1]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**829,437**	kWh[2]
The LED retrofit projects a **lifetime** reduction of:	**10,865,624**	kWh[3]

1. *Based on Regional Technical Forum. By request. General purpose and Three-Way. 250 to 1049 lumens.*
2. *LED kWh savings formula (Deemed savings per lamp x Number of participants x Lamps per participant).*
3. *LED kWh lifetime savings formula (Annual savings x Measure Life).*

Projected Savings from Evolve TSV Combo Showerhead Retrofit

Evolve TSV Combo showerhead retrofit inputs and assumptions:

Showerheads per electric DHW kit:	**1**	
Number of electric DHW participants:	**16,378**	
Domestic electric hot water reported:	**100%**	[1]
Number of people per household:	**2.21**	[1]
Deemed Savings:	**114.72**	[2]
Length of average shower:	**7.84**	minutes[3]
Showerhead (baseline):	**2.50**	gpm[3]
TSV Combo showerhead new (retrofit):	**1.75**	gpm
Measure life:	**10.00**	years[2]

Projected Electricity Savings:

TSV Combo showerhead retrofit projects an **annual** reduction of:	**1,878,884**	kWh[5]
TSV Combo showerhead retrofit projects a **lifetime** reduction of:	**18,788,842**	kWh[5]

Potential Water Savings with 100 Percent Installation:

TSV Combo showerhead retrofit projects an **annual** reduction of:	**77,814,546**	gallons[4]
TSV Combo showerhead retrofit projects a **lifetime** reduction of:	**778,145,462**	gallons[4]

1. *Data Reported by Program Participants.*
2. *Based on Regional Technical Forum.*
3. *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*
4. *Showerhead Gallons Formula (Number of participants x (Showerhead baseline - Showerhead new) x Length of average shower x Days per year x People per household).*
5. *Showerhead kWh formula (Number of Participants x Deemed Savings).*

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Projected Savings from Kitchen Faucet Aerator Retrofit

Kitchen Faucet Aerator retrofit inputs and assumptions:

Kitchen Faucet Aerator per electric DHW kit:	**1**	
Number of electric DHW participants:	**16,378**	
Domestic electric hot water reported:	**100%**	[1]
Number of people per household:	**2.21**	[1]
Savings:	**36.84**	kWh[2]
Average daily use:	**2.50**	minutes [3]
Kitchen Faucet Aerator (baseline):	**2.50**	gpm[3]
Kitchen Faucet Aerator (retrofit):	**1.50**	gpm
Measure life:	**10.00**	years[3]

Projected Electricity Savings:

Kitchen Faucet Aerator retrofit projects an **annual** reduction of:	**603,366**	kWh[4]
Kitchen Faucet Aerator retrofit projects a **lifetime** reduction of:	**6,033,655**	kWh[5]

Potential Water Savings with 100 Percent Installation:

Kitchen Faucet Aerator retrofit projects an **annual** reduction of:	**33,084,416**	gallons[6]
Kitchen Faucet Aerator retrofit projects a **lifetime** reduction of:	**330,844,159**	gallons[6]

1. *Data Reported by Program Participants.*
2. *Based on Regional Technical Forum. By request.*
3. *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*
4. *Kitchen Aerators kWh formula (Number of Participants x Savings).*
5. *Kitchen Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*
6. *Kitchen Aerators gallons formula (Number of Participants x (Kitchen aerator baseline - Kitchen aerator retrofit) x Average Daily Use x Days per year x People per household).*

Projected Savings from Bathroom Faucet Aerator Retrofit

Bathroom Faucet Aerator retrofit inputs and assumptions:

Bathroom Faucet Aerator per electric DHW kit:	**2**	
Number of electric DHW participants:	**16,378**	
Domestic electric hot water reported:	**100%**	[1]
Number of people per household:	**2.21**	[1]
Savings:	**22.08**	kWh[2]
Average daily use:	**1.50**	minutes [3]
Bathroom Faucet Aerator (baseline):	**2.20**	gpm[3]
Bathroom Faucet Aerator (retrofit):	**1.00**	gpm
Measure life:	**10.00**	years[3]

Projected Electricity Savings:

Bathroom Faucet Aerator retrofit projects an **annual** reduction of:	**723,252**	kWh[4]
Bathroom Faucet Aerator retrofit projects a **lifetime** reduction of:	**7,232,525**	kWh[5]

Potential Water Savings with 100 Percent Installation:

Bathroom Faucet Aerator retrofit projects an **annual** reduction of:	**23,820,779**	gallons[6]
Bathroom Faucet Aerator retrofit projects a **lifetime** reduction of:	**238,207,794**	gallons[6]

1. *Data Reported by Program Participants.*
2. *Based on Regional Technical Forum. By request.*
3. *(March 20, 2014). Blessing Memo for LivingWise Kits for 2014, Paul Sklar, E.I., Planning Engineer Energy Trust of Oregon.*
4. *Bathroom Faucet Aerator kWh formula (Number of participants x savings x Bathroom Faucet Aerators per electric DHW kit).*
5. *Bathroom Faucet Aerator kWh lifetime savings formula (Annual savings x Measure life).*
6. *Bathroom Faucet Aerator gallons formula ((People per Household x Average daily use) x (Bathroom faucet baseline - Bathroom faucet retrofit) x Days per year x Number of Participants).*

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Projected Savings from LED Night Light Installation

Energy Efficient Night Light Retrofit Inputs and Assumptions:

Average length of use:	**4,380**	hours per year[1]
Average night light uses:	**7**	watts
Retrofit night light uses:	**0.5**	watts
Measure life:	**10**	years[2]
Energy saved per year:	**12.00**	kWh per year
Energy saved over life expectancy:	**120.00**	kWh
Installation / participation rate of:	**94.69%**	[3]
Number of participants:	**39,667**	[3]

Projected Electricity Savings:

The Energy Efficient Night Light retrofit projects an **annual** reduction of:	**476,004**	kWh[4]
The Energy Efficient Night Light retrofit projects a **lifetime** reduction of:	**4,760,040**	kWh[5]

1. *Assumption (12 hours per day)*
2. *Product life provided by manufacturer*
3. *Data reported by program participants*
4. *Energy Efficient Night Light kWh savings formula (Energy saved per year x Number of participants x Installation rate)*
5. *Energy Efficient Night Light kWh lifetime savings formula (Energy saved over life expectancy x Number of participants x Installation rate)*

Projected Savings from Shower Timer Installation

Shower TImer inputs and assumptions:

% of water heated by gas:	**47.81%**	[1]
% of water heated by electricity:	**52.19%**	[1]
Installation / participation rate of Shower Timer:	**53.04%**	[1]
Average showerhead has a flow rate of:	**2.50**	gallons per minute[1]
Retrofit showerhead has flow rate of:	**1.75**	gallons per minute[1]
Number of participants:	**39,667**	[1]
Average of baseline and retrofit showerhead flow rate:	**2.13**	gallons per minute[2]
Shower duration:	**8.20**	minutes per day[3]
Shower Timer duration:	**5.00**	minutes per day[4]
Showers per capita per day (SPCD):	**0.67**	showers per day[3]
Percent of water that is hot water:	**73%**	[5]
Days per year:	**365.00**	days
Product life:	**2.00**	years[5]

Projected Water Savings:

Shower Timer installation projects an **annual** reduction of:	**34,988,052**	gallons[6]
Shower Timer installation projects a **lifetime** reduction of:	**69,976,104**	gallons[7]

Projected Electricity Savings:

Shower Timer installation projects an **annual** reduction of:	**2,399,402**	kWh[8]
Shower Timer installation projects a **lifetime** reduction of:	**4,798,804**	kWh[9]

Projected Natural Gas Savings:

Shower Timer installation projects an **annual** reduction of:	**109,901**	therms[10]
Shower Timer installation projects a **lifetime** reduction of:	**219,803**	therms[11]

1. *Data Reported by Program Participants.*
2. *Average of the baseline GPM and the retrofit GPM*
3. *(March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf*
4. *Provided by manufacturer.*
5. *Navigant EM&V Report for Super Savers Program in Illinois PY7*
6. *Annual water savings = Water Flow (Average of baseline and retrofit flow) × (Baseline Shower duration - Shower Timer duration) × Participants × Days per year × SPCD × Installation Rate of Shower Timer*
7. *Projected Annual Water Savings x Product Life*
8. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Participants*
9. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life x Participants*
10. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Participants*
11. *Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life x Participants*

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Enrollment Survey Response Summary

1 How is the water heated in your home?	
Electricity	52%
Gas	47%
Other	1%
2 Do you own or rent your home?	
Own	62%
Rent	38%
3 What is the primary method of heating your home?	
Gas forced air	49%
Heat pump	9%
Electric forced air	26%
Baseboard or ceiling cable	11%
Other	6%
4 What is the primary method of cooling your home?	
Central A/C	65%
Window A/C	23%
Heat pump	4%
Other	3%
None	6%
5 What, if any, energy-saving improvements are you planning to make in the next two years?	
Windows	20%
Furnace or A/C	13%
Insulation	8%
Appliances	22%
Smart thermostat	22%
Other	15%
6 How did you hear about this kit offering?	
Direct mail from Idaho Power	52%
Email from Idaho Power	37%
Friend or Family	3%
Idaho Power employee	2%
Info in bill	2%
Idaho Power website	2%
Other	1%
Blank	1%

Due to rounding of numbers, percentages may not add up to 100%

In-Kit Survey Response Summary

1 What type of home do you live in?	
Single family home - detached	62%
Apartment, Condo, Townhouses, or Multi-family with 2-3 units	17%
Apartment, Condo, Townhouses, or Multi-family with 4 or more units	15%
Mobile/Manufactured home	5%
2 How many people live in your home?	
5 or more	8%
4	11%
3	14%
2	39%
1	25%
3 How many of the LEDs did you install?	
All of them	41%
7-8	5%
5-6	16%
3-4	18%
1-2	10%
None	6%
4 If you did not install all of the LEDs, what did you do with the remainer?	
Plan to install, just haven't yet	22%
Stored for later use	68%
Gave them to someone else	4%
Other _____	7%
5 Have you installed the Evolve Showerhead?	
Yes	45%
Not yet, but will	41%
No, won't use	14%
6 Have you installed the Kitchen Faucet Aerator?	
Yes	51%
Not yet, but will	31%
No, won't use	18%
7 Have you installed the Bathroom Faucet Aerator #1?	
Yes	53%
Not yet, but will	35%
No, won't use	12%
8 Have you installed the Bathroom Faucet Aerator #2?	
Yes	36%
Not yet, but will	38%
No, won't use	27%

Due to rounding of numbers, percentages may not add up to 100%

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In-Kit Survey Response Summary *(continued)*

9 Have you used the LED Night Light?	
Yes	88%
Not yet, but will	10%
No, won't use	2%
10 Have you used the Shower Timer?	
Yes	53%
Not yet, but will	32%
No, won't use	14%
11 Have you used the Flow-Rate Test Bag to test the flow rate of your shower or faucets?	
Yes	26%
Not yet, but will	56%
No, won't use	18%
12 If you used the Digital Thermometer to check the temperature of your water, what was the temperature?	
> 140 F	4%
131 F to 140 F	10%
121 F - 130 F	20%
< 121 F	23%
Did not check water temperature	43%
13 Did you adjust the temperature of your electric water heater?	
Yes, I lowered it	12%
Yes, I raised it	3%
No, I did not adjust	85%
14 Did you adjust the temperature of your refrigerator?	
Yes, I lowered it	29%
Yes, I raised it	14%
No, I did not adjust	57%
15 Did you adjust the temperature of your freezer?	
Yes, I lowered it	24%
Yes, I raised it	11%
No, I did not adjust	65%
16 How satisfied were you with the kit ordering process?	
Very satisfied	90%
Somewhat satisfied	9%
Somewhat dissatisfied	0%
Very dissatisfied	1%
17 Did you receive your kit within 3 weeks?	
Yes	96%
No	4%

Due to rounding of numbers, percentages may not add up to 100%

In-Kit Survey Response Summary *(continued)*

18 How likely would you be to tell a friend or family member to order a kit?

Very likely	83%
Somewhat likely	15%
Somewhat unlikely	1%
Very unlikely	1%

19 Prior to hearing about the Energy-Saving Kits, were you aware Idaho Power had energy efficiency programs and incentives?

Yes	50%
No	50%

20 Have you ever gone to Idaho Power's website to look for information about energy efficiency programs and incentives?

Yes	36%
No	64%

21 How likely are you to participate in another energy efficiency program?

Very likely	77%
Somewhat likely	20%
Somewhat unlikely	2%
Very unlikely	1%

Due to rounding of numbers, percentages may not add up to 100%

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Follow-Up Survey Response Summary

1 Did you install the LEDs received in your kit?	
Yes, I installed all of them	47%
Yes, I installed some of them	47%
No, I didn't install any of them	6%
2 Did your experience with the LEDs in your kit cause you to purchase more LEDs?	
Yes, I purchased 10 or more LEDs	17%
Yes, I purchase less than 10 LEDs	40%
No, I did not purchase any additional LEDs	43%
3 Have you installed the Evolve Showerhead?	
Yes	60%
No, won't use	40%
4 Have you installed the Kitchen Faucet Aerator?	
Yes	61%
No, won't use	39%
5 Have you installed the Bathroom Faucet Aerator #1?	
Yes	64%
No, won't use	36%
6 Have you installed the Bathroom Faucet Aerator #2?	
Yes	47%
No, won't use	53%
7 Have you used the LED Night Light?	
Yes	96%
No, won't use	4%
8 Have you used the Shower Timer?	
Yes	57%
No, won't use	43%
9 Have you used the Flow-Rate Test Bag to test the flow rate of your shower or faucets?	
Yes	37%
No, won't use	63%
10 After receiving the kit, did you reduce the temperature of your refrigerator?	
Yes	47%
No	53%
11 After receiving the kit, did you reduce the temperature of your freezer?	
Yes	41%
No	59%

Follow-Up Survey Response Summary *(continued)*

12 After receiving the kit, did you reduce the temperature of your water heater?

Yes	25%
No	75%

13 Did you review and/or complete the Mini Home-Assessment included in the kit?

Yes	68%
No	32%

14 Since receiving the kit, have you gone to Idaho Power's website to look for information about energy efficiency programs or to find other ways to save?

Yes	35%
No	65%

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Idaho Cities & Towns Served

IDAHO CITIES & TOWNS SERVED		
ABERDEEN	GRAND VIEW	NOTUS
AMERICAN FALLS	GREENLEAF	OAKLEY
ARBON	HAGERMAN	OLA
ATOMIC CITY	HAILEY	OREANA
BELLEVUE	HAMMETT	PARMA
BLACKFOOT	HANSEN	PAUL
BLISS	HAZELTON	PAYETTE
BOISE	HEYBURN	PICABO
BRUNEAU	HILL CITY	PINE
BUHL	HOLLISTER	PINGREE
BURLEY	HOMEDALE	PLACERVILLE
CALDWELL	HORSESHOE BEND	POCATELLO
CAMBRIDGE	IDAHO CITY	POLLOCK
CAREY	INDIAN VALLEY	RICHFIELD
CARMEN	INKOM	RIGGINS
CASCADE	JEROME	ROCKLAND
CASTLEFORD	KETCHUM	ROGERSON
CHUBBUCK	KIMBERLY	RUPERT
COBALT	KING HILL	SALMON
CORRAL	KUNA	SHOSHONE
COUNCIL	LEADORE	STAR
DIETRICH	LEMHI	STERLING
DONNELLY	LETHA	SUN VALLEY
EAGLE	LOWMAN	SWEET
EAST MAGIC	MARSING	TENDOY
EDEN	MCCALL	TWIN FALLS
EMMETT	MELBA	WEISER
FAIRFIELD	MERIDIAN	WENDELL
FEATHERVILLE	MESA	WEST MAGIC
FILER	MIDDLETON	WILDER
FORT HALL	MIDVALE	SWEET
FRUITLAND	MOUNTAIN HOME	TENDOY
FRUITVALE	MURPHY	TRIUMPH
GARDEN CITY	MURTAUGH	TWIN FALLS
GARDEN VALLEY	NAMPA	WEISER
GIBBONSVILLE	NEW MEADOWS	WENDELL
GLENNS FERRY	NEW PLYMOUTH	WEST MAGIC
GOODING	NORTH FORK	WILDER
TOTAL NUMBER OF CITIES & TOWNS SERVED: 106		
TOTAL NUMBER OF HOUSEHOLDS SERVED: 38,571		

Oregon Cities & Towns Served

OREGON CITIES & TOWNS SERVED		
ADRIAN	HEREFORD	OXBOW
AROCK	HUNTINGTON	RICHLAND
BROGAN	JAMIESON	UNITY
DREWSEY	JORDAN VALLEY	VALE
HALFWAY	NYSSA	WESTFALL
HARPER	ONTARIO	
TOTAL NUMBER OF CITIES & TOWNS SERVED: 17		
TOTAL NUMBER OF HOUSEHOLDS SERVED: 1,096		

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Idaho Power Regions Served

REGIONS (IDAHO)	ELECTRIC	NON-ELECTRIC
CANYON	3,573	7,086
CAPITAL	5,638	9,439
EASTERN	2,197	2,149
SOUTHERN	2,337	2,523
WESTERN	1,904	1725
NUMBER OF HOUSEHOLDS IMPACTED:	15,649	22,922
TOTAL NUMBER OF HOUSEHOLDS IMPACTED:	38,571	

REGIONS (OREGON)	ELECTRIC	NON-ELECTRIC
CANYON	12	1
WESTERN	717	366
NUMBER OF HOUSEHOLDS IMPACTED:	729	367
TOTAL NUMBER OF HOUSEHOLDS IMPACTED:	1,096	

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AM Conservation Group

2020 Flex Peak Program
End-of-Season Annual Report

January 10, 2021

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Introduction

The Flex Peak Program (Program) has been operated by Idaho Power Company (Idaho Power or Company) since 2015. The Program is a voluntary demand response (DR) program available to large commercial and industrial customers that can reduce their electrical energy loads for short periods during summer peak days. By reducing demand on extreme system load days, the Program reduces the amount of generation and transmission resources required to serve customers. This Program, along with Idaho Power's other DR programs, Irrigation Peak Rewards and the Residential A/C Cool Credit Program, have helped delay the need to build supply-side resources.

The results presented in this report are from the 2020 Program season, the Company's sixth year of operating the Program. In its sixth year, the Program had a decrease in load reduction and realization rates from the prior year (2019) which are explained in later detail within this report. There were no new sites added, and overall participation resulted in the highest hourly load reduction for the season of 24.2 megawatts (MW). The average realization rate for the three load reduction events that occurred in the 2020 Program season was 65%. Enrollment in the Program decreased slightly for the 2020 Program season and 98% of previously participating sites re-enrolled in the Program. The total Program costs through December 31, 2020 were $541,350 The cost of having this resource available was $22.55 per kilowatt (kW) based on the maximum demand reduction of 24.2 MW achieved on July 16, 2020.

Background

In 2015, the Company requested approval to implement the Flex Peak Program as an Idaho Power operated program. The Idaho Public Utilities Commission (IPUC) approved the Company's request in Order No. 33292,[1] and the Public Utility Commission of Oregon (OPUC) accepted the proposal from Advice No. 15-03.[2] Prior to 2015, a similar DR program for commercial and industrial customers was operated by a third-party vendor.

As part of Advice No. 15-03, the OPUC adopted Staff's recommendation that the Company file an annual end-of-season report with information regarding the Program. The Company was also directed by the IPUC in Order No. 33292 to file an annual end-of-season report detailing the results of the Program. In compliance with the reporting requirements, the annual end-of-season report includes the following:

- Number of participating customers
- Number of participating sites

[1] *In the Matter of Idaho Power's Company's Application for Approval of New Tariff Schedule 82, A Commercial and Industrial Demand-Response Program (Flex Peak Program),* Case No. IPC-E-15-03, Order No. 33292 (May 7, 2015).

[2] Schedule 76, Flex Peak Program, Docket No. ADV 7/Advice No. 15-03 (approved April 28, 2015).

- MW of demand response under contract
- MW of demand response realized and incented per dispatch
- Percent of nominated MW achieved in each dispatch event by participant
- Cost analysis of the Program
- Number of events called
- Total load dropped for each event
- Event duration
- Total capacity payments made
- Total energy payments made
- Number of customers who failed to meet their load
- Number of Program applications denied due to Program subscription limit
- Participant attrition
- Issues the utility has identified meeting requests to participate in the Program
- Changes in baseline methodology taken or anticipated
- Improvements Idaho Power and the Program might benefit from

Program Details

The Program pays participants a financial incentive for reducing load within their facility and is active June 15 to August 15, between the hours of 2 p.m. and 8 p.m. on non-holiday weekdays.

Customers with the ability to nominate or provide load reduction of at least 20 kW are eligible to enroll in the Program. The 20 kW threshold allows a broad range of customers the ability to participate in the Program. Participants receive notification of a load reduction event (event) two hours prior to the start of the event, and events last between two to four hours.

The parameters of the Program are in Schedule 76[3] in Oregon and Schedule 82[4] in Idaho, and include the following:

- A minimum of three load reduction events will occur each Program season.
- Events can occur any weekday, excluding July 4, between the hours of 2 p.m. and 8 p.m.
- Events can occur up to four hours per day and up to 15 hours per week, but no more than 60 hours per Program season.
- Idaho Power will provide notification to participants two hours prior to the initiation of an event.
- If prior notice of a load reduction event has been sent, Idaho Power can choose to cancel the event and notify participants of cancellation 30 minutes prior to the start of the event.

[3] Idaho Power Company, P.U.C. ORE. No. E-27, Schedule 76.

[4] Idaho Power Company, I.P.U.C. No. 29, Tariff No. 101, Schedule 82.

Program Incentives

The Program includes both a fixed and variable incentive payment. The fixed incentive is calculated by multiplying the actual kW reduction by $3.25 for weeks when an event is called or the weekly nominated kW amount by $3.25 for weeks when an event is not called. The variable energy incentive is calculated by multiplying the kW reduction by the event duration hours to achieve the total kilowatt-hour (kWh) reduction during an event. The variable incentive payment is $0.16 per kWh and is implemented for events that occur after the first three events.

The Program also includes an incentive adjustment of $2.00 when participants do not achieve their nominated amount during load reduction events. This adjustment amount is used for the first three events. After the third event, the adjustment is reduced to $0.25 per kW. Incentives are calculated using Idaho Power's interval metering billing data and participants were issued the incentives within 30 days of the end of the Program season. Participants can elect to have their incentive checks mailed or their Idaho Power account credited within the 30 days. The incentive structure offered for the 2019 season is listed in Table 1.

Table 1.

Fixed-Capacity Payment Rate*	Variable Energy Payment Rate**
$3.25 per Weekly Effective kW Reduction	$0.16 per kWh (Actual kW x Hours of Event)
Adjustment for first three events $2.00 per kW not achieved up to nomination	**Adjustment after first three events** $0.25 per kW not achieved up to nomination
**To be prorated for partial weeks*	***Does not apply to first three Program events*

Program Results

The results presented throughout this report are at the generation level and system losses have been considered. Idaho Power called three load reduction events in 2020. The first event occurred on July 16, the second on July 30, and the third on August 5. The maximum realization rate achieved during the season was 68% during the event on July 16 and the average for all three events combined was 65%. The realization rate is the percentage of load reduction achieved versus the amount of load reduction committed for an event. The highest hourly load reduction achieved was during the July 16 event at 24.2 MW.

Participants had a committed load reduction of 35.8 MW in the first week of the Program season. This was a small decrease from the 2019 season at 36.3 MW. This weekly commitment, or "nomination", was comprised of customers participating in the Program totaling 141 sites. All these sites participated in the 2019 season. The committed load reduction at the end of the season was 35.94 MW. The maximum available capacity of

the program came from a nominated amount in week seven of the season at 36.05 MW. Past years certain events have achieved higher than a 100% realization rate which would make this the maximum potential available capacity for the program.

The first event was called on Thursday, July 16. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 35.8 MW. The average load reduction was 23.6 MW. The highest hourly load reduction was 24.2 MW during hour two. The realization rate for this event was 66%.

The second event was called on Thursday, July 30. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 36.05 MW. The average load reduction was 22.3 MW. The highest hourly load reduction was 23 MW during hour three. The realization rate for this event was 62%.

The third event was called on Wednesday, August 5. Participants were notified at 2 p.m. for a four-hour event from 4-8 p.m. The total nomination for this event was 35.9 MW. The average load reduction was 23.6 MW. The highest hourly load reduction was 23.9 MW during hour two. The realization rate for this event was 66%.

Enrollment specific to the Oregon service area included five participants totaling eight sites enrolled. These eight sites had an average nominated capacity for the season of 11.4 MW and achieved a maximum reduction during the season of 9.9 MW during hour three on the July 30 event.

Participation

The number of sites enrolled in the Program for 2020 was 141 from 62 participants. The average number of sites enrolled per participating customer was 2.3. The Program did not experience significant attrition and re-enrollment in the Program was high as 141 of the 145 sites participating from the prior season re-enrolled. Four sites did not re-enroll from the 2019 season. One site reduced its operating hours significantly which no longer made it a good program candidate, one site had some significant construction upgrades and changes during the Summer that was not conducive to participating. The remaining two sites had disenrolled in 2019 midway through the season and chose not to sign up in 2020.

This past season Idaho Power continued the auto-enrollment option where existing participants were re-enrolled in the Program automatically and a confirmation packet was mailed early in March based on the prior year's enrollment information. Participants notified the Company in writing if they no longer wanted to participate as well as to change their nomination amount or update/change contact information regarding personnel for event notification. The auto-enrollment process has proven to be successful, and the Company anticipates utilizing this process in the future.

Pursuant to the Settlement Agreement approved in IPUC Case No. IPC-E-13-14[5] and OPUC UM 1653[6] (Settlement), Idaho Power did not actively seek to expand the agreed upon 35 MW enrollment capacity but did recruit nominated capacity slightly above 35 MW in case any customers would again need to reduce their nomination before the season started. The Company has continued to strive to maintain the number and size diversity (in terms of nominated load reduction) of sites enrolled. The breakout of nomination groups among the sites has stayed very consistent from the 2019 season with the largest quantity of sites falling within the 0-50 kW segment followed by 51-200 kW. The Company did not deny any Program applications in 2020.

Figure 1 represents Idaho Power's service area divided into three regional areas with two sub areas: Canyon, (Canyon West) Capital and Southern (South East).

Figure 1.



[5] *In the Matter of the Continuation of Idaho Power Company's A/C Cool Credit, Irrigation Peak Rewards, and FlexPeak Demand Response Programs for 2014 and Beyond*, Case No. IPC-E-13-14, Order No. 32923.

[6] *In the Matter of Idaho Power Company, Staff Evaluation of the Demand Response Programs*, UM 1653, Order No. 13-482.

Figure 2 represents the enrolled capacity (total nominations) that were enrolled in 2020 and the distribution by Idaho Power's regional service areas.

Figure 2.

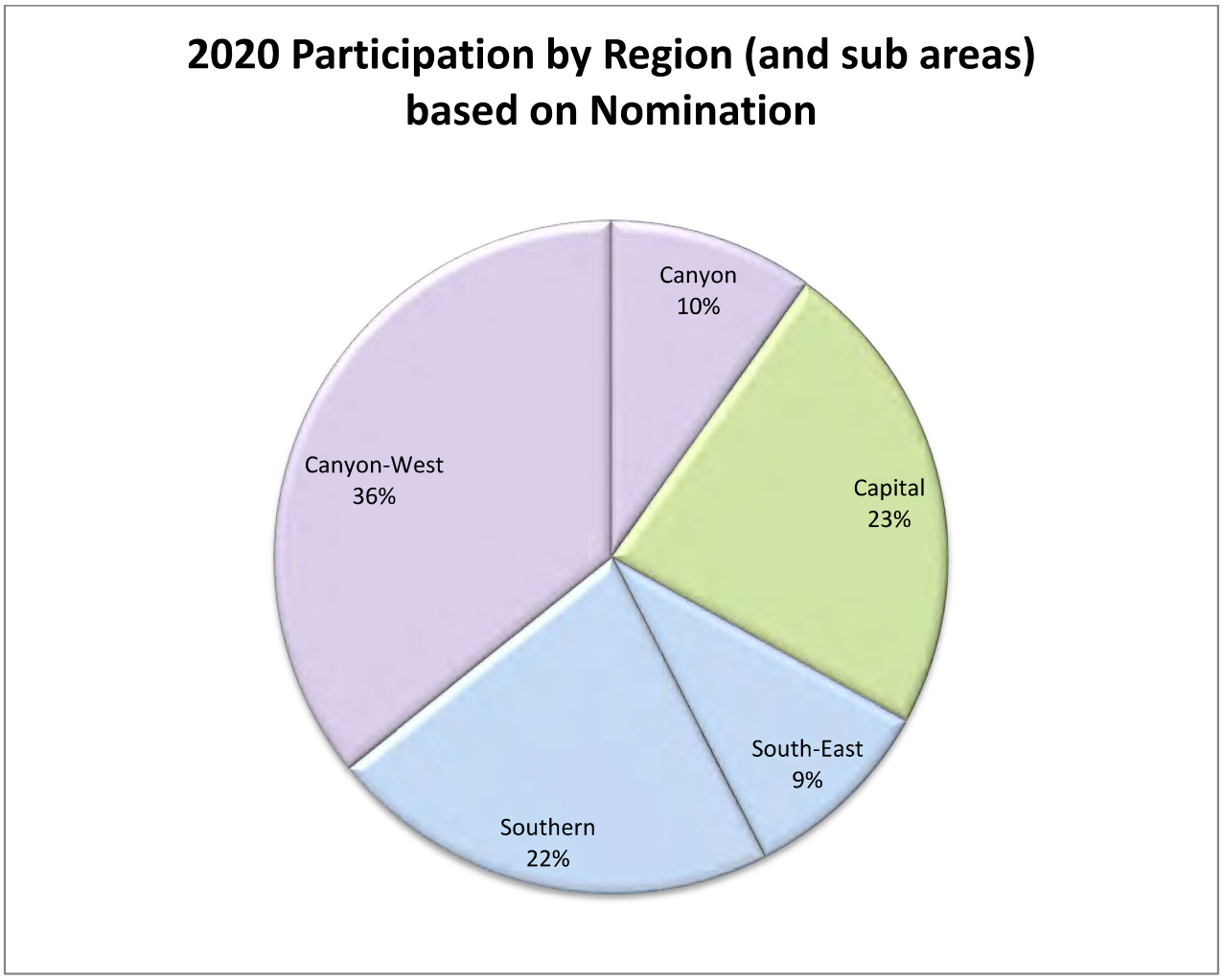
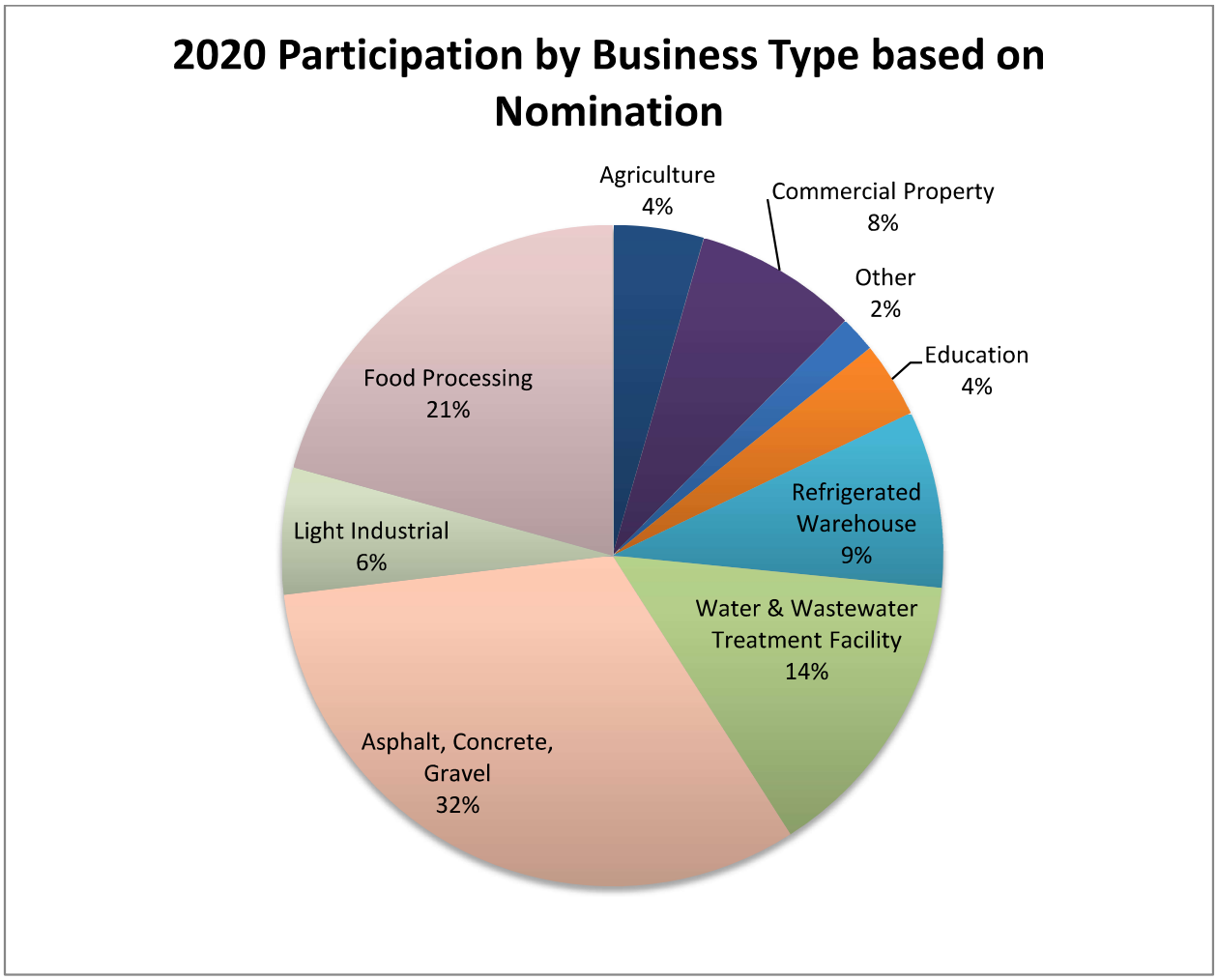


Figure 3 represents the enrolled capacity in 2020 and the diversity based on business type.

Figure 3.



Operations

Interval metering data provides Idaho Power the ability to view all participants' load after events. This metering data was used to calculate the reduction achieved per site during load reduction events. Using this data, Idaho Power provided participants post-event usage reports that showed hourly baseline, actual usage, and reduction during an event. This data is provided to assist participants in refining their nomination for future events. This data also provides information useful in determining which participating sites may have opportunity to provide more reduction or change their reduction strategy if nomination amounts were not achieved.

Load Reduction Analysis

An evaluation of the potential load reduction impacts in 2020 was conducted internally by Idaho Power. The goal of the review performed by Idaho Power was to calculate the load reduction in MW for the Program. The analysis also verified load reduction per site and per event. For the 2021 program year Idaho Power will issue an RFP for a third-party impact evaluation to be conducted.

The baseline methodology used in 2020 is the same methodology utilized in prior seasons. The baseline that load reductions are measured against during load reduction events is calculated using a 10-day period. The baseline is the average kW of the highest energy usage days during the event availability time (2-8 p.m.) from the highest three days out of the last 10 non-event weekdays. Individual baselines are calculated for each facility site. Once the original baseline is calculated, there is an adjustment included in the methodology called the Day-of-Adjustment (DOA) that is used to arrive at the adjusted baseline.

Adjustments address situations where load is lower or higher than it has historically been, and the baseline does not accurately reflect the load behavior immediately prior to the event. The DOA is applied to each site's original baseline by accounting for the difference between the average baseline kW and the average curtailment day kW during hours 2-3 prior to the start of the event. The DOA is calculated as a flat kW and is applied to all baseline hours and capped at +/- 20% of the original baseline kW. The DOA is symmetrical, having either an upward or downward adjustment to the baseline, and is applied to the original baseline kW for each facility site for each hour during the Program event.

As Figure 4 below depicts, the nomination group with the most sites was in the 0-50 kW range, accounting for approximately 38% of the sites.

Figure 4.

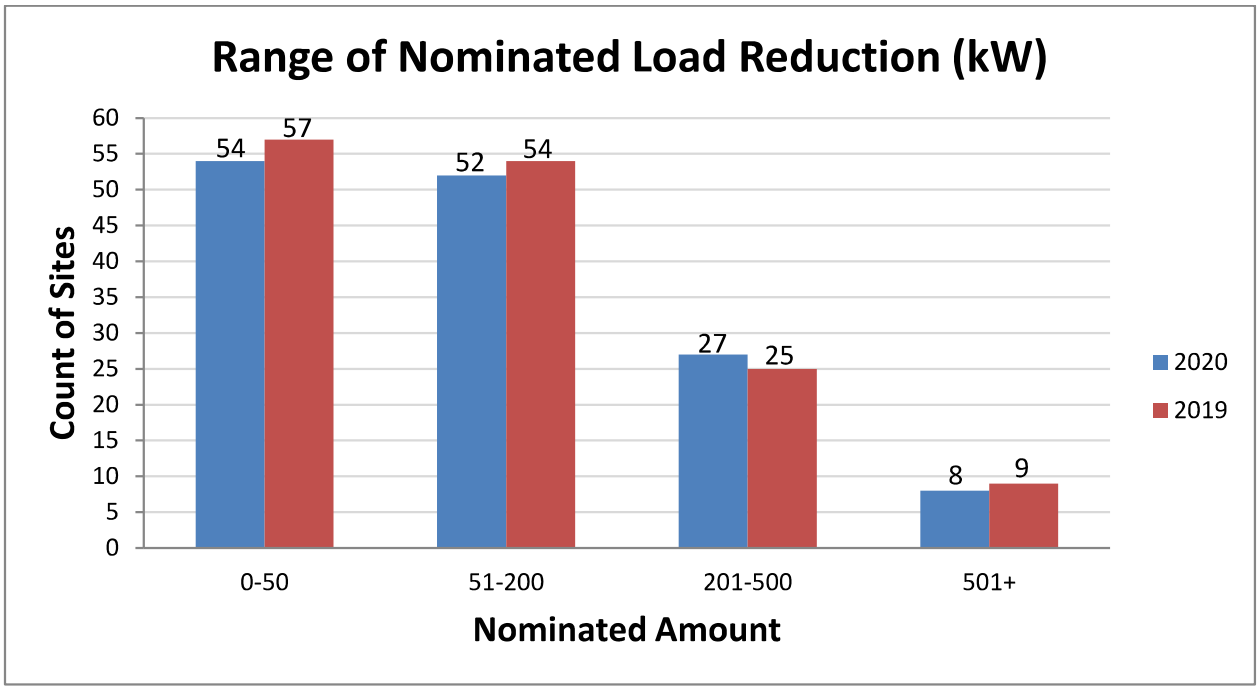


Table 2 shows the Program realization rates for 2020 based on average load reduction per event.

