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November 6, 2026 NWN OPUC Advice No. 26-10

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street SE, Suite 100
Post Office Box 1088
Salem, Oregon 97308-1088

Re: NEW Schedule 354 – Hybrid Heating Program

Northwest Natural Gas Company, dba NW Natural ("NW Natural" or "Company"), files herewith the following revisions to its Tariff P.U.C. Or. 25, stated to become effective on April 1, 2027.

Original Sheet 354-1	Schedule 354	Hybrid Heating Program

Purpose

The purpose of this filing is to request the Public Utility Commission of Oregon ("Commission") to approve a new tariff Schedule 354, Hybrid Heating Program for residential customers. Schedule 354, Hybrid Heating Program, includes a one-time $3,500 incentive for program participants to install a hybrid heating system, and a fixed charge of $5.00 per month ("Hybrid Heating Charge") paid by program participants to ensure that customers that receive the benefit of this incentive continue to pay a proportionate share of fixed system costs.

Hybrid Heating Program Incentive.

Schedule 354, Hybrid Heating Program, will provide a one-time $3,500 incentive to homeowners and qualified contractors and installers who install a hybrid heating system (a ducted air-source heat pump sized for air conditioning and space heating in milder weather, and a natural gas furnace that will serve homeowners' colder-weather space heating needs). The $3,500 incentive is economically justified based on an 18-year net present value (NPV) evaluation of Hybrid Heating Program avoided environmental compliance costs and avoided electric system costs, as further described in NW Natural's supporting testimony included in this filing (see below).

Hybrid Heating Charge
The Hybrid Heating Charge is a fixed monthly charge of $5.00 that will apply to all customers who receive service to a residence that has received the $3,500 incentive per Schedule 354, Hybrid Heating Program. The Hybrid Heating Charge is designed to collect a proportionate share of fixed system costs from participating hybrid heating customers whose usage is less on average compared to non-participating customers, which mitigates the cross-subsidization of these costs.

Cost Recovery
Concurrently with this filing, NW Natural has filed an Application for an Accounting Order that seeks to capitalize the program's costs. NW Natural proposes to capitalize the program costs and record them as a regulatory asset, which will be included as rate base within the Company's revenue requirement in a future cost recovery proceeding. As explained in NW Natural's separate application, this accounting treatment reduces the program's near-term rate impact on customers, better aligns cost recovery with the period where both customers and the overall energy system benefit from investments in hybrid heating, and incentivizes NW Natural to pursue creative solutions that address not only issues facing the Company, such as compliance with the Climate Protection Program ("CPP"), but also issues facing the broader energy system, such as resource adequacy and affordability. NW Natural will seek a prudency determination of these costs at the time the Company requests recovery in customer rates.

Supporting Testimony
In support of this filing, NW Natural submits the prepared joint testimony of Ms. Kellye Dundon, Mr. Andrew Sprott, and Mr. Robert J. Wyman. This testimony describes NW Natural's Hybrid Heating Program in detail, including supporting appendices that provide additional information and analysis. Consistent with prior tariff advice filings that included testimony, NW Natural will not repeat its testimony here.[1] Rather, the prepared joint testimony provides a detailed explanation of:

- Hybrid heating, including how it works and the benefits it provides to the overall energy system. (Section II of testimony);

- How hybrid heating emerged from the 2025 Integrated Resource Plan ("IRP") with the support of Commission Staff and the Commission, as well as the Company's prior pilots and why this program complements the Energy Trust of Oregon's ("ETO") hybrid heating work plan (Section III of testimony);

- The program design, including eligibility, the incentive and its economic justification, and rate design (Section IV of testimony);

- Customer outreach, participant benefits, equity considerations, and program evaluation (Section V of testimony);

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[1] *See e.g. Initial Tariff Advice Filing*, Schedule 400: Smart Energy Pilot Program, NWN Advice No. OPUC 07-4 (Jun. 29, 2007) (available at: https://edocs.puc.state.or.us/efdocs/UAA/5217uaa124425.pdf).

- How the program supports CPP compliance at lower cost and risk than other compliance resources (Section VI of testimony); and

- Program costs and the proposed accounting treatment (Section VII of testimony).

NW Natural notes that Schedule 354, Hybrid Heating Program, is just the beginning of its efforts to promote hybrid heating across its entire service territory. Pursuant to Commission direction in the Company's 2025 IRP, NW Natural continues to work with the ETO on developing a hybrid heating work plan that also encourages customers to install heat pumps instead of central air conditioning.[2] The ETO program will take additional time to develop, as it involves close coordination with electric utilities, and a hybrid heating measure was not included as a specific activity in the ETO's Multi-Year Plan or Utility Specific Action Plan.

Conclusion

NW Natural respectfully requests that the Commission approve these tariff changes to become effective April 1, 2027.

In accordance with ORS 757.205, copies of this letter and the filing made herewith are available at the Company's main office in Portland, Oregon and on its website at www.nwnatural.com.

Workpapers will be uploaded to a Commission Huddle workspace.

Please address correspondence on this matter to me with copies to the following:

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Respectfully submitted,

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Enclosures

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[2] *In the Matter of Northwest Natural Gas Co., dba NW Natural, 2025 Integrated Resource Plan*, Docket No. LC 86, Order No. 26-150 (Apr. 30, 2026).

SCHEDULE 354
HYBRID HEATING PROGRAM

(N)

PURPOSE:
To describe the terms and conditions for NW Natural's Hybrid Heating Program, a voluntary program that provides a $3,500 incentive to install a Qualifying Hybrid Heating System. A Qualifying Hybrid Heating System consists of: 1) a natural gas furnace that is no more than ten years old, and 2) an air source ducted electric heat pump that is sized for air conditioning and space heating in milder conditions (above 35 degrees Fahrenheit). The natural gas furnace will provide space heating in colder weather.

AVAILABLE:
Subject to the conditions below, the $3,500 incentive to install a Qualifying Hybrid Heating System is available to: 1) new residential construction where the home either will be an owner-occupied primary residence or will be a long-term rental, including, but, not limited to, single family homes, row houses, and townhomes, and 2) NW Natural's existing Residential Customers with a natural gas furnace that is no more than ten years old and whose existing home is either their primary residence or a single family long-term rental, including, but, not limited to, single family homes, row houses, and townhomes on Rate Schedule 2 of NW Natural's Tariff.

Accessory dwelling units and stacked multifamily units are not eligible for the $3,500 incentive to install a Qualifying Hybrid Heating System. Customers that already have hybrid heating systems are not eligible to participate in this program.

ENROLLMENT AND PROGRAM DETAILS:
Hybrid Heating Program participants will receive a $3,500 incentive to install a Qualifying Hybrid Heating System. All new equipment that is part of the Qualifying Hybrid Heating System must be installed by an HVAC professional or the homebuilder. Self-installs are not eligible for the $3,500 incentive. NW Natural may require verification from the HVAC professional or the homebuilder that a Qualifying Hybrid Heating System was installed in an eligible residence. The $3,500 incentive is only available to residential premises that have their own individual heating systems. Ductless, cold climate, and geothermal heat pumps are not eligible for the $3,500 incentive.

FIXED MONTHLY CHARGE
A fixed monthly charge of $5.00, herein referred to as the "Hybrid Heating Charge," is assessed to all Rate Schedule 2 customers who take service at a residential premises that has received the $3,500 incentive to install a Qualifying Hybrid Heating System. The Hybrid Heating Charge applies to customers that have received the $3,500 incentive and are taking service at the residential premises with the Qualifying Hybrid Heating System, as well as subsequent customers that take service at such residential premises. The Hybrid Heating Charge ensures that customers taking service at participating residential premises continue to pay a proportionate share of fixed natural gas system costs despite lower natural gas usage, thereby mitigating such costs from being shifted to customers taking service at residential premises that did not receive the $3,500 incentive.

PROGRAM COSTS:
Program costs will be capitalized, which will be included as rate base within the Company's revenue requirement in a cost recovery proceeding.

REPORTING
After $10 million in incentive payments have been made to promote the installation of Qualifying Hybrid Heating Systems, an independent third party hired by NW Natural will prepare a measurement and verification (M&V) report that will inform recommendations for program improvements. The M&V report will examine program expenditures, energy and emissions savings, participation rates, and incentive payouts. Based on this M&V process, NW Natural may request changes to the program or continue the program without changes.

GENERAL:
Service under this Schedule is governed by the terms of this Schedule and Rate Schedule 2, the General Rules and Regulations contained in this, any other schedules that by their terms or by the terms or by the terms of this Schedule apply to service under this Schedule, and by all rules and regulations prescribed by regulatory authorities, as amended from time to time.

(N)

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

OPUC Advice No. 26-10

NW Natural

Testimony of Kellye Dundon, Andrew Sprott and Robert J. Wyman

HYBRID HEATING PROGRAM
EXHIBIT 100

November 6, 2026

EXHIBIT 100 – TESTIMONY – HYBRID HEATING PROGRAM

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I. INTRODUCTION AND SUMMARY

Q. Please state your names and positions at Northwest Natural Gas Company dba NW Natural ("NW Natural" or "the Company").

A. My name is Kellye Dundon. My current position is Director of Carbon Policy & Energy Efficiency. I hold a Bachelor of Science in Environmental Sciences with a minor in Energy and Resources from the University of California, Berkeley. I began my career as an environmental consultant with SLR Consulting, where I spent nearly a decade advising clients in the energy, transportation, natural resources, and industrial sectors on air quality permitting and compliance, greenhouse gas reporting, regulatory applicability, emissions analysis, and environmental data management. I joined NW Natural in 2021 and I currently oversee environmental policy, greenhouse gas reporting, operational sustainability, and energy efficiency programs. My work focuses on emerging climate and environmental regulation, including Oregon's Climate Protection Program and Washington's Climate Commitment Act, as well as market wide energy efficiency incentives for residential, commercial, and industrial customers. I have approximately 15 years of professional experience, with deep expertise at the intersection of environmental regulation, greenhouse gas policy, energy, and utility operations.

My name is Andrew Sprott. My current position is Director of Integrated Resource Planning. I hold a Bachelor of Arts in Economics, cum laude, from Portland State University and a Master of Arts in International Economics and International Relations from the Johns Hopkins University School of Advanced International Studies, with a concentration in energy, resources, and the

environment. I have 14 years of professional experience in energy and infrastructure economics. I also hold a Certified Public-Private Partnership Foundation accreditation from APMG International. I joined NW Natural in September 2025 as Director of Integrated Resource Planning. Before joining NW Natural, I worked at Castalia, an economics and policy consultancy based in Washington, DC, from 2014 to 2025. I advanced from Analyst to Practice Leader and built and led the firm's largest practice. I led and contributed to hundreds of projects for governments, utilities, regulators, and investors in more than 50 countries. That work included power sector planning, demand forecasting, utility financial modeling, tariff and regulatory design, project finance, feasibility analysis, and economic cost-benefit analysis.

My name is Robert J. Wyman. My current position is Regulatory Affairs Senior Economist. I hold a Bachelor of Science in Economics from the Robert D. Clark Honors College at the University of Oregon and a Master of Arts in Applied Economics from the University of Michigan Rackham Graduate School. Prior to attending graduate school, I was employed by ECONorthwest, an economics consultancy, and worked in the firm’s economic development and transportation practice area. I was responsible for the technical analysis on and consultation for dozens of projects, largely in the Pacific Northwest and Western states. I joined NW Natural in 2016 as a Rates and Regulatory Analyst. I have nearly 20 years of professional experience including 8 years of consulting with a focus on public finance and policy, urban economics, and financial feasibility (benefit-cost) analysis as well as over 10 years as an analyst and economist in the energy

industry with a focus on load forecasting, cost of service, and rate spread and rate design.

Q. What is the purpose of your testimony?

A. The purpose of our testimony is to describe and support NW Natural's proposed program to promote hybrid heating for residential existing and new construction customers. Specifically, NW Natural proposes Schedule 354, Hybrid Heating Program, which provides a one-time $3,500 incentive in the form of a rebate to homeowners and homebuilders who install a ducted air-source heat pump sized for air conditioning and space heating in milder weather (above 35 degrees Fahrenheit). A natural gas furnace will serve homeowners' colder weather space heating needs.

In this testimony, NW Natural demonstrates that the $3,500 incentive is economically justified based on an 18-year net present value ("NPV") evaluation of Hybrid Heating Program avoided environmental compliance costs (for existing homes) and avoided electric system costs (for new construction homes). Further, the Company proposes a $5.00 per month "Hybrid Heating Charge" on participating customers' bills. This rate design ensures participating customers continue to pay the same proportionate share of fixed system costs as non-participating customers, thereby mitigating residential class cross-subsidization.