Table 2.

Curtailment Event	Event Timeframe	Nominated Demand Reduction	Average Demand Reduction (MW)	Max Demand Reduction (MW)	Realization Rate*
July 16	4-8 pm	35.8	23.6	24.2	66%
July 30	4-8 pm	36	22.3	23	62%
August 5	4-8 pm	35.9	23.6	23.9	66%
Average		35.9	23.2	23.7	65%

** Based on average reduction*

Figure 5 below shows both the average and peak demand reduction achieved during each of the three curtailment events. The maximum demand reduction achieved ranged from a low of 23 MW for the July 30 event to a high of 24.2 MW for the July 16 event. The July 30 event's average of 22.3 MW reduction achieved a realization rate of 62%, while the August 5 event's average of 23.6 MW reduction achieved a realization rate of 66%. Combined, the three events had an average realization rate of 65%.

Event performance and realization rates for the 2020 season were significantly reduced due to the impact of COVID-19 on customer's operations and ability to reduce load. Typically, we achieve a realization rate of 85% or greater in past seasons. COVID19 had a significant impact on reduction results. This year, many customers did not reduce energy use during program events because they were trying to increase production and recoup revenue after having been shut down for several months prior to the program season.

Many national account big box stores and HVAC dependent businesses were not able to curtail load due to increased outside air (OSA) requirements and using more energy to meet air quality with facilities. Buildings increased their outside air requirements for HVAC to reduce stagnant air that may circulate the virus inside buildings so more airflow from outside was added. The Idaho Power Corporate Headquarters was a prime example. This facility used more energy all summer than normal due to increased OSA and then having to cool that air down. Nationally, commercial and industrial demand response was impacted significantly based on industry studies from the Peak Load Management Alliance.

Figure 5.

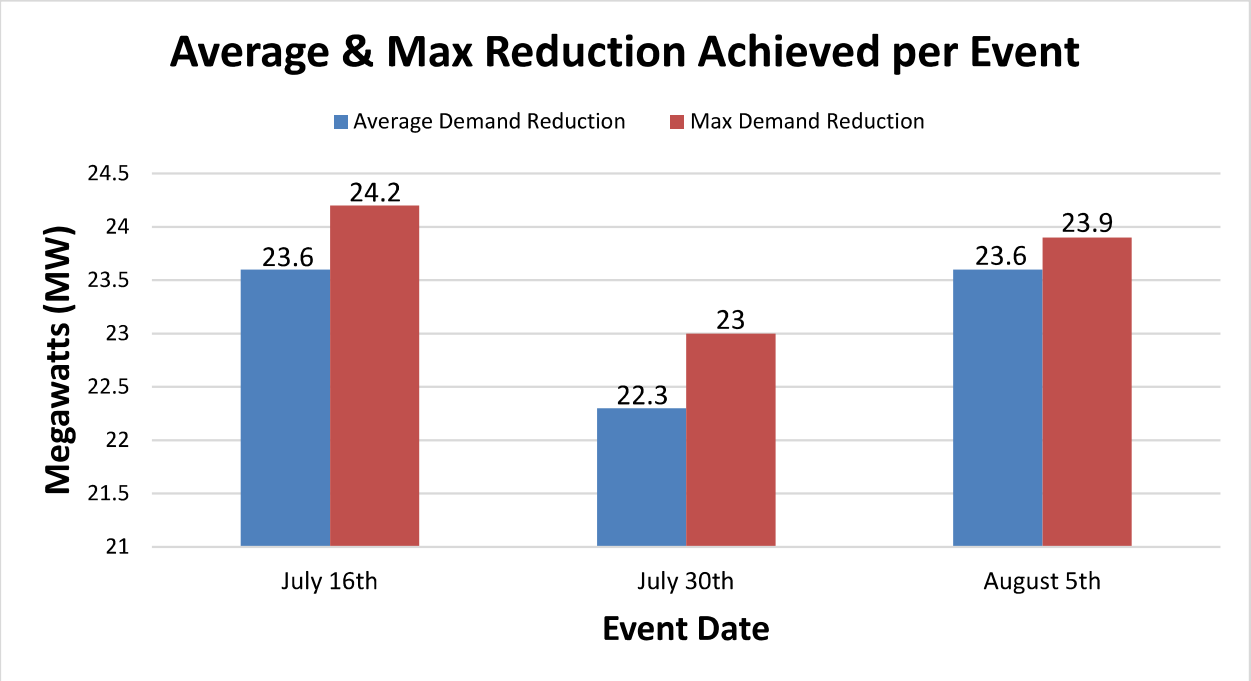


Table 3 shows the realization rate for each participant in the Program for 2020.

Table 3.

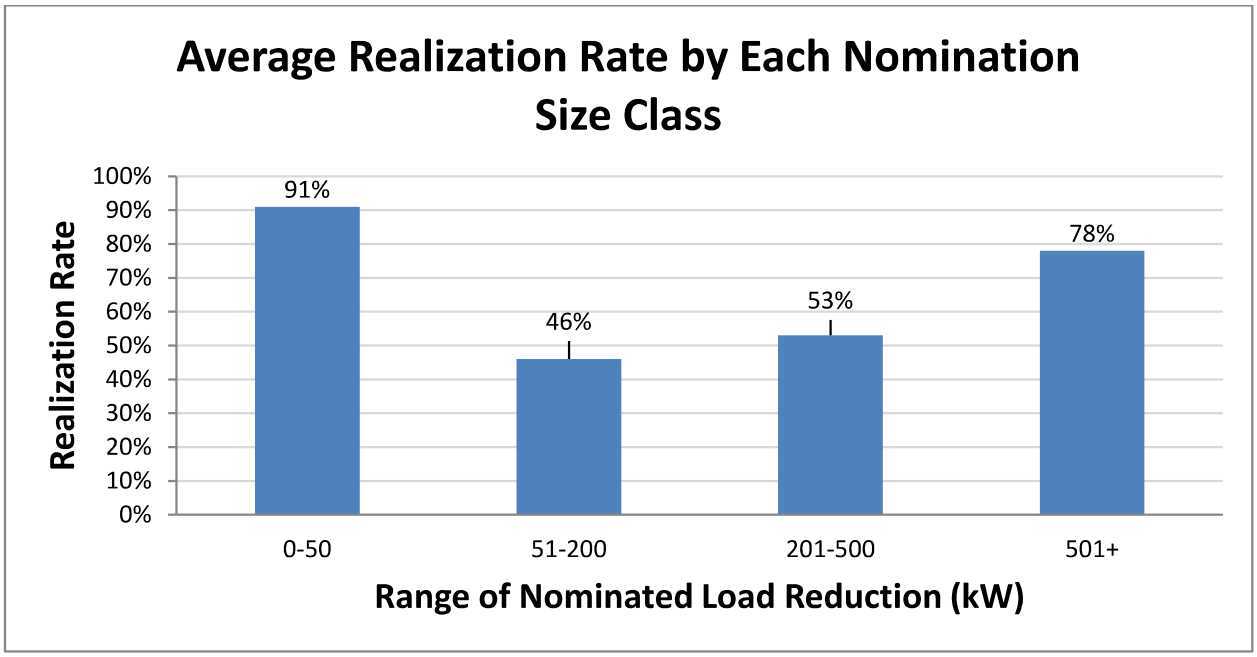
Participant Number	July 16 Event Realization	July 30 Event Realization	August 5 Event Realization	Season Realization
1	56%	57%	68%	60%
2	106%	117%	58%	94%
3	98%	57%	36%	64%
4	47%	110%	46%	68%
5	91%	45%	34%	57%
6	1%	1%	9%	4%
7	156%	91%	105%	117%
8	24%	13%	12%	16%
9	141%	116%	119%	125%
10	135%	161%	282%	193%
11	1%	9%	10%	7%
12	49%	42%	41%	44%
13	10%	90%	84%	61%
14	13%	63%	11%	29%
15	111%	127%	96%	111%
16	99%	2%	2%	34%
17	26%	36%	11%	24%
18	132%	64%	104%	100%
19	88%	95%	92%	91%
20	76%	51%	8%	45%
21	186%	159%	299%	214%
22	28%	51%	53%	44%
23	82%	28%	0%	37%
24	140%	46%	13%	66%
25	124%	90%	116%	110%
26	1%	6%	0%	2%
27	41%	20%	0%	20%
28	55%	255%	289%	200%
29	0%	0%	0%	0%
30	107%	127%	125%	120%
31	35%	58%	23%	39%
32	48%	20%	0%	22%
33	13%	477%	1201%	564%
34	0%	30%	4%	11%

Participant Number	July 16 Event Realization	July 30 Event Realization	August 5 Event Realization	Season Realization
35	107%	37%	44%	63%
36	10%	0%	0%	3%
37	106%	0%	0%	35%
38	59%	63%	0%	41%
39	20%	16%	22%	19%
40	286%	168%	148%	201%
41	292%	60%	37%	130%
42	5%	61%	20%	29%
43	0%	0%	1%	0%
44	63%	2%	162%	75%
45	93%	74%	108%	91%
46	8%	10%	99%	39%
47	8%	28%	47%	28%
48	0%	0%	74%	25%
49	0%	22%	1%	8%
50	1%	0%	178%	60%
51	1%	19%	0%	7%
52	16%	7%	0%	8%
53	0%	0%	18%	6%
54	50%	12%	37%	33%
55	28%	32%	5%	21%
56	104%	103%	121%	109%
57	120%	93%	106%	107%
58	66%	74%	98%	79%
59	14%	39%	25%	26%
60	29%	14%	23%	22%
61	73%	95%	55%	75%
62	3%	1%	9%	4%

Broken out across four size segments, the sites with the smallest nominated load reduction, 0–50 kW, achieved a realization rate across the three events at 91%. The 0-50 kW group had the largest portion of sites enrolled in the Program, totaling 54 sites which accounted for 38% of total enrolled sites. The second smallest size class, 51–200 kW, had 52 sites enrolled and achieved the lowest average realization rate at 46%. The 201-500 kW group had 27 sites enrolled and achieved a realization rate of 53%. The largest size class, 501+ kW, had eight sites enrolled and achieved the highest average realization rate across the three events at 78%. Idaho Power will continue to work with all customer segments to help refine nominations to align closer with realistic reduction opportunities which will increase the overall program realization rate. This trend with the smallest group and largest group performing above the middle segments has been apparent for several seasons now.

Figure 6 below represents the realization rate achieved by each nomination group, averaged across all three events. To calculate the results, each site's average load reduction (across three events) was divided by its average nomination across the three events and then grouped by size.

Figure 6.



Program Costs

Program costs for 2020 totaled $542,480. Incentive payments were the largest expenditure comprising approximately 83% of total costs.

The incentive payments from the three events called during the 2020 Program season were broken down as follows: the fixed capacity payments total was $450,450 and the variable energy payment total was $0. Variable energy payments were not made during the season because the variable energy payment is implemented starting with the fourth event.

The total Program costs for 2020 are estimated to be $22.42 per kW based on the maximum demand reduction of 24.2 MW, or $23.38 per kW, based on average load reduction for the season of 23.2 MW.

Table 4 below displays the 2020 Program costs by expense category.

Table 4.

Expense Category	2020 Program Costs
Materials & Equipment	$960
Marketing & Administration	$91,071
Incentive payments	$450,450
Total	**$542,480**

Benefit-Cost Analysis

Idaho Power believes the purpose of demand response is to minimize or delay the need to build new supply-side peaking generation resources and to reduce load during extreme system peaks. The benefits of having the Program available, and with each load reduction event, provide Idaho Power a supply side resource to mitigate any system peak deficits. DR helps fulfill the current system capacity need and prolongs the need to build new generation resources.

The Benefit-Cost analysis for the Program is based on a 20-year model that uses financial and demand-side management alternate cost assumptions from the *2017 Integrated Resource Plan* (IRP). The Settlement, as approved in IPUC Order No. 32923 and OPUC Order No. 13-482, established a new method for valuing DR and defined the annual cost of operating Idaho Power's three DR programs for the maximum allowable 60 hours as no more than $16.7 million.

The annual value calculation will be updated with each IRP based on changes that include, but are not limited to, need, capital cost, or financial assumptions. This amount was reevaluated in the 2017 IRP to be $19.8 million.

In 2020, the cost of operating all three of Idaho Power's DR programs was $7.7 million. It is estimated that if the three programs were dispatched for the full 60 hours, the total costs would have been approximately $10.9 million, which is below the total annual costs agreed upon in the Settlement as revised in the 2017 IRP.

The Company believes by calling at least three events per season the Program will be more effective in providing consistent and reliable reduction. Having a minimum of three events allows the Company to test processes and software and helps customers fine tune their curtailment plan. The Company did not call more than three load reduction events during the 2020 Program season because Idaho Power's generation resources were sufficient to satisfy system load. However, in all three events the Program provided a resource to assist Load Serving Operators balancing the forecast when it did not align with actual peak load, as well as potentially avoid additional market purchases.

The variable energy price for utilizing the Program after the third event is $0.16/kWh and could be considered the dispatch price for calling load reduction events beginning with the fourth event. The price of $0.16/kWh is typically higher than the energy market

price. The Company believes the variable energy price is appropriate because having a dispatch price below $0.16/kWh could cause the Company to call events more frequently resulting in reduced participant performance and event fatigue.

Idaho Power's cost-effectiveness evaluation for DR programs is updated annually. A more comprehensive cost-benefit analysis will be included in the Company's Demand-Side Management 2020 Annual Report when all the data will be available.

Program Marketing

Though the terms of IPUC Order No. 32923 and OPUC Order No. 13-482 do not require program marketing, Idaho Power energy advisors regularly communicate with current participants and encourage them to enroll new sites. The Flex Peak Program also continued to be included in the C&I Energy Efficiency Program collateral.

Customer Satisfaction Results

Idaho Power did not conduct a post-season survey this year as one with conducted in 2019 and the program conducts surveys on a three-year cycle.

Program Activities for 2021

The primary improvement Idaho Power and the Program could benefit from is more consistent load reduction when events are called to achieve a higher realization rate. The Company will continue to communicate the value proposition with enrolled participants and the importance of active participation when events are called. Recruitment efforts for the 2021 season will begin in the first quarter of 2021 to encourage participation. Idaho Power will engage with existing participants to discuss past performance and upcoming season details. The Program Specialist has already started working with potential candidates for the 2021 season with an increased focus on enrolling national chain stores within our service area. This customer type makes a good candidate for the program due to extended operating hours, non-production load types and consistent energy usage profiles.

The Program will continue to be marketed as part of the C&I Energy Efficiency Program. The Company will utilize its Energy Advisors to retain the currently enrolled sites and encourage new sites to participate.

For the upcoming season, Idaho Power plans to focus on retaining currently enrolled participants and will more pro-actively work with the Marketing Specialist to promote the Program at Company sponsored events and trainings. The Company will continue to target enrollment of national chain customers within our service area.

Conclusion

The Program currently contributes approximately 10% of the Company's overall DR portfolio and can be relied on to provide dispatchable load reduction to the electrical grid. When analyzing the Program at the generation level, industrial and commercial customers have made noteworthy contributions to Idaho Power's DR programs. The cost of having this resource available was $23.38 per kW based on average reduction (23.2 MW) for the season.

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Historical DSM Expense and Performance

2002–2020

Historical DSM Expense and Performance, 2002–2020

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Demand Response								
A/C Cool Credit								
2003	204	$ 275,645	$ 275,645		0.0			
2004	420	287,253	287,253		0.5			
2005	2,369	754,062	754,062		3			
2006	5,369	1,235,476	1,235,476		6			
2007	13,692	2,426,154	2,426,154		12			
2008	20,195	2,969,377	2,969,377		26			
2009	30,391	3,451,988	3,451,988		39			
2010	30,803	2,002,546	2,002,546		39			
2011	37,728	2,896,542	2,896,542		24			
2012	36,454	5,727,994	5,727,994		45			
2013	n/a	663,858	663,858		n/a			
2014	29,642	1,465,646	1,465,646		44			
2015	29,000	1,148,935	1,148,935		36			
2016	28,315	1,103,295	1,103,295		34			
2017	28,214	936,272	936,272		29			
2018	26,182	844,369	844,369		29			
2019	23,802	877,665	877,665		24			
2020	22,536	765,020	765,020		19			
Total		**$ 29,832,096**	**$ 29,832,096**					
Flex Peak Program								
2009	33	528,681	528,681		19			
2010	60	1,902,680	1,902,680		48			
2011	111	2,057,730	2,057,730		59			
2012	102	3,009,822	3,009,822		53			
2013	100	2,743,615	2,743,615		48			
2014	93	1,563,211	1,563,211		40			
2015	72	592,872	592,872		26			

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2016	137	767,997	767,997		42			
2017	141	658,156	658,156		36			
2018	140	433,313	433,313		33			
2019	145	626,823	626,823		31			
2020	141	542,480	542,480		24			
Total		**$ 15,427,378**	**$ 15,427,378**					
Irrigation Peak Rewards								
2004	58	344,714	344,714		6			
2005	894	1,468,282	1,468,282		40			
2006	906	1,324,418	1,324,418		32			
2007	947	1,615,881	1,615,881		37			
2008	897	1,431,840	1,431,840		35			
2009	1,512	9,655,283	9,655,283		160			
2010	2,038	13,330,826	13,330,826		250			
2011	2,342	12,086,222	12,086,222		320			
2012	2,433	12,423,364	12,423,364		340			
2013	n/a	2,072,107	2,072,107		n/a			
2014	2,225	7,597,213	7,597,213		295			
2015	2,259	7,258,831	7,258,831		305			
2016	2,286	7,600,076	7,600,076		303			
2017	2,307	7,223,101	7,223,101		318			
2018	2,335	6,891,737	6,891,737		297			
2019	2,332	6,771,708	6,771,708		278			
2020	2,292	6,407,412	6,407,412		292			
Total		**$ 105,503,015**	**$ 105,503,015**					
Residential Efficiency								
Ductless Heat Pump Pilot								
2009	96	202,005	451,605	409,180		18	0.031	0.086
2010	104	189,231	439,559	364,000		20	0.044	0.103
2011	131	191,183	550,033	458,500		20	0.028	0.081

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2012	127	159,867	617,833	444,500		20	0.024	0.094
2013	215	237,575	992,440	589,142		15	0.032	0.132
2014	179	251,446	884,211	462,747		15	0.042	0.148
Total	**852**	**$ 1,231,307**	**$ 3,935,681**	**2,728,069**		15	**$ 0.044**	**$ 0.138**
Easy Savings : Low-Income Energy Efficiency Education								
2015	2,068	127,477	127,477	624,536		10	0.021	0.021
2016	2,001	127,587	127,587	402,961		9	0.035	0.035
2017	2,470	149,813	149,813	280,049		8	0.064	0.064
2018	282	147,936	147,936	29,610		3	1.370	1.370
2019	430	145,494	145,494	45,150		3	0.885	0.885
2020	155	9,503	9,503	10,628		3	0.299	0.299
Total	**7,406**	**$ 707,809**	**$ 707,809**	**1,392,934**		**9**	**$ 0.068**	**$ 0.068**
Educational Distributions								
2015	28,197	432,185	432,185	1,669,495		10	0.026	0.026
2016	67,065	2,392,884	2,392,884	15,149,605		10	0.016	0.016
2017	84,399	3,466,027	3,466,027	21,187,261		11	0.016	0.016
2018	94,717	3,180,380	3,180,380	16,051,888		11	0.019	0.019
2019	95,528	2,880,467	2,880,467	10,805,474		11	0.025	0.025
2020	97,228	3,106,820	3,106,820	9,481,801		11	0.038	0.038
Total	**467,134**	**$ 15,458,763**	**$ 15,458,763**	**74,345,524**		**11**	**$ 0.024**	**$ 0.024**
Energy Efficiency Packets								
2002	2,925	755	755	155,757		7	0.001	0.001
Total	**2,925**	**$ 755**	**$ 755**	**155,757**		**7**	**$ 0.001**	**$ 0.001**
Energy Efficient Lighting								
2002	11,618	243,033	310,643	3,299,654		7	0.012	0.015
2003	12,662	314,641	464,059	3,596,150		7	0.014	0.021
2004	n/a	n/a	n/a	n/a			n/a	n/a
2005	43,760	73,152	107,810	1,734,646		7	0.007	0.010
2006	178,514	298,754	539,877	6,302,794		7	0.008	0.014
2007	219,739	557,646	433,626	7,207,439		7	0.012	0.017
2008	436,234	1,018,292	793,265	14,309,444		7	0.011	0.013
2009	549,846	1,207,366	1,456,796	13,410,748		5	0.020	0.024

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2010	1,190,139	2,501,278	3,976,476	28,082,738		5	0.020	0.031
2011	1,039,755	1,719,133	2,764,623	19,694,381		5	0.015	0.024
2012	925,460	1,126,836	2,407,355	16,708,659		5	0.012	0.025
2013	1,085,225	1,356,926	4,889,501	9,995,753		8	0.016	0.058
2014	1,161,553	1,909,823	7,148,427	12,882,151		8	0.018	0.066
2015	1,343,255	2,063,383	4,428,676	15,876,117		10	0.013	0.028
2016	1,442,561	3,080,708	10,770,703	21,093,813		11	0.014	0.049
2017	1,766,758	4,872,888	11,078,990	37,765,190		12	0.012	0.026
2018	1,340,842	2,435,130	3,277,039	18,856,933		14	0.011	0.014
2019	1,336,440	2,126,262	2,782,039	16,245,551		14	0.011	0.014
2020	1,148,061	1,667,159	3,065,781	13,942,202		14	0.012	0.022
Total	**15,232,422**	**$ 28,572,409**	**$ 60,695,685**	**261,004,362**		**9**	**$ 0.015**	**$ 0.031**
Energy House Calls								
2002	17	26,053	26,053	25,989		20	0.082	0.082
2003	420	167,076	167,076	602,723		20	0.023	0.023
2004	1,708	725,981	725,981	2,349,783		20	0.025	0.025
2005	891	375,610	375,610	1,775,770		20	0.017	0.017
2006	819	336,701	336,701	777,244		20	0.035	0.035
2007	700	336,372	336,372	699,899		20	0.039	0.039
2008	1,099	484,379	484,379	883,038		20	0.045	0.045
2009	1,266	569,594	569,594	928,875		20	0.052	0.052
2010	1,602	762,330	762,330	1,198,655		20	0.054	0.054
2011	881	483,375	483,375	1,214,004		20	0.027	0.027
2012	668	275,884	275,884	1,192,039		18	0.016	0.016
2013	411	199,995	199,995	837,261		18	0.016	0.016
2014	297	197,987	197,987	579,126		18	0.029	0.029
2015	362	214,103	214,103	754,646		18	0.020	0.020
2016	375	206,437	206,437	509,859		18	0.029	0.029
2017	335	183,035	183,035	428,819		16	0.032	0.032
2018	280	160,777	160,777	374,484		16	0.032	0.032
2019	248	161,894	161,894	309,154		16	0.039	0.039

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2020	51	46,352	46,352	56,944		16	0.075	0.075
Total	**12,430**	**$ 5,913,934**	**$ 5,913,934**	**15,498,312**		**19**	**$ 0.032**	**$ 0.032**
ENERGY STAR® Homes Northwest (gas heated)								
2014	282			195,372		22		
2015	69			46,872		22		
Total	**351**	**$ 0**	**$ 0**	**242,244**		**22**		
Fridge and Freezer Recycling Program								
2009	1,661	305,401	305,401	1,132,802		8	0.041	0.041
2010	3,152	565,079	565,079	1,567,736		8	0.054	0.054
2011	3,449	654,393	654,393	1,712,423		8	0.046	0.046
2012	3,176	613,146	613,146	1,576,426		8	0.046	0.046
2013	3,307	589,054	589,054	1,442,344		8	0.061	0.061
2014	3,194	576,051	576,051	1,390,760		6	0.062	0.062
2015	1,630	227,179	227,179	720,208		6	0.048	0.048
2016	1,539	257,916	257,916	632,186		6	0.062	0.062
2017	2,031	265,942	265,942	498,513		6	0.080	0.080
2018	304	33,907	33,907	73,602		7	0.061	0.061
Total	**23,443**	**$ 4,088,069**	**$ 4,088,069**	**10,747,000**		**7**	**$ 0.062**	**$ 0.062**
Heating & Cooling Efficiency Program								
2006		17,444	17,444					
2007	4	488,211	494,989	1,595		18	27.344	27.710
2008	359	473,551	599,771	561,440		18	0.073	0.092
2009	349	478,373	764,671	1,274,829		18	0.034	0.054
2010	217	327,669	1,073,604	1,104,497		20	0.025	0.083
2011	130	195,770	614,523	733,405		20	0.018	0.056
2012	141	182,281	676,530	688,855		20	0.018	0.066
2013	210	329,674	741,586	1,003,730		20	0.022	0.050
2014	230	362,014	1,247,560	1,099,464		20	0.022	0.075
2015	427	626,369	2,064,055	1,502,172		20	0.028	0.092
2016	483	594,913	1,404,625	1,113,574		20	0.040	0.040
2017	654	597,198	1,433,357	1,138,744		15	0.041	0.099
2018	712	585,211	1,686,618	1,556,065		15	0.029	0.085

Program/Year	Participants	Total Costs		Savings and Demand Reductions		Measure Life (Years)	Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)		Total Utility ($/kWh)	Total Resource ($/kWh)
2019	681	499,179	1,512,183	1,412,183		15	0.028	0.084
2020	1,019	606,559	1,911,792	1,839,068		14	0.033	0.103
Total	**5,616**	**$ 6,364,417**	**$ 16,243,307**	**15,029,782**		**18**	**$ 0.036**	**$ 0.093**
Home Energy Audits								
2013		88,740	88,740					
2014	354	170,648	170,648	141,077		10	0.150	0.150
2015	251	201,957	226,806	136,002		10	0.184	0.184
2016	539	289,812	289,812	207,249		11	0.163	0.163
2017	524	282,809	353,385	175,010		12	0.146	0.182
2018	466	264,394	321,978	211,003		12	0.113	0.137
2019	421	230,786	282,215	179,754		11	0.122	0.150
2020	97	130,546	130,546	31,938		12	0.448	0.448
Total	**2,652**	**$ 1,659,692**	**$ 1,864,130**	**1,082,033**		**11**	**$ 0.178**	**$ 0.200**
Home Energy Reports Program								
2018	23,914	194,812	194,812	3,281,780		1	0.046	0.046
2019	24,976	200,406	200,406	8,444,746		1	0.018	0.018
2020	127,138	899,203	899,203	10,427,940		1	0.081	0.081
Total	**176,028**	**$ 1,294,421**	**$ 1,294,421**	**22,154,466**		**1**	**$ 0.055**	**$ 0.055**
Home Improvement Program								
2008	282	123,454	157,866	317,814		25	0.029	0.037
2009	1,188	321,140	550,148	1,338,876		25	0.019	0.032
2010	3,537	944,716	2,112,737	3,986,199		45	0.016	0.035
2011	2,275	666,041	2,704,816	917,519		45	0.038	0.155
2012	840	385,091	812,827	457,353		45	0.044	0.093
2013	365	299,497	1,061,314	616,044		45	0.025	0.090
2014	555	324,717	896,246	838,929		45	0.020	0.055
2015	408	272,509	893,731	303,580		45	0.046	0.152
2016	482	324,024	1,685,301	500,280		45	0.034	0.177
2017	355	166,830	1,345,002	415,824		45	0.021	0.167
2018		2,926	2,926					
Total	**10,287**	**$ 3,830,946**	**$ 12,222,915**	**9,692,418**		**42**	**$ 0.025**	**$ 0.080**

Program/Year	Participants	Total Costs		Savings and Demand Reductions		Measure Life	Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	(Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Multifamily Energy Savings Program								
2016	196	59,046	59,046	149,760		10	0.040	0.040
2017	683	168,216	168,216	617,542		11	0.026	0.026
2018	764	205,131	205,131	655,953		11	0.030	0.030
2019	457	131,306	131,306	346,107		11	0.036	0.036
2020	33	89,829	89,829	28,041		11	0.372	0.372
Total	**2,133**	**$ 653,529**	**$ 653,529**	**1,797,404**		**11**	**$ 0.042**	**$ 0.042**
Oregon Residential Weatherization								
2002	24	-662	23,971	4,580		25	0.010	0.389
2003		-943						
2004	4	1,057	1,057					
2005	4	612	3,608	7,927		25	0.006	0.034
2006		4,126	4,126					
2007	1	3,781	5,589	9,971		25	0.028	0.042
2008	3	7,417	28,752	22,196		25	0.025	0.096
2009	1	7,645	8,410	2,907		25	0.203	0.223
2010	1	6,050	6,275	320		30	0.011	0.062
2011	8	7,926	10,208	21,908		30	0.021	0.027
2012	5	4,516	11,657	11,985		30	0.022	0.056
2013	14	9,017	14,369	14,907		30	0.035	0.055
2014	13	5,462	9,723	11,032		30	0.028	0.050
2015	4	5,808	10,388	11,910		30	0.028	0.050
2016	7	3,930	5,900	2,847		30	0.079	0.118
2017	7	2,384	3,755	2,154		30	0.063	0.099
2018	5	5,507	5,507					
2019	8	5,982	14,432	2,069		45	0.149	0.360
2020	0	5,313	5,313	0		45		
Total	**109**	**$ 84,928**	**$ 173,040**	**126,713**		**28**	**$ 0.048**	**$ 0.097**
Rebate Advantage								
2003	73	27,372	79,399	227,434		45	0.008	0.022
2004	105	52,187	178,712	332,587		45	0.010	0.034

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2005	98	46,173	158,462	312,311		45	0.009	0.032
2006	102	52,673	140,289	333,494		45	0.010	0.027
2007	123	89,269	182,152	554,018		45	0.010	0.021
2008	107	90,888	179,868	463,401		45	0.012	0.025
2009	57	49,525	93,073	247,348		25	0.015	0.029
2010	35	39,402	66,142	164,894		25	0.018	0.031
2011	25	63,469	85,044	159,325		25	0.024	0.033
2012	35	37,241	71,911	187,108		25	0.012	0.024
2013	42	60,770	92,690	269,891		25	0.014	0.021
2014	44	63,231	89,699	269,643		25	0.014	0.020
2015	58	85,438	117,322	358,683		25	0.014	0.020
2016	66	111,050	148,142	411,272		25	0.016	0.022
2017	66	104,996	229,104	214,479		45	0.025	0.055
2018	107	147,483	355,115	284,559		45	0.027	0.064
2019	109	156,748	355,897	353,615		44	0.023	0.052
2020	116	180,422	437,263	366,678		44	0.031	0.075
Total	**1,368**	**$ 1,458,338**	**$ 3,060,284**	**5,510,739**		**38**	**$ 0.017**	**$ 0.036**
Residential New Construction Pilot Program (ENERGY STAR® Homes Northwest)								
2003		13,597	13,597	0				
2004	44	140,165	335,437	101,200		25	0.103	0.246
2005	200	253,105	315,311	415,600		25	0.045	0.056
2006	439	469,609	602,651	912,242		25	0.038	0.049
2007	303	475,044	400,637	629,634		25	0.056	0.047
2008	254	302,061	375,007	468,958		25	0.048	0.059
2009	474	355,623	498,622	705,784		25	0.039	0.055
2010	630	375,605	579,495	883,260		25	0.033	0.051
2011	308	259,762	651,249	728,030		32	0.020	0.051
2012	410	453,186	871,310	537,447		35	0.046	0.089
2013	267	352,882	697,682	365,370		36	0.053	0.104
2014	243	343,277	689,021	332,682		36	0.057	0.114
2015	598	653,674	1,412,126	773,812		36	0.046	0.099

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2016	110	142,158	297,518	150,282		36	0.051	0.107
2017	277	323,520	603,420	608,292		45	0.029	0.054
2018	307	400,912	926,958	777,369		36	0.028	0.064
2019	322	534,118	1,411,391	774,597		54	0.035	0.092
2020	248	473,504	865,989	649,522		58	0.044	0.081
Total	**5,434**	**$ 6,321,801**	**$ 11,547,422**	**9,814,080**		**34**	**$ 0.043**	**$ 0.079**
Shade Tree Project								
2014	2,041	147,290	147,290					
2015	1,925	105,392	105,392					
2016	2,070	76,642	76,642					
2017	2,711	195,817	195,817					
2018	2,093	162,995	162,995	35,571		20	0.307	0.307
2019	2,063	147,750	147,750	35,727		30	0.235	0.235
2020	0	28,490	28,490	52,662		30	0.038	0.038
Total	**12,903**	**$ 864,376**	**$ 864,376**	**123,960**		27	**$ 0.501**	**$ 0.501**
Simple Steps, Smart Savings								
2007		9,275	9,275	0				
2008	3,034	250,860	468,056	541,615		15	0.044	0.082
2009	9,499	511,313	844,811	1,638,038		15	0.031	0.051
2010	16,322	832,161	1,025,151	1,443,580		15	0.057	0.070
2011	15,896	638,323	1,520,977	1,485,326		15	0.034	0.080
2012	16,675	659,032	817,924	887,222		14	0.061	0.075
2013	13,792	405,515	702,536	885,980		12	0.041	0.071
2014	10,061	227,176	302,289	652,129		12	0.031	0.041
2015	9,343	139,096	397,898	770,822		10	0.018	0.053
2016	7,880	153,784	379,752	577,320		11	0.025	0.063
2017	12,556	191,621	484,380	900,171		11	0.020	0.051
2018	7,377	90,484	133,101	241,215		12	0.034	0.050
2019	5,729	90,499	123,541	271,452		11	0.032	0.043
2020	6,894	99,141	98,629	148,404		12	0.073	0.073
Total	**135,058**	**$ 4,298,280**	**$ 7,308,320**	**10,443,274**		**13**	**$ 0.043**	**$ 0.073**

Program/Year	Participants	Total Costs		Savings and Demand Reductions		Measure Life	Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	(Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Weatherization Solutions for Eligible Customers								
2008	16	52,807	52,807	71,680		25	0.057	0.057
2009	41	162,995	162,995	211,719		25	0.059	0.059
2010	47	228,425	228,425	313,309		25	0.056	0.056
2011	117	788,148	788,148	1,141,194		25	0.042	0.042
2012	141	1,070,556	1,070,556	257,466		25	0.254	0.254
2013	166	1,267,791	1,267,791	303,116		25	0.240	0.240
2014	118	791,344	791,344	290,926		25	0.163	0.163
2015	171	1,243,269	1,243,269	432,958		25	0.175	0.175
2016	147	1,323,793	1,323,793	621,653		25	0.130	0.130
2017	164	1,108,862	1,121,071	604,733		23	0.115	0.117
2018	141	1,022,471	1,022,471	571,741		23	0.112	0.112
2019	129	957,626	957,626	504,988		23	0.119	0.119
2020	27	208,715	208,715	47,360		23	0.277	0.277
Total	**1,425**	**$ 10,226,801**	**$ 10,239,011**	**5,372,843**		**24**	**$ 0.143**	**$ 0.143**
Window AC Trade Up Pilot								
2003	99	6,687	10,492	14,454		12	0.051	0.079
Total	**99**	**$ 6,687**	**$ 10,492**	**14,454**		**12**	**$ 0.051**	**$ 0.079**
Residential—Weatherization Assistance for Qualified Customers (WAQC)								
WAQC—Idaho								
2002	197	235,048	492,139					
2003	208	228,134	483,369					
2004	269	498,474	859,482	1,271,677		25	0.029	0.050
2005	570	1,402,487	1,927,424	3,179,311		25	0.033	0.045
2006	540	1,455,373	2,231,086	2,958,024		25	0.037	0.056
2007	397	1,292,930	1,757,105	3,296,019		25	0.029	0.040
2008	439	1,375,632	1,755,749	4,064,301		25	0.025	0.032
2009	427	1,260,922	1,937,578	4,563,832		25	0.021	0.033
2010	373	1,205,446	2,782,597	3,452,025		25	0.026	0.060
2011	273	1,278,112	1,861,836	2,648,676		25	0.036	0.052
2012	228	1,321,927	1,743,863	621,464		25	0.157	0.208

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2013	245	1,336,742	1,984,173	657,580		25	0.150	0.223
2014	244	1,267,212	1,902,615	509,620		25	0.184	0.276
2015	233	1,278,159	2,072,901	529,426		25	0.179	0.290
2016	234	1,254,338	1,870,481	722,430		25	0.129	0.192
2017	196	1,269,507	1,721,632	654,464		30	0.134	0.182
2018	190	1,254,630	1,795,301	641,619		30	0.136	0.194
2019	193	1,264,767	1,890,584	639,880		30	0.137	0.205
2020	115	1,361,163	1,703,879	218,611		30	0.432	0.540
Total	**5,571**	**$ 21,841,003**	**$ 32,773,794**	**30,628,960**		**25**	**$ 0.053**	**$ 0.079**
WAQC—Oregon								
2002	31	24,773	47,221	68,323		25	0.027	0.051
2003	29	22,255	42,335	102,643		25	0.016	0.031
2004	17	13,469	25,452	28,436		25	0.035	0.067
2005	28	44,348	59,443	94,279		25	0.035	0.047
2006						25		
2007	11	30,694	41,700	42,108		25	0.054	0.074
2008	14	43,843	74,048	73,841		25	0.040	0.068
2009	10	33,940	46,513	114,982		25	0.023	0.031
2010	27	115,686	147,712	289,627		25	0.030	0.038
2011	14	46,303	63,981	134,972		25	0.025	0.035
2012	10	48,214	76,083	26,840		25	0.133	0.210
2013	9	54,935	67,847	24,156		25	0.168	0.208
2014	11	52,900	94,493	24,180		25	0.162	0.289
2015	10	36,873	46,900	20,595		25	0.133	0.169
2016	12	35,471	63,934	23,732		25	0.111	0.199
2017	7	37,978	61,052	15,074		30	0.175	0.281
2018	3	18,344	24,191	7,886		30	0.161	0.213
2019	4	38,960	62,905	9,419		30	0.287	0.463
2020	0	24,414	24,414	0		30		
Total	**247**	**$ 723,399**	**$ 1,070,224**	**1,101,093**		**25**	**$ 0.049**	**$ 0.072**