NW Natural proposes that Schedule 354, Hybrid Heating Program, including the Hybrid Heating Charge, take effect on April 1, 2027 such that rates are not increased during the winter moratorium established in Oregon law.[1]

Q. Please summarize your testimony.

A. Our testimony demonstrates how the Company's proposed Schedule 354, Hybrid Heating Program benefits both NW Natural's customers and Oregon's overall energy system. Oregon's energy system is simultaneously balancing three competing priorities: 1) resource adequacy, 2) emissions reductions, and 3) affordability. Successfully balancing all three of these policy goals simultaneously will require the natural gas and electric systems to work together in new ways that utilize each system's strengths. By combining the direct use natural gas system's ability to reliably and affordably provide large amounts of on-demand energy in colder weather with the electric system's increasing amount of intermittent renewable power in milder weather, hybrid heating helps both NW Natural and the State as a whole better balance these competing policy goals.

Our testimony demonstrates that hybrid heating results in both natural gas and electric systems avoiding costs that would otherwise be incurred to meet space heating demand, which provides the economic basis for the proposed $3,500 hybrid heating incentive. Specifically, our testimony:

[1] HB 3179 established a moratorium on rate increases for both gas and electric utilities between November 1 and March 31 of each year.

- Further explains what hybrid heating is and why the energy system benefits from it (Section II);
- Describes how hybrid heating emerged from the 2025 Integrated Resource Plan ("IRP") with the support of Commission Staff ("Staff") and the Commission, as well as the Company's prior pilots and why this program complements the Energy Trust of Oregon ("Energy Trust") hybrid heating work plan (Section III);
- Describes the program design, including eligibility, the incentive and its economic justification, and rate design (Section IV);
- Describes customer outreach, participant benefits, equity considerations, and program evaluation (Section V);
- Explains how the program supports Climate Protection Program ("CPP") compliance at lower cost and risk than other compliance resources (Section VI); and
- Describes program costs and the proposed accounting treatment (Section VII).

II. WHY OREGON'S ENERGY SYSTEM BENEFITS FROM HYBRID HEATING

Q. What is hybrid heating?

A. In the context of this program, hybrid heating, also referred to as a dual-fuel system, combines an electric air source heat pump[2] with a natural gas furnace in

[2] NW Natural also recognizes that other types of heat pumps could be paired with a natural gas furnace, such as geothermal. However, this program is focused on air source heat pumps, which are the most common type of heat pump in our service territory.

a single, integrated heating and cooling system. The heat pump provides air conditioning in summer, as well as space heating during milder weather, while the gas furnace provides heat during colder conditions. In contrast, a conventional system uses a central air conditioner to provide all the cooling and a gas furnace to provide all the space heating. In a hybrid system, both the heat pump and the natural gas furnace use the home's existing ductwork, and an integrated control determines which heating source operates based on outdoor temperature and the system's control settings.

Q. How does a hybrid heating system operate over the course of the year?

A. During mild and moderate weather, the heat pump provides electric heating by transferring heat from the outdoor air into the home. During hot weather, the heat pump reverses operation and provides central air conditioning by transferring heat from inside the home to the outdoors. When outdoor conditions become colder and the heat pump becomes less efficient due to less heat being available to transfer from the outdoor air into the home, the integrated controls transition heating operation to the natural gas furnace. This is in contrast to an all-electric heat pump system which shifts over to inefficient electric resistance backup heating during these lower temperatures. The specific changeover point of 35 degrees Fahrenheit is implemented through the hybrid heating system's controls.

Q. What customer and energy system needs is the program intended to address?

A. The program is designed to address resource adequacy, emissions reductions, and affordability. We now will address each of these needs in turn.

A. Resource Adequacy

Q. How does this program address resource adequacy?

A. Since gas furnaces provide heating during colder winter conditions, hybrid heating reduces the load that the electric system would otherwise serve in their absence. During these colder winter conditions, the Pacific Northwest has a growing resource adequacy problem on the electric system. In its 2026 Northwest Regional Forecast, the Pacific Northwest Utilities Conference Committee ("PNUCC"), which is a trade association for regional electric utilities and power industry partners, concluded that "[s]ystem pressure is increasing, particularly during peak demand periods, reinforcing growing constraints on both capacity and energy adequacy."[3] During peak demand periods, PNUCC forecasts power deficits over the next decade. In the winter, this deficit is projected to grow to 13.1 GW by January 2036.[4] This substantial gap exists even though NW Natural delivers more energy than any other electric or gas utility in Oregon. Adding space heating load to the electric system during these cold periods would further exacerbate this gap.

In addition, the region's electric utilities sponsored a study by Energy and Environmental Economics ("E3") examining this issue. The study found that there is a "resource gap that grows to 9 GW of effective capacity by 2030 and 14-18 GW

[3] Pacific Northwest Utilities Conference Committee, Northwest Regional Forecast of Power Loads and Resources August 2026 to July 2038, at 6 (April 2026) (available at: https://www.pnucc.org/wp-content/uploads/2026-PNUCC-Northwest-Regional-Forecast-4-21-26-final.pdf).

[4] *Id.*

by 2035."[5] This resource gap results in the Pacific Northwest "fac[ing] a multi-day reliability challenge driven by cold snaps and low hydro conditions,"[6] which are the precise conditions where hybrid heating is the most valuable.

Q. Has NW Natural previously examined this growing resource adequacy issue?

A. Yes. The Company formed an advisory group as part of its IRP analysis of building electrification and resource adequacy that consisted of a former Bonneville Power Administration administrator, the former CEO of Seattle City Light, the former CEO of Pacific Power, and a former chair of the Public Utility Commission of Oregon who was also an Oregon State Senator. Cumulatively, the advisory group has over 100 years of combined energy experience in the Pacific Northwest. The advisory group evaluated several electric supply scenarios ranging from "current trends," where the system evolves consistent with current trends and permitting timelines, to an "aggressive improvement" scenario, where the electric system quickly develops new resources due to technological advances leading to declining costs, as well as accelerated permitting timelines.[7]

[5] E3, Resource Adequacy and the Energy Transition in the Pacific Northwest, at 5 (April 2026) (available at: https://www.ethree.com/wp-content/uploads/2026/04/E3-NW-RA-Final-Report_040826.pdf)

[6] E3, Resource Adequacy and the Energy Transition in the Pacific Northwest, at 14 (April 2026) (available at: https://www.ethree.com/wp-content/uploads/2026/04/E3-NW-RA-Final-Report_040826.pdf)

[7] *In the Matter of Northwest Natural Gas Company, dba NW Natural, 2025 Integrated Resource Plan*, Docket No. LC 86, Statement of the Independent Advisory Group Regarding NW Natural's Integrated Resource Plan and Evaluation of Electrification of Current Gas Loads (IRP), Appendix L (Aug. 1, 2025) (available at: https://edocs.puc.state.or.us/efdocs/HAA/lc86haa338770056.pdf).