Program/Year	Participants	Total Costs		Savings and Demand Reductions		Measure Life (Years)	Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)		Total Utility ($/kWh)	Total Resource ($/kWh)
WAQC—BPA Supplemental								
2002	75	55,966	118,255	311,347		25	0.013	0.028
2003	57	49,895	106,915	223,591		25	0.017	0.036
2004	40	69,409	105,021	125,919		25	0.041	0.062
Total	**172**	**$ 175,270**	**$ 330,191**	**660,857**		**25**	**$ 0.020**	**$ 0.037**
WAQC Total	**5,990**	**$ 22,739,672**	**$ 34,174,209**	**32,390,910**		**25**	**$ 0.052**	**$ 0.078**
Commercial								
Air Care Plus Pilot								
2003	4	5,764	9,061	33,976		10	0.021	0.033
2004		344	344					
Total	**4**	**$ 6,108**	**$ 9,405**	**33,976**		**10**	**$ 0.022**	**$ 0.034**
Commercial Energy-Saving Kits (Commercial Education Initiative)								
2005		3,497	3,497					
2006		4,663	4,663					
2007		26,823	26,823					
2008		72,738	72,738					
2009		120,584	120,584					
2010		68,765	68,765					
2011		89,856	89,856					
2012		73,788	73,788					
2013		66,790	66,790					
2014		76,606	76,606					
2015		65,250	65,250					
2016								
2017								
2018	1,652	146,174	146,174	442,170		10	0.034	0.034
2019	2,629	161,945	161,945	569,594		10	0.029	0.029
2020	1,379	103,678	103,678	258,368		11	0.047	0.047
Total	**5,660**	**$ 1,081,156**	**$ 1,081,156**	**1,270,132**		**10**	**$ 0.106**	**$ 0.106**
New Construction								
2004		28,821	28,821					

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2005	12	194,066	233,149	494,239		12	0.043	0.052
2006	40	374,008	463,770	704,541		12	0.058	0.072
2007	22	669,032	802,839	2,817,248		12	0.015	0.040
2008	60	1,055,009	1,671,375	6,598,123		12	0.017	0.028
2009	72	1,327,127	2,356,434	6,146,139		12	0.024	0.043
2010	70	1,509,682	3,312,963	10,819,598		12	0.016	0.035
2011	63	1,291,425	3,320,015	11,514,641		12	0.010	0.026
2012	84	1,592,572	8,204,883	20,450,037		12	0.007	0.036
2013	59	1,507,035	3,942,880	10,988,934		12	0.012	0.032
2014	69	1,258,273	3,972,822	9,458,059		12	0.012	0.037
2015	81	2,162,001	6,293,071	23,232,017		12	0.008	0.024
2016	116	1,931,222	4,560,826	12,393,249		12	0.014	0.033
2017	121	2,433,596	4,265,056	17,353,820		12	0.013	0.022
2018	104	2,069,645	5,054,215	13,378,315		12	0.014	0.034
2019	168	3,548,476	5,292,835	20,640,334		12	0.015	0.023
2020	119	2,383,983	4,175,611	14,565,936		12	0.018	0.031
Total	**1,260**	**$ 25,335,974**	**$ 57,951,566**	**181,555,230**		**12**	**$ 0.015**	**$ 0.035**
Retrofits								
2006		31,819	31,819					
2007	104	711,494	1,882,035	5,183,640	0.8	12	0.015	0.040
2008	666	2,992,261	10,096,627	25,928,391	4.5	12	0.013	0.043
2009	1,224	3,325,505	10,076,237	35,171,627	6.1	12	0.011	0.032
2010	1,535	3,974,410	7,655,397	35,824,463	7.8	12	0.013	0.024
2011	1,732	4,719,466	9,519,364	38,723,073		12	0.011	0.022
2012	1,838	5,349,753	9,245,297	41,568,672		12	0.012	0.020
2013	1,392	3,359,790	6,738,645	21,061,946		12	0.014	0.029
2014	1,095	3,150,942	5,453,380	19,118,494		12	0.015	0.025
2015	1,222	4,350,865	7,604,200	23,594,701		12	0.017	0.029
2016	1,577	5,040,190	8,038,791	28,124,779		12	0.016	0.026
2017	1,137	4,343,835	12,500,303	23,161,877		12	0.017	0.049
2018	1,358	5,990,179	16,253,716	34,910,707		12	0.015	0.042

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2019	1,033	6,281,056	17,700,769	42,674,418		12	0.013	0.037
2020	630	3,587,277	11,964,431	20,965,215		12	0.019	0.063
Total	**16,543**	**$ 57,208,841**	**$ 134,761,010**	**396,012,003**		**12**	**$ 0.016**	**$ 0.037**
Holiday Lighting								
2008	14	28,782	73,108	259,092		10	0.014	0.035
2009	32	33,930	72,874	142,109		10	0.031	0.066
2010	25	46,132	65,308	248,865		10	0.024	0.034
2011	6	2,568	2,990	66,189		10	0.004	0.005
Total	**77**	**$ 111,412**	**$ 214,280**	**716,255**		**10**	**$ 0.019**	**$ 0.037**
Oregon Commercial Audit								
2002	24	5,200	5,200					
2003	21	4,000	4,000					
2004	7	0	0					
2005	7	5,450	5,450					
2006	6							
2007		1,981	1,981					
2008		58	58					
2009	41	20,732	20,732					
2010	22	5,049	5,049					
2011	12	13,597	13,597					
2012	14	12,470	12,470					
2013	18	5,090	5,090					
2014	16	9,464	9,464					
2015	17	4,251	4,251					
2016	7	7,717	7,717					
2017	13	8,102	8,102					
2018	0	1,473	1,473					
2019	11	7,262	7,262					
2020	2	1,374	1,374					
Total	**238**	**$ 113,271**	**$ 113,271**					

Program/Year	Participants	Total Costs		Savings and Demand Reductions		Measure Life	Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	(Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Oregon School Efficiency								
2005		86	86					
2006	6	24,379	89,771	223,368		12	0.012	0.044
Total	**6**	**$ 24,465**	**$ 89,857**	**223,368**		**12**	**$ 0.012**	**$ 0.044**
Small Business Direct Install								
2020	139	339,830	339,830	780,260		9	0.058	0.058
Total	**139**	**$ 339,830**	**$ 339,830**	**780,260**		**9**	**$ 0.058**	**$ 0.058**
Industrial								
Custom Projects								
2003		1,303	1,303					
2004	1	112,311	133,441	211,295		12	0.058	0.069
2005	24	1,128,076	3,653,152	12,016,678		12	0.010	0.033
2006	40	1,625,216	4,273,885	19,211,605		12	0.009	0.024
2007	49	3,161,866	7,012,686	29,789,304	3.6	12	0.012	0.026
2008	101	4,045,671	16,312,379	41,058,639	4.8	12	0.011	0.044
2009	132	6,061,467	10,848,123	51,835,612	6.7	12	0.013	0.024
2010	223	8,778,125	17,172,176	71,580,075	9.5	12	0.014	0.027
2011	166	8,783,811	19,830,834	67,979,157	7.8	12	0.012	0.026
2012	126	7,092,581	12,975,629	54,253,106	7.6	12	0.012	0.021
2013	73	2,466,225	5,771,640	21,370,350	2.4	12	0.010	0.024
2014	131	7,173,054	13,409,922	50,363,052	5.6	12	0.013	0.024
2015	160	9,012,628	20,533,742	55,247,192	6.3	11	0.016	0.035
2016	196	7,982,624	16,123,619	47,518,871		16	0.013	0.026
2017	170	8,679,919	17,279,117	44,765,354		16	0.015	0.029
2018	248	8,808,512	16,112,540	46,963,690		16	0.014	0.026
2019	257	11,879,873	24,590,176	70,433,920		15	0.013	0.027
2020	169	18,059,396	41,604,451	94,006,717		15	0.018	0.042
Total	**2,266**	**$ 114,852,657**	**$ 247,638,815**	**778,604,617**		**13**	**$ 0.015**	**$ 0.033**
Green Motors Rewind—Industrial								
2016	14			123,700		7		
2017	13			143,976		7		
2018	25			64,167		7		

Program/Year	Participants	Total Costs: Utility Cost [b]	Total Costs: Resource Cost [c]	Savings and Demand Reductions: Annual Energy [e] (kWh)	Savings and Demand Reductions: Peak Demand [f] (MW)	Measure Life (Years)	Levelized Costs [a]: Total Utility ($/kWh)	Levelized Costs [a]: Total Resource ($/kWh)
2019	12			117,223		8		
2020	10			56,012		8		
Total	**74**	**$ 0**	**$ 0**	**505,078**		**7**		
Irrigation								
Irrigation Efficiency Rewards								
2003	2	41,089	54,609	36,792	0.0	15	0.106	0.141
2004	33	120,808	402,978	802,812	0.4	15	0.014	0.048
2005	38	150,577	657,460	1,012,883	0.4	15	0.014	0.062
2006	559	2,779,620	8,514,231	16,986,008	5.1	8	0.024	0.073
2007	816	2,001,961	8,694,772	12,304,073	3.4	8	0.024	0.103
2008	961	2,103,702	5,850,778	11,746,395	3.5	8	0.026	0.073
2009	887	2,293,896	6,732,268	13,157,619	3.4	8	0.026	0.077
2010	753	2,200,814	6,968,598	10,968,430	3.3	8	0.030	0.096
2011	880	2,360,304	13,281,492	13,979,833	3.8	8	0.020	0.113
2012	908	2,373,201	11,598,185	12,617,164	3.1	8	0.022	0.110
2013	995	2,441,386	15,223,928	18,511,221	3.0	8	0.016	0.098
2014	1,128	2,446,507	18,459,781	18,463,611	4.6	8	0.016	0.119
2015	902	1,835,711	9,939,842	14,027,411	1.6	8	0.016	0.085
2016	851	2,372,352	8,162,206	15,673,513		8	0.018	0.063
2017	801	2,475,677	8,382,962	16,824,266		8	0.018	0.060
2018	1,022	2,953,706	11,948,469	18,933,831		8	0.019	0.076
2019	1,080	2,661,263	10,042,514	10,073,455		8	0.032	0.120
2020	1,018	3,401,673	16,857,055	12,847,823		15	0.025	0.125
Total	**13,634**	**$ 37,014,247**	**$ 161,772,127**	**218,967,140**		**8**	**$ 0.025**	**$ 0.108**
Green Motors Rewind—Irrigation								
2016	23			73,617		19		
2017	27			63,783		19		
2018	26			67,676		19		
2019	34			44,705		20		
2020	23			36,147		20		
Total	**133**	**$ 0**	**$ 0**	**285,928**		**19**		

Program/Year	Participants	Total Costs: Utility Cost [b]	Total Costs: Resource Cost [c]	Savings and Demand Reductions: Annual Energy [e] (kWh)	Savings and Demand Reductions: Peak Demand [f] (MW)	Measure Life (Years)	Levelized Costs [a]: Total Utility ($/kWh)	Levelized Costs [a]: Total Resource ($/kWh)
Other Programs								
Building Operator Training								
2003	71	48,853	48,853	1,825,000		5	0.006	0.006
2004	26	43,969	43,969	650,000		5	0.014	0.014
2005	7	1,750	4,480	434,167		5	0.001	0.002
Total	**104**	**94,572**	**97,302**	**2,909,167**		**5**	**0.007**	**0.007**
Comprehensive Lighting								
2011		2,404	2,404					
2012		64,094	64,094					
Total		**$ 66,498**	**$ 66,498**					
Distribution Efficiency Initiative								
2005		21,552	43,969					
2006		24,306	24,306					
2007		8,987	8,987					
2008		-1,913	-1,913					
Total		**$ 52,932**	**$ 75,349**					
DSM Direct Program Overhead								
2007		56,909	56,909					
2008		169,911	169,911					
2009		164,957	164,957					
2010		117,874	117,874					
2011		210,477	210,477					
2012		285,951	285,951					
2013		380,957	380,957					
2014		478,658	478,658					
2015		272,858	272,858					
2016		293,039	293,039					
2017		1,759,352	1,759,352					
2018		1,801,955	1,801,955					
2019		2,119,820	2,119,820					
2020		1,811,869	1,811,869					
Total		**$ 9,924,588**	**$ 9,924,588**					

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Local Energy Efficiency Fund								
2003	56	5,100	5,100					
2004		23,449	23,449					
2005	2	14,896	26,756	78,000		10	0.024	0.042
2006	480	3,459	3,459	19,027		7	0.009	0.009
2007	1	7,520	7,520	9,000		7	0.135	0.135
2008	2	22,714	60,100	115,931	0.0	15	0.019	0.049
2009	1	5,870	4,274	10,340	0.0	12	0.064	0.047
2010	1	251	251		0.0			
2011	1	1,026	2,052	2,028		30	0.035	0.070
2012								
2013								
2014	1	9,100	9,100	95,834		18		
Total	**545**	**$ 93,385**	**$ 142,061**	**330,160**		**14**	**$ 0.028**	**$ 0.043**
Other C&RD and CRC BPA								
2002		55,722	55,722					
2003		67,012	67,012					
2004		108,191	108,191					
2005		101,177	101,177					
2006		124,956	124,956					
2007		31,645	31,645					
2008		6,950	6,950					
Total		**$ 495,654**	**$ 495,654**					
Residential Economizer Pilot								
2011		101,713	101,713					
2012		93,491	93,491					
2013		74,901	74,901					
Total		**$ 270,105**	**$ 270,105**					
Residential Education Initiative								
2005		7,498	7,498					
2006		56,727	56,727					
2007								

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2008		150,917	150,917					
2009		193,653	193,653					
2010		222,092	222,092					
2011		159,645	159,645					
2012		174,738	174,738					
2013		416,166	416,166					
2014	6,312	423,091	423,091	1,491,225		11		
2015		149,903	149,903					
2016		290,179	290,179					
2017		223,880	223,880					
2018		172,215	172,215					
2019		160,851	160,851					
2020		223,731	223,731					
Total		**$ 3,025,287**	**$ 3,025,287**	**1,491,225**				
Solar 4R Schools								
2009		45,522	45,522					
Total		**$ 45,522**	**$ 45,522**					
Market Transformation								
Consumer Electronic Initiative								
2009		160,762	160,762					
Total		**$ 160,762**	**$ 160,762**					
NEEA								
2002		1,286,632	1,286,632	12,925,450				
2003		1,292,748	1,292,748	11,991,580				
2004		1,256,611	1,256,611	13,329,071				
2005		476,891	476,891	16,422,224				
2006		930,455	930,455	18,597,955				
2007		893,340	893,340	28,601,410				
2008		942,014	942,014	21,024,279				
2009		968,263	968,263	10,702,998				
2010		2,391,217	2,391,217	21,300,366				

Program/Year	Participants	Total Costs		Savings and Demand Reductions		Measure Life (Years)	Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)		Total Utility ($/kWh)	Total Resource ($/kWh)
2011		3,108,393	3,108,393	20,161,728				
2012		3,379,756	3,379,756	19,567,984				
2013		3,313,058	3,313,058	20,567,965				
2014		3,305,917	3,305,917	26,805,600				
2015		2,582,919	2,582,919	23,038,800				
2016		2,676,387	2,676,387	24,352,800				
2017		2,698,756	2,698,756	24,440,400				
2018		2,500,165	2,500,165	25,666,800				
2019 [1]		2,721,070	2,721,070	18,368,135				
2020		2,789,210	2,789,210	15,990,638				
Total	**$**	**39,513,801**	**$ 39,513,801**	**373,856,184**				
Annual Totals								
2002		1,932,520	2,366,591	16,791,100	0.0			
2003		2,566,228	3,125,572	18,654,343	0.0			
2004		3,827,213	4,860,912	19,202,780	6.5			
2005		6,523,348	10,383,577	37,978,035	43.9			
2006		11,174,181	20,950,110	67,026,303	43.6			
2007		14,896,816	27,123,018	91,145,357	57.9			
2008		20,213,216	44,775,829	128,508,579	74.3			
2009		33,821,062	53,090,852	143,146,365	235.5			
2010		44,643,541	68,981,324	193,592,637	357.7			
2011		44,877,117	79,436,532	183,476,312	415.2			
2012		47,991,350	77,336,341	172,054,327	448.8			
2013		26,100,091	54,803,353	109,505,690	54.5			
2014		35,648,260	71,372,414	145,475,713	389.7			
2015		37,149,893	70,467,082	162,533,155	374.5			
2016		40,499,570	70,984,604	170,792,152	379.0			
2017		44,828,089	78,799,054	191,471,395	383.0			
2018		42,926,872	75,797,483	184,078,634	358.7			
2019		47,390,056	83,661,890	203,301,810	332.5			
2020		49,354,064	100,218,669	196,808,914	336.0			
Total Direct Program	**$**	**556,367,488**	**$ 999,006,887**	**2,437,208,001**				

Program/Year	Participants	Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
		Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
Indirect Program Expenses								
DSM Overhead and Other Indirect								
2002		128,855						
2003		-41,543						
2004		142,337						
2005		177,624						
2006		309,832						
2007		765,561						
2008		980,305						
2009		1,025,704						
2010		1,189,310						
2011		1,389,135						
2012		1,335,509						
2013		$741,287						
2014		1,065,072						
2015		1,891,042						
2016		2,263,893						
2017		2,929,407						
2018		1,335,208						
2019		1,194,640						
2020		1,202,238						
Total		**$ 20,025,416**						
Total Expenses								
2002		2,061,375						
2003		2,528,685						
2004		3,969,550						
2005		6,700,972						
2006		11,484,013						
2007		15,662,377						
2008		21,193,521						
2009		34,846,766						

		Total Costs		Savings and Demand Reductions			Levelized Costs [a]	
Program/Year	Participants	Utility Cost [b]	Resource Cost [c]	Annual Energy [e] (kWh)	Peak Demand [f] (MW)	Measure Life (Years)	Total Utility ($/kWh)	Total Resource ($/kWh)
2010		45,832,851						
2011		46,266,252						
2012		49,326,859						
2013		26,841,378						
2014		36,713,333						
2015		39,040,935						
2016		42,763,463						
2017		47,757,496						
2018		44,262,080						
2019		48,584,696						
2020		50,556,303						
Total 2002–2020		**$ 576,392,905**						

[a] Levelized Costs are based on financial inputs from Idaho Power's *2017 Integrated Resource Plan* and calculations include line loss adjusted energy savings.
[b] Program life benefit/cost ratios are provided for active programs only.
[c] The Total Utility Cost is all cost incurred by Idaho Power to implement and manage a DSM program.
[d] The Total Resource Cost is the total expenditures for a DSM program from the point of view of Idaho Power and its customers as a whole.
[e] Average Demand = Annual Energy/8,760 annual hours.
[f] Peak Demand is reported for programs that directly reduce load or measure demand reductions during summer peak season. Peak demand reduction for demand response programs is reported at the generation level assuming 9.7% peak line losses.
[1] Savings are preliminary funder share estimates. Final results will be provided by NEEA in May 2021.

ACLARA ACE™

Adaptive Consumer Engagement

Idaho Power Corporation
Home Energy Report Year 3
Final Program Summary

Version 1.3

Updated: 2/26/2021



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Document Approval

The purpose of this section is to acknowledge approval of the information presented within. Please use the track-changes features to indicate any changes necessary before approval of the plan can be made. When ready to approve, please indicate the version number being approved, and complete the fields below.

This Idaho Power Company Home Energy Report year three Final Program Summary, version 1.3 approved by:

Client Name:	
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Executive Summary

1. PROJECT OVERVIEW

In July 2017, Idaho Power contracted with Aclara and its subcontractor, Uplight[1] to create a Home Energy Report pilot program with the goal of reducing participating residential customers' energy use while meeting cost-effectiveness guidelines. The program was initially to span one year, with the possibility of renewal.

The pilot program was renewed for a second year in August 2018, with the addition of a second winter heating group and the optimization of existing treatment customers from year one. Year two of the pilot program was extended from August 2019 through February 2020 to ensure continuity of treatment, in preparation for an expansion of the program in year three.

The program was expanded for 3.5 more years—through December 31, 2023--in February 2020 (which is detailed in this report). This expansion planned for the addition of 130,000 more participants; however, during the implementation phase it was determined that 108,424 customers were eligible to be added to the program as treatment participants. As of the launch of this expansion, 18,492 treatment customers from the pilot program remained eligible after optimizing the existing population.

The Home Energy Reports included the following elements:

- **Customer information:** customer name, address, and account number
- **Household energy-usage disaggregation:** home usage separated into four loads (heating, air conditioning, lights & appliances, and always-on)
- **Targeted message(s)**: customized messaging to drive customers to relevant programs and the *My Account* portal
- **Social benchmarks**: customer's home energy use compared to similar homes and efficient homes, designed to motivate savings
- **Personalized savings recommendations:** Tips for saving energy based on home profile attributes, customer segmentation, and season



2. RESULTS AND FINDINGS

Main takeaways from year three of the program are as follows.

Each existing treatment group saved well over 1%; the new treatment group is ramping up quickly.

[1] Uplight in this case is formerly known as Ecotagious. Ecotagious was acquired by Uplight in August 2019, after the completion of the program.

T1, T2, T3, and T4 were treated throughout the entire program year; T6 started receiving HERs in June 2020. All savings calculations for T1, T2, T3, T4, and T6 factored in only the period of active treatment. T5 savings included an active and an inactive period.

- T1: 1.25% or 267.72 kWh per customer
- T2: 1.76% or 363.31 kWh per customer
- T3: 1.48% or 223.38 kWh per customer
- T4: 3.25% or 339.66 kWh per customer
- T5: 0.49% or 39.67 kWh per customer

- T6: 0.56% or 50.06 kWh per customer

See section 1.3 for definitions of the treatment group.

Collectively, all treatment groups saved .74%

Using a weighted average calculation, these five treatment groups saved 0.74% or 87.03 kWh per customer. In 2020, total savings calculated are 10,316,562 kWh. Although T-5 did not receive reports after February of 2020, when compared with their control group, they showed persistent savings. Including the savings from T5, the overall annual savings from this program are 10,427,940 kWh.

T4 outperformed in savings (%)

Although all treatment groups saw statistically significant savings throughout program year three, T4 had the highest percent savings relative to its respective control group, C4. The T4 treatment group was established in year one of the pilot and had the lowest overall year-round pre-treatment usage of all the remaining active treatment groups, 9,000-12,000 kWh per year. In 2020, T4 and C4 customers had an average total consumption 10,477 kWh compared to an average of 14,237 kWh across all treatment groups.

Email Adoption Rates Remain Low

- 13 total old customers switched to email (0.1%)
- 87 total new customers switched to email (0.08%)

All new treatment customers in 2020 were notified of the option to receive email reports in their welcome letters, yet email adoption remained low throughout the year.

Opt-Out Rates Stayed Below 0.25%

In 2020, 154 participants opted out of the program – a 0.11% opt-out rate (0.05% for existing, quarterly report participants, 0.13% for new, bimonthly participants). From the beginning of the pilot through December 2020, there have been 457 cumulative opt-outs for a cumulative opt-out rate of 0.34%

The overall program opt-out rate was 0.22% in year 2, and 0.64% in year 1.

Reports Delivered in 2020

	Recipients	# Email Reports	# Paper Reports
February	T1, T2, T3, T4, T5	16	20,197
May	T1, T2, T3, T4	11	18,129
June	T6	0	106,947
August	T1, T2, T3, T4, T6	57	123,044
October	T6	75	102,314
November	T1, T2, T3, T4	13	17,350
December	T6	85	100,564
		257	488,545

1 Program Overview

1.1 Team Structure

The IPC Home Energy Report program has been a joint effort between Idaho Power Company, Aclara, and Uplight (formerly Ecotagious) since 2017. Uplight acquired Ecotagious in July of 2019.

Aclara and Uplight have been partnering on this program since 2017, combining their offerings to deliver greater value and energy savings to customers. In combining Uplight's ability to segment residential energy use into load types and Aclara's behavioural efficiency programs, they have driven savings for gas and electric utilities.

1.2 Objectives

1.2.1 2020 OBJECTIVES

The following business requirements were captured during an onsite meeting on August 22, 2019 and incorporated into the design of this expansion from the pilot project:

- Maximize the total kWh saved, ensuring a UCT of >1 (with a buffer), and maintain high customer satisfaction levels.
- Meet cost-effectiveness guidelines from a Total Resource Cost (TRC) and UCT perspective.
    - >1 UCT + buffer
- Maintain or enhance the current customer satisfaction levels.
    - Maintain low opt-out rate
    - Drive positive customer interactions
    - Maintain low volume of program-related calls to the Customer Interaction Center
- Average annual savings of 1-3%
    - So long as savings are detectable and statistically significant
- Encourage customer engagement with energy usage, including utilization of online tools and lift for other EE programs.

1.2.2 ADDITIONAL OBJECTIVES

Monitor persistent savings of T5 group

In the expansion program, T5 customers were removed from treatment because their overall usage was low and they had not achieved statistically significant savings in the pilot program. IPC would like to continue to monitor their persistent savings in year three to determine if combining them with the rest of the treatment population could yield additional combined savings. Because the T5 customers had been treated in year two, the savings calculated using a difference-in-difference methodology can be attributed to treatment in previous years.

What are the combined savings of all treatment groups including T5?

Including T5 in the combined savings for all treatment groups in year three increases the cumulative savings by 111,378 kWh to 10,427,940 kWh. The inclusion of T5 also reduces the margin of error in the calculation from 11.39 to 11.15, improving statistical significance. The weighted average savings per customer is 86.72 kWh with T5 and 87.03 kWh without T5.

1.3 Treatment Groups Defined

1.3.1 2020 TREATMENT GROUPS

In May of 2020, customers from T1, T2, T3, and T4 that had not been removed through attrition were selected to continue to participate in the HER program. All T5 customers were removed from treatment entirely based on savings results from the pilot (July 2017 through December 31, 2019). The remaining Idaho Power customers were run through eligibility criteria (defined in section 2.3.2) to create a new T6 group. This included some C1, C2, C3, and C4 customers from the pilot that had been removed from control groups by DNV-GL to expand the pool of eligible customers.

- **T1:** customers with high winter use (electric heating) added in Year One,
- **T2:** customers with high winter use (electric heating) added in Year Two,
- **T3:** customers with high year-round energy use added in Year One,
- **T4:** customers with medium year-round energy use added in Year One, and
- **T5:** customers with low year-round energy use added in Year One, and
- **T6:** expansion customers based on eligibility criteria determined after the pilot.

The total number of customers receiving reports was expanded significantly.

In year one of the pilot program, the total number of customers receiving reports was approximately 25,500. In year two, the total was around 24,000. In the 2020 expansion, the addition of the T6 group brought the total number of customers receiving reports up to just over 125,000. Between March 1, 2020 and December 31, 2020, a total of 125,216 customers received at least one report throughout the year. 18,128 of those were existing customers from year 2 and 107,088 were new customers added to treatment in June 2020.

New customers received bimonthly treatment while existing customers received quarterly treatment.

During the pilot program, there appeared to be no meaningful savings benefit from sending customers reports bimonthly rather than quarterly. Therefore, in 2020, all existing customers (carried forward from the pilot) were sent quarterly reports starting with the February reports. All new customers were sent reports on a bimonthly schedule with the intention of shifting them to a quarterly treatment schedule in 2021.

Table 1 – 2020 Report Delivery Schedule by Cohort

	2020											
	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
T1, T2, T3, T4		✓			✓			✓			✓	
T5*		✓										
T6						✓		✓		✓		✓

1.3.2 ELIGIBILITY SCREENING

Eligibility screening for T1, T3, T4, and T5 was initially conducted in year one, and these groups persisted into year two.

Eligibility screening for T2 was conducted in year one with the T1 group; however, heating source data for these customers was unavailable until year two, at which time they were re-evaluated for eligibility.

The eligibility criteria applied in years one and two were also applied in year three to determine the eligible participants in the T6 group, with new criteria added based on learnings from the pilot.

Table 2 - Eligibility Criteria for 2020 Expansion

Idaho only	Required Idaho service addresses
AMI Data	Required AMI data
Active only	Removed all accounts without >12 months active history
Individual only	Filtered out all non-individual accounts
Exclude Do Not Contact	Filtered out do not contact list
Net Metering and Master metered accounts (I03)	Removed all Net Metering and Master metered accounts (I03)
Exclude non-English	Removed all known language types other than English
Comparable homes only	Removed homes built prior to 1860, or more than 6 bathrooms, or more than 8 bedrooms, and homes with <350 ft or >7000 ft
Homes only	Effectively excludes junk accounts (barn, shop, garage, well, pump, etc., etc.)
Exclude manufactured homes	Excluded all manufactured homes
Exclude multi-family	Exclude Multi-family
Remove duplicates	Remove duplicates

For the expansion in 2020, all T5 and C5 customers were removed from both participation and eligibility based on savings results from the two-year pilot. Additionally, a third party (DNV-GL) randomly removed 29,369 customers from C1, C2, C3, and C4 to free them up for possible treatment in the expansion. The analysis by DNV-GL determined how many customers could be removed from these control groups while still allowing for statistical significance in calculating savings cumulatively across all treatment groups.

In April 2020, eligibility screening was conducted to establish a new T6 group from the remaining Idaho Power customers and those freed up from C1, C2, C3, and C4.

Idaho Power scrubbed the initial count of customers and applied the following filters:

IPC Applied Filters

This list is consistent with filters applied during the pilot phase.

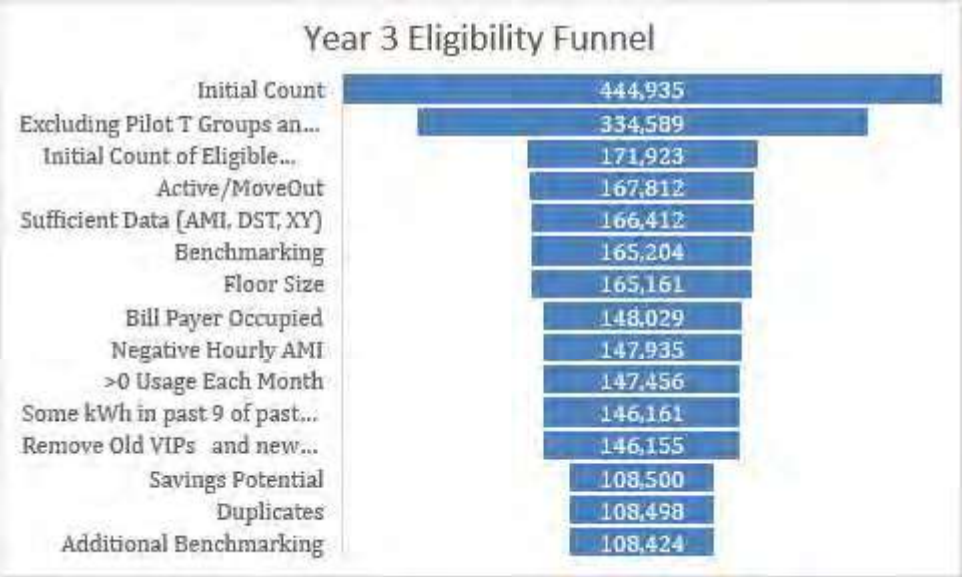
- Required Idaho service addresses
- Required AMI data
- Required residential accounts (I01)
- Required meters associated with a home
- Removed:
    - All non-individual accounts
    - Accounts with less than 12 months active history
    - Do not contact list
    - Net Metering (I84), Master metered accounts (I03) and Time-of-Day (I05)
    - Known language barriers
    - Built prior to 1860, more than 6 bathrooms, more than 8 bedrooms, homes with <350 ft^2 or >7000 ft^2. Used CoreLogic GIS data.
    - Used premise type and installation type to remove the following:
        - Manufactured homes
        - Multi-family
    - Duplicates

The criteria for culling customers during eligibility screening are listed in Table 3.

Table 3 – Criteria and Rationale for Culling Customers During Eligibility Screening

Priority Order	Criteria Filter Applied	Qty	Description
1	Initial Count	444,935	Provided by IPC; all customers with active status and AMI data for the past 12 months.
2	Excluding Pilot T Groups and C5	334,589	Excluding treatment and control customers carried over from pilot and all T5/C5 customers
3	Initial Count of Eligible Customers Based on IPC filters/scrub	171,923	Provided by IPC; all eligible customers after IPC scrubbed the population for using eligibility criteria "IPC Applied"
4	Active/MoveOut	167,812	No Longer Active and MoveOuts after 03012019
5	Sufficient Data (AMI, DST, XY)	166,412	AMI data complete for 13 months
6	Benchmarking	165,204	Removed those with benchmarking data (home size and location) that caused them to have insufficient number of comparable homes
7	Floor Size	165,161	Non-zero and <7,000 SF
8	Bill Payer Occupied	148,029	Removed service zip codes that do not match billing zip codes
9	Negative Hourly AMI	147,935	Customers with negative AMI are likely to never see reports
10	>0 Usage Each Month	147,456	Every month should have some usage
11	Some kWh in past 9 months	146,161	163 kWh/month
12	Correct Rate Code	146,161	
13	Remove Old VIPs	146,155	
14	Savings Potential	108,500	Remove customers with less than 7,000 kWh of usage
15	Duplicates	108,498	2 duplicates removed
16	Additional Benchmarking	108,424	Customers that fall into a benchmarking cluster that does not have at least 100 participants when AC flag is applied

Figure 2 - Eligibility Funnel for 2020 Expansion



1.4 Customer Data Acquisition/Integration

The initial data acquisition and integration required to begin the program was performed in year one. This involved using third-party demographic and property data, as well as IPC's data on customer usage.

For the 2020 expansion, data acquisition and integration were primarily maintenance, including receiving weekly electric customer-billing data and regular electric AMI data for the treatment groups, control groups, and a sample of customers (for benchmarking). In addition, Aclara extracts customer action and profile data from *My Account* tools (EnergyPrism) weekly for treatment and control groups (this ensures home profiles are up to date), and Idaho Power provides Aclara with real-time data re: customers who have opted out so they can be removed from the program.

One important change that was made to customer data acquisition was the frequency with which electric AMI data is transferred from IPC to Aclara. In years one and two, AMI data was transferred weekly; however, in the spring of 2020, the data transfer frequency was updated to daily with data available to Aclara shortly after midnight each day. The AMI data that was transferred in 2020 generally lagged 5 days from the time AMI data is read from the meter. As a result, AMI data is available as soon as 5 days after it is read. The value this change brings to the program is the ability to send reports up to 5 days sooner.

Table 4 - Data Requirements

Integration Point	Description	Format	Frequency	Initiator	Recipient
Public Record Data	Aclara calls Melissa Data for latest property records for treatment group customers, selected control customers, and random sample for benchmarking.	CSV	batch: one-time historical (performed year one)	Aclara	Aclara
Electric Customer-Billing Data	Idaho Power provides electric customer-billing data for treatment-group customers, selected control customers, and all eligible customers incrementally each week.	CSV	recurring weekly	IPC	Aclara
Electric Customer-AMI Data	Idaho Power provides recurring daily AMI updates of electric AMI data for treatment group customers, selected control customers, and all eligible customers for benchmarking.	CSV	recurring daily	Idaho Power	Aclara
Action and Profile Data	Aclara extracts customer action and profile data from *My Account* tools (EnergyPrism) for treatment and control group customers.	CSV	recurring weekly	Aclara	Aclara
Opt-Outs	Aclara provides a weekly report on all customer calls and opt-outs to Idaho Power.	CSV	recurring weekly	Idaho Power	Aclara

1.5 Additional Benchmarking Flags (AC and ESH)

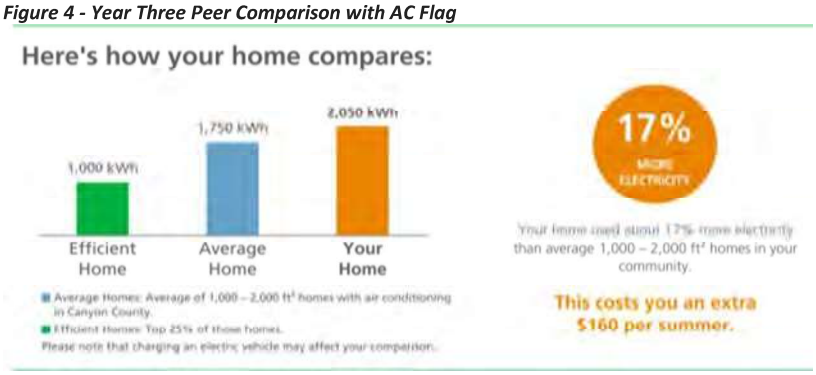
Benchmarking flags are used to cluster customers based on similar home properties for the purpose of calculating peer comparisons and identifying how each treatment customer's usage compares to the average and efficient homes of similar properties. In the pilot program, the flags used to identify benchmarking clusters were 1) Square Footage, 2) Home Type, and 3) County.

Figure 3 - Peer Comparison Section



During the expansion, two dynamic benchmarking flags were added to improve the accuracy of peer comparisons and those were 4) Air Conditioning and 5) Electric Heating. This way customers with air conditioning were only compared with other customers with air conditioning and those customers with electric heating were only compared with other customers with electric heating. This dynamic design was messaged to customers in small print under the peer comparison charts as shown in figure 3. The electric heating flag was used in years one and two to create benchmarking groups for T1 and T2 during the winter months. The benefit of the dynamic benchmarking system is improved benchmark groupings that consider whether customers have electric heating. This allows for benchmarks that match each customer's primary heat source, if known. The dynamic benchmarking system also allows the same segmentation with air conditioning.

Figure 4 - Year Three Peer Comparison with AC Flag



1.6 Aligning Tip Selection with Season

In order to get timely and relevant tips out to customers at the beginning of a season (either winter or summer), the standard protocol of reporting on the last quarter or two months, and using the results to suggest tips for the next quarter or two months, was not as successful in year one as intended (a customer receiving tips based on the past two months electricity may not find them to be relevant to the coming two months if there is a change of season).

In 2020, the solution employed was to send a seasonal report at the beginning of the season with suggested actions/tips based on behavior last season.

1.7 COVID-19 Adjustments

In response to the COVID-19 pandemic and its impacts on both customer behavior and Idaho Power operations, some adjustments were made to report content:

- Tips were reviewed to ensure the use of sensitive messaging regarding increased energy use.
- The promotion of paperless billing, MyAccount, alerts, and energy-related activities for families were substituted for promotions involving contractor visits.
- Customer Interaction Center hours were updated to reflect the availability of agents.

2 2020 Program Results

2.1 Objectives: Findings

2.1.1 ENERGY SAVINGS

Cumulative Savings During Treatment Period

In total, each treatment group showed savings of between 0.56 percent and 3.25 percent. This added up to a total combined savings of 10,316,562 kWh across all groups in treatment as of December 31, 2020. Savings calculations from all treatment groups were statistically significant. See table 5 for savings per cohort.