The advisory group found each scenario "to be overly optimistic by assuming base assumptions that would result in electrification of current gas loads being easier, faster and cheaper than [their] own experience and judgment."[8] They concluded that the "electric future transition will be harder, slower and more expensive than the scenarios we were presented even without electrifying current natural gas [direct] use."[9] It also is the advisory group's "view that the electric system will be greatly challenged to meet the existing [clean energy] policy prescriptions and planned load growth even without taking into account electrification of the natural gas system."[10]

Specifically, they cite the increasing reliance on natural gas generation to meet peak demand, stating "electric systems of the region are also relying heavily on the gas systems for electric generation for peak load service," and that during a severe winter storm in January 2024 "the Pacific Northwest could have experienced rolling blackouts of a magnitude that would be unprecedented in our region . . . [w]ithout record electric imports from the Southwest and Rocky Mountain states."[11] Moreover, PNUCC has subsequently concluded in its 2026 Northwest Regional Forecast that "relying heavily on imports or short-term purchases is not a prudent foundation for long-term resource planning," and that "[r]ecent events [such as the January 2024 winter storm] show that shortages can be expensive for

[8] *Id.*

[9] *Id.*

[10] *Id.*

[11] *Id.*

consumers—both through exposure to high market prices and the need to procure emergency or unplanned capacity."[12]

Q. Is there a growing recognition that leveraging the direct use natural gas system can help address this resource adequacy issue?

A. Absolutely. Recent studies and plans filed by FortisBC, Puget Sound Energy, and Xcel Energy support hybrid heating. FortisBC's 2026 Long Term Gas Resource Plan reports that a cold-climate heat pump raises a home's electric peak demand four to five times as much as a hybrid system does.[13] FortisBC also cites BC Hydro's 2025 IRP, which finds that hybrid homes in the Lower Mainland of British Columbia have about 75 percent lower peak demand than all-electric heat pump homes.[14]

Puget Sound Energy's 2023 Updated Decarbonization Study found that the two hybrid heat pump scenarios had the lowest net present value of total net incremental electric and gas costs among four electrification scenarios: about $7.3 billion to $7.5 billion, compared with $8.8 billion for standard heat pumps and $10.5

[12] PNUCC, Northwest Regional Forecast of Power Loads and Resources August 2026 through July 2036, at 8-9 (April 2026) (available at: https://www.pnucc.org/wp-content/uploads/2026-PNUCC-Northwest-Regional-Forecast-4-21-26-final.pdf).

[13] FortisBC Energy Inc., 2026 Long Term Gas Resource Plan, BCUC Exhibit B-1 at 4-25, 4-30 & Figure 4-15 (Mar. 27, 2026); see also FortisBC Energy Inc., Final Argument ¶ 44, at 17 (Aug. 17, 2026), available at: https://www.bcuc.com/OurWork/ViewProceeding?applicationid=1436.

[14] British Columbia Hydro and Power Authority, 2025 Integrated Resource Plan, BCUC Exhibit B-1, Figure 2-7 (Oct. 31, 2025) (available at: https://docs.bcuc.com/documents/proceedings/2025/doc_84202_b-1-bch-2025-irp-application.pdf); see also FortisBC Energy Inc., Final Argument ¶ 52, at 22 (Aug. 17, 2026).

billion for cold-climate heat pumps. These figures reflect direct costs and exclude externality costs.[15]

In addition, E3's analysis for Xcel Energy's Colorado Clean Heat Plan found that, of the 2050 pathways it modeled, the pathway that keeps hybrid heating had the lowest electric peak demand impacts. By contrast, the all-electric pathways would add 9,200 MW to 12,000 MW of peak demand by 2040, which affects the scale of transmission, distribution, and firm generation capacity required.[16]

Finally, E3, in its study on behalf of the region's electric utilities, found that "[h]ybrid heating could reduce RA [resource adequacy] need up to 7 GW in 2045."[17]

Q. To address the resource adequacy issue, must the program provide hybrid incentives for both new and existing construction?

A. Yes, the program needs to address both new and existing construction. If the program does not address new construction and the home would otherwise be all-electric, then incremental winter peaking load will be placed on an electric system that is ill-equipped to meet it at all, let alone with intermittent renewable generation

[15] Puget Sound Energy, WUTC Docket Nos. UE-220066, UG-220067 and UG-210918, GRC Stipulation O, Updated Decarbonization Study at 5 (Dec. 22, 2023), (available at: https://www.pse.com/-/media/PDFs/IRP/2024/03252024/220066Attachment-APSE-Decarbonization-Study.pdf).

[16] Energy and Environmental Economics, Inc. (E3), Clean Heat Portfolio Analysis, prepared for Public Service Company of Colorado (Aug. 1, 2023), Colo. PUC Proceeding No. 23A-0392EG, Hearing Exhibit 102, Attachment DRA-1, at 68 & 70–71 of 71 & Figure 22 (Clean Heat Plus with Clean Molecules has the lowest peak demand impacts due to hybrid heating; Electrification Only and Clean Heat Plus, Pivot to All-Electric lead to peak demand impacts of 9,200 MW to 12,000 MW by 2040, depending on heat pump performance assumptions) (available at: https://www.xcelenergy.com/staticfiles/xe-responsive/Company/Rates%20&%20Regulations/23A-0392EG_Hearing%20Exhibit%20102_Attachment%20DRA-1.pdf).

[17] E3, Resource Adequacy and the Energy Transition in the Pacific Northwest, at 19 (available at: https://www.ethree.com/wp-content/uploads/2026/04/E3-NW-RA-Final-Report_040826.pdf).

resources plus battery storage. If the program does not address existing construction, those homes would not be incentivized to install hybrid systems that use heat pumps to provide space heating in milder conditions where there are adequate electric resources to serve load and intermittent renewable generation is more readily available.