Additionally, the T5 treatment group was treated with home energy reports through February 2020 and did continue to show persistent savings post-treatment. All treatment customers in 2020, including the T5 post-treatment period, shows total combined savings of 10,427,940 kWh. See table 6 for the treatment and persistence savings for the T5 group; and table 7 for combined savings including T5.

Table 5 – 2020 Cumulative Savings by Cohort
T1234 Treatment Period: Jan 1, 2020 - Dec 31, 2020
T6 Treatment Period: Jun 1, 2020 - Dec 31, 2020

Cohort	Avg kWh Savings per Customer	Average savings percent	95% Confidence Margin of Error	One-Sided Null Hypothesis P-Value	Cumulative Aggregate Savings (kWh)
Winter Heating – T1	267.72	1.25%	298.91	0.039593	1,445,666
Winter Heating – T2	363.31	1.76%	302.86	0.009356	1,734,800
Year-Round - T3	223.38	1.48%	154.82	0.002342	1,237,313
Year-Round - T4	339.66	3.25%	138.84	8.14E-07	881,080
Expansion - T6	50.06	0.56%	29.33	0.000412	5,017,703
					10,316,562

Table 6 – 2020 Cumulative Savings by T5
T5 Treatment Period: Jan 1, 2020 - Feb 29, 2020
T5 Persistent Period: Mar 1, 2020 - Dec 31, 2020

Cohort	Avg kWh Savings per Customer	Average savings percent	Cumulative Aggregate Savings (kWh)
Year-Round - T5	39.67	0.49%	67,831

Table 7 – 2020 Combined cumulative Savings for all Treatment Groups including T5

Cohort	Avg kWh Savings per Customer	Average savings percent	Cumulative Aggregate Savings (kWh)
T123456	86.72	0.74%	10,427,940

2.1.2 MONTHLY SAVINGS BY TREATMENT GROUP

Table 8 - Monthly Average Percentage Savings per Cohort

	T1B	T1Q	T3B	T3Q	T4B	T4Q	T1	T2	T3	T4	T6
Jan 2020	3.54%	0.85%	1.28%	2.62%	3.20%	4.57%	NA	2.09%	NA	NA	NA
Feb 2020	2.57%	1.56%	0.88%	3.26%	3.64%	2.95%	NA	1.87%	NA	NA	NA
Mar 2020	2.65%	2.48%	0.94%	2.09%	3.29%	3.29%	NA	2.21%	NA	NA	NA
Apr 2020	NA	NA	NA	NA	NA	NA	1.83%	1.95%	1.14%	2.93%	NA
May 2020	NA	NA	NA	NA	NA	NA	1.55%	1.54%	1.31%	2.59%	NA
Jun 2020	NA	NA	NA	NA	NA	NA	1.39%	-0.05%	1.04%	3.44%	0.27%
Jul 2020	NA	NA	NA	NA	NA	NA	1.26%	0.43%	1.71%	2.82%	0.75%
Aug 2020	NA	NA	NA	NA	NA	NA	1.32%	0.21%	0.97%	2.12%	0.61%
Sep 2020	NA	NA	NA	NA	NA	NA	1.42%	0.79%	1.77%	2.68%	1.08%
Oct 2020	NA	NA	NA	NA	NA	NA	1.48%	1.77%	1.58%	2.80%	0.32%
Nov 2020	NA	NA	NA	NA	NA	NA	1.03%	1.25%	1.89%	1.70%	0.50%
Dec 2020	NA	NA	NA	NA	NA	NA	1.77%	2.87%	2.31%	4.16%	0.52%

2.1.3 EVALUATION, MEASUREMENT & VERIFICATION PROCESS

The treatment groups' energy savings were evaluated following standard industry-accepted evaluation practices. The program was set up as a Randomized Control Trial (RCT), with a third party (DNV-GL) randomly assigning the treatment and control groups. The evaluation employed a difference-in-differences method, which allows for accurate evaluation of program-driven energy savings.

Year One

In year one, appropriately sized treatment and control groups were created for each cohort, assuming an attrition rate of 10 percent and allowing for statistically significant detection of energy savings in excess of 1.2 percent in the treatment groups. To achieve this objective, all eligible customers were placed in either the treatment or control group.

In year one, 27,000 customers were identified as initial program participants. After taking into consideration exclusionary factors such as move-ins/move-outs, as well as removing some potential T1 participants due to a lack of adequate county benchmarks, the sample size at the time of the first report was 25,677.

Year Two

In year two, at the time the bimonthly and monthly groups were created, the total number of customers in treatment groups was down to around 23,000, a net decrease from the previous year. The changes made to the treatment groups were as follows:

1. The T2 group was added to the study.
2. Move-outs were removed from all EMV treatment groups, the result of on-going attrition due to customers moving out over the course of year 1.
3. All groups were optimized to remove households with low savings potential (see 2.3.3).

The total number of customers in control groups in year two was 110,969 (down from 166,840 in year one). The same changes made to the treatment groups were applied to the control groups:

1. A new control group was created to accompany the new T2 group.
2. Move-outs were removed from all control groups, the result of on-going attrition due to customers moving out over the course of year 1.
3. The control groups were similarly optimized to remove households with low savings potential.

Households where residents moved out during the evaluation period were taken out of both the treatment and control groups for the purpose of measuring energy savings. Customers who opted out or did not receive reports due to being marked non-deliverable by the National Change of Address database were left in both the treatment and control groups for the purpose of measuring energy savings.

Program Year 2020

The treatment customers from the pilot continued treatment (except T5) and a new treatment group and new control group were created to expand the number of customers in treatment. After optimization of the existing treatment groups was complete, a total of 18,492 customers were identified as existing customers eligible for treatment in year three. The following changes were made to the existing treatment customers:

1. The T5 treatment group was removed from participation because this group showed the lowest propensity to save energy during the pilot.
2. All remaining treatment customers from the pilot (years one and two) were moved to a consolidated quarterly treatment schedule.
3. The C5 control group was removed from eligibility for treatment.

The following changes were made to the existing control groups:

The C1, C2, C3, and C4 control groups were reduced in size significantly. 75,973 customers were removed from these four control groups to free them up for treatment in year three as T6 customers. The number of customers removed from each control group was determined by DNV-GL with consideration given to the impact their removal would have on the statistical significance of calculated savings across all treatment groups. See table 9 for a record of the changes made to the C1, C2, C3, and C4 control groups.

Table 9 - Reduction in Existing Control Groups

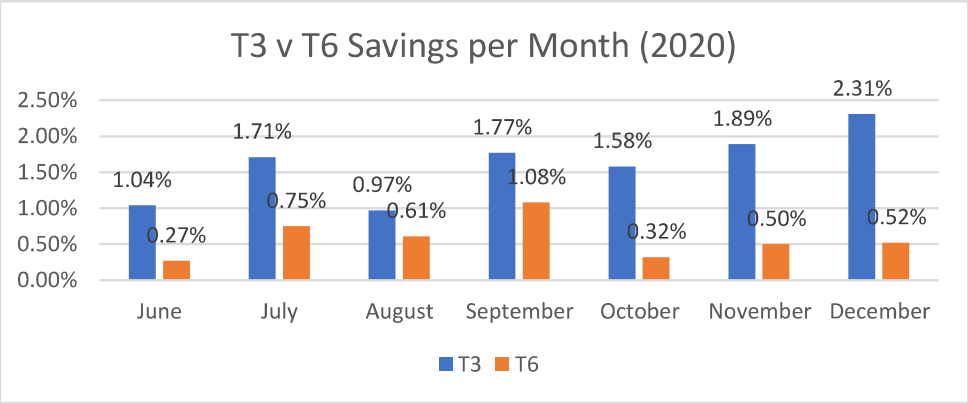
Group	Original Control Group Size	Reduced New Control Group Size
C1	12,090	1,450
C2	5,024	800
C3	35,194	3,520
C4	31,995	2,560

In the spring of 2020, a new treatment group (T6) was created based on eligibility criteria applied to the remaining population. The number of new customers eligible for treatment as of the start of year three was 108,498.

2.1.4 COMBINED SAVINGS FOR NEW CUSTOMERS (T6) VS. EXISTING CUSTOMERS (T1234)

Treatment of new T6 customers began in June 2020 and continued throughout 2020. Treatment of existing customers (T1, T2, T3, and T4) started prior to the start of 2020 and continued throughout 2020. An analysis of savings within the new customer group compared to the existing customer group found that in year three, new customers (T6) saved 7.15 kWh per month on average and the existing customers (T1, T2, T3, and T4) saved 24.12 kWh per month on average. The T6 group savings by month are showing a favorable increase in both the summer cooling season as well as the winter heating season. The T6 group is much larger than all treatment groups and more closely represents the entire Idaho Power customer base than any other group. Savings from the T6 group did not show the same trend as those from any of the existing waves but did follow similar directional patterns.

Figure 5 - T6 Savings Compared to T3



2.2 Email Reports

2.2.1 ENROLLMENT

Starting in March 2019, HER recipients were given the option to receive reports by email. They were made aware of this option through a note in the header of their print HERs. With the expansion of the HER program to include the T6 group in June 2020, 106,941 (new) customers received welcome letters introducing them to the program. The welcome letters also contained information regarding the option to receive reports by email instead of print.

As of December 31, 2020, 107 customers have opted to receive email reports rather than print reports.

Figure 6 - HER Header with Email Sign-Up Information



Figure 7 - HER Welcome Letter FAQ regarding Email Option



While some customers indicated that they would prefer to receive email reports, the impact of email reports on savings is presently unknown. Currently, email reports are offered for customer convenience, not due to any impact they may (or may not) have on savings.

2.2.2 DELIVERY, OPEN, AND BOUNCE RATES

In 2020, a total of 261 email reports had been sent to Idaho customers and seeds (i.e., IPC employees receiving an eHER in order to evaluate it). Of these, all 261 emails were successfully delivered, and a total of 82 were opened. The total clickthrough rate (that is, the rate of clicks on links contained within the emails) was 26.8 percent.

2.3 Customer Feedback

2.3.1 CUSTOMER SERVICE LINE CALLS AND OPT-OUT RATES

Table 10 - CSA Calls and Opt-Out Rates

	2018	2019	2020
Total Calls	411	246	1,087
Opt-Out Calls	0.64%	0.22%	0.124%

In 2020, IPC customer solutions advisors (CSAs) received 1087 calls related to the HER program, compared to 246 calls in 2019 and 411 calls in 2018. The 2020 opt-out rate was 0.124% percent compared to 0.22 percent in year two and 0.64 percent in year one.

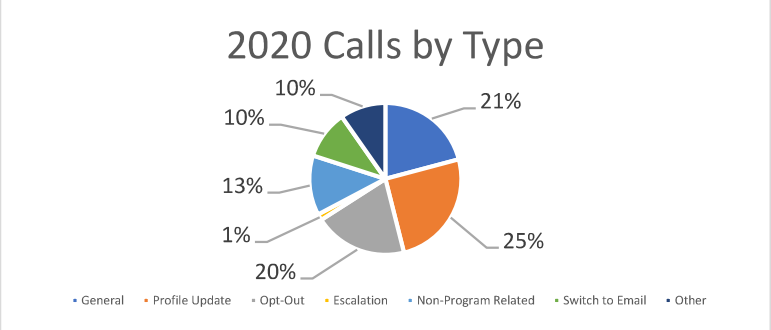
From January to December 2020, CSAs classified each call they received into one of seven categories:

- General
- Profile Update
- Opt-Out
- Escalation
- Non-Program-Related
- Switching to Email Reports
- Other

Table 11 – Reasons for Calls to CSAs in 2020 by Category

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
General	7	1	1	1	5	48	58	35	3	27	9	33	228
Profile Update	4	2	1	0	4	57	80	43	17	43	4	21	276
Opt Out	4	2	0	0	4	56	45	31	4	27	7	31	211
Escalation	0	0	0	0	0	0	1	5	3	3	0	2	14
Non-Program-Related	0	1	0	0	0	16	19	25	16	27	10	25	139
Switch to Email	1	0	0	0	1	36	29	18	0	14	2	12	113
Other	0	0	0	0	2	39	18	17	3	13	3	6	106

Figure 8 - 2020 Calls by Type



Following are some sample notes from CSAs regarding phone calls from customers about the HER program:

- *"Customer called with a question about her a/c usage pattern."*
- *"[Customer] wanted information on how to cut down his energy usage."*
- *"[Customer] wanted to know how to qualify for a smart thermostat incentive."*
- *"Based on the findings on the report, customer is interested in a Home Energy Audit."*
- *"Daughter is moving out of home receiving HER and father was taking over the service there. Got CSA number off the report."*
- *"[Customer] enjoys the reports very much and thinks it is interesting to see how he does during the different times of the year."*
- *"Customer feels that the information isn't useful."*
- *"Customer has 7-9 stock tank heaters that they run in the winter and receiving the report upsets her."*

2.4 Additional Metrics

2.4.1 MICROSITE ENGAGEMENT

Table 12 - Microsite Activity by Month

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Unique Clicks	0	0	0	4	1	21	16	42	4	16	7	14	125
Total Clicks	0	0	0	10	2	21	21	46	5	20	7	19	151
Unique Page Views	12	12	5	34	31	51	48	74	11	58	15	41	392
Total Page Views	13	12	5	45	34	55	52	79	12	62	21	48	438

Microsite usage has increased with the launch of the expansion in June 2020, as expected. From January 1, 2020 to December 31, 2020, there were a total of 392 unique page views (that is, people who navigated to the site) and 125 unique clicks within the site. 76% of unique page views for the year occurred after the T6 expansion customers began receiving their reports.

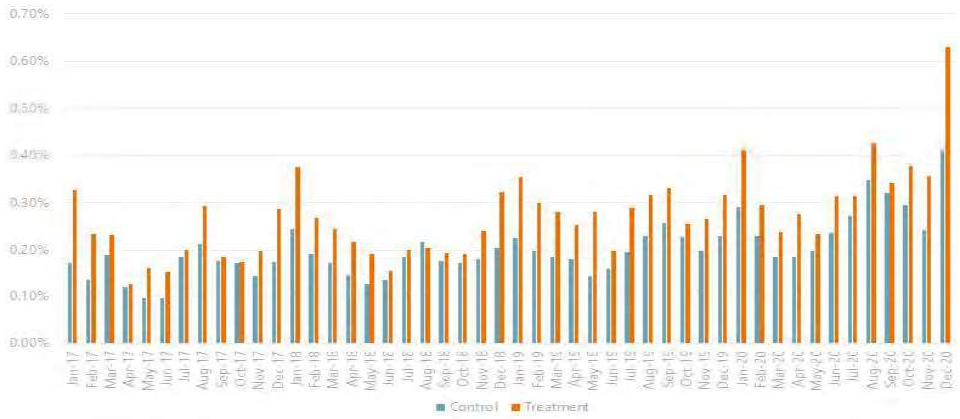
Low microsite usage is to be expected, as the site serves only to supplement the HER program and does not offer extra value to customers beyond answering basic FAQs. It is not a venue for customers to update their home profiles or opt out of the program; it functions primarily to help reduce call volumes.

The microsite link — http://idahopower.com/homeenergyreport — is available from HER reports.

2.4.2 MY ACCOUNT WEB ACTIVITY

Since the beginning of the program, the treatment groups have consistently used IPC's *My Account* slightly more than the controls. The treatment group has been an average of 0.1 percent more active on My Account than the controls since January 2017.

Figure 9 - My Account Activity Treatment vs Control Program to Date



2.4.3 ATTRITION RATES

Attrition rates measure the number of people removed from the HER program, either due to not meeting program requirements or because participants chose to opt out. The permanent attrition rate in Y3 was 9.4% with 11,850 customers either opting out or being permanently removed for one of the following reasons: move-outs, incompatible location type, incompatible property type, or non-deliverable. Additionally, 280 customers were removed for having insufficient benchmarking groups. In October 2020, the decision was made to permanently remove these customers going forward. The October benchmarking analysis identified an additional 334 participants at-risk for future removal due to the size of their benchmarking groups (fewer than 100 active participants in a benchmarking group compromises the county peer comparisons).

NEW CUSTOMER (T6) ATTRITION RATES

Table 13 - T6 Attrition Rates in 2020

T6	Jun	Aug	Oct	Dec	Total
Permanent Removals					
Move Outs	517	689	3155	1874	6235
Location	28	33	207	0	268
Property	3	11	15	13	42
Opt Outs	0	63	48	26	137
Temporary Removals					
AMI Insufficient/Negative Usage	5	358	413	422	1198
USPS - Non Deliverables[2]	1009	1053	964	988	4014
Total Removals	1562	2207	4802	3323	11894
Insufficient Benchmarking	28	34	207	0	269
Reports Delivered	**106,941**	**105,267**	**102,314**	**100,560**	**415,082**

[2] USPS – Non Deliverables were temporarily removed from eligibility each month; then those customers regained eligibility for treatment the following month until after October of 2020. Starting with the November reports, any customer listed as non-deliverable was permanently removed from the program. Throughout 2020, 1,905 customers were permanently removed because their addresses were non-deliverable by USPS.

EXISTING CUSTOMER (T12345) ATTRITION RATES

Table 14 - T1234 Attrition Rates in 2020

T12345	Feb	May	Aug	Nov	Total
Permanent Removals					
Move Outs	263	238	90	470	1061
AMI Insufficient/Negative Usage	119	0	0	0	119
Location	0	0	0	0	0
Property	2	2	0	1	5
Opt Outs	7	5	2	3	17
Temporary Removals					
AMI Insufficient/Negative Usage	0	67	81	33	181
USPS - Non Deliverables	44	15	26	19	104
Total Removals	435	327	199	526	1487
Insufficient Benchmarking	0	0	12	0	12
Reports Delivered	**20,197**	**18,126**	**17,773**	**17,346**	**73,442**

3 Lessons Learned & Future Recommendations

3.1 Process Improvements

Based on the findings from year two, the following process improvements were implemented in 2020:

Daily AMI Data Transfer

In the pilot program (years one and two), AMI data was transferred via FTP from Idaho Power to Aclara on a weekly basis. This limited the timeframe within which reports could be generated because updated AMI data was not available regularly enough to generate reports any day of the week.

In the spring of 2020, a shift was made to the AMI data transfer process to begin sending the file daily as opposed to weekly. This change resulted in updated AMI data available on a daily basis and has reduced the time needed between report template approval and report generation by multiple days.

Evaluate Content-Approval and Revision Process

Although content and design for reports had been pre-approved for this program, context for those approvals was lacking. Therefore, when the content appeared in layout with the target delivery date and audience identified, the content often needed to be tweaked. Since the current process did not take this into account, it decreased the efficiency of report generation and delivery. At times, these final edits also impacted the time allowed for QA, which introduced more opportunities for error.

In 2020, additional time was allocated to the initial content review and approval process to ensure reviews were not unnecessarily rushed. The addition of 1-2 days during the content review phase has reduced the number of late process tweaks; however, additional time may be needed.

Minimize HER with Zero Usage

In the pilot year 1 and 2, reports where customers had zero usage in the reporting period were sent out. This is due to a variety of reasons such as changes in occupancy in households and the inclusion of vacation homes.

To minimize this issue, an additional eligibility filter was added during the expansion implementation phase to require that all customers had a minimum of 163 kWh in at least 9 of the past 12 months.

To mitigate the number of reports sent out with zero usage, each report run is analyzed to ensure that all treated customers have at least 97.5% AMI readings over the past 12 months. Those that do not are removed from treatment for that cycle.

Consider Rules for Attrition

In Year 1 and Year 2 of the pilot, customers who did not receive a report because they had missing billing data or other data errors in one report period were also removed from the program and did not receive any future reports. This affects program savings and also means that a customer that is potentially a good candidate to receive HERs will no longer receive HERs at all.

In 2020, as part of the expansion, customers were no longer permanently removed if they could not be treated in any given month for insufficient billing, USPS non-deliverable[3], or AMI data error. In October, the decision was made to begin removing the USPS non-deliverable customers permanently because these customers are unlikely to receive any future reports if they were determined by the USPS to be non-deliverable in any given month. Aclara/Uplight and Idaho Power are continuing to review the participants that move into the USPS non-deliverable status to ensure the best customer experience for these participants going forward.

Monitor Incoming Customer Calls

Occasionally, issues are discovered through review of the customer solutions advisor (CSA) summary report. For example, a small number of HER participants had called to let Idaho Power know they had received a current HER report for a report period corresponding to a period after they had vacated a premise.

Program Managers made a commitment heading into the expansion to closely monitor the CSA summary reports each and every week to ensure that issues brought up by program participants are acknowledged and addressed. As a result, a handful of critical issues were spotted and addressed throughout Year 3.

- Home profile updates were not reflected quickly enough to be captured in the next report. A change was made to reduce the amount of time between the receipt of home profile updates and the generation of reports.
- All opt-outs were not being captured and processed. A change was made to the data ingestor to ensure all opt-outs were processed and an additional level of quality control was implemented.
- A customer received another participant's home energy report. This led to the shifting of the barcode used for QA by the printer so that their backup printers could also scan to ensure the proper report was inserted into each envelope.

Permanently Remove Customers with Insufficient Benchmark Groups

Benchmarking customers are non-treated energy users grouped into clusters that take into consideration home attributes such as square footage, county, home type, and the presence of air conditioning or electric heating. These customers are not impacted by typical attrition because they are not treated; however, they are impacted by move-outs. An improvement made in October 2020 was to remove any treatment customers that do not have at least 100 comparable active, benchmark homes from the program permanently instead of temporarily. This decision was to ensure a positive and consistent customer experience. With fewer than 100 homes in the benchmark cluster, the only way to maintain report delivery was to expand the geographic region beyond the participant's county. It was determined the variations in weather patterns and inconsistency in a participant's comparison group had a high propensity to lead to customer dissatisfaction.

3.2 Lessons Learned

In 2020 there were several lessons learned, detailed below. These learnings serve as a mechanism identifying program improvement opportunities, in subsequent years.

Welcome Letters Can Only be Sent with Initial Report

Those customers that did not receive treatment in the first month cannot be sent a welcome letter in a future month and therefore should be removed from treatment. It was discovered in November 2020 that the costs and level of effort associated with sending one off welcome letters is prohibitive and should be avoided. As a result, welcome letters should only be sent with the initial batch of reports and customers that are untreatable with the first report drop should be excluded from participation. With the expansion, 1,562 new customers were untreated when the welcome letters were sent in June of 2020.

AC and ESH Benchmarking Flags Cause an Increase in Attrition

The addition of air conditioning and electric heating benchmarking flags reduced benchmarking cluster sizes, resulting in more removals based on sufficient availability of benchmarking data. In future eligibility evaluations, the use of these benchmarking flags should be scrutinized to determine the value added. There were 280 customers permanently removed due to insufficient benchmarking data in 2020.

Opt-in to Email Remains Low with Language Added to Welcome Letter

It was observed that opt-ins for email reports were still very low, even after including language about the option in the welcome letter and continuing to display similar language on print reports, which was done in year two. Email was the most preferred method of delivery according to responses in the survey conducted in 2019 but it is likely that adoption is low due to the level of effort needed in order to opt-in to email. There is no way to determine if email report recipients have a higher savings than print report recipients because the email population remains too small and there is not a control group associated with either segment. If there is a push to encourage customers to opt-in to the email channel, the barriers to opt-in need to be lessened.

Missed Opt-outs

A customer that called to opt-out was not successfully removed from the program and had to call to opt-out a second time. It was determined that this was the result of a broken translation between the CSA survey report and the ingestion of data into the database. This underlying issue was resolved in October 2020; however, as a second checkpoint, the CSA survey reports are now also being manually reviewed prior to each report run to ensure all opt-outs have been removed.

3.3 Recommended Improvements

Based on the findings from 2020, Aclara/Uplight has the following recommendations for enhancing the program in 2021 and beyond:

Evaluate Messaging to Ensure the Appropriate Use of Tips for Each Season

Throughout the year, tips and messaging were tailored to the seasons so that the focus of each reports correlates with the weather. For example, in November, customers were presented with a winter heating focused set of tips. In some months, there are additional opportunities for focused messaging based on the season. In February, all customers were treated with an Appliances & Lights focused report; however, the program is designed so that customers receive their reports at the beginning of the month so the winter heating focus could continue into the February reports.

In 2021, it is recommended that the messaging schedule be re-evaluated for additional opportunities that may lead to increased savings.

Review Net Metering Later in the Eligibility Process

The eligibility process takes several weeks to complete and the eligibility of each customer can change during this process. One attribute that is changing for customers frequently is the change over to net metering. It is recommended that future eligibility processes remove net metering accounts towards the end of the selection process as they did change over the course of the 2020 expansion selection process. The number of net metering accounts created is growing quickly and those customers often have negative usage readings, making them ineligible for treatment in any given month. Removing these types of accounts closer to the end of the eligibility process should catch a greater number of net meters before final selection is complete.

Review Benchmarking Insufficiencies during Eligibility Process

Many of the customers that were permanently removed due to insufficient benchmarking data could have been identified during the eligibility screening process in 2020. It is recommended any future eligibility processes involve an analysis of how many customers will likely be untreatable in any given month due to benchmarking insufficiencies. A sufficient benchmarking cluster is defined as 100 customers; however, some benchmarking customers can become inactive over time. For this reason, a threshold of 115 per benchmarking cluster is recommended.

Consider Another Customer Satisfaction Survey

The last customer satisfaction survey was conducted in year two and gave us a valuable look into how favorably customers viewed this program, as well as how likely they were to change their energy consumption behavior based on the reports they received. There was no survey conducted in 2020 to determine the trend in customer satisfaction scores over time. Now that the program has expanded in scope by nearly 500%, there is an opportunity to measure this important metric across a more determinative sample size.

Incorporate Self-Service Opt-in to Email Function

The number of households who decided to switch from paper to email reports continues to be low – only 107 households. In the pilot program years, it was determined that a likely cause of low enrollments was

the requirement that customers had to call in to opt into email reports. Aclara/Uplight was unable to provide a self-service option to allow customers to opt-in to email through the customer portal without contacting Idaho Power. Since this continues to be a likely cause of low adoption in the expansion program, the recommendation is that a self-service opt-in function be added to the customer portal.

Identify a Place to Capture EV Ownership in Preparation for EV Messaging

Although EV messaging is currently static on the reports, it is becoming more critical for both customer satisfaction and accurate comparisons. It is recommended that a single web-capture location be identified for capturing EV ownership to facilitate accurate identification of participants to receive custom EV messaging.

4 Appendices

4.1 Appendix A: Sample Home Energy Reports

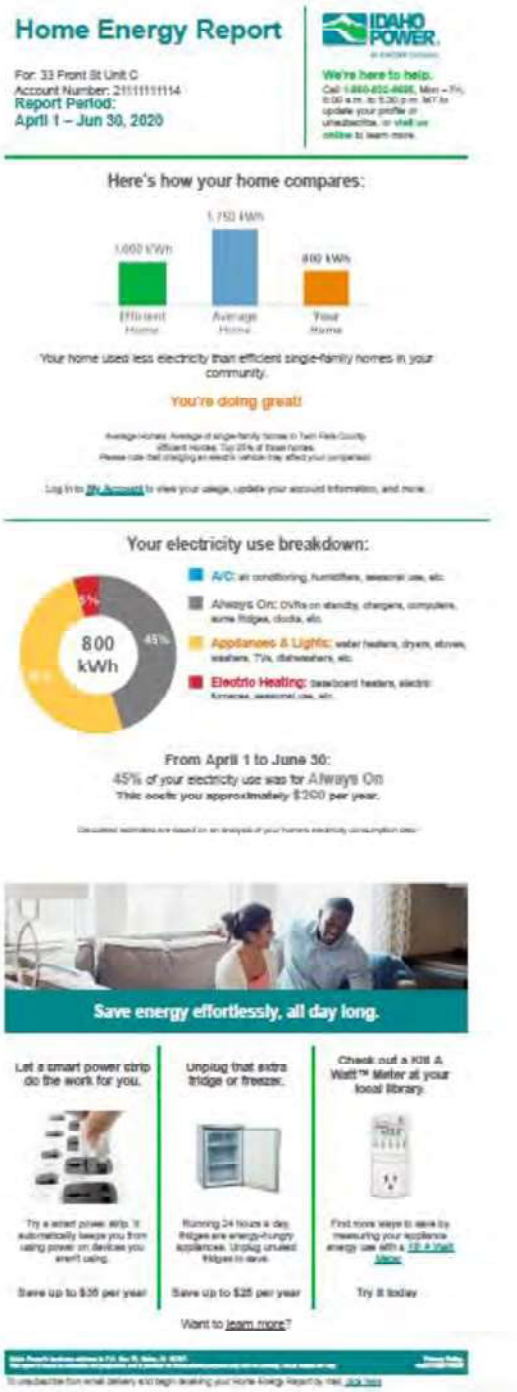
A-1. SAMPLE PRINT HER — ALWAYS-ON TIPS



A-2. SAMPLE PRINT HER — A/C TIPS



A-3. SAMPLE EMAIL REPORT — ALWAYS-ON TIPS



Home Energy Report

For: 33 Front St Unit C
Account Number: 21111111114
Report Period:
April 1 – Jun 30, 2020

IDAHO POWER

We're here to help.

Here's how your home compares:

1,000 kWh
1,750 kWh
800 kWh
Efficient Home
Average Home
Your Home

Your home used less electricity than efficient single-family homes in your community.

You're doing great!

Your electricity use breakdown:

800 kWh
45%

A/C: air conditioning, humidifiers, seasonal use, etc.
Always On: DVRs on standby, chargers, computers, some fridges, clocks, etc.
Appliances & Lights: water heaters, dryers, stoves, washers, TVs, dishwashers, etc.
Electric Heating: baseboard heaters, electric

From April 1 to June 30:
45% of your electricity use was for Always On
This costs you approximately $200 per year.

Save energy effortlessly, all day long.

Let a smart power strip do the work for you.

Try a smart power strip. It automatically keeps you from using power on devices you aren't using.

Save up to $35 per year

Unplug that extra fridge or freezer.

Running 24 hours a day, fridges are energy-hungry appliances. Unplug unused fridges to save.

Save up to $25 per year

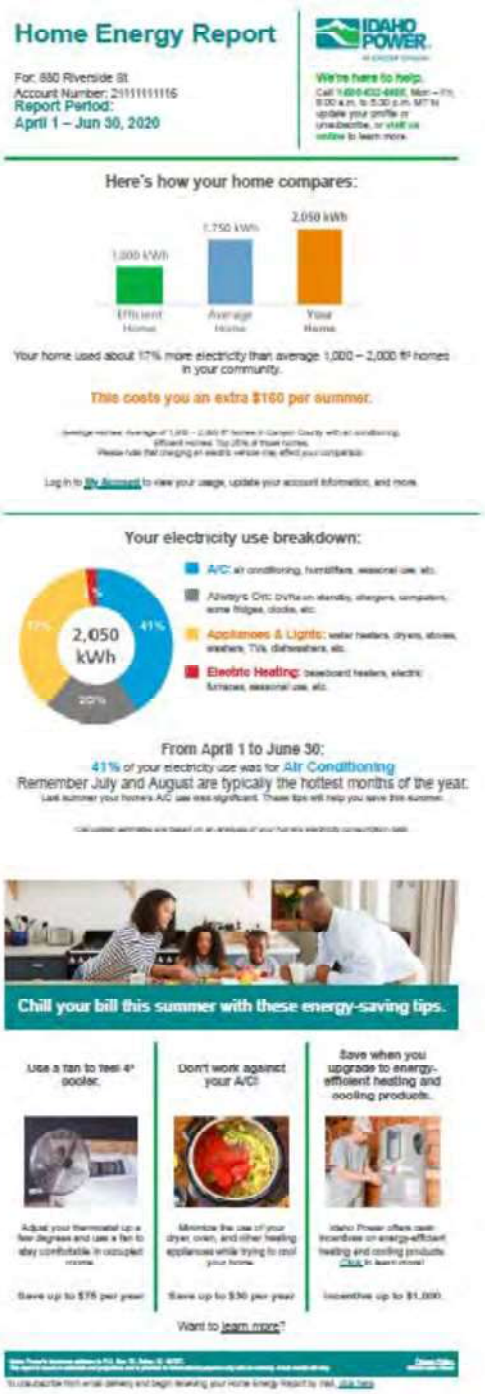
Check out a Kill A Watt™ Meter at your local library.

Find more ways to save by measuring your appliance energy use with a Kill A Watt Meter.

Try it today

Want to learn more?

A-4. SAMPLE EMAIL REPORT — A/C TIPS



A-5. Sample Print Report — Appliances & Lights Tips

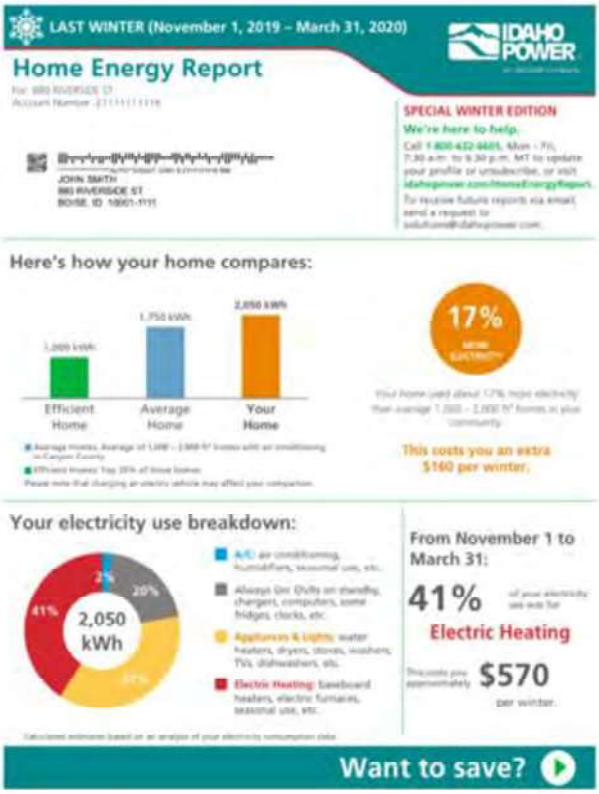




A-6. Sample Email Report — Appliances & Lights Tips

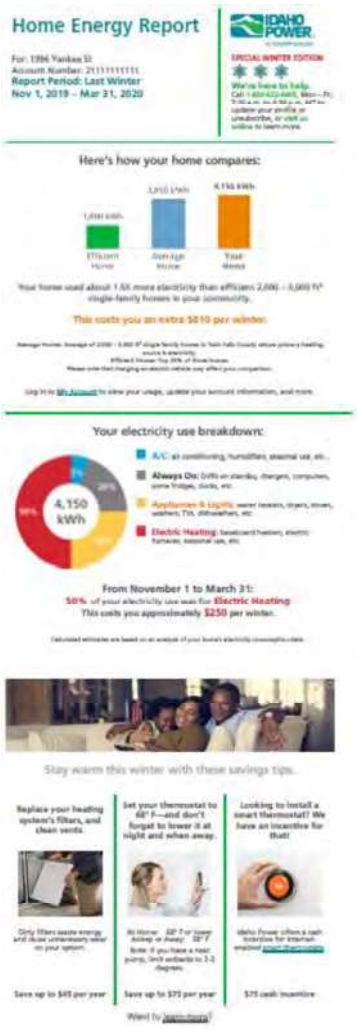


A-7. Sample Print Report — Heating Tips





A-8. Sample Email Report — Heating Tips



4.2 Appendix B: Quarterly Program Monitoring Reports

Reports on program metrics were reported on a quarterly basis, according to the schedule below.

Report #	Date Presented	Report Period
Q1	April 30, 2020	January 1, 2020 – March 31, 2020
Q2	July 29, 2020	April 1, 2020 - June 30, 2020
Q3	November 4, 2020	July 1, 2020 - September 30, 2020
Q4	February, 2021	October 1, 2020 - December 31, 2020

IDAHO POWER ENERGYWISE
PROGRAM SUMMARY REPORT
2019-2020

SUBMITTED BY:

FRANKLIN ENERGY

Idaho Power EnergyWise Program Summary Report 2019-2020

Made possible by:

IDAHO POWER®

An IDACORP Company

Submitted by:

FRANKLIN ENERGY

August 2020

"The kids like the kits because they can share what they learn in class with their family. They also liked learning about how much their video game consoles cost to run."

Tanya Scheibe, Teacher
Lake Ridge Elementary School

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"I liked how the chapters in the books were broken up into manageable sections. The little activities were great for helping focus on finding key information."

Brian Fischer, Teacher
Eagle Hills Elementary School

Executive Summary

Franklin Energy is pleased to present this Program Summary Report to Idaho Power, which summarizes the 2019-2020 Idaho Power EnergyWise Program. The program was implemented in the Idaho Power service area in the states of Idaho and Oregon by 9,800 teachers, students, and their families.

The following pages provide an overview of the program and materials, outline of program implementation, introduction to the program team, description of program enhancements, impact of the program, and summary of results from the home activities. In addition to this information, evaluations, letters, and comments are provided for a glimpse into actual participant feedback. Lastly, projected savings from the individual measures found within the EnergyWise Kit are also included.

Participant Satisfaction

A successful program excites and engages participants. Students, parents, and teachers are asked to evaluate the program and provide personal comments. A sample of the feedback is given in the margin. ›



Teachers who indicated that the products in the kit were easy for students to use.



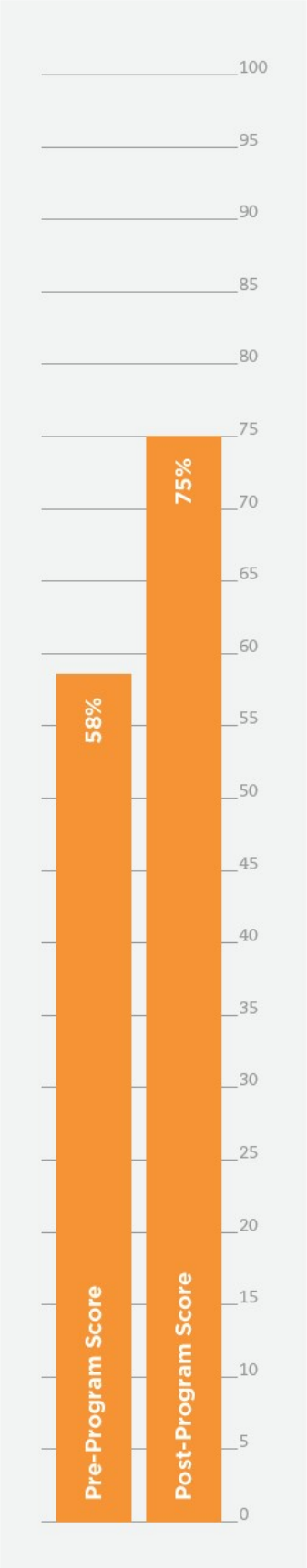
Teachers who indicated they would recommend this program to other colleagues.



Teachers who indicated they would conduct this program again.

A summary of responses can be found in Appendix D.

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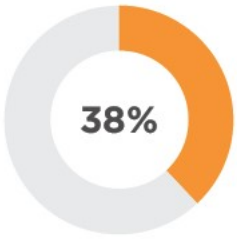
Knowledge Gained

Identical tests were administered to the students prior to the program and again upon program completion to measure knowledge gained. Scores and subject knowledge improved from **58%** to **75%**.

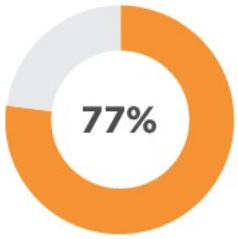
Measures Installed

Students completed take-home activities as part of the program and reported on the kit measures they installed in their homes.

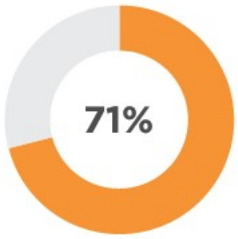
A summary of responses can be found in Appendix B.



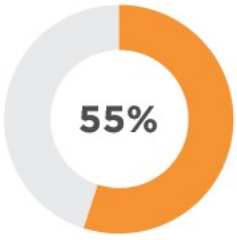
Students who reported they installed the High-Efficiency Showerhead.



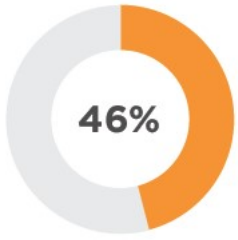
Students who indicated they installed the LED Night Light.



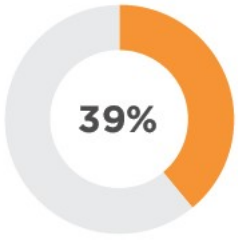
Students who reported they used the Shower Timer.



Students who reported they installed the first 9-watt LED.



Students who reported they installed the second 9-watt LED.



Students who reported they installed the third 9-watt LED.

Student Survey Response by Region

	Total	Capital	Canyon	Eastern	Southern	Western
Total Participants	9,800	3,085	2,409	1,285	1,546	1,475
Students	9,439	2,978	2,314	1,240	1,490	1,417
Surveys Received	2,970	772	1,138	475	270	315
Percent Response	31%	26%	49%	38%	18%	22%

Energy and Water Savings Results

In addition to educating students and their parents, a primary program goal is to generate cost-effective energy and water savings. Student home surveys not only provided the data used in the savings projections, but also reinforced the learning benefits.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

PROJECTED ANNUAL SAVINGS	
13,512,502	gallons of water saved
1,961,084	kWh of electricity saved
54,398	therms of gas saved
13,512,502	gallons of wastewater saved

PROJECTED LIFETIME SAVINGS	
135,125,024	gallons of water saved
21,005,950	kWh of electricity saved
543,976	therms of gas saved
135,125,024	gallons of wastewater saved

PROJECTED ANNUAL SAVINGS PER HOME	
1,379	gallons of water saved
200	kWh of electricity saved
6	therms of gas saved
1,379	gallons of wastewater saved

PROJECTED LIFETIME SAVINGS PER HOME	
13,788	gallons of water saved
2,143	kWh of electricity saved
56	therms of gas saved
13,788	gallons of wastewater saved

***Per Idaho Power's request, the associated savings for the shower timer have not been included in savings totals.*

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"This was a wonderful idea! I'm so glad that my children have been a part of this program. They now can see and understand why and how power is important. Also, the money that goes out for power."

[redacted]

J R Simplot Elementary School

Program Overview

The Idaho Power EnergyWise Program, a school-based energy efficiency education program, is designed to generate immediate and long-term resource savings by bringing interactive, real-world education home to students and their families. The 2019-2020 program was taught in grade 3-6 throughout the Idaho Power service area.

The Idaho Power EnergyWise Program team identifies and enrolls students and teachers within the designated service area. The program physically begins with classroom discussions using a Student Guide that provides the foundations of using energy and water efficiently. It is followed by hands-on, creative, problem-solving activities led by the classroom teacher.

All program materials support state and national academic standards to allow the program to fit easily into a teacher's existing curriculum and requirements. The participating classroom teachers follow the Teacher Book and lesson plan. Information is given to guide lessons throughout the program in order to satisfy each student's individual needs, whether they are visual, auditory, or kinesthetic learners.

The EnergyWise Kit and Student Workbook comprise the take-home portion of the program. Students receive a kit containing high-efficiency measures they use to install within their homes. With the help of their parents/guardians, students install the kit measures and complete a home survey. The act of installing and monitoring new energy efficiency devices in their homes allows students to put their learning into practice. Here, participants and their parents/guardians realize actual water and energy savings within their home, benefitting two generations.

A critical element of Franklin Energy program design is the use of new knowledge through reporting. At the end of the program, the Idaho Power EnergyWise program team tabulates all participant responses—including home survey information, teacher responses, student letters, and parent feedback—and generates this Program Summary Report.

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"I know this is probably costly to Idaho Power, but my daughter was very excited to tell me everything she learned, this was awesome! I'm active military, I have lived in many places, and you have the lowest prices. Thank you for this program and all you do!"

[redacted]

Prospect Elementary

Program Materials

Each participant in the Idaho Power EnergyWise Program receives classroom materials and energy efficiency kits containing high-efficiency measures to perform the program's take-home activities. Program materials for students, parents/guardians, and teachers are outlined below.

Each Student & Teacher Receives

Student Guide

Student Workbook

Parent Letter/Pledge Form

Student Survey Form

Certificate of Achievement

EnergyWise Kit Containing:

- High-Efficiency Showerhead
- Shower Timer
- LED Night Light
- (3) 9-watt LED Light Bulbs
- FilterTone® Alarm
- Digital Thermometer
- Reminder Stickers and Magnet Pack
- Flow Rate Test Bag
- Natural Resource Fact Chart
- Parent/Guardian Program Evaluation
- Illustrated Instruction Guide

Idaho Power EnergyWise Wristband

Website Access at:

http://www.idahopower.com/wise

Toll-Free HELP Line

Each Teacher/Classroom Receives

Teacher Book

Idaho Power Custom Introduction Video Flash Drive

Step-by-Step Program Checklist

Lesson Plans

Idaho State and National Academic Standards Chart

Extra Activities Booket

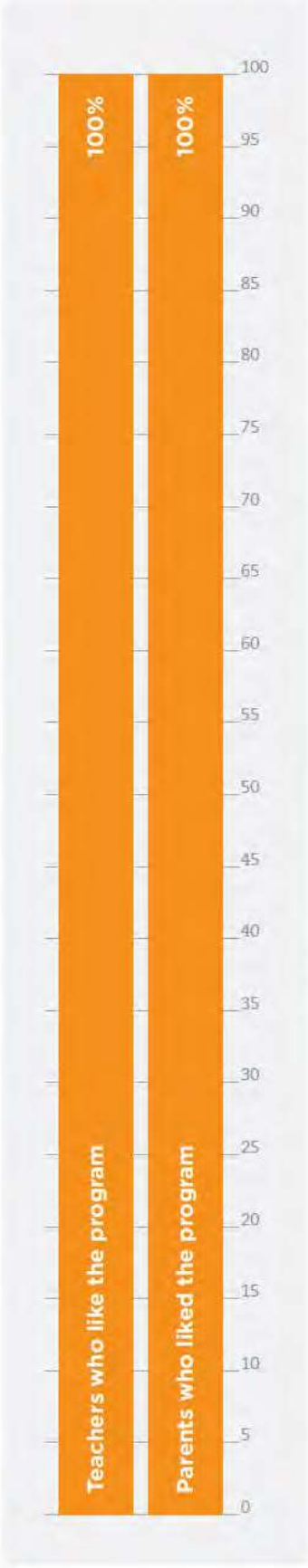
Teacher Survey Form

Pre/Post Student Survey Answer Keys

Electricity Poster

Self-Addressed Postage-Paid Envelope

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Custom Branding

In addition to increasing resource awareness and efficiency, the program has been designed to strengthen bonds between Idaho Power and the community. One of the steps taken to ensure the greatest possible exposure is to feature the Idaho Power logo throughout each EnergyWise Kit. In addition to the kit, the Teacher Survey Form, Parent Letter/Pledge Form, Student Guide, Student Workbook, Teacher Book, and Idaho Power exclusive Introduction Video (flash drive) also feature Idaho Power branding. Further, a custom Teacher Solicitation Flyer was created for Energy and Education Outreach Advisors' (EOEA) program promotion.



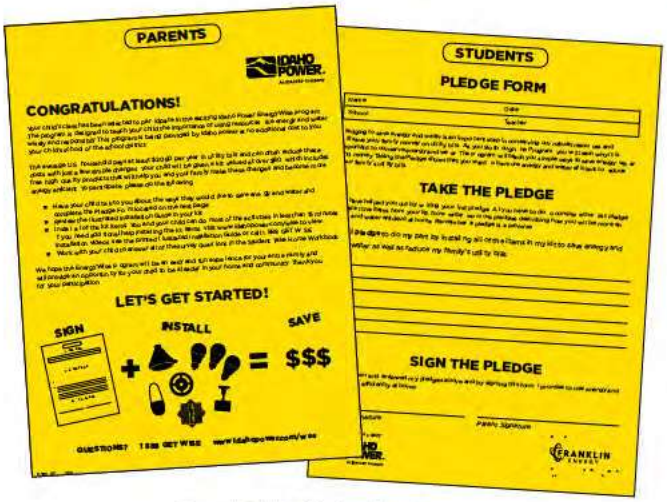




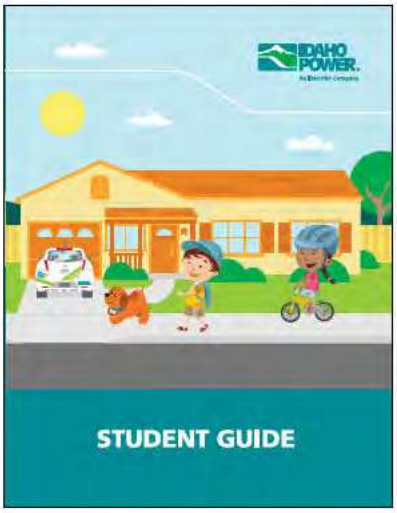
Program Materials



Teacher Survey Form



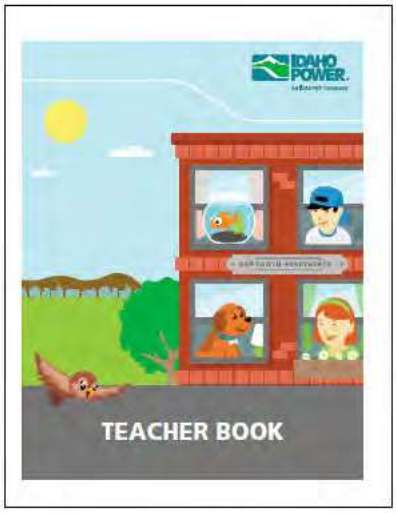
Parent Letter/Pledge Form



Student Guide



Student Take-Home Workbook



Teacher Book



Certificate of Achievement



Kit Box



Introduction Video (flash drive) Pen

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"The lessons were very engaging for students. They liked learning about energy and how to conserve it."

Andrea Chester, Teacher
West Canyon Elementary

Program Implementation

The 2019-2020 Idaho Power EnergyWise Program followed this comprehensive implementation schedule:

1. Identification of Idaho state and national academic standards & benchmarks
2. Curriculum development and refinement (completed annually)
3. Curriculum correlation to Idaho state and national academic standards & benchmarks
4. Materials modification to incorporate Idaho Power branding
5. Incentive program development
6. Teacher outreach and program introduction by Franklin's Outreach Team and Idaho Power EOEAs
7. Teachers enrolled in the program individually by Franklin's Outreach Team and Idaho Power EOEAs
8. Implementation dates scheduled with teachers by Franklin's Outreach Team and Idaho Power EOEAs
9. Program material delivered to coincide with desired implementation date
10. Delivery confirmation
11. Periodic contact to ensure implementation and teacher satisfaction
12. Program completion incentive offered
13. Results collection
14. Program completion incentive delivered to qualifying teachers
15. Thank you cards sent to participating teachers
16. Data analysis
17. Program Summary Report generated and distributed

Participating teachers are free to implement the program to coincide with their lesson plans and class schedules. Appendix C provides a comprehensive list of classrooms in grades 3-6 that participated during the 2019-2020 school year.

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Franklin Energy has been in the business of designing and implementing energy and water efficiency programs for nearly three decades. Throughout this time we've built an expert team of industry professionals that deliver a seamless program to achieve your goals.

We designed the Idaho Power EnergyWise Program in our program center from the ground up. Working in conjunction with Idaho Power, we identified goals, desired outcomes of the program, and specific materials' customization. The result is a stimulating program that delivers significant and measurable resource savings. The Idaho Power EnergyWise Program features a proven blend of innovative education, comprehensive implementation services, and hands-on activities to put efficiency knowledge to work in homes throughout the Idaho Power service territory.

The Idaho Power EnergyWise Program is a reflection of true teamwork. On behalf of the entire implementation team at Franklin Energy, we would like to thank you for the opportunity to design and implement the Idaho Power EnergyWise Program. It has been a pleasure working with you, we look forward to many more years of program success.

Sincerely,



Chase Griswold
Program Manager, CAPM



Libby Wilson
Director of Program Services

Program Team

Program Team

The success of the Idaho Power EnergyWise Program is owed to a cross-functional implementation team chosen specifically to meet the goals of the program. We incorporated both a PMP® certified Program Manager and a CEM® designated energy analyst to ensure the program hits key milestones and delivers results. These thought leaders are supported by an integral mix of specialists working in unity to accomplish your program objectives. The Idaho Power EnergyWise Program implementation team consisted of the following:

Outreach

Our outreach team is the face of the Idaho Power EnergyWise Program, introducing teachers to the program, and providing support throughout implementation to guarantee the program's success in the classroom. This group builds relationships and keeps teachers engaged in program execution year after year.

Graphic Design and Marketing

Expertly-designed kits and program materials are a result of our Graphic Design and Marketing teams. This group provides brand alignment and marketing strategies to ensure program branding is within guidelines. Additionally, this team facilitates copy and art direction and works with education to develop end-user activities.

Education

Led by a Ph.D. educator having both classroom and administration leadership experience, this team is responsible for the development of educational content as well as classroom energy literacy and engagement. The group also ensures the program's content is aligned with Idaho state expectations in science, math, and language as well as the rigorous expectations of STEM (Science, Technology, Engineering, and Math).

Information Technology

We leave IT strategy and cyber security in the hands of our experts. This team built and manages the integrated systems responsible for seamlessly blending operations, driving automation, and maximizing participation in the Idaho Power EnergyWise Program. This group provides the managed data services and software in support of outreach, enrollment, order processing, fulfillment, data collection and reporting.

Warehouse and Logistics

Last but not least, our warehouse and logistics teams guarantee Idaho Power EnergyWise Program materials reach the classroom on-time and without errors. This group provides printing, purchasing, production, quality assurance & control, warehousing and shipping for all program materials. Additionally, this team ensures that all materials are consistent with orders and confirms delivery.

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"I loved the workbook and how it was made into activities for kids to complete. Having it be hands-on is very helpful."

[redacted]
Gooding Elementary/Middle School

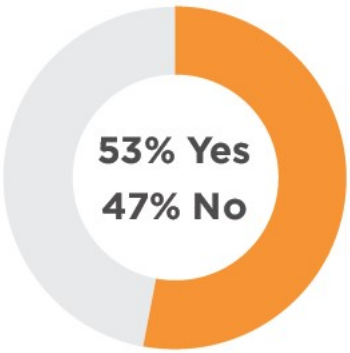
Program Impact

The Idaho Power EnergyWise Program has had a significant impact within the community. As illustrated below, the program successfully educated participants about energy and water efficiency while generating resource savings through the installation of efficiency measures in homes. Home survey information was collected to track projected savings and provide household consumption and demographic data. Program evaluations and comments were collected from teachers, students, and parents. The following program elements were used to collect this data:

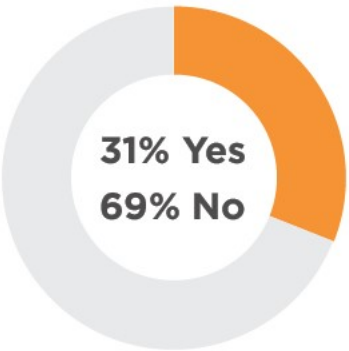
A. Home Survey for Capital Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 107 participating teachers in the Capital region, 23 (21%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 2,978 participating children in the Capital region, 772 (26%) returned completed surveys.

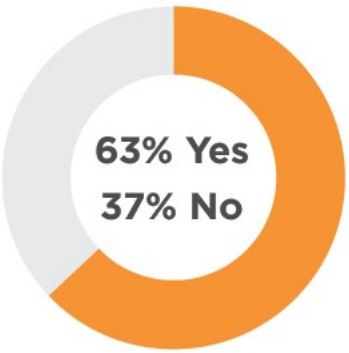
Did your family install the first 9-watt LED Light Bulb?	**Yes - 53%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 31%**
Did your family change the way they use energy?	**Yes - 63%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.



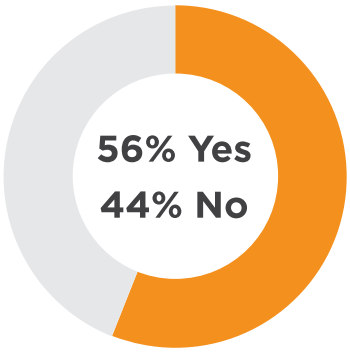
Students who indicated their family changed the way they use energy.

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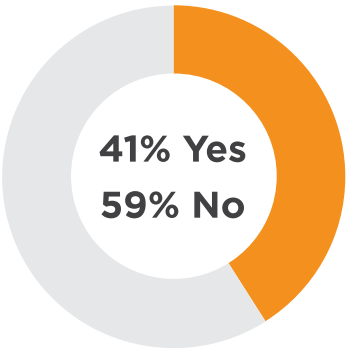
Home Survey for Canyon Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 95 participating teachers in the Canyon region, 24 (25%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 2,314 participating children in the Canyon region, 1,138 (49%) returned completed surveys.

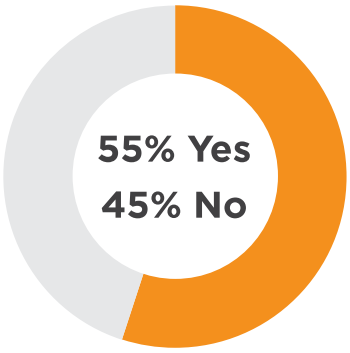
Did your family install the first 9-watt LED Light Bulb?	**Yes - 56%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 41%**
Did your family change the way they use energy?	**Yes - 55%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.

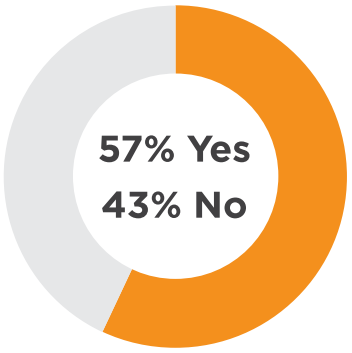


Students who indicated their family changed the way they use energy.

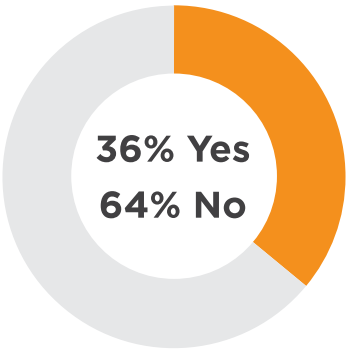
Home Survey for Eastern Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 45 participating teachers in the Eastern region, 10 (22%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 1,240 participating children in the Eastern region, 475 (38%) returned completed surveys.

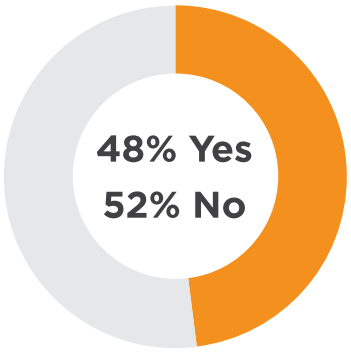
Did your family install the first 9-watt LED Light Bulb?	**Yes - 57%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 36%**
Did your family change the way they use energy?	**Yes - 48%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.



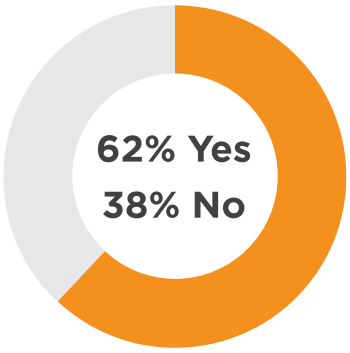
Students who indicated their family changed the way they use energy.

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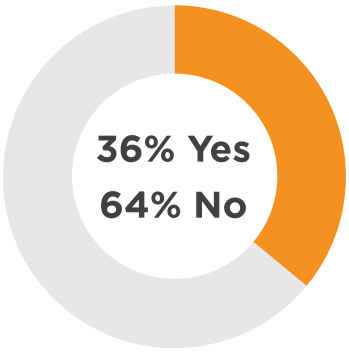
Home Survey for Southern Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 56 participating teachers in the Southern region, 10 (18%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 1,490 participating children in the Southern region, 270 (18%) returned completed surveys.

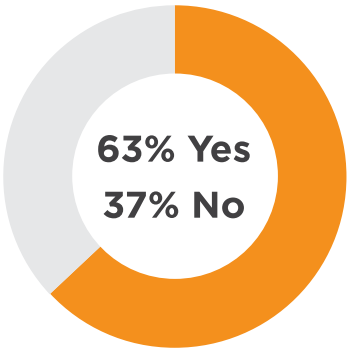
Did your family install the first 9-watt LED Light Bulb?	**Yes - 62%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 36%**
Did your family change the way they use energy?	**Yes - 63%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.

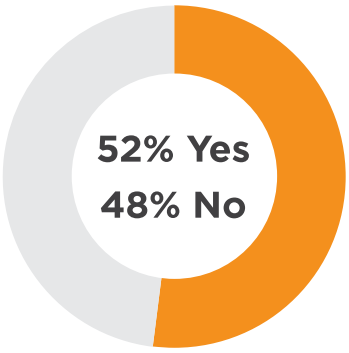


Students who indicated their family changed the way they use energy.

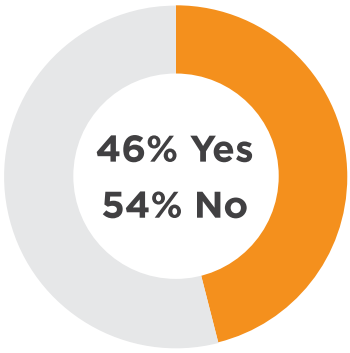
Home Survey for Western Region

Participating teachers were asked to return their students' completed home check-up and home activities results. Of the 58 participating teachers in the Western region, 6 (10%) returned survey results for the program. Parents and students were asked to install the kit measures and complete the home activities. Of the 1,417 participating children in the Western region, 315 (22%) returned completed surveys.

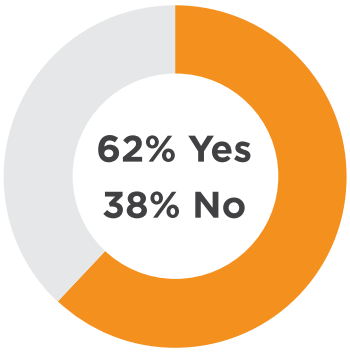
Did your family install the first 9-watt LED Light Bulb?	**Yes - 52%**
Did your family install the new High-Efficiency Showerhead?	**Yes - 46%**
Did your family change the way they use energy?	**Yes - 62%**



Students who indicated they installed the first 9-watt LED Light Bulb.



Students who indicated they installed the High-Efficiency Showerhead.



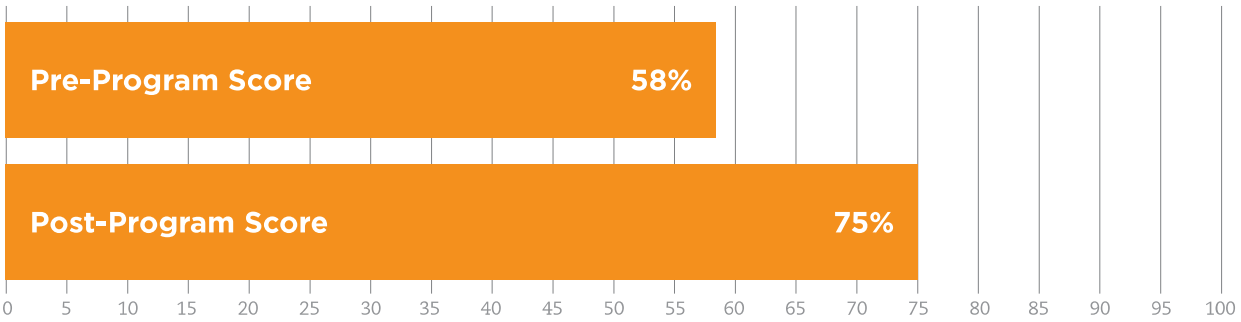
Students who indicated their family changed the way they use energy.

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B. Pre-Program and Post-Program Tests

Students were asked to complete a 10-question test before the program was introduced and then again after it was completed to determine the knowledge gained through the program. The average student answered **5.8** questions correctly prior to being involved in the program and then improved to answer **7.5** questions correctly following participation. Of the 9,439 student households participating, 2,970 returned survey responses.

Scores improved from 58% to 75%.



Pre-Program and Post-Program Test Questions

		Pre	Post
1	Which layer of Earth do we live on?		
	Crust	62%	85%
	Mantle	8%	3%
	Inner Core	8%	3%
	Outer Core	23%	9%
2	Non-Potable water is safe to drink.		
	True	25%	11%
	False	75%	89%
3	Which of these is not a renewable resource?		
	Wind	20%	8%
	Plants	7%	4%
	Gold	54%	78%
	Animals	19%	10%
4	Saving water saves energy.		
	True	84%	94%
	False	16%	6%

Pre-Program and Post-Program Test Questions

		Pre	Post
5	Which are fossil fuels?		
	Coal	22%	13%
	Oil	13%	6%
	Natural Gas	14%	9%
	All of the above	51%	72%
6	Which type of energy is created in the process of Photosynthesis?		
	Nuclear Energy	19%	14%
	Thermal Energy	26%	21%
	Chemical Energy	30%	51%
	Electric Energy	25%	14%
7	Which Kit item will save the most natural resources?		
	Compact Fluorescent Lamp	31%	29%
	High-Efficiency Showerhead	32%	52%
	FilterTone® Alarm	18%	10%
	LED Night Light	18%	9%
8	Which major appliance uses the most energy?		
	Dishwasher	21%	14%
	Refrigerator	59%	63%
	Dryer	21%	24%
9	An LED (light emitting diode) light bulb uses more energy than an incandescent bulb.		
	True	36%	16%
	False	64%	84%
10	On-peak time is the best time to play video games.		
	True	32%	16%
	False	68%	84%

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C. Home Activities—Summary

As part of the program, parents and students installed resource efficiency measures in their homes. They also measured the pre-existing devices to calculate savings that they generated. Using the family habits collected from the home survey as the basis for this calculation, 9,800 households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come. Of the 9,439 student households participating, 2,970 returned survey responses.

Projected Resource Savings

A list of assumptions and formulas used for these calculations can be found in Appendix A.

Number of Participants:	**9,800**		
	Annual	**Lifetime**	
Projected reduction from Showerhead retrofit:	**13,512,502**	**135,125,024**	gallons
Product Life: **10 years**	**866,826**	**8,668,258**	kWh
	45,436	**454,359**	therms
Projected reduction from first **9**-watt LED Light Bulb:	**281,282**	**3,375,390**	kWh
Product Life: **25,000 hours** (**12** years)			
Projected reduction from second **9**-watt LED Light Bulb:	**223,942**	**2,687,304**	kWh
Product Life: **25,000 hours** (**12** years)			
Projected reduction from third **9**-watt LED Light Bulb:	**192,329**	**2,307,946**	kWh
Product Life: **25,000 hours** (**12** years)			
Projected reduction from LED Night Light retrofit:	**215,831**	**2,158,308**	kWh
Product Life: **10,000 hours**			
Projected reduction from FilterTone® installation:	**180,874**	**1,808,744**	kWh
Product Life: **10 years**	**8,962**	**89,618**	therms
TOTAL PROGRAM SAVINGS:	**13,512,502**	**135,125,024**	gallons
	1,961,084	**21,005,950**	kWh
	54,398	**543,976**	therms
TOTAL PROGRAM SAVINGS PER HOUSEHOLD:	**1,379**	**13,788**	gallons
	200	**2,143**	kWh
	6	**56**	therms

***Per Idaho Power's request, the associated savings for the shower timer have not been included in savings totals*

***Lifetime LED savings based on assumption that inefficient bulb would stay in place for 12 years.*

D. Teacher Program Evaluation

Program improvements are based on participant feedback received. One of the types of feedback obtained is from participating teachers via a Teacher Program Evaluation Form. They are asked to evaluate relevant aspects of the program and each response is reviewed for pertinent information. The following is feedback from the Teacher Program Evaluation for the Idaho Power EnergyWise Program. Of the 176 participating teachers, 73 returned teacher program evaluation surveys.

Teacher Response

(A summary of responses and regional data can be found in Appendix D)

100% of participating teachers indicated they would enroll in the program again given the opportunity.

100% of participating teachers indicated they would recommend the program to their colleagues.

What did students like best about the program? Explain.

"They loved to experiment with the different items in the kits."
Jill Mesecher, Mill Creek Elementary School

"Having the kits to take home and use."
Courtney Craner, Central Elementary School

"The kits, they also enjoyed the night lights."
Staci Miller, Mill Creek Elementary School

"They liked activities in the books such as crosswords and the classroom activities, with items such as the night light, and shower timer."
Brian Fischer, Eagle Hills Elementary School

"The hands-on information and activities."
Matea Schindel, Snake River Elementary

"They loved the kits and were dying to take them home."
Karla Miller, Silver Trail Elementary School

"The ability to apply what they learned in class at home."
Lindsay Strong, Snake River Elementary

"Students were excited about using the kits at home."
Andrea Chester, West Canyon Elementary

"They loved the kits and the activities."
Rachel Thomas, Green Acres Elementary School

"They loved the EnergyWise kits. It allowed them to use the information from the book at home."
Cody Perry, Tendoy Elementary

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Teacher Response

(A summary of responses and regional data can be found in Appendix D)

What did you like best about the program? Explain.

"Extra science materials with all the visuals."
Courtney Craner, Central Elementary School

"The kits, encourages power conservation."
Staci Miller, Mill Creek Elementary School

"Easy to use and integrate the content."
Matea Schindel, Snake River Elementary

"I liked having the materials handy in the classroom and the student books."
Karla Miller, Silver Trail Elementary School

"The real world science for students."
Lindsay Strong, Snake River Elementary

"The students were able to report how using the kit changed their energy habits."
Christin Brown, Gate City Elementary School

"Can do as little or much as needed."
Kathy Walker, Green Acres Elementary School

"The workbooks are on the student's level."
Rachel Thomas, Green Acres Elementary School

"I liked that the students were able to talk with their parents."
Emry Smith, West Canyon Elementary

"Good information, the text provided helped with real life learning."
Julie Bodily, Four Rivers Community School

"I like the energy kits best because I love that my students have the opportunity to learn and connect with their families."
Kayden Tague, Whitney Elementary School

"The family involvement with the take home materials."
Joleena Malugani, Washington Elementary School

"The program is fairly user friendly. I also liked the hands-on projects."
Zachary Dwello, Nampa Christian School

E. Parent/Guardian Program Evaluation

Parent involvement with program activities and their children is of paramount interest to both Idaho Power and teachers in the program. When parents take an active role in their child's education it helps the schools and strengthens the educational process considerably. When students successfully engage their families in retrofit, installation, and home energy efficiency projects, efficiency messages are powerfully delivered to two generations in the same household. The program is a catalyst for this family interaction, which is demonstrated by feedback from Parent/Guardian Program Evaluations. The following is feedback from the Parent/Guardian Program Evaluations for the Idaho Power EnergyWise Program. Of the 9,439 participating families, 47 parents returned program evaluation surveys.

Parent Response

(A summary of responses and regional data can be found in Appendix E)

100% of participating parents indicated that the program was easy to use.

100% of participating parents indicated they would continue to use the kit items after the completion of the program.

100% of participating parents indicated they would like to see this program continued in local schools.

As a parent, which aspect of the program did you like best?

"Working on it together and discussing positive ways to impact the planet."
[redacted], **Silver Sage Elementary School**

"The light bulbs and showerhead."
[redacted], **Fruitland Elementary School**

"Overall education and encouragement of conservation."
[redacted], **Reed Elementary**

"Getting our children involved in saving energy."
[redacted], **Tendoy Elementary**

"Learning about energy."
[redacted] **Chief Joseph School Of The Arts**

"Water conservation with shower length and electricity usage."
[redacted], **Crimson Point Elementary**

"It being interactive & kid friendly."
[redacted] **Cynthia Mann Elementary School**

"Shower timer!"
[redacted], **Cynthia Mann Elementary School**

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Parent Response

(A summary of responses and regional data can be found in Appendix E)

Are there any comments you would like to express to your child's program sponsor?

"I know this is probably costly to Idaho Power, but my daughter was very excited to tell me everything she learned, this was awesome! I'm active military, I have lived in many places, and you have the lowest prices. Thank you for this program and all you do!"
[redacted], **Prospect Elementary**

"Thank you very much for this program it was fun for my son to do and our whole family was involved and learning together."
[redacted] **Prospect Elementary**

"Awesome job!"
[redacted] **Cynthia Mann Elementary School**

"Thank you for helping empower the kids to make smart choices. Well done and please let us know how we can help continue the program."
[redacted], **Cynthia Mann Elementary School**

"Thanks for the light bulbs!"
[redacted], **Idaho Arts Charter School (K-4)**

"My son really enjoyed this and is much more energy savvy now. He talked about all the projects often since they are things we did in the house that he sees everyday."
[redacted], **Gooding Elementary/Middle School**

"Thank you for the wonderful kit! My child loved all the gadgets especially the thermometer! I love the light bulbs."
[redacted], **Gooding Elementary/Middle School**

"Thank you it was a great conversation starter about how we can do better in our home."
[redacted] **Pioneer School Of The Arts**

"Thank you."
[redacted], **Wapello Elementary School**

F. Teacher Letters

Dear Idaho Power,

Thank you so much for the opportunity to participate in this program! It was a great chance for the students to experience hands on how they can conserve energy and make our city a cleaner and better place to live.

The students really enjoyed receiving their kits and completing the activities at home. I know that many were excited about the simple ways that they can conserve such as using the shower timer, switching out light bulbs, and simply plugging in an LED night light. The ease of the Energy Kits was great for the students, parents, and teacher.

It was such a simple process to go through the text with the students. I loved how organized the materials were and how meaningful the activities were. As a whole, the program is organized extremely well. In fact, I recently sent in a request for an energy kit for my home through Idaho Power.

The students learned a lot about conservation through this program. In fact, during our Passion Project Time (a time students get to research and learn about a topic of their choice) many students were interested in related topics and what they could do to conserve energy and help the environment. It was great to see students take a real interest and dip deeper into a topic that was interesting to them.

I am excited to participate in this program again next year. I hope to be able to spend more time on activities to make the program even more meaningful for the students.

Thank you again for providing schools and students with such a simple, well organized, and meaningful way for students to learn about conservation and energy. It is a great experience for all students!

With much appreciation,

Laura VanDerschaaf
5th Grade - Lake Ridge Elementary

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Teacher Letters

(continued)

Birch Elementary School
6900 Birch Lane
Nampa, ID 83687
(208) 461-5960

November 13, 2019

Dear Idaho Power,

I would like to thank you for allowing us to participate in the Energy Wise education program.

The kids learned a lot about energy and how to be more energy efficient in their homes. I think teaching children how to conserve energy has fallen by the wayside, so these lessons help families become more energy conscious at home and at school. The lessons were interesting, easy to teach, and the kids had a fun time installing the items in the kit.

Thanks again for making this program available to our schools and for the monetary donation. We really appreciate it!

Sincerely,

Mary Jo Pegram

Mary Jo Pegram
4th Grade Teacher

Teacher Letters

(continued)

Valley View Elementary School

3555 N. Milwaukee St., Boise, ID 83704 Phone# (208) 854-6370 Fax # (208) 854-6371

April 23, 2020

Dear Idaho Power,

Valley View Elementary fifth grade has been fortunate to participate in the Idaho Power Energy Wise Program. We volunteer to participate in this program each year because we clearly see the benefit of educating students on the importance of energy awareness and understanding.

Thank you for allowing us to be a part of a comprehensive program that provides useful resources and materials. The lessons are easy to understand and the home support materials are a nice extension to the lessons.

Parents appreciate the materials kit and information. Many students have commented on how they use the energy saving tools and their parents have saved money. Students have also reported family discussions regarding energy and power.

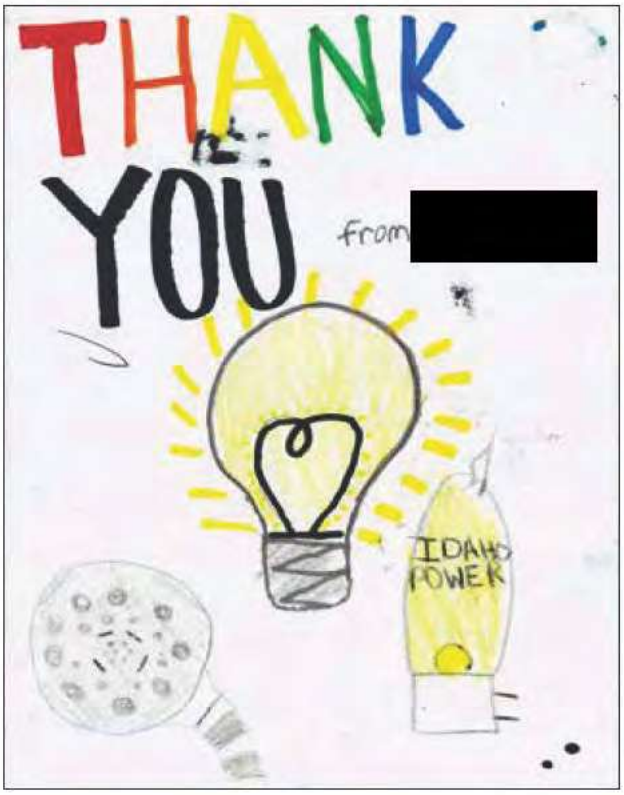
Once again, we are grateful for the opportunity to share this program with our students. As you know, they are our future and as such, we want to give them the best knowledge we can so they can positively contribute to helping our community and environment.