Q. Compared to hybrid heating, would the building of additional intermittent electric renewable resources plus battery storage be a better way to address the region's resource adequacy issues, particularly in colder weather?

A. No. In its Clean Energy Plan and Integrated Resource Plan, Portland General Electric ("PGE") stated:

> Zero-emissions technologies available today primarily include costly variable energy resources (VERs), such as wind and solar, as well as short duration (mainly 4-hour) battery storage. *Deep decarbonization using these existing technologies alone puts at risk the reliability of the entire PGE system. These technologies are not dispatchable (there when you need them) and there are limitations to the energy they can provide, especially during sustained heat or cold events.*[18]

For that reason, PGE's Clean Energy Plan and Integrated Resource Plan states that "continued attention is needed on the development of commercially viable alternatives" that can satisfy resource adequacy and reliability demands.[19] In comparison, Staff has found that that hybrid heat pump configurations are

[18] PGE 2026 Clean Energy Plan & Integrated Resource Plan, at 58 (emphasis added) (available at: https://portlandgeneral.com/about/who-we-are/resource-planning/combined-cep-and-irp).

[19] *Id*.

commercially viable. They already "exist in tens of thousands of NW Natural customer homes today," such that "[t]here is limited technology risk in deploying."[20]

To be clear, however, NW Natural does not view hybrid heating as a replacement for intermittent renewable electric generation, battery storage, or continued technological innovation. Nor is NW Natural suggesting that electric utilities will not be able to meet appliable clean energy requirements, such as HB 2021 and Oregon's renewable portfolio standard. In fact, as further discussed in Section IV of our testimony, NW Natural commissioned E3 to calculate the costs that the electric system avoids incurring due to the Hybrid Heating Program assuming that electric utilities comply with all clean energy requirements.[21] This calculation, combined with the Company's subsequent analysis, demonstrates that hybrid heating is a tool that can immediately help address the region's resource adequacy issues as part of an "all of the above" strategy that seeks to maximize the value of the natural gas and electric systems.

B. Emissions Reductions

Q. How does NW Natural's Hybrid Heating Program advance Oregon's emissions reduction goals?

A. If a home uses a heat pump during milder conditions for space heating, it will be served by an electric system that increasingly relies on intermittent renewable resources during such weather. In this way, the home will be reducing emissions

[20] I*n the Matter of Northwest Natural Gas Co., dba NW Natural, 2025 Integrated Resource Plan*, Docket No. LC 86, Order No. 26-150, Appendix A, at 22 (Apr. 30, 2026).

[21] NW Natural/101, Dundon-Sprott-Wyman.

for existing construction or, in the case of new construction, limiting the amount of those emissions compared to a conventional system that uses a central air conditioner to provide all the cooling and a gas furnace to provide all the space heating.

In colder conditions, however, relying on a natural gas furnace more affordably meets homeowners' space heating needs than an air source heat pump after taking into consideration the cost of Oregon's emissions reduction programs (the Climate Protection Program ("CPP") for natural gas utilities, and renewable portfolio standard and HB 2021 for electric utilities), as well as generation and transmission costs that the electric system avoids by a natural gas furnace meeting space heating needs in colder weather.

Moreover, in its study on resource adequacy for the region's electric utilities, E3 found "electric reliability during [cold weather] events will be dependent on natural gas combustion for the foreseeable future."[22] E3's finding that the electric system continues to rely on natural gas generation to serve incremental load during the winter is consistent with real world experience. The Bonneville Power Administration ("BPA") has stated that "in the winter gas-fired generation is typically on the margin and electricity prices are strongly correlated with the prevailing price of natural gas."[23]

[22] E3, Resource Adequacy and the Energy Transition in the Pacific Northwest, at 57 (available at: https://www.ethree.com/wp-content/uploads/2026/04/E3-NW-RA-Final-Report_040826.pdf).

[23] BPA, Power Market Price Study, BP-26-FS-BPA-04, at 5 (available at: https://proceedings.bpa.gov/Home/LoadDocuments?RateCaseId=38).

Similarly, as stated above, PGE has noted the limitations of intermittent renewable resources in its 2026 Clean Energy Plan and Integrated Resource Plan. Additionally, in describing how it plans to meet load in December 2030, PGE's 2023 Clean Energy Plan Update and Integrated Resource Plan explains "thermal generation is deployed as PGE non-emitting generation is volatile and scarce while market premiums for clean energy are high."[24] PGE's 2026 Clean Energy Plan Update and Integrated Resource Plan also forecasts a heavy reliance on natural gas electric generation to meet its load in December 2030.[25]

Given both E3's findings and real world experience, the issue is not ***whether*** Oregon's energy system will continue to utilize natural gas. Rather the issue is ***how*** Oregon's energy system will continue to utilize natural gas in a way that meets the State's emissions reductions goals as affordably as possible while promoting resource adequacy. After incorporating E3's findings, NW Natural's analysis demonstrates that hybrid heating is a more affordable way of meeting Oregon's emissions reduction requirements compared to an all-electric alternative for both new and existing construction.

[24] PGE, 2023 Clean Energy Plan Update and Integrated Resource Plan Update, at 151 (available at: https://downloads.ctfassets.net/416ywc1laqmd/UlLUBLOdenMjnrFJHv2mV/c382e175edae0e6ccffb806cd02bb6db/2023_CEP_IRP_Update_Errata.pdf).

[25] PGE, 2026 Clean Energy Plan Update and Integrated Resource Plan, Flexibility Study, at 11 (available at: https://portlandgeneral.com/about/who-we-are/resource-planning/combined-cep-and-irp).

Q. Please further explain why hybrid heating is a more affordable pathway for meeting Oregon's emissions reduction requirements compared to an all-electric alternative for both new and existing construction.

A. As explained above, if the program does not address new construction and the home would otherwise be all-electric, then incremental winter peaking load is added to the electric system. Even putting aside resource adequacy issues that already make additional electric winter peaking load an undesirable outcome, the added GHG compliance costs of the electric system serving this load plus the increased generation and transmission costs, makes the direct use natural gas system a more affordable choice. Again, NW Natural's analysis includes the cost to serve this additional load on the natural gas system, including CPP compliance costs.

Similarly, if the program does not address existing construction, a natural gas furnace would provide space heating in both milder and colder conditions, which would lead to more emissions compared to hybrid heating where a heat pump would provide space heating in milder conditions when more intermittent renewable generation is available.