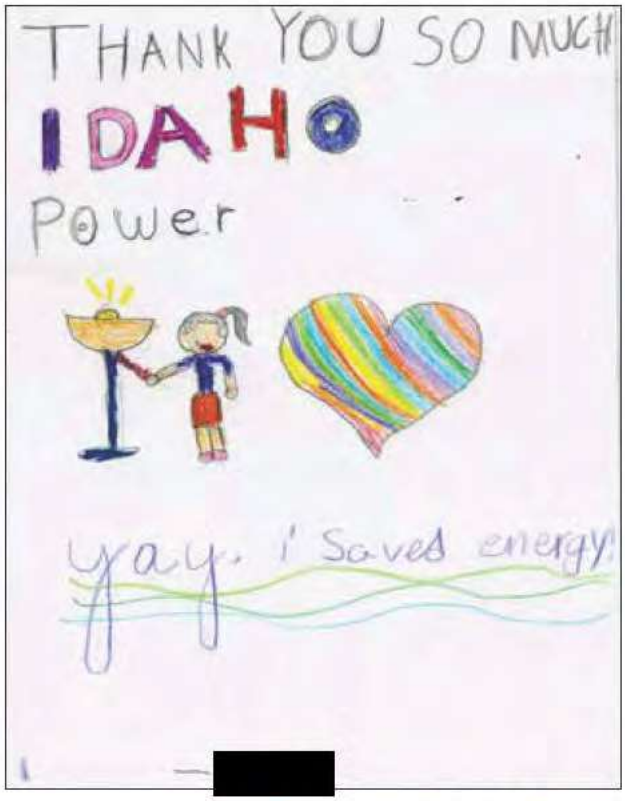
Sincerely,

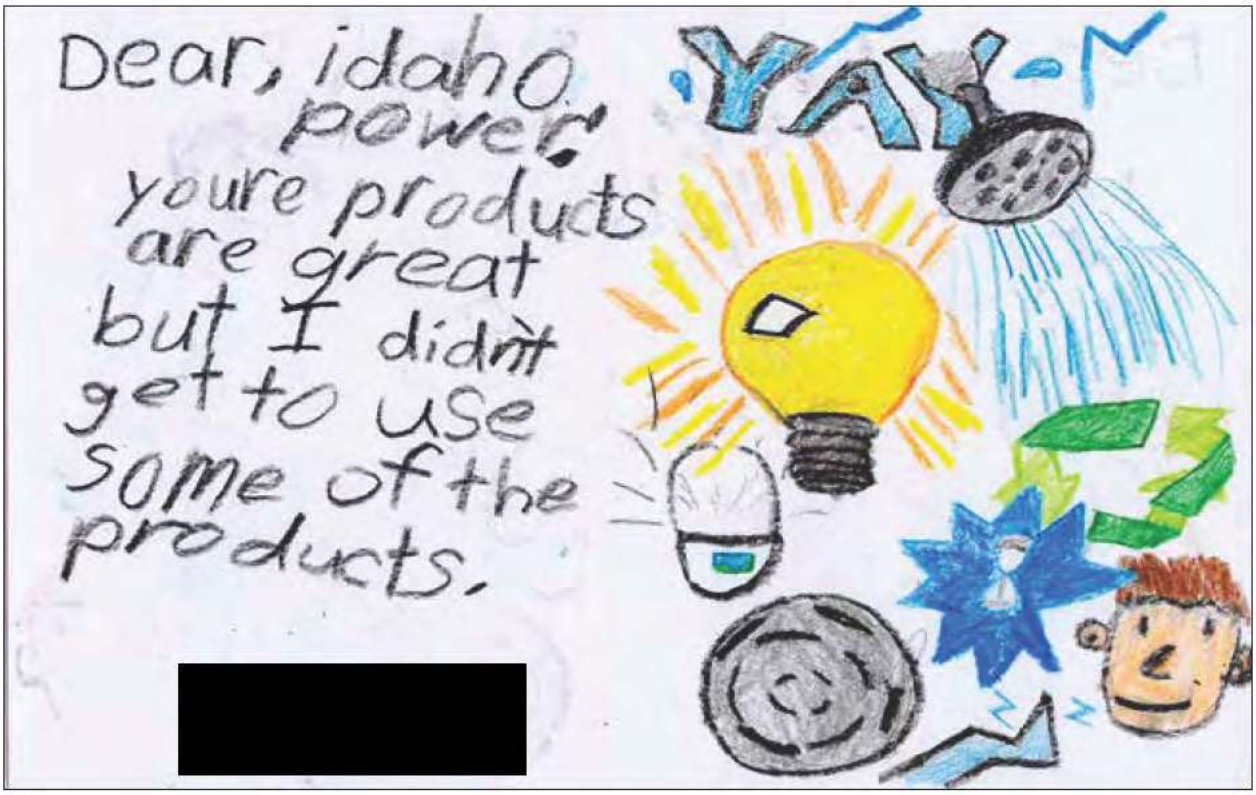
Meko Myers & Shawna Hiller
Valley View Elementary

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G. Student Letters

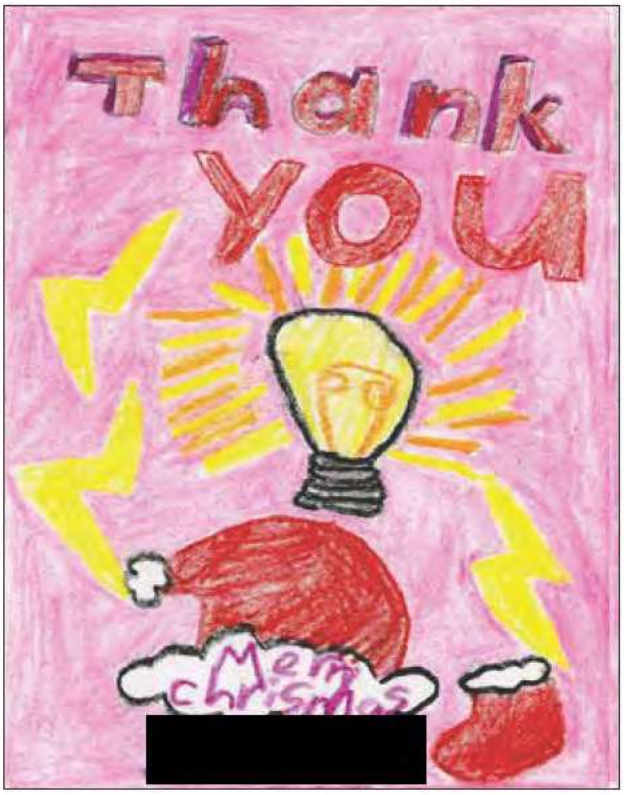


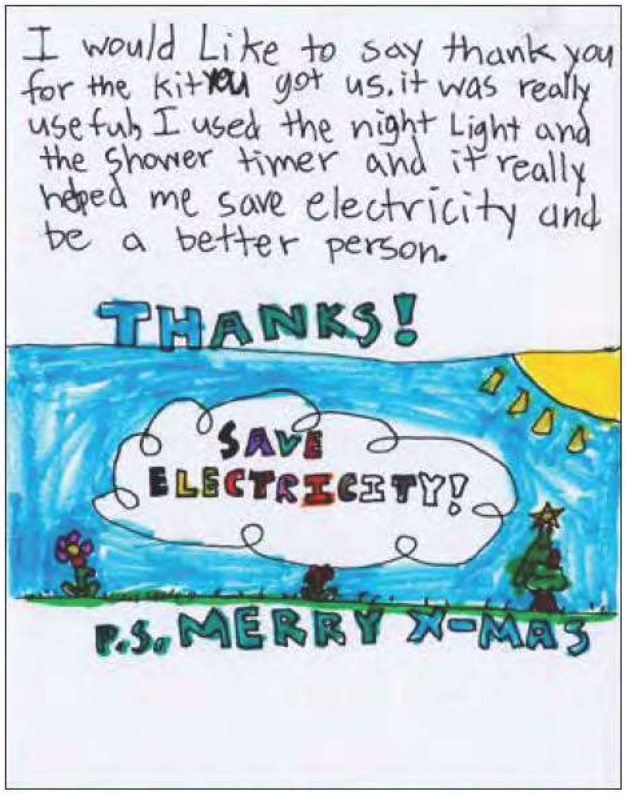


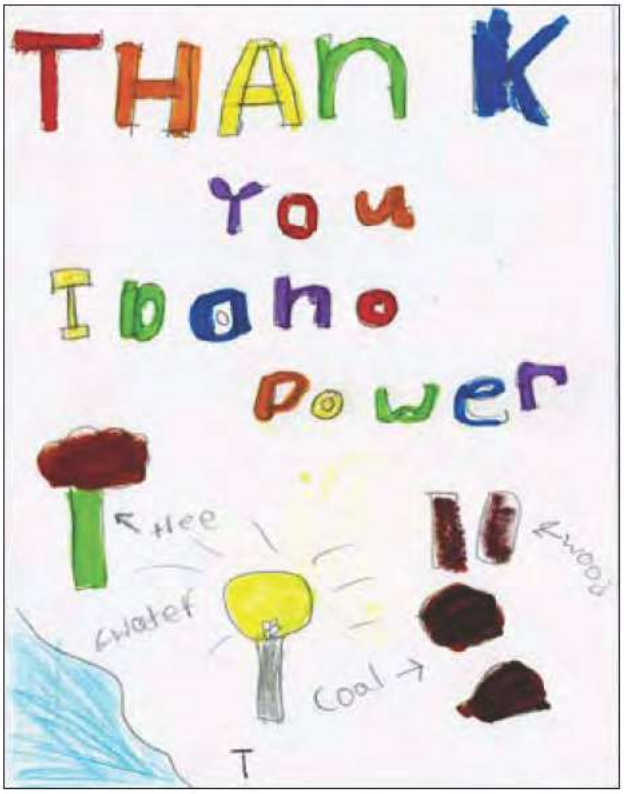


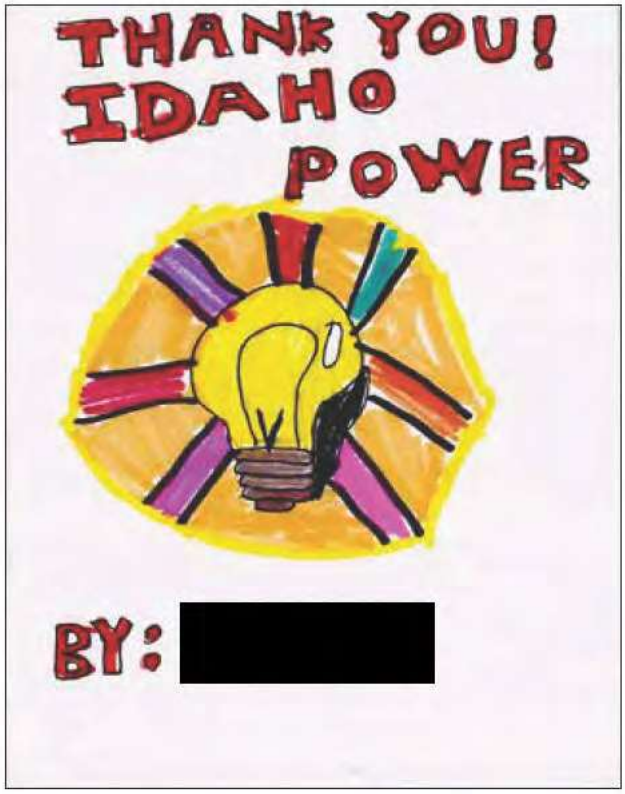
Student Letters

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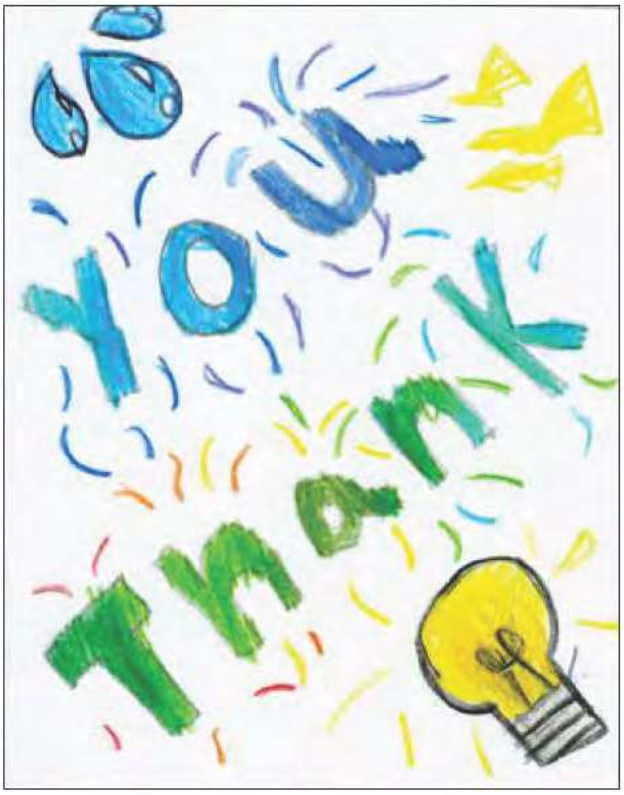


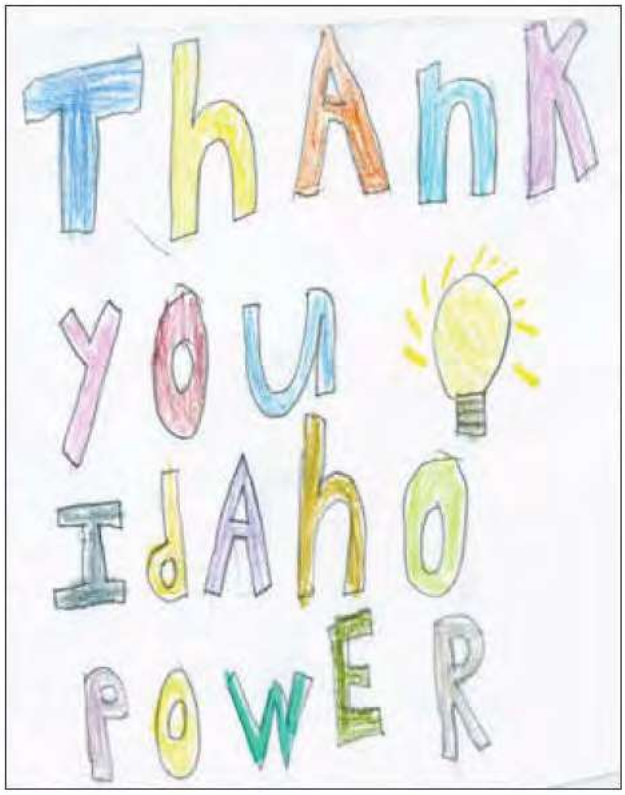


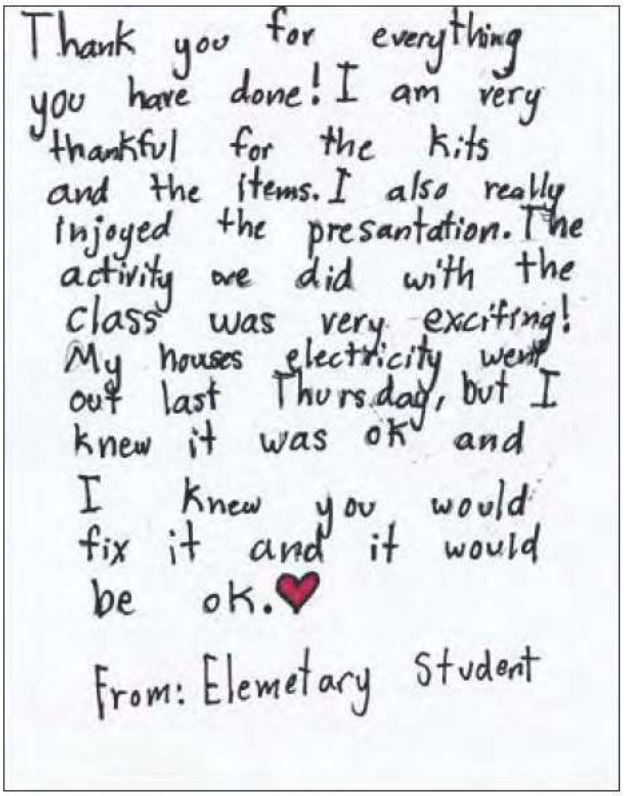
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Student Letters

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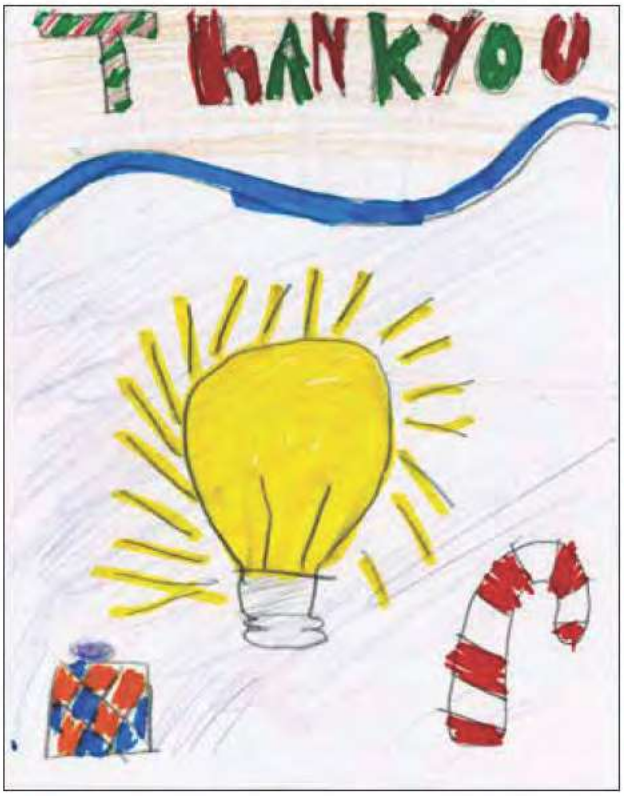

Thank you for everything you have done! I am very thankful for the kits and the items. I also really injoyed the presantation. The activity we did with the class was very exciting! My houses electricity went out last Thursday, but I knew it was ok and I knew you would fix it and it would be ok. ♥

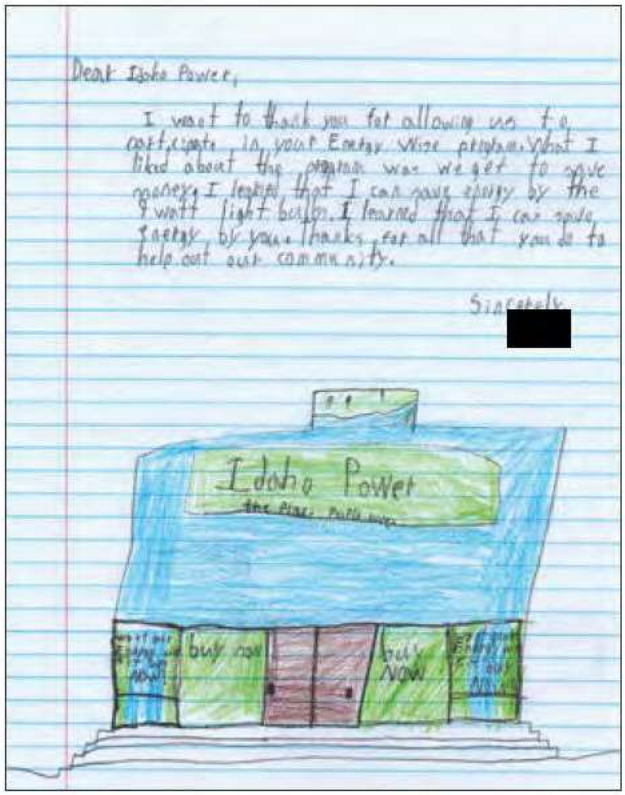
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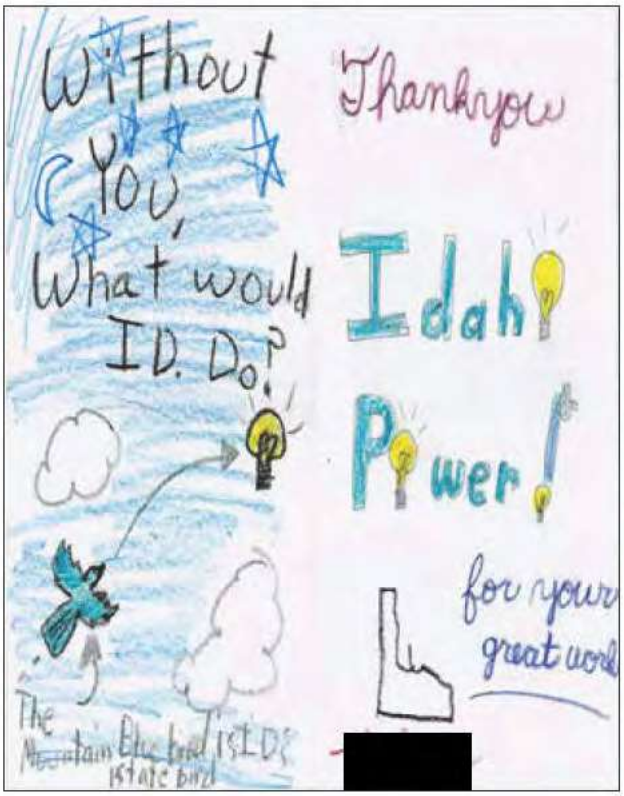


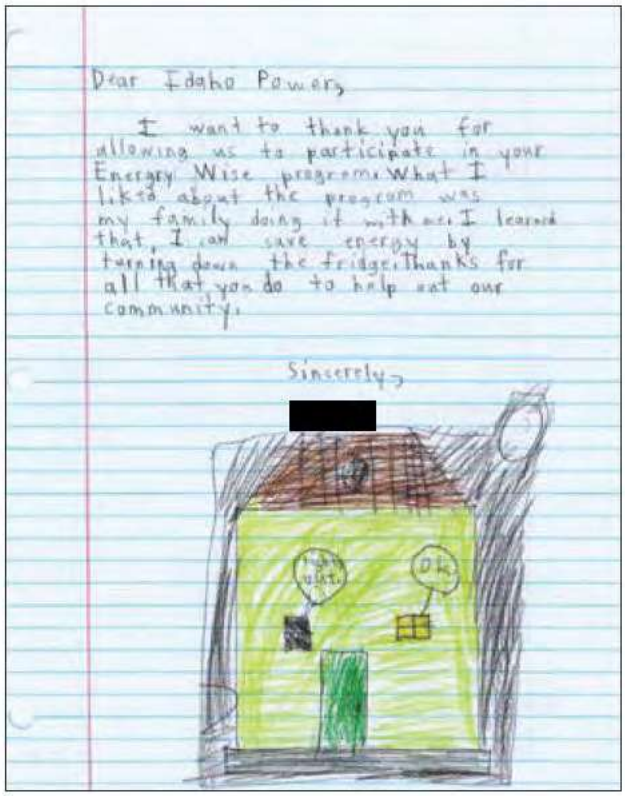
Student Letters

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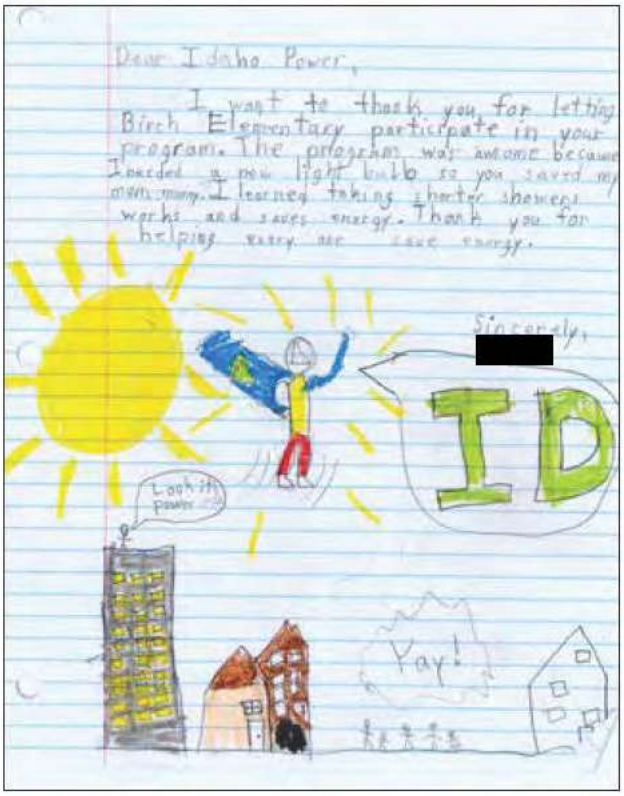


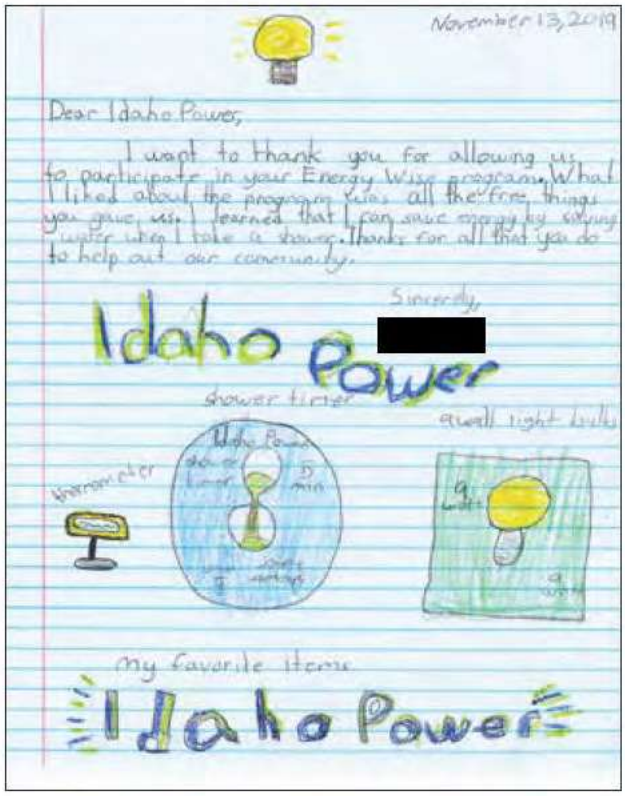


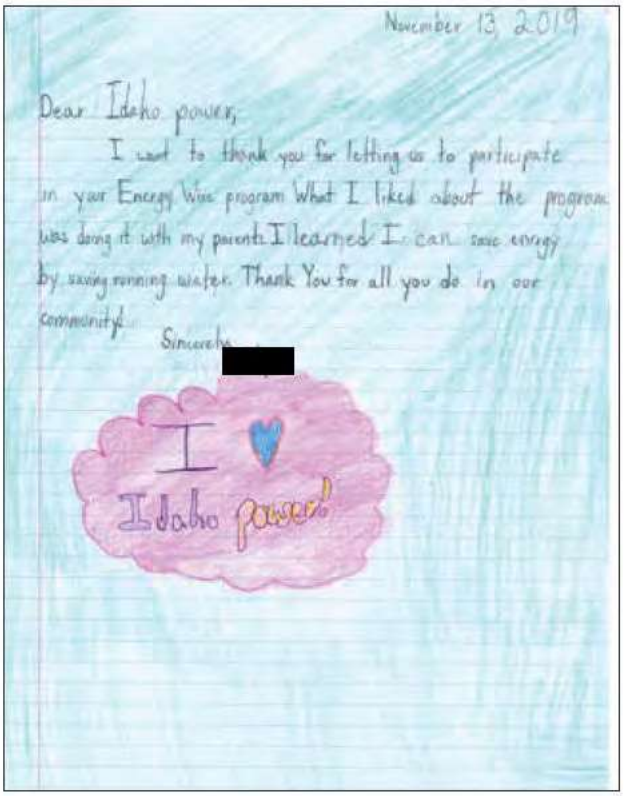
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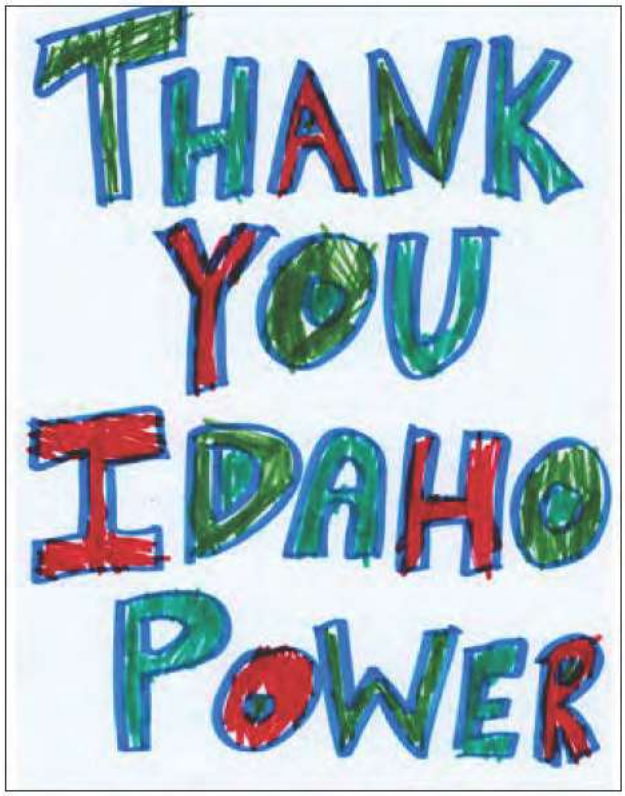
Student Letters

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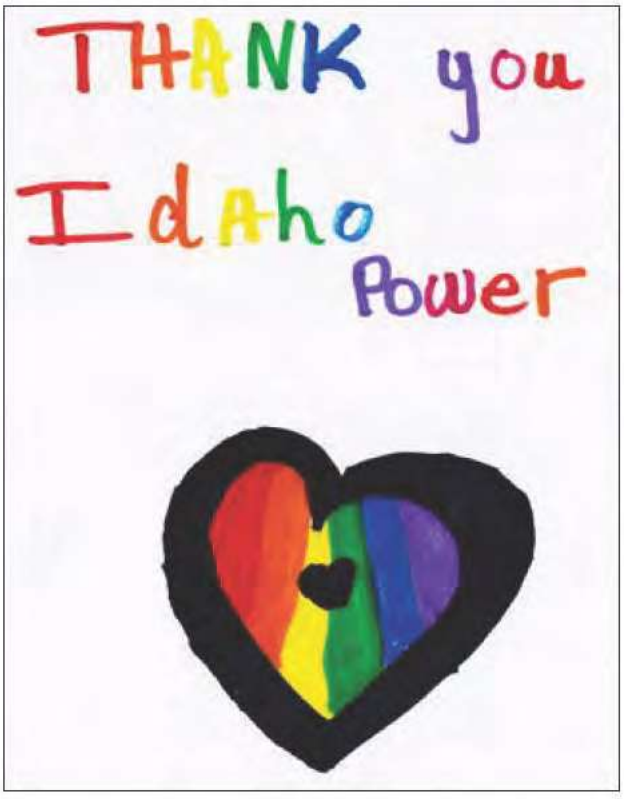


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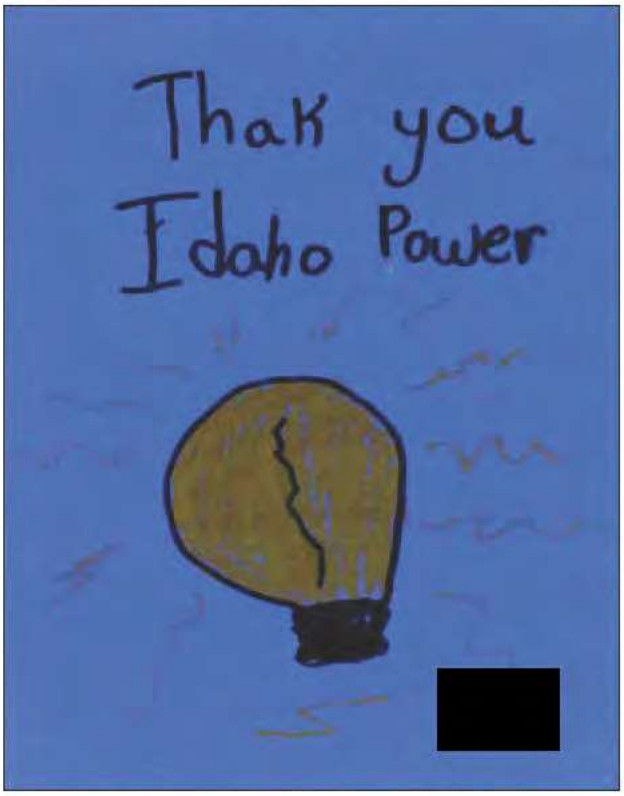


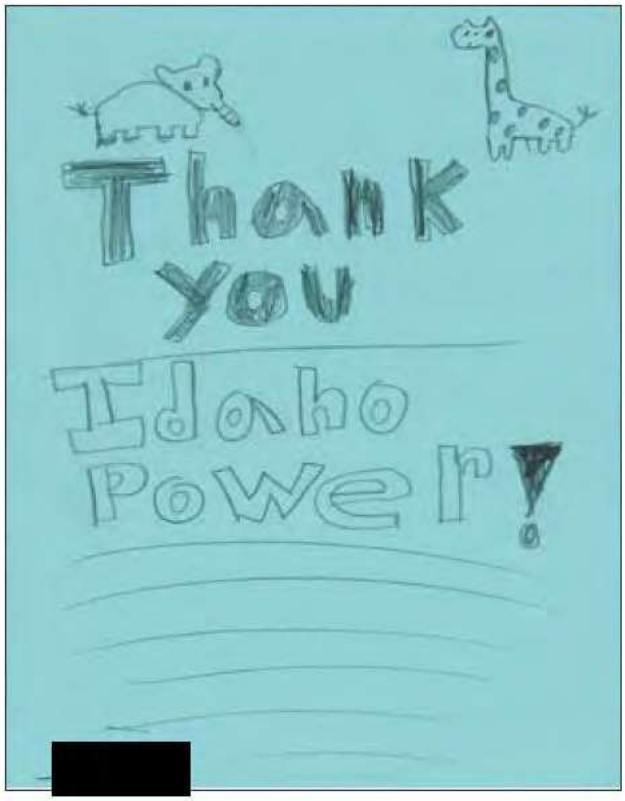


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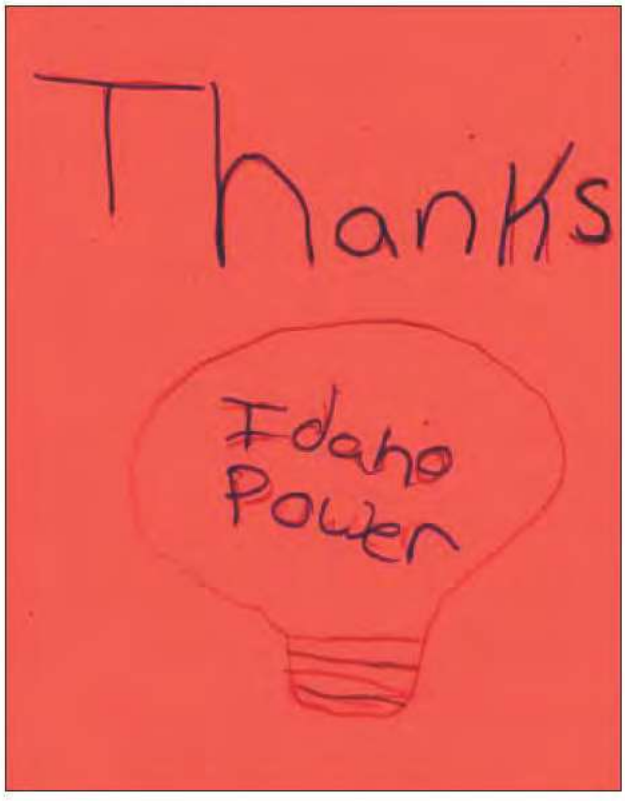
Student Letters

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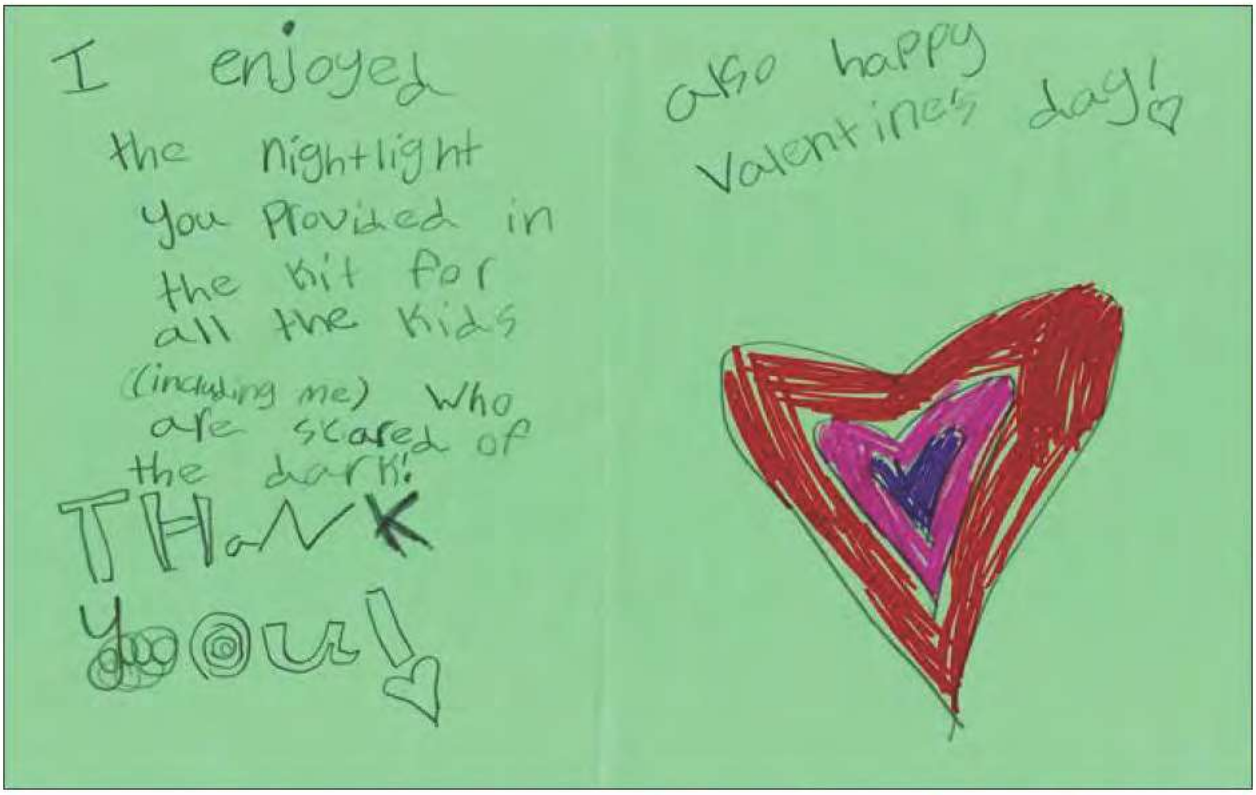






Student Letters

(continued)





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"I liked the supplies and discussions that we were able to have on saving energy. I also liked the important information contained in the program."

Shawna Hiller, Teacher
Valley View Elementary School

Appendices

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Projected Savings from Showerhead Retrofit

Showerhead Retrofit Inputs and Assumptions:

Average household size:	**5.05**	people[1]
Average number of full bathrooms per home:	**2.00**	full bathrooms per home[1]
% of water heated by gas:	**51.18%**	[1]
% of water heated by electricity:	**48.82%**	[1]
Installation / participation rate of:	**37.63%**	[1]
Average Showerhead has a flow rate of:	**2.02**	gallons per minute[1]
Retrofit Showerhead has a flow rate of:	**1.30**	gallons per minute[1]
Number of participants:	**9,800**	[1]
Shower duration:	**8.20**	minutes per day[2]
Showers per day per person:	**0.67**	showers per day[2]
Product life:	**10**	years[3]

Projected Water Savings:

Showerhead retrofit projects an **annual** reduction of:	**13,512,502**	gallons[4]
Showerhead retrofit projects a **lifetime** reduction of:	**135,125,024**	gallons[5]

Projected Electricity Savings:

Showerhead retrofit projects an **annual** reduction of:	**866,826**	kWh[2,6]
Showerhead retrofit projects a **lifetime** reduction of:	**8,668,258**	kWh[2,7]

Projected Natural Gas Savings:

Showerhead retrofit projects an **annual** reduction of:	**45,436**	therms[2,8]
Showerhead retrofit projects a **lifetime** reduction of:	**454,359**	therms[2,9]

1 Data Reported by Program Participants.

2 (March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf

3 Provided by manufacturer.

4 [(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days

5 [(Average Household Size x Shower Duration x Showers per Day per Person) ÷ Average Number of Full Bathrooms per Home] x (Average Showerhead Flow Rate - Retrofit Showerhead Flow Rate) x Number of Participants x Installation Rate x 365 days x Product Life

6 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity

7 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life

8 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas

9 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life

Projected Savings from Shower Timer Installation

Shower Timer Inputs and Assumptions:

% of water heated by gas:	51.18%	[1]
% of water heated by electricity:	48.82%	[1]
Installation / participation rate of Shower Timer:	70.82%	[1]
Average showerhead has a flow rate of:	2.02	gallons per minute[1]
Retrofit showerhead has flow rate of:	1.30	gallons per minute[1]
Number of participants:	9,800	[1]
Average of baseline and retrofit showerhead flow rate:	1.66	gallons per minute[2]
Shower duration:	8.20	minutes per day[3]
Shower timer duration:	5.00	minutes per day[4]
Showers per capita per day (SPCD):	0.67	showers per day[3]
Percent of water that is hot water:	73%	[5]
Days per year:	365.00	days
Product life:	2.00	years[5]

Projected Water Savings:

Shower Timer installation projects an **annual** reduction of:	9,003,673.55	gallons[6]
Shower Timer installation projects a **lifetime** reduction of:	18,007,347.10	gallons[7]

Projected Electricity Savings:

Shower Timer installation projects an **annual** reduction of:	577,585	kWh[8]
Shower Timer installation projects a **lifetime** reduction of:	1,155,170	kWh[9]

Projected Natural Gas Savings:

Shower Timer installation projects an **annual** reduction of:	30,275	therms[10]
Shower Timer installation projects a **lifetime** reduction of:	60,550	therms[11]

1 Data Reported by Program Participants.

2 Average of the baseline GPM and the retrofit GPM

3 (March 4, 2010). EPA WaterSense® Specification for Showerheads Supporting Statement. Retrieved from http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf

4 Provided by manufacturer.

5 Navigant EM&V Report for Super Savers Program in Illinois PY7

6 Annual water savings = Water Flow (Average of baseline and retrofit flow) × (Baseline Shower duration - Shower Timer duration) × Participants × Days per year × SPCD × Installation Rate of Shower Timer

7 Projected Annual Water Savings x Product Life

8 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Participants

9 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.18 kWh/gal x % of Water Heated by Electricity x Product Life x Participants

10 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Participants

11 Projected Annual Water Savings x Percent of Water that is Hot Water x 0.009 Therms/gal x % of Water Heated by Natural Gas x Product Life x Participants

**Per Idaho Power's request, the savings figures for the shower timer have not been included in the savings totals.*

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Projected Savings from FilterTone® Alarm Installation

FilterTone® Installation Inputs and Assumptions:

Annual energy (electricity) use by a central air conditioner:	**4,467**	kWh[1]
Annual energy (natural gas) use by a central space heating or furnace:	**421**	therms[1]
Projected increase in efficiency (electricity):	**1.75%**	[2]
Projected increase in efficiency (natural gas):	**0.92%**	[2]
Product life:	**10**	years[3]
Installation / participation rate of:	**23.61%**	[4]
Number of participants:	**9,800**	[4]

Projected Electricity Savings:

The FilterTone installation projects an **annual** reduction of:	**180,874**	kWh[5]
The FilterTone installation projects a **lifetime** reduction of:	**1,808,744**	kWh[6]

Projected Natural Gas Savings:

The FilterTone installation projects an **annual** reduction of:	**8,962**	therms[7]
The FilterTone installation projects a **lifetime** reduction of:	**89,618**	therms[8]

1 U.S. Department of Energy, Energy Information Administration 2005 Residential Energy Consumption Web site for Mountain West States: http://www.eia.gov/consumption/residential/data/2005/

2 Reichmuth P.E., Howard. (1999). Engineering Review and Savings Estimates for the 'Filtertone' F lter Restriction Alarm.

3 Provided by manufacturer.

4 Data reported by program participants.

5 Annual energy (electricity) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (electricity) x Installation rate x Number of participants

6 Annual energy (electricity) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (electricity) x Installation rate x Number of participants x Product life

7 Annual energy (natural gas) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (natural gas) x Installation rate x Number of participants

8 Annual energy (natural gas) use by a central air conditioner, heat pump or furnace x Projected increase in efficiency (natural gas) x Installation rate x Number of participants x Product life

Projected Savings from First 9-watt LED Light Bulb Retrofit

LED Retrofit Inputs and Assumptions:

Product life:	**25,000**	hours[1]
Watts used by the LED light bulb:	**9**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**59.46**	watts[3]
Installation / participation rate of:	**55.46%**	[3]
Number of participants:	**9,800**	[3]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**281,282**	kWh[2,4]
The LED retrofit projects a **lifetime** reduction of:	**3,375,390**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x 12 years] ÷ 1,000} x Number of participants x Installation rate

***Lifetime LED savings based on assumption that inefficient bulb would stay in place for 12 years.*

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Projected Savings from Second 9-watt LED Light Bulb Retrofit

LED Retrofit Inputs and Assumptions:

Product life:	**25,000**	hours[1]
Watts used by the LED light bulb:	**9**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**57.80**	watts[3]
Installation / participation rate of:	**45.65%**	[3]
Number of participants:	**9,800**	[3]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**223,942**	kWh[2,4]
The LED retrofit projects a **lifetime** reduction of:	**2,687,304**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x 12 years] ÷ 1,000} x Number of participants x Installation rate

***Lifetime LED savings based on assumption that inefficient bulb would stay in place for 12 years.*

Projected Savings from Third 9-watt LED Light Bulb Retrofit

LED Retrofit Inputs and Assumptions:

Product life:	**25,000**	hours[1]
Watts used by the LED light bulb:	**9**	watts[1]
Hours of operation per day:	**2.81**	hours per day[2]
Watts used by the replaced incandescent light bulb:	**57.93**	watts[3]
Installation / participation rate of:	**39.10%**	[3]
Number of participants:	**9,800**	[3]

Projected Electricity Savings:

The LED retrofit projects an **annual** reduction of:	**192,329**	kWh[2,4]
The LED retrofit projects a **lifetime** reduction of:	**2,307,946**	kWh[2,5]

1 Provided by manufacturer.

2 Frontier Associates. (2011). Oncor's LivingWise Program: Measurement & Verification Update.

3 Data reported by program participants.

4 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x Hours of operation per day x 365 Days] ÷ 1,000} x Number of participants x Installation rate

5 {[(Wattage of incandescent light bulb replaced - Wattage of LED light bulb) x 12 years] ÷ 1,000} x Number of participants x Installation rate

***Lifetime LED savings based on assumption that inefficient bulb would stay in place for 12 years.*

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Projected Savings from LED Night Light Retrofit

Energy Efficient Night Light Retrofit Inputs and Assumptions:

Average length of use:	**4,380**	hours per year[1]
Average night light uses:	**7**	watts
Retrofit night light uses:	**0.5**	watts
Product life:	**10**	years[2]
Energy saved per year:	**28**	kWh per year
Energy saved over life expectancy:	**285**	kWh
Installation / participation rate of:	**77.36%**	[3]
Number of participants:	**9,800**	[3]

Projected Electricity Savings:

The Energy Efficient Night Light retrofit projects an **annual** reduction of:	**215,831**	kWh[4]
The Energy Efficient Night Light retrofit projects a **lifetime** reduction of:	**2,158,308**	kWh[5]

1 Assumption (12 hours per day)

2 Product life provided by manufacturer

3 Data reported by program participants

4(kWh per year x Number of participants) x Installation rate

5((kWh per year x Number of participants) x Installation rate) x Effective useful life

***Lifetime LED savings based on assumption that inefficient bulb would stay in place for 12 years.*

Home Check-Up

	Total	Capital	Canyon	Eastern	Southern	Western
Total Participants	9,800	3,085	2,409	1,285	1,546	1,475
Students	9,439	2,978	2,314	1,240	1,490	1,417
Surveys Received	2,970	772	1,138	475	270	315
Percent Response	31%	26%	49%	38%	18%	22%

		Total	Capital	Canyon	Eastern	Southern	Western
1	What type of home do you live in?						
	Single Family Home (Mobile)	8%	5%	11%	8%	9%	9%
	Single Family Home (Manufactured)	8%	4%	7%	9%	10%	15%
	Single Family Home (Built)	67%	76%	63%	67%	65%	56%
	Multi-Family (2-4 units)	10%	9%	11%	10%	10%	10%
	Multi-Family (5-20 units)	5%	5%	6%	5%	3%	9%
	Multi-Family (21+ units)	2%	1%	2%	2%	2%	2%
2	Was your home built before 1992?						
	Yes	38%	28%	34%	55%	39%	48%
	No	62%	72%	66%	45%	61%	52%
3	Is your home owned or rented?						
	Owned	74%	79%	74%	72%	69%	72%
	Rented	26%	21%	26%	28%	31%	28%
4	How many kids live in your home (age 0-17)?						
	1	10%	9%	10%	10%	9%	14%
	2	30%	35%	30%	25%	27%	27%
	3	27%	27%	27%	26%	29%	27%
	4	17%	16%	16%	21%	19%	15%
	5+	16%	13%	17%	18%	17%	18%

Due to rounding of numbers, percentages may not add up to 100%

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Home Check-Up

(continued)

		Total	Capital	Canyon	Eastern	Southern	Western
5	How many adults live in your home (age 18+)?						
	1	9%	8%	8%	11%	11%	13%
	2	69%	77%	68%	66%	69%	61%
	3	13%	9%	15%	16%	13%	12%
	4	5%	3%	6%	5%	4%	7%
	5+	3%	2%	3%	2%	3%	7%
6	Does your home have a programmable outdoor sprinkler system?						
	Yes	66%	82%	71%	49%	55%	43%
	No	34%	18%	29%	51%	45%	57%
7	Does your home have a programmable thermostat?						
	Yes	76%	83%	80%	68%	68%	63%
	No	24%	17%	20%	32%	32%	37%
8	What is the main source of heating in your home?						
	Natural Gas	41%	56%	40%	38%	36%	20%
	Electric Heater	42%	36%	42%	45%	51%	48%
	Propane	4%	2%	4%	4%	5%	4%
	Heating Oil	1%	1%	1%	0%	0%	2%
	Wood	5%	2%	5%	3%	5%	17%
	Other	7%	3%	8%	9%	3%	9%
9	What type of air conditioning unit do you have?						
	Central Air Conditioner	71%	84%	76%	55%	65%	52%
	Evaporative Cooler	7%	6%	6%	9%	5%	8%
	Room Unit	13%	7%	9%	21%	17%	25%
	Don't Have One	10%	3%	9%	16%	13%	14%
10	Does your home have a Dishwasher?						
	Yes	86%	94%	91%	76%	75%	72%
	No	14%	6%	9%	24%	25%	28%

Due to rounding of numbers, percentages may not add up to 100%

Home Check-Up

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
11 How many half-bathrooms are in your home?						
0	58%	42%	55%	78%	69%	62%
1	34%	49%	37%	15%	24%	26%
2	6%	6%	6%	5%	6%	9%
3	2%	2%	2%	2%	1%	2%
4+	1%	1%	1%	1%	0%	0%
12 How many full bathrooms are in your home?						
1	21%	11%	18%	27%	30%	36%
2	55%	55%	61%	44%	55%	52%
3	20%	25%	18%	24%	11%	10%
4	4%	8%	2%	3%	3%	2%
5+	1%	1%	1%	1%	1%	0%
13 How many toilets are in your home?						
1	15%	6%	13%	22%	21%	29%
2	40%	29%	41%	45%	50%	50%
3	33%	47%	37%	23%	22%	16%
4	9%	15%	7%	9%	4%	4%
5+	2%	4%	2%	2%	2%	1%
14 How is your water heated?						
Natural Gas	51%	64%	54%	46%	39%	28%
Electricity	49%	36%	46%	54%	61%	72%

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Home Activities

	Total	Capital	Canyon	Eastern	Southern	Western
Total Participants	9,800	3,085	2,409	1,285	1,546	1,475
Students	9,439	2,978	2,314	1,240	1,490	1,417
Surveys Received	2,970	772	1,138	475	270	315
Percent Response	31%	26%	49%	38%	18%	22%

		Total	Capital	Canyon	Eastern	Southern	Western
1	What is the flow rate of your old showerhead?						
	0 - 1.0 GPM	10%	8%	9%	11%	9%	15%
	1.1 - 1.5 GPM	21%	19%	21%	20%	27%	22%
	1.6 - 2.0 GPM	21%	23%	21%	19%	25%	13%
	2.1 - 2.5 GPM	22%	23%	22%	25%	22%	17%
	2.6 - 3.0 GPM	16%	15%	17%	14%	12%	16%
	3.1+ GPM	11%	11%	10%	12%	5%	17%
2	Did you install the new High-Efficiency Showerhead?						
	Yes	38%	31%	41%	36%	36%	46%
	No	62%	69%	59%	64%	64%	54%
3	If you answered "yes" to question 2, what is the flow rate of your new showerhead?						
	0 - 1.0 GPM	23%	20%	21%	33%	20%	26%
	1.1 - 1.5 GPM	41%	42%	38%	38%	50%	45%
	1.6 - 1.75 GPM	36%	37%	41%	29%	30%	29%
4	Did you use the Shower Timer?						
	Yes	71%	71%	72%	66%	67%	74%
	No	29%	29%	28%	34%	33%	26%
5	Did your family install the first 9-watt LED Light Bulb?						
	Yes	55%	53%	56%	57%	62%	52%
	No	45%	47%	44%	43%	38%	48%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

		Total	Capital	Canyon	Eastern	Southern	Western
6	If you answered "yes" to question 5, what is the wattage of the incandescent bulb you replaced?						
	40-watt	16%	17%	16%	13%	12%	20%
	60-watt	38%	38%	35%	46%	43%	34%
	75-watt	15%	14%	16%	10%	16%	18%
	100-watt	11%	10%	13%	11%	9%	9%
	Other	20%	19%	20%	21%	19%	19%
7	Did your family install the second 9-watt LED Light Bulb?						
	Yes	46%	44%	47%	43%	47%	47%
	No	54%	56%	53%	57%	53%	53%
8	If you answered "yes" to question 7, what is the wattage of the incandescent bulb you replaced?						
	40-watt	17%	18%	18%	14%	13%	22%
	60-watt	38%	37%	38%	40%	40%	38%
	75-watt	13%	14%	13%	11%	18%	13%
	100-watt	9%	10%	10%	9%	5%	8%
	Other	22%	20%	22%	25%	24%	19%
9	Did your family install the third 9-watt LED Light Bulb?						
	Yes	39%	38%	41%	38%	36%	40%
	No	61%	62%	59%	62%	64%	60%
10	If you answered "yes" to question 9, what is the wattage of the incandescent bulb you replaced?						
	40-watt	18%	16%	20%	13%	12%	23%
	60-watt	36%	37%	34%	35%	36%	37%
	75-watt	14%	9%	14%	14%	23%	14%
	100-watt	10%	12%	10%	10%	5%	9%
	Other	23%	23%	21%	29%	24%	17%
11	Did your family install the FilterTone® Alarm?						
	Yes	24%	23%	28%	18%	20%	22%
	No	76%	77%	72%	82%	80%	78%

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Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
12 How much did your family turn down the thermostat in winter for heating?						
1 - 2 Degrees	19%	23%	20%	13%	21%	13%
3 - 4 Degrees	19%	22%	19%	15%	20%	17%
5+ Degrees	14%	15%	15%	14%	10%	10%
Didn't Adjust Thermostat	48%	40%	46%	58%	48%	59%
13 How much did your family turn up the thermostat in summer for cooling?						
1 - 2 Degrees	18%	20%	22%	12%	19%	11%
3 - 4 Degrees	18%	22%	17%	11%	18%	21%
5+ Degrees	15%	16%	18%	12%	9%	10%
Didn't Adjust Thermostat	49%	42%	43%	65%	54%	58%
14 Did you install the LED Night Light?						
Yes	77%	79%	77%	76%	82%	74%
No	23%	21%	23%	24%	18%	26%
15 Did your family lower your water heater settings?						
Yes	23%	23%	25%	21%	19%	26%
No	77%	77%	75%	79%	81%	74%
16 Did your family raise the temperature on your refrigerator?						
Yes	16%	15%	19%	15%	13%	17%
No	84%	85%	81%	85%	87%	83%
17 Did you complete the optional online energy use activity?						
All of it	5%	3%	6%	4%	4%	8%
Some of it	18%	15%	20%	14%	24%	17%
None	77%	82%	74%	82%	71%	74%
18 Did you work with your family on this Program?						
Yes	61%	66%	59%	49%	67%	67%
No	39%	34%	41%	51%	33%	33%

Due to rounding of numbers, percentages may not add up to 100%

Home Activities

(continued)

	Total	Capital	Canyon	Eastern	Southern	Western
19 Did your family change the way they use water?						
Yes	52%	56%	51%	43%	58%	54%
No	48%	44%	49%	57%	42%	46%
20 Did your family change the way they use energy?						
Yes	58%	63%	55%	48%	63%	62%
No	42%	37%	44%	52%	37%	38%
21 How would you rate the Idaho Power EnergyWise® Program?						
Great	48%	49%	48%	44%	53%	53%
Pretty Good	39%	41%	38%	38%	40%	39%
Okay	10%	9%	11%	14%	6%	6%
Not So Good	2%	1%	3%	5%	2%	2%

Due to rounding of numbers, percentages may not add up to 100%

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Participant List

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Adams Elementary School	Simone Mansfield	1	25	No
Capital	Adams Elementary School	Maggie Wilson	1	25	No
Western	Aiken Elementary School	Patty Eidson	1	23	No
Western	Aiken Elementary School	Candace Zugner	1	26	No
Capital	Amity Elementary School	Megan Fuller	1	27	Yes
Western	Annex Charter School	Julie Alexander	1	21	No
Western	Annex Charter School	Dean Seward	1	19	Yes
Canyon	Birch Elementary School	Carol Briggs	1	27	Yes
Canyon	Birch Elementary School	Brenda Fly	1	27	Yes
Canyon	Birch Elementary School	Juilana Lookhart	1	27	Yes
Canyon	Birch Elementary School	MaryJo Pegram	1	27	Yes
Southern	Carey Public School	Jan Morey	1	16	Yes
Southern	Castleford Elementary School	Carrie March	1	17	No
Southern	Castleford Elementary School	Caree Thomas	1	17	No
Canyon	Centennial Elementary School	Doris Atherton	1	29	Yes
Canyon	Centennial Elementary School	Diane Gharring	1	29	Yes
Canyon	Centennial Elementary School	Chris Wilmes	1	29	No
Canyon	Central Elementary School	Courtney Craner	1	28	Yes
Canyon	Central Elementary School	Aubrey Crisp	1	26	Yes
Capital	Chief Joseph School Of The Arts	Linda Conry	1	25	Yes
Capital	Chief Joseph School Of The Arts	Kelley Gove	1	25	No
Capital	Christine Donnell School of Arts	Tyler Bishop	1	29	Yes
Capital	Christine Donnell School of Arts	Amy Hymas	1	29	Yes
Capital	Christine Donnell School of Arts	Debra Tiffany	1	30	Yes
Eastern	Chubbuck Elementary School	Christenia Coast	1	21	No
Eastern	Chubbuck Elementary School	Lori Schmitt	1	20	No
Eastern	Claude A. Wilcox Elementary School	Lacie Christensen	1	32	Yes
Eastern	Claude A. Wilcox Elementary School	Monique Gannon	1	31	Yes
Eastern	Claude A. Wilcox Elementary School	Tricia Hemsley	1	31	Yes
Capital	Collister Elementary School	Lisa Baker	1	31	No
Canyon	Crimson Point Elementary	Tonia Burbank	1	30	No
Canyon	Crimson Point Elementary	Julie Butler	1	30	No
Canyon	Crimson Point Elementary	Randi Davis	1	12	No
Canyon	Crimson Point Elementary	Lisa Schmidt	1	30	No
Capital	Cynthia Mann Elementary School	Rachael Cromie	1	31	No

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Cynthia Mann Elementary School	Beth Laugheed	1	12	No
Capital	Cynthia Mann Elementary School	Emily Rebich	1	26	No
Canyon	Desert Springs Elementary School	Lindsay Mangum	1	26	Yes
Canyon	Desert Springs Elementary School	Stacey Pearson	1	26	Yes
Canyon	Desert Springs Elementary School	Janelle Smith	1	26	Yes
Canyon	Desert Springs Elementary School	Jackie Sodaro	1	26	Yes
Eastern	Donald D. Stalker Elementary School	Lisa Clark	1	22	No
Eastern	Donald D. Stalker Elementary School	LaNita McRae	1	23	No
Western	Donnelly Elementary	Brakae Campbell	1	25	Yes
Western	Donnelly Elementary	Melissa Maini	1	23	No
Capital	Eagle Hills Elementary School	Noell Bautista	1	27	Yes
Capital	Eagle Hills Elementary School	Jillian Cole	1	29	Yes
Capital	Eagle Hills Elementary School	Brian Fischer	1	28	Yes
Capital	Eagle Hills Elementary School	Samantha Purcell	1	26	No
Canyon	East Canyon Elementary	Amber Faille	1	23	No
Canyon	East Canyon Elementary	Michelle Gooch	1	23	No
Canyon	East Canyon Elementary	Tiara Shippy	1	23	No
Capital	Eliza Hart Spalding Elementary School	Shawna Brenna	1	26	No
Capital	Eliza Hart Spalding Elementary School	Brian Jensen	1	26	No
Capital	Eliza Hart Spalding Elementary School	Krista Johnson	1	26	No
Capital	Eliza Hart Spalding Elementary School	Sarah Williams	1	26	Yes
Eastern	Ellis Elementary School	Kim Benson	1	24	No
Eastern	Ellis Elementary School	Margo Lamont	1	24	No
Eastern	Ellis Elementary School	Sherry VanEvery	1	24	No
Capital	Foothills School of Arts and Science	Justin Brune	1	12	No
Capital	Foothills School of Arts and Science	Jude McDougall	1	13	No
Western	Four Rivers Community School	Julie Bodily	1	28	Yes
Western	Four Rivers Community School	Zuri Montoya	1	27	Yes
Capital	Frontier Elementary	Joshua Thompson	1	53	No
Western	Fruitland Elementary School	Amber Bridgewater	1	20	Yes
Western	Fruitland Elementary School	Ish Green	1	18	No
Western	Fruitland Elementary School	Suzy Hrizuk	1	21	Yes
Western	Fruitland Elementary School	Linda Langley	1	17	No
Western	Fruitland Elementary School	Heather Llanas	1	20	Yes
Western	Fruitland Elementary School	Stacy Wescott	1	18	Yes

Note: "T" represents number of teachers and "S" represents number of students

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Western	Fruitland Middle School	Jaris Lewis	1	30	Yes
Western	Fruitland Middle School	Makayla MacKenzie	1	30	No
Western	Fruitland Middle School	Alison Parrot	1	30	Yes
Western	Fruitland Middle School	Deborah Schmid	1	30	No
Western	Fruitland Middle School	Chance Stringer	1	30	No
Capital	Galileo STEM Academy	Beth Bivens	1	33	No
Capital	Galileo STEM Academy	Nicole Sarty	1	33	No
Capital	Galileo STEM Academy	Stacie Swenwold	1	33	Yes
Western	Garden Valley Elementary	Tonya Smith	1	25	Yes
Capital	Garfield Elementary School	Sonia Galaviz	1	26	Yes
Capital	Garfield Elementary School	Katie Tunca	1	26	Yes
Eastern	Gate City Elementary School	Christin Brown	1	28	Yes
Eastern	Gate City Elementary School	Lacey Smart	1	28	Yes
Capital	Glenns Ferry Middle School	Liza Martin	1	36	Yes
Southern	Gooding Elementary/Middle School	Tracie Anderson	1	29	No
Southern	Gooding Elementary/Middle School	Winona Gurney	1	30	Yes
Southern	Gooding Elementary/Middle School	Cameron Knigge	1	30	No
Southern	Gooding Elementary/Middle School	Samantha Knittle	1	110	Yes
Southern	Gooding Elementary/Middle School	Kate Rippee	1	29	No
Capital	Grace Jordan Elementary School	Darwood Ashmead	1	31	No
Capital	Grace Jordan Elementary School	Jason Fewkes	1	28	No
Capital	Grace Jordan Elementary School	Shannon Nicholson	1	28	No
Eastern	Green Acres Elementary School	Rachel Thomas	1	28	Yes
Eastern	Green Acres Elementary School	Kathy Walker	1	28	Yes
Canyon	Greenhurst Elementary School	Tami Ashley	1	21	No
Canyon	Greenhurst Elementary School	John Stull	1	21	Yes
Eastern	Groveland Elementary	Kalli Lopez	1	18	Yes
Eastern	Groveland Elementary	Melissa Schreiber	1	18	No
Southern	Hansen Elementary School	Marcie Parkinson	1	24	No
Southern	Harrison Elementary School	Cortney Day	1	30	No
Southern	Harrison Elementary School	Alger	1	25	No
Southern	Harrison Elementary School	Boyle	1	30	No
Capital	Hawthorne Elementary School	Susie Noland	1	28	No
Western	Henry L Slater Elementary School	Sarah Huckins	1	22	No
Western	Henry L Slater Elementary School	Karen Klus	1	22	No

Note: "T" represents number of teachers and "S" represents number of students

Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Western	Henry L Slater Elementary School	Stephanie Lardy	1	24	No
Western	Henry L Slater Elementary School	Linda Pelroy	1	22	No
Western	Henry L Slater Elementary School	Thomas	1	22	No
Western	Henry L Slater Elementary School	Josh Weible	1	22	Yes
Southern	Heritage Academy School	Renette Reyes	1	15	No
Capital	Highlands Elementary School	Eileen Beatty	1	24	No
Capital	Highlands Elementary School	Matt Brown	1	8	No
Capital	Highlands Elementary School	Gretchen Carter	1	12	Yes
Capital	Hillsdale Elementary School	Angie Fraas	1	32	Yes
Capital	Hillsdale Elementary School	Hannah Kessler	1	28	Yes
Capital	Hillsdale Elementary School	Michelle Montoya	1	29	Yes
Capital	Hillsdale Elementary School	Jocelyn Robinson	1	28	Yes
Southern	Hilltop SDA School	Bobi Crenshaw	1	11	No
Western	Homedale Elementary	Kayla Blackstock	1	22	No
Western	Homedale Elementary	Robyn Chandler	1	22	No
Western	Homedale Elementary	Lesa Folwell	1	22	No
Western	Homedale Elementary	Toby Johnson	1	22	No
Western	Homedale Middle School	David Hann	1	1	No
Western	Homedale Middle School	Heather Landa	1	100	No
Capital	Hunter Elementary School	Rene Bilkiss	1	27	Yes
Capital	Hunter Elementary School	Cinda Bodell	1	27	Yes
Capital	Hunter Elementary School	Diane Escandon	1	27	Yes
Capital	Hunter Elementary School	Rebecca Lenon	1	27	Yes
Capital	Hunter Elementary School	Angela Zweifel	1	26	Yes
Canyon	Idaho Arts Charter School (K-4)	Jill Schmoll	1	30	Yes
Eastern	Indian Hills Elementary	Heidi Austin	1	25	No
Eastern	Indian Hills Elementary	Mark Bowman	1	25	No
Eastern	Indian Hills Elementary	Deri Hall	1	25	No
Eastern	Indian Hills Elementary	Janet Plowman	1	25	No
Canyon	Iowa Elementary	Pepper Allen	1	27	No
Canyon	Iowa Elementary	Shetila Henry	1	27	No
Canyon	Iowa Elementary	Veronica Knutson	1	27	No
Eastern	J R Simplot Elementary School	Michelle Anderson	1	26	No
Eastern	J R Simplot Elementary School	Madison Brambila	1	26	No

Note: "T" represents number of teachers and "S" represents number of students

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Eastern	J R Simplot Elementary School	Bill Morris	1	52	No
Eastern	J R Simplot Elementary School	Lachele Wheeler	1	26	Yes
Capital	Joplin Elementary School	Amy Bass	1	28	No
Capital	Joplin Elementary School	Kirsten Grover	1	28	No
Western	Keating Elementary School	Amanda Wilde	1	20	No
Western	Kenneth Carberry Elementary School	Alissa Combe	1	24	No
Western	Kenneth Carberry Elementary School	Karen Nichols	1	23	No
Western	Kenneth Carberry Elementary School	Paige Parker	1	25	Yes
Western	Kenneth Carberry Elementary School	Katrina Savitz	1	24	Yes
Southern	Kimberly Elementary School	Roberta Beck	1	22	No
Southern	Kimberly Elementary School	Cathy Bohman	1	22	No
Southern	Kimberly Elementary School	Deanna Miller	1	22	No
Southern	Kimberly Elementary School	Rachelle Mueller	1	22	Yes
Capital	Koelsch Elementary School	Roxy AlmaTaya	1	28	Yes
Capital	Koelsch Elementary School	Kellie Penn	1	27	Yes
Canyon	Lake Ridge Elementary School	Deanna Menssen	1	32	Yes
Canyon	Lake Ridge Elementary School	Tanya Scheibe	1	32	Yes
Canyon	Lake Ridge Elementary School	Amy Taylor	1	32	Yes
Canyon	Lake Ridge Elementary School	Laura VanDerschaaf	1	33	Yes
Canyon	Lewis & Clark Elementary	Teri Kelly	1	22	Yes
Canyon	Lewis & Clark Elementary	Adam Trowbridge	1	24	Yes
Canyon	Lewis & Clark Elementary	Meghan Willard	1	25	Yes
Eastern	Lewis and Clark Elementary	John Anderson	1	27	Yes
Eastern	Lewis and Clark Elementary	Stacy Briner	1	27	Yes
Eastern	Lewis and Clark Elementary	Tamara Palmer	1	26	Yes
Capital	Liberty Elementary School	Tara Diemart	1	29	No
Southern	Lincoln Elementary School	Danielle Alger	1	25	No
Southern	Lincoln Elementary School	Alexis Boyle	1	30	No
Southern	Lincoln Elementary School	Courtney Day	1	30	No
Canyon	Lincoln Elementary School	Joana John	1	26	No
Capital	Lowell Elementary School	Jayna Eichelberger	1	24	Yes
Capital	Lowell Elementary School	Cory James	1	26	Yes
Capital	Maple Grove Elementary	Amber Bigelow	1	9	No
Capital	Maple Grove Elementary	Marie Lichte	1	28	No
Capital	Maple Grove Elementary	Scott Roe	1	30	No

Note: "T" represents number of teachers and "S" represents number of students

Participant List

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REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Western	Marsing Elementary School	Stevi Campbell	1	31	Yes
Western	Marsing Elementary School	Jodette Lemos	1	31	Yes
Western	Marsing Elementary School	Danielle Swanson	1	21	No
Capital	Mary McPherson Elementary School	Stephanie Clark	1	34	No
Capital	Mary McPherson Elementary School	Stacee Marshall	1	33	Yes
Capital	Mary McPherson Elementary School	Annie Nuuvali	1	34	No
Western	May Roberts Elementary School	Amanda DeVos	1	27	No
Western	May Roberts Elementary School	Carol DeWitt	1	27	No
Western	Meadows Valley School	Courtney Fisher	1	18	Yes
Western	Meadows Valley School	Brent LaFay	1	18	No
Canyon	Melba Elementary	Carrie Bowers	1	26	Yes
Canyon	Melba Elementary	Marie Rockwood	1	26	Yes
Canyon	Melba Elementary	Katie Strawser	1	26	Yes
Canyon	Middleton Heights Elementary School	Kim Platt	1	22	No
Canyon	Mill Creek Elementary School	Lyna Butler	1	24	Yes
Canyon	Mill Creek Elementary School	Stephani Little	1	24	Yes
Canyon	Mill Creek Elementary School	Jill Mesecher	1	23	Yes
Canyon	Mill Creek Elementary School	Staci Miller	1	24	Yes
Canyon	Mill Creek Elementary School	Allison Villastrigo	1	24	Yes
Capital	Morley Nelson Elementary School	Alisha Coy	1	27	Yes
Capital	Morley Nelson Elementary School	Tobin Goodan	1	32	No
Capital	Morley Nelson Elementary School	Kimberly Vuturo	1	32	No
Capital	Morley Nelson Elementary School	Julia Zarbnisky	1	26	No
Southern	Morningside Elementary School	Katie Mancari	1	22	No
Southern	Morningside Elementary School	Sandy Paul	1	23	No
Southern	Morningside Elementary School	Stephen Rahe	1	23	No
Southern	Murtaugh Elementary School	Anita McClure	1	30	No
Southern	Murtaugh Elementary School	Brooke Stanger	1	27	No
Canyon	Nampa Christian School	Zachary Dwello	1	21	Yes
Western	New Plymouth Elementary School	Christy Norris	1	25	Yes
Western	New Plymouth Elementary School	Jolene Taggart	1	27	Yes
Western	New Plymouth Elementary School	Dorothy Woods	1	25	Yes
Capital	North Elementary	Sherri Redmond	1	75	Yes
Capital	North Star Charter School	Carol DeFriez	1	30	Yes
Capital	North Star Charter School	Michelle Obenchain	1	30	No