C. Affordability

Q. How does this program address affordability?

A. Homeowners making heating and cooling decisions face equipment and energy cost considerations that do not always align with optimal decarbonization and resource adequacy pathways. The program is designed to close that affordability gap. First, it supports resource adequacy and emissions reductions in a more

affordable way than an all-electric alternative, especially because it avoids the reliability and cost issues associated with adding incremental electric winter peaking load. Second, it makes a residential hybrid heating option more economically accessible for homeowners who choose it. Third, NW Natural has designed the rates associated with the Hybrid Heating Program so that participating customers pay the Hybrid Heating Charge, which ensures that non-participating customers' share of NW Natural's fixed costs do not increase.

Q. To address affordability, must the program provide hybrid incentives for both new and existing construction?

A. Yes. Both new and existing homeowners should be incentivized to have hybrid heating. For new construction, NW Natural's Hybrid Heating Program avoids costs on the electric system and helps address resource adequacy while ensuring that participating customers continue to pay their proportionate of the natural gas service's fixed costs through the Hybrid Heating Charge despite lower natural use. At the same time, NW Natural's Hybrid Heating Program provides societal benefits as well because the overall energy system is being optimized in a way that reduces costs to everyone in NW Natural's service territory, even if they are not gas customers.

In addition, Staff found in NW Natural's 2025 IRP that currently avoided costs show significant electric and gas value for hybrid heat pumps, and that adding a heat pump to an existing gas furnace, rather than replacing the furnace

with a heat pump, reduces electric capacity needs.[26] Staff also found that adding a heat pump to an existing furnace has a net present value of $9,776 in avoided compliance costs alone, before counting electric system value,[27] which is far in excess of NW Natural's proposed $3,500 incentive, as further explained in the next section of our testimony that describes how hybrid heating emerged as a resource in NW Natural's 2025 IRP.

III. HYBRID HEATING IN NW NATURAL'S 2025 IRP

Q. How did hybrid heating emerge as a resource in NW Natural's 2025 IRP?

A. In acknowledging the Company's 2022 IRP, the Commission expressed concern that "a categorical refusal to look at electrification as a resource for CPP compliance may fail to protect and potentially harm customers," and stated that it expected "the next cycle of IRPs to advance significantly in this area."[28] NW Natural took that direction seriously. For the 2025 IRP (Docket No. LC 86), the Company commissioned ICF to conduct an electrification study and, as stated above, retained an independent Advisory Group of outside experts with electric planning and operations backgrounds to review and pressure-test the assumptions. Unlike the 2022 IRP, which quantified electrification impacts only on NW Natural's system, the study estimated the costs of building electrification across both energy systems, including electric generation, transmission, and distribution, as well as

[26] Docket No. LC 86, Order No. 26-150, Appendix A, at 21 (Apr. 30, 2026).

[27] *Id*.

[28] *In the Matter of Northwest Natural Gas Co., dba NW Natural, 2022 Integrated Resource Plan*, Docket No. LC 79, Order No. 23-281, at 10 (Aug. 2, 2023).

customer equipment conversion. The study compared the Reference Case against three scenarios: Modest Customer Electrification, Hybrid System Electrification, and All-Electric Buildings. The Hybrid and All-Electric scenarios were intentionally designed with the same high level of heat pump adoption, so that the only meaningful difference between them was whether heat to meet colder weather space heating needs came from the customer's natural gas furnace or from electricity.

Q. What did the electrification study find with respect to hybrid heating?

A. The study found that hybrid heating dramatically outperforms an all-electric approach. Cumulative incremental costs through 2050, relative to the Reference Case, were approximately $13.3 billion in the Hybrid scenario compared to $22.7 billion in the All-Electric scenario (2024 dollars).[29] By 2050, building electrification in the All-Electric scenario added approximately 4.5 GW of winter peak-hour load in Oregon from NW Natural customers alone, while the Hybrid scenario added approximately 0.25 GW.[30] At the same time, the Hybrid scenario reduced residential and commercial gas consumption by approximately 80 percent while retaining the gas system to serve the coldest hours of the year, and cumulative GHG reductions were essentially the same across all scenarios (approximately 66.5 million metric tons CO2e in the Hybrid scenario versus 66.4 million in the All-Electric scenario).[31]

[29] Docket No. LC 86, 2025 Integrated Resource Plan, at 11-3 (Aug. 1, 2025).

[30] Docket No. LC 86, 2025 Integrated Resource Plan, at 10-29 (Aug. 1, 2025).

[31] Docket No. LC 86, 2025 Integrated Resource Plan, at 10-25. (Aug. 1, 2025).

These results do not mean that hybrid heating was the lowest-cost pathway in the IRP. On a net present value basis, total costs were approximately $12.2 billion in the Reference Case, $19.9 billion in the Hybrid scenario, and $24.2 billion in the All-Electric scenario.[32] The Reference Case, which meets CPP obligations through energy efficiency, Community Climate Investments ("CCIs"), renewable natural gas ("RNG"), and other compliance resources, remained the least-cost path. But the Hybrid scenario was a deliberately aggressive "what-if" bookend in the IRP, not a program design. It assumed near-universal heat pump adoption on an accelerated schedule, full equipment conversion costs for every participating home, and the associated electric system buildout.

Q. If the Reference Case was lower cost, why did the IRP call for a Hybrid Heating Program?

A. The IRP analyzed what it would cost to convert most of NW Natural's customers to heat pumps to evaluate a pathway to meeting CPP compliance obligations without CCIs and alternative fuels. This program, in contrast, is designed to incentivize customers to choose a qualified hybrid heating and cooling system, which costs more than standard standalone air conditioning equipment and furnace, to benefit the energy system and reduce future costs for all energy users. The IRP concluded that "[w]hile the Reference Case appears to be the lowest cost scenario, hybrid heating is a promising approach to reducing emissions while retaining optionality and flexibility of two major energy systems. As such, pilots and

[32] Docket No. LC 86, 2025 Integrated Resource Plan, at 1-25 (Aug. 1, 2025).

programs that further the understanding of how this can scale to be a cost-effective solution for both energy systems should be pursued."[33] The IRP's long-term resource strategy included Action Item A-18, under which "NW Natural will develop programs that promote the use of hybrid space heating systems," and its near-term action plan included Action Item B-17: "Develop a Hybrid Heating Program providing cost effective emissions reduction incentives." This program is a key part in implementing that commitment.[34]

Q. How did Staff and the Commission respond to the IRP's hybrid heating findings?

A. Staff supported hybrid heating. In its Opening Comments, Staff stated that it "is optimistic that pursuit of hybrid solutions represents a least-regrets, near-term opportunity," and noted that the Hybrid scenario reduced the net present value of CPP compliance costs to approximately $1.7 billion, compared to $5.7 billion under the preferred resource strategy.[35] In its final report, Staff found that the cost difference between the preferred portfolio and the Hybrid scenario exceeds $4 billion over the planning horizon and described the differences between those portfolios as "a valuable north star for planning."[36] Staff stated that it "sees progress on the Company's hybrid heating pilots as a top priority," and described Action

[33] Docket No. LC 86, 2025 NW Natural Integrated Resource Plan, at 1-27. (Aug. 1, 2025).