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	North Star Charter School	Mariah Rodeghiero	1	30	No
Western	Nyssa Elementary School	Paula Barnhart	1	18	Yes
Western	Nyssa Elementary School	Trisha Bunker	1	37	Yes
Southern	Oregon Trail Elementary School	Chrystine Heimdal	1	35	No
Canyon	Owyhee Elementary	Brenda Allen	1	23	No
Canyon	Owyhee Elementary	Christa Roesberry-Barber	1	24	Yes
Canyon	Owyhee Elementary	Becki Wheeler	1	23	Yes
Western	Park Intermediate	Kathleen Cahill	1	22	No
Western	Park Intermediate	Jenny Conant	1	21	No
Western	Park Intermediate	Emily McLeod	1	21	No
Western	Park Intermediate	Jessica Mosley	1	25	Yes
Western	Park Intermediate	Grace Sharp	1	22	Yes
Canyon	Park Ridge Elementary School	Allison Garrison	1	25	Yes
Canyon	Park Ridge Elementary School	Andrea Wallin	1	25	Yes
Capital	Peregrine Elementary School	Kristie Brokaw	1	21	No
Capital	Peregrine Elementary School	Barbara Nesbit	1	22	Yes
Capital	Peregrine Elementary School	Carri Thornburg	1	25	No
Capital	Peregrine Elementary School	Britnie Winters	1	25	No
Southern	Pioneer Montessori School	Hannah Beane	1	11	No
Capital	Pioneer School Of The Arts	Nadine Bennett	1	30	Yes
Capital	Pioneer School Of The Arts	Anissa Bramlet	1	29	Yes
Capital	Pioneer School Of The Arts	Brent Jons	1	30	No
Capital	Pioneer School Of The Arts	Cindy Potts	1	30	No
Eastern	Pocatello Community Charter School	Stephanie England	1	26	No
Eastern	Pocatello Community Charter School	Cara Sonneman	1	26	No
Capital	Ponderosa Elementary School	Deborah Lichter	1	33	Yes
Capital	Ponderosa Elementary School	Veronica McAchran	1	34	Yes
Capital	Ponderosa Elementary School	Kris Pfaff	1	35	Yes
Southern	Popplewell Elementary School	Cathy Butenschoen	1	30	No
Southern	Popplewell Elementary School	Bill Clements	1	30	No
Southern	Popplewell Elementary School	Melinda Fontana	1	30	No
Southern	Popplewell Elementary School	Kelly Perron	1	30	No
Capital	Prospect Elementary	Daly Hull	1	26	No
Capital	Prospect Elementary	Stephanie Lewis	1	25	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	Prospect Elementary	Sophia Roe	1	27	No
Capital	Prospect Elementary	Kit Shuman	1	26	No
Capital	Prospect Elementary	Sharleen Thurston	1	26	Yes
Canyon	Purple Sage Elementary School	Shalynn Carpenter	1	18	Yes
Canyon	Purple Sage Elementary School	Melissa McPherson	1	22	Yes
Canyon	Purple Sage Elementary School	Katie Ward	1	21	Yes
Southern	Raft River Elementary School	Angie Spencer	1	30	Yes
Canyon	Reed Elementary	Adrianna Cuchillo	1	29	No
Canyon	Reed Elementary	Jennifer Dolan	1	29	Yes
Canyon	Reed Elementary	Mary Holmes	1	29	No
Canyon	Reed Elementary	Arielle Jensen	1	29	No
Capital	River Valley Elementary School	Dena Jozwik	1	27	No
Southern	Rock Creek Elementary	Donna Alexander	1	31	Yes
Southern	Rock Creek Elementary	Andy Arenz	1	32	No
Southern	Rock Creek Elementary	Pauli Connelly	1	31	No
Southern	Rock Creek Elementary	Julie Delia	1	32	Yes
Eastern	Rockland Elementary School	Heidi Stiffler	1	11	No
Canyon	Ronald Reagan Elementary School	Nicole Kemp	1	26	No
Canyon	Ronald Reagan Elementary School	Lisa Martell	1	26	No
Canyon	Ronald Reagan Elementary School	Sheryll Sharp	1	26	Yes
Capital	Roosevelt Elementary School	Alicia Bradshaw	1	28	No
Capital	Roosevelt Elementary School	Kathryn ONeil	1	29	No
Capital	Rose Hill Montessori	Julie Douglas	1	22	No
Canyon	Ross Elementary School	Yvette Marshall	1	29	No
Canyon	Sacajawea Elementary School	Jennifer Howell	1	30	No
Canyon	Sacajawea Elementary School	Terra Hurd	1	30	No
Canyon	Sacajawea Elementary School	Penny Washburn	1	30	No
Southern	Sawtooth Elementary School	Emily Martin	1	25	Yes
Capital	Seven Oaks Elementary School	Jennifer DeMarini	1	26	Yes
Capital	Seven Oaks Elementary School	Heather Neptune	1	25	Yes
Capital	Seven Oaks Elementary School	Liz Paradis	1	25	Yes
Western	Shadow Butte Elementary School	Christina Henery	1	26	No
Western	Shadow Butte Elementary School	Kristina Maxwell	1	27	No
Western	Shadow Butte Elementary School	Melissa Stringfield	1	25	No
Canyon	Sherman Elementary School	Jennifer Castricone	1	18	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Canyon	Sherman Elementary School	Josephine Fisher	1	19	No
Canyon	Sherman Elementary School	Jennifer Jensen	1	19	No
Canyon	Sherman Elementary School	Kaitlynn Johnson	1	19	No
Southern	Shoshone Elementary School	Charli Cenarrusa	1	18	No
Southern	Shoshone Elementary School	Denice Christiansen	1	18	No
Capital	Silver Sage Elementary School	Lisa Jimenez	1	28	Yes
Capital	Silver Sage Elementary School	Kelcey Moore	1	26	Yes
Canyon	Silver Trail Elementary School	Kim Birkinbine	1	27	Yes
Canyon	Silver Trail Elementary School	Dan Hoehne	1	25	Yes
Canyon	Silver Trail Elementary School	Karla Miller	1	27	Yes
Canyon	Skyway Elementary School	Mark Elli	1	30	Yes
Canyon	Skyway Elementary School	Elizabeth Pierce	1	30	No
Canyon	Skyway Elementary School	Casi Spengler	1	30	No
Canyon	Skyway Elementary School	Jamie Warren	1	30	No
Canyon	Snake River Elementary	Heather Packer	1	18	No
Canyon	Snake River Elementary	Matea Schindel	1	19	Yes
Canyon	Snake River Elementary	Lindsay Strong	1	18	Yes
Capital	Star Elementary School	Angela Fulkerson	1	36	Yes
Capital	Star Elementary School	Joyanna Galan	1	31	Yes
Capital	Star Elementary School	Carmi Scheller	1	36	Yes
Capital	Stephensen Elementary School	SD Rhatigan	1	32	Yes
Capital	Stephensen Elementary School	Trouten	1	31	No
Eastern	Stoddard Elementary School	Alicia Cody	1	23	Yes
Eastern	Stoddard Elementary School	Fairley Faroni	1	21	No
Eastern	Stoddard Elementary School	Natasha Luker	1	20	No
Eastern	Stoddard Elementary School	Craig Ockermen	1	21	Yes
Southern	Summit Elementary School	Don Adams	1	25	Yes
Southern	Summit Elementary School	John Derr	1	26	Yes
Southern	Summit Elementary School	Jorma Fletcher	1	26	No
Southern	Summit Elementary School	Stacey Lakey	1	25	Yes
Southern	Summit Elementary School	Suzi McGinnis	1	26	No
Southern	Summit Elementary School	Tracy Park	1	27	Yes
Southern	Summit Elementary School	Michele Putnam	1	25	Yes
Southern	Summit Elementary School	Maggie Stump	1	26	Yes
Southern	Summit Elementary School	Audra Thompson	1	25	Yes

Note: "T" represents number of teachers and "S" represents number of students

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(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Southern	Summit Elementary School	Kimberly Wallace	1	25	Yes
Southern	Summit Elementary School	Anne Winder	1	25	Yes
Southern	Summit Elementary School	Brad Winder	1	25	Yes
Eastern	Syringa Elementary School	Aubrey Eldredge	1	24	No
Eastern	Syringa Elementary School	Andrea Gulden	1	23	No
Eastern	Syringa Elementary School	Cindel Vasquez	1	23	No
Southern	Syringa Mountain Charter School	Angie Grant	1	18	No
Southern	Syringa Mountain Charter School	Shawn Myers	1	26	No
Capital	Taft Elementary School	Jessica Rose	1	25	No
Capital	Taft Elementary School	Sarah Wright	1	23	Yes
Eastern	Tendoy Elementary	Cody Perry	1	24	Yes
Eastern	Tendoy Elementary	Diana Son	1	25	Yes
Capital	Trail Wind Elementary School	Kori Bevis	1	29	No
Capital	Trail Wind Elementary School	Karen Palazzolo	1	30	No
Eastern	Tyhee Elementary School	Amy Bare	1	30	No
Eastern	Tyhee Elementary School	Jayne Johnson	1	29	Yes
Eastern	Tyhee Elementary School	Haley Luce	1	29	No
Southern	Valley Elementary	Jennifer Bailey	1	23	Yes
Southern	Valley Elementary	Holly Hall	1	23	Yes
Capital	Valley View Elementary School	Shawna Hiller	1	25	Yes
Capital	Valley View Elementary School	Meko Myers	1	25	Yes
Canyon	Van Buren Elementary School	Becky Gans	1	21	No
Canyon	Van Buren Elementary School	Jenny Hartvigsen	1	21	No
Canyon	Van Buren Elementary School	Aimee Stacy	1	23	No
Canyon	Van Buren Elementary School	Cindy Wells	1	23	No
Western	W.W. Jones Elementary School	Vicki McConnell	1	3	Yes
Eastern	Wapello Elementary School	LaNae Porter	1	24	No
Eastern	Wapello Elementary School	Kristine Schnittgen	1	26	Yes
Canyon	Washington Elementary School	Kyle Backlund	1	26	No
Canyon	Washington Elementary School	Joleena Malugani	1	26	Yes
Canyon	Washington Elementary School	Heather Mueller	1	26	Yes
Canyon	West Canyon Elementary	Andrea Chester	1	25	Yes
Canyon	West Canyon Elementary	Sirrah Elliott	1	24	Yes
Canyon	West Canyon Elementary	Chuck Knox	1	25	Yes
Canyon	West Canyon Elementary	Emry Smith	1	23	Yes

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Participant List

(continued)

REGION	SCHOOL	TEACHER	T	S	SURVEYS RETURNED
Capital	West Elementary School	Travis Henke	1	25	Yes
Capital	West Elementary School	Tricia Henke	1	25	No
Capital	Whitney Elementary School	Tasha Crowell	1	26	Yes
Capital	Whitney Elementary School	Eden Rodriguez	1	33	No
Capital	Whitney Elementary School	Kayden Tague	1	22	Yes
Eastern	William Thomas Middle School	Kelly Coleman	1	125	Yes
Canyon	Willow Creek Elementary School	Kim Chierici	1	4	Yes
Canyon	Willow Creek Elementary School	Nicole Gibbs	1	4	Yes
Canyon	Willow Creek Elementary School	Kayla Stone	1	5	Yes
Canyon	Willow Creek Elementary School	Melissa Sullivan	1	4	Yes
Canyon	Wilson Elementary School	Keelee Babcock	1	22	Yes
Canyon	Wilson Elementary School	Afton McSherry	1	23	No
Canyon	Wilson Elementary School	Debbie Peterson	1	23	Yes

	TOTALS	361	9,439	
	TOTAL PARTICIPANTS	9,800		
TOTAL PARTICIPATING 2019-2020 TEACHERS	361	176	49%	YES
		185	51%	NO
TOTAL STUDENT SURVEYS RETURNED	2,970			
TOTAL INCENTIVE PAID OUT	$14,000			
FULL YEAR SURVEY RETURN PERCENTAGE	31%			

Teacher Program Evaluation Data

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	361	107	95	45	56	58
Surveys Received	73	23	24	10	10	6
Percent Response	20%	21%	25%	22%	18%	10%

		Number	Percent
1	The materials were clearly written and well organized.		
	Strongly Agree	52	71%
	Agree	20	27%
	Disagree	0	0%
	Strongly Disagree	1	1%
2	The products in the Kit were easy for students to use.		
	Strongly Agree	40	56%
	Agree	31	44%
	Disagree	4	0%
	Strongly Disagree	1	0%
3	Students indicated that their parents supported the program.		
	Yes	65	90%
	No	7	10%
4	Would you conduct this Program again?		
	Yes	72	100%
	No	0	0%
5	Would you recommend this program to other colleagues?		
	Yes	72	100%
	No	0	0%
6	If my school is eligible for participation next year, I would like to enroll.		
	Yes	71	99%
	No	1	1%

Due to rounding of numbers, percentages may not add up to 100%

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Parent/Guardian Program Evaluation Data

	Total	Capital	Canyon	Eastern	Southern	Western
Participants	9,439	2,978	2,314	1,240	1,490	1,417
Surveys Received	41	28	28	14	17	7
Percent Response	.97%	1.29%	.99%	.74%	.82%	.95%

Total Parent Responses **41**

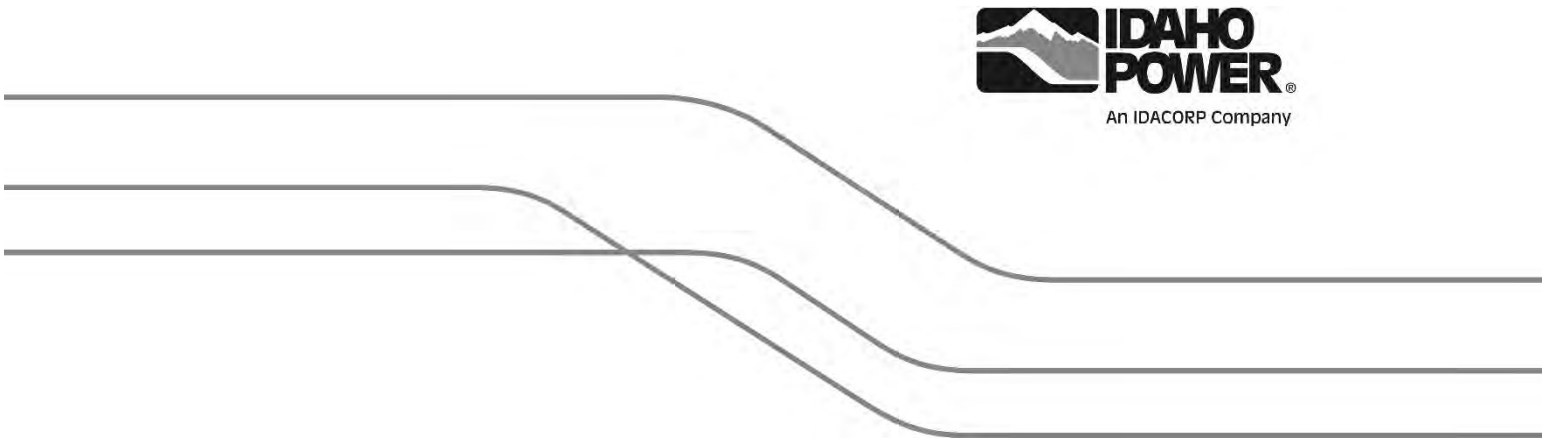
		Number	Percent
1	Was the Program easy for you and your child to use?		
	Yes	41	100%
	No	0	0%
2	Will you continue to use the Kit items after the completion of the Program?		
	Yes	41	100%
	No	0	0%
3	Would you like to see this Program continued in local schools?		
	Yes	41	100%
	No	0	0%

Due to rounding of numbers, percentages may not add up to 100%

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2020 Irrigation Peak Rewards Program Report

February 2021

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INTRODUCTION

The Irrigation Peak Rewards Program (IPR) is a voluntary demand response program available to Idaho Power Company's (IPC) agricultural irrigation customers since 2004. IPR pays irrigation customers a financial incentive for the ability to turn off participating irrigation pumps at potentially high system load periods (summer peak). IPC estimates future capacity needs through the Integrated Resource Plan and then plans resources to mitigate these shortfalls. IPR is a result of this planning process and the success of the program is measured by the amount of demand reduction available to IPC during potential system peak periods

Details

Interruption Options

IPR is available to IPC irrigation customers receiving service under schedules 24 and 84 in Idaho and Oregon. Eligibility is based on prior participation at the pump location. There are two options for shut off: automatic dispatch option and manual dispatch option. The load reduction spans a seven-hour timeframe with four groups. Each group is off for four hours starting at 2:00 p.m. If four or more events are dispatched during the season, any participant willing to have the pump remain off until 9:00 p.m. may have an additional variable payment. Currently, the options for dispatch groups are as follows:

- 2:00 to 6:00 p.m.
- 3:00 to 7:00 p.m.
- 4:00 to 8:00 p.m.
- 5:00 to 9:00 p.m.

Automatic Dispatch Option

Pumps enrolled in the automatic dispatch option have one of two devices installed at the pump location. The device controls the associated irrigation pump(s) with a signal from IPC. This option requires all pumps shut off at a site for the demand response event. Approximately 90 percent of the devices are demand response units (DRU) and use IPC's Automated Metering Infrastructure (AMI) to send the signal to open the contactor to shut off the pump. The other 10 percent of automatic participants have a cellular device (cell device) installed. If the pump has an AMI meter, then a DRU is installed. If AMI technology is not available, a cell device is installed. The cell device has the same load control feature as the AMI DRU but a cellular network signal is used to send the command for shut off during the event.

Manual Dispatch Option

Pumps with at least 1,000 cumulative horse power (hp) or that IPC has determined to have limited communication availability, are eligible for the manual dispatch option (manual). Participants under this classification choose to manually control which pumps are turned off during a load control event. Manual participants are required to select a nominated load reduction of kilowatts (kW) available for shut off during the season. They may choose to shut down all or partial load at the site.

Parameters

- Season dates June 15 to August 15
- Minimum of three load-control events
- Load-control events may occur any weekday or Saturday, excluding July 4 between the hours of 1:00 p.m. and 9:00 p.m.
- Load-control events may occur up to four hours per day and up to 15 hours per week, but no more than 60 hours per program season
- IPC notifies automatic participants by phone, email, and/or text messaging four hours before the start of the event whenever possible
- IPC notifies manual participants by phone, email, and/or text four hours before the start of the event
- IPC may cancel the load-control event and notify participants of the cancellation up to 30 minutes before the event start time
- Parameters for IPR do not apply to system emergencies

Incentives

Automatic dispatch participants receive incentives in the form of a billing credit. The billing credit is made up of a demand credit and an energy credit applied to the monthly billing dates June 15 through August 15. The demand and energy credits for the manual dispatch participants are paid with a check.

Demand credits are calculated by multiplying the monthly billing kW by the demand-related incentive amount. The energy credits are calculated by multiplying the monthly billing kilowatt-hour (kWh) usage by the energy-related incentive amount. Credits are prorated for periods when meter reading/billing cycles do not align with the IPR season dates.

The incentive structure includes fixed and variable incentives. Variable incentives apply if more than three events occur in the season. Participants who choose the extended 5:00 to 9:00 p.m. group are paid a larger variable credit. No variable incentive payments were made in 2020.

Incentives are calculated for manual and automatic dispatch participants using IPC metered billing data.

Monthly billing credits are calculated and applied using IPC's billing software. Manual credits are calculated using interval metering data and nominated kW. The participants receive payment in the form of a check sent through the mail. The incentive rates for 2020 are listed in Table 1.

Table 1
Monthly incentive rates for manual and automatic options

Fixed Demand Credit ($/billing kW)	Fixed Energy Credit ($/billing kWh)	Variable Energy Credit ($/billing kWh)	Extended Variable Energy Credit* ($/billing kWh)
$5.00	$0.0076	$0.148	$0.198

* 5-9 p.m. group

Opt-Outs

Under the rules of the automatic dispatch option, participants have the option to opt-out of a load control event up to five times per pump per season. Opt-out fees are equal to $5.00 multiplied by the billed kW for that billing cycle. An explicit opt-out occurs when the participant asks IPC to remove the pump for that specific load control event. An inexplicit opt-out occurs when a participant turns the pump on prior to the four hours. Interval metering data and the hp rating are used to determine an inexplicit opt-out after the event data has been collected and analyzed.

PARTICIPATION

IPR enrollment packets were mailed to all customers signed up for past participanting service points in February 2020. Contents of the packet included an IPR brochure, program application, incentive structure details, eligible pump locations and an estimated incentive for each pump location.

IPC presented IPR details at irrigation workshops. In 2020 only two workshops were completed as the others scheduled were cancelled due to COVID uncertainty. IPC had the opportunity to communicate program details while staffing the booth at four agricultural shows across the service area. IPC continues to encourage past participants to enroll.

Nominated billing demand was 400.52 MW with 2,292 pumps enrolled for the 2020 season. The annual participation has remained steady over the past couple of years.

Figure 1 shows IPC's service area divided into three regional areas; Canyon–West, Capital, and South–East. Five areas within the three regions will be referenced throughout this report; Western, Canyon, Capital, Southern, and Eastern.

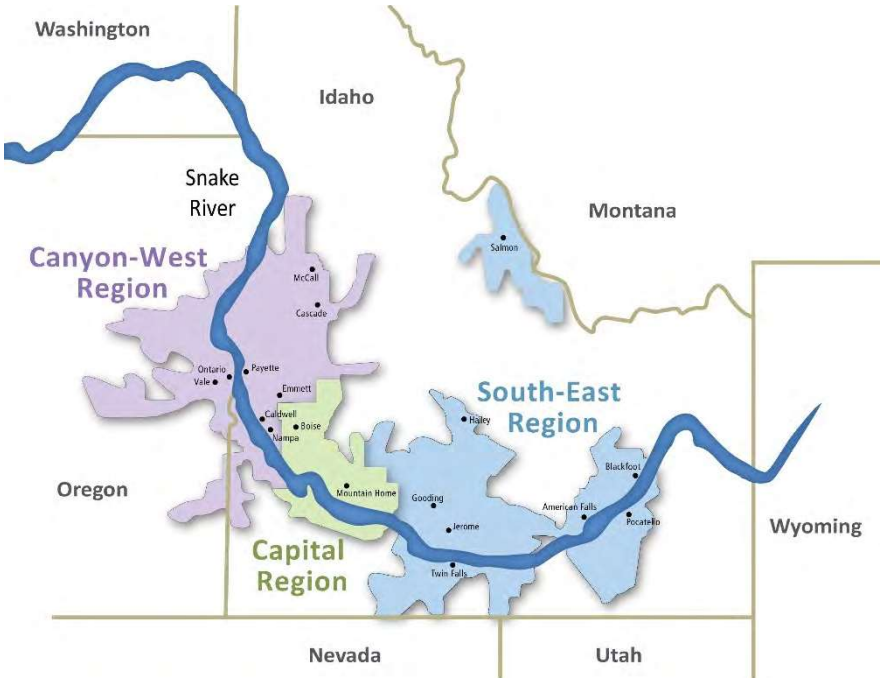


Figure 1
IPC service area

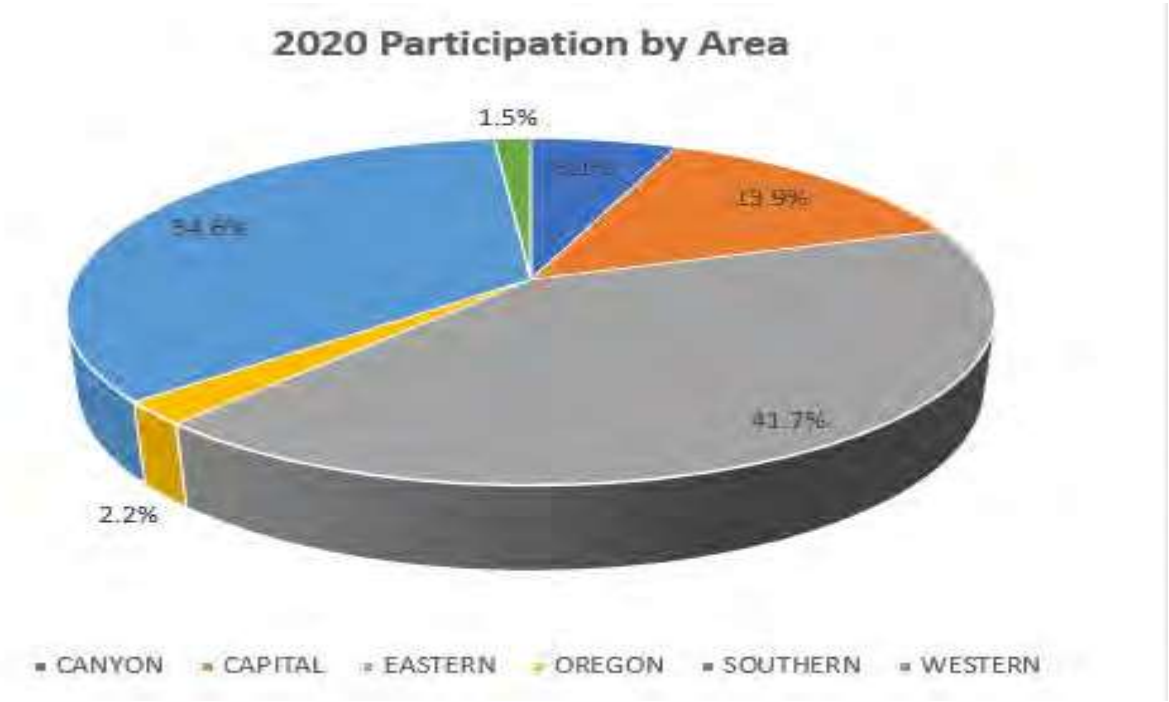


Figure 2
Distribution of participants by service area

Table 2
Eligible pump locations, nominated MW, and participation levels by area

IPC Regional Area	Eligible Service Locations	Manual Dispatch Option	Automatic Dispatch Option	Total Enrolled by Area	Eligible Enrolled	Nominated MW
Canyon	164	12	128	140	85.37%	35.22
Capital	379	31	287	318	83.91%	87.32
Eastern	1126	0	995	995	84.81%	134.70
Southern	980	5	789	794	81.02%	130.89
Western	62	0	35	35	56.45%	2.78
Oregon	63	3	48	51	79.37%	9.62
Totals	**2,774**	**51**	**2,241**	**2,292**	**82.62%**	**400.52**

OPERATIONS

Equipment

IPC has expanded the use of AMI technology with the use of DRUs installed at pump locations. AMI technology provides the ability to turn off pumps during an IPR event by sending command through the power line.

AMI technology allows IPC to investigate the hourly data of participating pumps during load-control events. Three days after the event an hourly usage report is downloaded and analyzed. These reports provide data to help determine which DRUs functioned properly and which pumps turned off and stayed off during the event. During the 2020 season 2,307 DRUs were active and installed at 1,917 pump locations.

In addition to using AMI technology, IPC developed its own load control device. These devices utilize a cellular network signal to communicate with and shut off the pump during a load-control event. The data available from the cellular device systems allows IPC to view status information for each location and successful cellular communication. Hourly usage data is not available at these sites. During the 2020 season 298 cellular devices were active and installed at 262 pump locations.

Monitoring

Identification and correction of device failure is an ongoing effort before the season begins and throughout the season. Proper identification of malfunctioning devices helps to accurately predict the load reduction. Based on information and assumptions made using the interval metering data and the communication reports a work order may be sent to the electrician to troubleshoot the device. Often it is found the device is not working or damaged and exchanged for a new device.

A variety of issues with DRUs and cell devices have been identified, including:

- Inoperable
- Damaged
- DRU missing a fuse
- DRU serial number had been recorded inaccurately and the system could not find the correct communication path
- New panel install at the pump site
- Water damage to the DRU
- DRU missing—no longer at the pump location

Data Gathering and Processing

Troubleshooting, customer payments and program performance are informed by the interval metering data analysis. The first step of the data analysis is gathering the data. This includes AMI data, cellular device data, MV-90 hourly data, and logged data from manually read meters. The data was then separated into three data sets:

1. Pumps with AMI technology and hourly usage data
2. Pumps with cellular device data
3. Pumps running on the manual dispatch option with interval data

LOAD REDUCTION ANALYSIS

The load reduction analysis or program performance for the season is calculated using six primary sources:

1. Program participant list
2. AMI hourly usage data
3. Interval metering data
4. MV90 interval data
5. Cellular device communication data from event days
6. Total system load data for event days and surrogate days

The IPR participant data for each event day includes the following:

- Pump number
- Meter number
- 2020 dispatch option
- 2020 dispatch group
- Nominated kW
- Cellular device or DRU number or identified as Manual site

IPC system load monitoring was used as a comparison for impact of the load reduction during the event. The total system load monitoring provides megawatt (MW) readings in five-minute increments on event days as well as comparative nonevent days.

Baseline Calculations and Event Reduction Calculations

Calculating the performance of the program requires a comparison between usage prior to the event (baseline hours) and usage during the event. See Appendix 1 for the definition of terms and the demand reduction calculation method. The descriptions below outline the process.

- Baseline hours are calculated using the average of the four hours prior to the dispatch group start time.
- The event hour reduction is calculated using the average of the event time frame for each dispatch group.
- Data with errors are removed from the data set.
- Load reduction for automatic AMI dispatch option is calculated and then extrapolated to represent all load including those without interval metering data.
- Load reduction for the automatic cell dispatch option is calculated using the AMI percentage extrapolated to represent the load reduction of sites with cell phones and sites with data errors.
- Load reduction for manual dispatch option is calculated using interval metering data from AMI, MV-90 and manual data loggers without errors.
- 1998 pump locations have interval data, representing 83.51 percent of the total program MW nomination.

Table 3 displays the load reduction results for each event day. The load reduction at generation level includes a 9.7 percent line loss.

Table 3
Hourly demand reduction results (MW) for each event for total program, including line losses

Event Date	2–3 p.m.	3–4 p.m.	4–5 p.m.	5–6 p.m.	6–7 p.m.	7–8 p.m.	8–9 p.m.
6/24/2020	78.63	162.67	236.38	292.43	213.80	129.76	56.05
7/21/2020	61.75	118.38	190.55	240.52	178.77	122.14	49.97
7/31/2020	43.10	111.64	181.82	225.96	182.86	114.31	44.14

Table 4
Hourly demand reduction results (MW) for each event, for Oregon-only pumps, including line losses

Event Date	2–3 p.m.	3–4 p.m.	4–5 p.m.	5–6 p.m.	6–7 p.m.	7–8 p.m.	8–9 p.m.
6/24/2020	0.00	0.00	7.59	8.09	8.09	8.09	.49
7/21/2020	0.00	0.00	5.95	6.34	6.34	6.34	.39
7/31/2020	0.00	0.00	5.60	5.96	5.96	5.96	.36

June 24

The first event occurred on a Wednesday. Notifications to the participants went out as designed and the commands sent to the DRU's and Cell devices occurred without delays. Interval metering data for the AMI group reflected an average of 70 percent of the nominated load were running during the base hours. Of the 70 percent the data indicates a 90 percent reduction. The manual or large payment group reflected nearly 90 percent on during the base hours for a 83 percent load reduction. The total load reduction for the 5 – 6:00 pm hour was 292.43 MW including line losses.

July 21

The second event occurred on a Tuesday. Notifications to program participants were successful and the AMI and cell commands were initiated and delivered timely resulting in the expected load reduction. Interval metering data for the AMI automated dispatch group reflected an average of 58 percent of the nominated load running during the base hours. Of the pumps running 91 percent stayed off during the event. The manual or large payment group data shows 84 percent of the load on during the base hours and nearly 80 percent turned off during the event hours. The total load reduction for the 5 – 6:00 pm hour was 240.52 MW including line losses.

July 31

The third event occurred on a Friday. The notifications to participants went out as designed and the communication to the DRUs and Cell devices occurred without delays. It is common for irrigation load to taper in July and the 2020 season was no different. Of the nominated pump load, the AMI automated dispatch group had 55 percent of the pumps running during the base hours. We experienced a record 'opt out' amount of 10.18 MW or 7 percent of the load on during base. For the manual or large credit participants the load on in base was just over 80 percent and of that load nearly 76 percent turned off during the event time. The total load reduction for the 5 – 6:00 pm hour was 225.96 MW including line losses.

Potential Realization Rate Analysis

The realization rate is used to determine the IPR potential performance for any day during the season. It is defined as the likelihood that an irrigation pump is on and available for shutoff during a demand response event. For the analysis the realization rate percentage is reduced by the average of device failures, opt-outs and small loads left on during an event. These reductions averaged 10.47 percent for the 2020 season. For the max potential number the average of 9.9% was utilized as event date of June 24th experienced a 9.9% average and the peak date was June 26th. Due to the event date being in the same two week timeframe as the load reduction event the reduction was not the season average. By removing the average left on IPC more accurately calculates the potential load reduction for any day during the season had a demand response event been called. Table 5 shows the average by category for load left on at participating pumps.

Table 5
Results for each event day by category and percentage, percentage during each event by reason

Event Date	Small Load	Explicit Opt Out	Inexplicit opt out	Device Failure	Early On	Average percent of MW on during an event
6/24/2020	0.85%	1.51%	1.74%	5.48%	0.32%	9.90%
7/21/2020	0.75%	0.84%	1.14%	5.91%	0.17%	8.82%
7/31/2020	0.68%	5.78%	1.29%	4.83%	0.13%	12.71%

This rate is typically the highest at the end of June and the beginning of July when a larger percentage of irrigation pumps are operating nearly 24 hours per day seven days per week. The potential realization rate is lower later in the season when many pumps are not operating due to crop maturity and reduced watering demands. The 2020 maximum potential realization rate of 67.90 percent on June 26th, which results in a maximum potential load reduction for IPR of 298.34 MW for the 2020 IPR season.

Load Reduction Results—Total System Load Data

IPC measures system load data in five-minute intervals. This data is also used to validate load reduction for IPR during the season. Each event day is considered to evaluate the results of the program operation. The reduction is considered an estimate due to the expected load curve being estimated from similar days without events. Figure 4 shows each load reduction day in 2020 with an estimated curve showing expected load. Each day shows a similar reduction to the interval metering data analysis.

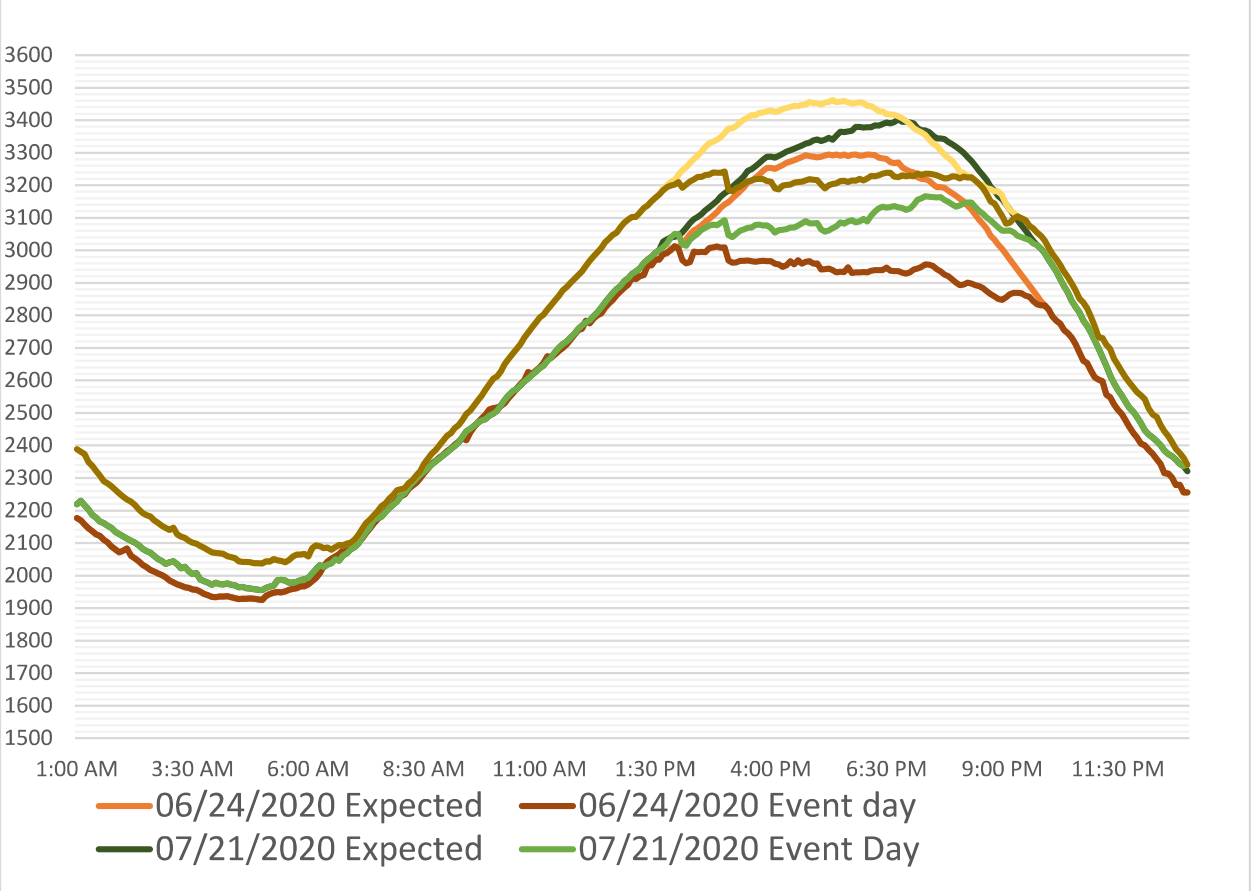


Figure 3
Load reduction results—total system load data

COSTS

IPR spent a total of $6,407,412.42 with the incentive credit being the largest portion at 96.9 percent of total program costs. Incentives paid for the 2020 season total $6,510,245.14. Had the program been utilized beyond 3 events then additional variable incentives would have been paid. The estimated maximum cost of variable incentives of running the program at the full 60 hours per season or an additional 48 hours is another $3.0 million dollars.

Table 6
Annual program costs by category

Expense Item	2020 Total Cost
Materials & Equipment	$55,009.51
Purchased Service	$138,803.91
Other Expense	$1,192.73
Incentives	$6,124,936.89
Labor/Administrative Expense	$87,469.38
Total	$6,407,412.42

CUSTOMER SATISFACTION

The general sentiment of Peak Participants is positive with most folks asking for more notice of an event and to enroll more pumps into the program. For an additional touch point with our Peak Rewards participants a letter was mailed to each participant with a summary of peak credits and totals for the 2020 season.

CONCLUSIONS

Highlights from the 2020 season include the following:

- 2,292 pumps enrolled
- 400.52 MW of nominated billing demand
- Maximum potential demand-reduction of 298.34 MW including line losses
- Event 1: June 24 – actual reduction 292.43 MW including line losses

- Event 2: July 21 – actual reduction 240.52 MW including line losses
- Event 3: July 31 – actual reduction 225.96 MW including line losses
- 2,307 active AMI DRUs
- 298 active IPC cellular devices
- 82.62 percent of eligible pump locations with devices participated
- Exchanged 179 Cell devices to DRU's in October 2020
- Peak Credit letter mailed showing the summary of credits
- The cost of running the program for three events this season was $6.4 million
- The cost of having this resource available was $21.48 per kW
- The estimated cost of running the program at the full 60 hours per season or an additional 48 hours is another $3.0 million

Appendix 1
The demand reduction calculation method

Abbreviations

ADO—Automatic Dispatch Option

AEL—Average Event Load

AMI—Automated Metering Infrastructure

BL—Baseline Load

DR—Demand Reduction

MDO—Manual Dispatch Option

MV-90—Specific Meter Package with Interval Data

Σ—Sum

Automatic Dispatch Option

Load reduction for each event was calculated using hourly data for each pump using the last three hours of each curtailment event was calculated as follows:

$$DR_{pump} = BL_{pump} - AEL_{pump}$$

The load reduction for all pumps within a dispatch group is the total hourly reduction for each group as calculated below:

$$DR_{group} = \Sigma\, DR_{pump\ (groups\ 1\text{-}4)} + \frac{DR_{(groups)}}{DR_{nominated\ (groups)}} * \text{Nominated } DR_{\text{pumps with errors}}$$

Load reduction for the automatic dispatch option was calculated as follows:

$$DR_{ADO} = \Sigma\, DR_{group}$$

Manual Dispatch Option

Data utilized for manual dispatch option participants is AMI hourly usage or MV-90 interval data.

Load reduction for manual dispatch option was calculated as follows:

$$DR_{group} = \Sigma\, DR_{pump\ AMI} + \Sigma\, DR_{pump\ MV\text{-}90} + \frac{DR_{(groups)}}{DR_{nominated\ (groups)}} * \text{Nominated } DR_{\text{pumps with errors}}$$

The total demand reduction for the Manual Dispatch Option was calculated as follows:

$$DR_{MDO} = \Sigma\, DR_{group}$$

The total IPR load reduction was calculated by summing the Automatic Dispatch Option sites and the Manual Dispatch Option sites calculated reduction:

$$\text{Total Program DR} = DR_{MDO} + DR_{Group}$$