[34] NW Natural is also continuing to work with Energy Trust of Oregon on hybrid heating, which is described in detail in our testimony.

[35] Docket No. LC 86, Staff Opening Comments, at 22, 29 (Oct. 23, 2025) (available at: lc86hac341121114.pdf).

[36] Docket No. LC 86, Order No. 26-150, Appendix A, at 12 (Apr. 30, 2026).

Items A-18 (hybrid heating) and A-21 (joint system planning) "as part of a critical path" toward a more affordable approach to meeting load, capacity, and compliance needs.[37]

As stated above, Staff also observed that hybrid heat pump configurations already "exist in tens of thousands of NW Natural customer homes today," such that "[t]here is limited technology risk in deploying."[38] Also, as stated above, Staff found that adding a heat pump to an existing furnace has a net present value of $9,776 in avoided compliance costs alone, before counting electric system value.[39] In Order No. 26-150, the Commission acknowledged the 2025 IRP and its near-term action plan, subject to conditions that included directing NW Natural to work with Energy Trust of Oregon ("Energy Trust") and electric utilities to develop a concrete and actionable hybrid heating work plan by January 2027.

Q. Does this program complement the work that NW Natural is doing with the Energy Trust and electric utilities?

A. Yes. NW Natural expects that this program will inform its ongoing discussions with the Energy Trust and electric utilities because it can be launched faster. A hybrid heating measure was not included as a specific activity in Energy Trust's Multi-Year Plan or Utility Specific Action Plan, and developing a joint gas-electric measure requires resolving cost allocation and joint planning questions that will take time. This program can be in place soon after it is approved. Therefore, NW

[37] Docket No. LC 86, Order No. 26-150, Appendix A. at 7, 11 (Apr. 30, 2026).

[38] Docket No. LC 86, Order No. 26-150, Appendix A, at 11, 22 (Apr. 30, 2026).

[39] Docket No. LC 86, Order No. 26-150, Appendix A, at 21 (Apr. 30, 2026).

Natural expects the program to provide valuable real-world data that can inform joint energy system planning strategy, analysis, and cost allocation that will inform the Energy Trust program, as well as future hybrid heating efforts.

Further, the program does not depend on electric utility participation to move forward. The incentive is justified based on avoided gas and electric costs and will create benefits for participating natural gas customers. At the same time, non-participating customers will not pay a higher share of NW Natural's fixed costs as a result of lower natural gas use. Rather, as explained above, participating customers will pay for their participation through a $5.00 per month Hybrid Heating Charge to mitigate cross-subsidization. The program also serves all of NW Natural's customers. Energy Trust's electric programs only serve customers of PGE and Pacific Power while this program is designed to reach all of NW Natural's customers regardless of electric provider.

That said, NW Natural wants electric utilities involved. Hybrid heating is fundamentally a joint system resource, and the electric system captures a meaningful share of its value through avoided winter peak capacity. The Company welcomes partnerships with electric utilities, including co-funding, demand response or capacity payments consistent with IRP Action Item B-16, and data sharing, and it will coordinate with Energy Trust to avoid double counting of savings.

Q. Aside from simply studying hybrid heating in the IRP, has NW Natural actually tested hybrid heating in small scale pilots?

A. Yes. NW Natural has participated in several hybrid heating pilots that have tested different equipment configurations and control strategies. First, the Energy Trust Dual-Fuel Pilot paired an air-source heat pump with a customer's existing gas furnace and used a fixed temperature switchover setpoint as the control strategy, which is the same basic configuration this program will incentivize. NW Natural expects Energy Trust to provide the results of this pilot in 2027. Second, the Northwest Energy Efficiency Alliance ("NEEA") Clark County Dual-Fuel Pilot is evaluating a hydronic combination space and water heating configuration that uses a controller to modulate between gas and electric heating. During the 2025-2026 heating season, NEEA simulated demand response events to test that control capability and quantify the capacity benefit for Clark Public Utilities. Third, through the Oregon Low Income Energy Efficiency program, NW Natural partnered with Homes for Good in Lane County on a proof-of-concept pilot that installed ground-source heat pumps with gas furnace backup in 12 homes of customers who had previously participated in weatherization. Both the Clark County and the Lane County pilots were completed and showed positive results.

Q. How does this program differ from those pilots?

A. The pilots were designed to answer technical questions about configurations and controls in a small number of homes. This program is the next step. It is the Company's first hybrid heating offering designed to be deployed across its service territory, with a dedicated tariff, a cost-justified incentive, eligibility and verification

requirements, builder and installer outreach, third-party measurement and verification, and a budget sized to reach several thousand customers. The pilots demonstrated that the technology works. This program is designed to show that hybrid heating can be delivered at scale as a cost-effective emissions reduction resource.

IV. PROGRAM DESIGN

Q. Please describe the program components.

A. The program has three core components, each discussed below: (A) eligibility requirements that define who may participate and what equipment qualifies; (B) a one-time incentive that is economically justified by the energy system costs it avoids; and (C) a rate design that ensures program participants pay their share of fixed system costs.

A. Eligibility Requirements

Q. Who is eligible for the program?

A. Eligible participants are homeowners and homebuilders in NW Natural's service territory installing qualifying hybrid heating systems in new or existing single-family homes and certain multifamily residential properties as described in Schedule 354, Hybrid Heating Program.

Q. What are the principal program eligibility rules?

A. All participants must install a ducted air source heat pump sized for air conditioning that will also provide space heating in milder conditions. This requirement enables participating customers to receive air conditioning if they do not currently have it. Customers must also have a natural gas furnace that is 10 years old or newer. The

natural gas furnace will provide heating during colder weather in the winter months. The requirement that the gas furnace be no more than ten years old ensures that existing customers will retain their hybrid heating configuration long enough to provide the avoided environmental compliance and electric system costs that justify the program incentive of $3,500. The system will switch from the heat pump to the gas furnace when the outside temperature falls to 35 degrees Fahrenheit.

Q. Will NW Natural work with trade allies to ensure they are educated about the Hybrid Heating Program, its eligibility and installation requirements, and its benefits?

A. Yes. NW Natural will promote ongoing educational opportunities for both HVAC professionals and residential new construction builders on the installation of hybrid heating systems. The Company also plans to identify additional training needs and installer support through feedback from early program participants and potential participants.

Q. What equipment configurations do not qualify for the program?

A. The program excludes ductless, cold climate, and geothermal heat pumps. Ductless heat pumps are excluded initially because they are unlikely to be chosen when a home has existing ductwork, and they add complexity to dual-fuel controls. Cold climate and geothermal heat pumps are excluded initially because of their higher incremental costs but may be considered for program eligibility later. The program also excludes replacement of existing dual-fuel or hybrid systems for existing customers.

Q. What program mechanism prevents oversized or non-qualifying equipment from being installed?

A. To receive the incentive, program participants must document the installed hybrid system configuration. The Company may establish additional verification requirements as the program progresses.

B. Incentive and Economic Justification

Q. What is the proposed Hybrid Heating Program incentive?

A. As noted above, the Company proposes a Hybrid Heating Program incentive of $3,500 for all program participants, to be used for purchasing and installing the heating and cooling equipment necessary to achieve the hybrid heating configuration eligible for program participation as described above.

Q. What type of economic analysis did NW Natural conduct to derive the Hybrid Heating Program incentive?

A. The Company conducted an 18-year discounted cash flow ("DCF") analysis to evaluate the economic justification for hybrid program incentives of varying levels for both existing and new customers.[40] The DCF model treats the hybrid program incentive as a capital investment with an 18-year life, measuring the cost of service of this investment (including capital carrying charges, equity return, and taxes) against NW Natural's avoided environmental compliance costs for existing customers and avoided electric system costs for new customers.

[40] NW Natural has filed the DCF models for both new and existing customers as workpapers in this docket.

Where the models produce a non-positive net present value ("NPV") of the discounted stream of costs, netted against measured benefits (i.e., avoided costs realized due to hybrid program participation) plus additional program revenues from the $5.00 per month Hybrid Heating Charge, the incentive investment is economically justified. In other words, a zero or negative NPV means that the discounted 18-year stream of avoided cost benefits and other revenues outweigh the incentive investment cost of service on an NPV basis, resulting in lower incremental energy system costs. The Company used its real after-tax weighted average cost of capital from its latest general rate proceeding (UG 520) as a discount rate factor in its analysis.

Q. Does a negative NPV indicate that non-participating NW Natural customers benefit from the program as well?

A. Yes. The negative NPV demonstrates that non-participating customers benefit from the program because hybrid heat avoids energy system costs for all gas and electric customers while mitigating rate class cross-subsidization among the Company's residential customers. The incremental Hybrid Heating Charge, as explained further below, helps promote this equitable outcome because it ensures that program participants continue to pay fixed costs for their natural gas service even though their use of natural gas has declined.

Q. Please further describe the Hybrid Heating Program existing customer DCF model.

A. The existing customer 18-year DCF model assumes customers rely solely on a gas furnace for space heating that uses 670 therms annually, based on the

characteristics of a program-eligible residence with a gas furnace less than 10 years old. The model further assumes that usage is reduced by 331 therms after the installation of an air source heat pump, to 339 therms annually. The 331 therms directly reduced through hybrid program participation have an assumed levelized avoided cost of $1.07 per therm (described below), which offsets the revenue requirement associated with the incentive investment. Revenue requirement is further offset by the $5.00 per month Hybrid Heating Charge. With this Hybrid Heating Charge, the existing customer DCF model economically justifies an incentive of up to $3,626, which the Company rounded down to $3,500. With an incentive of $3,500, the Hybrid Heating Program is a least-cost CPP compliance pathway, as we explain further below.

Q. Why does the Hybrid Heating Program existing customer DCF model not include an offset for electric avoided costs?

A. The Company chose not to model avoided electric costs for existing customers because these avoided costs depend on a counterfactual that is not certain (i.e., how many existing customers would otherwise fully electrify without the program compared to those that would remain natural gas customers), and where these customers are located. As we explain below, while these factors can be measured for new construction customers, neither can be estimated reliably for existing customers. As a result, the existing customer DCF analysis understates the program's benefits. Three factors support the choice not to model an electric avoided cost offset in the existing customer DCF model:

- The counterfactual is uncertain. For new construction customers, the alternative to a hybrid home is a fully electric home with a known electric load. An existing customer already has a gas furnace. All existing customers will keep the furnace under this program, so electric system costs are avoided only for participants who would otherwise have fully electrified. The Company's IRP does not forecast large-scale electrification by existing customers because it has not observed this trend amongst its customers, and assuming high conversion rates here would not be consistent with that planning basis.
- Avoided delivery costs depend on location. Distribution costs are avoided only when enough customers served by the same facilities would otherwise electrify to require an upgrade. Estimating that would require customer-level adoption forecasts by substation which the Company does not have. The new construction customer DCF model is not dependent on that forecast. Each new construction home adds load the electric system must serve, so the Company can value the difference between a hybrid home and a fully electric home using system-wide avoided costs per MWh by month and hour. For the new construction DCF model, those values do not depend on where the home is built, whereas the existing customer DCF model would require such an understanding.
- The model's assumption is conservative. The existing customer DCF model assigns no avoided electric costs to any existing customer program

participants. Some program participants could otherwise have replaced their gas furnace with a fully electric system when it reached the end of its life. For those customers, hybrid heating keeps the furnace serving cold-weather heating load that would otherwise fall on the electric system. Because the existing customer DCF model values that electric load at zero, it understates the hybrid program's benefits.

Q. For the DCF models for both existing and new construction customers, how was the levelized natural gas environmental compliance cost calculated?

A. The levelized natural gas environmental compliance cost is based on the resource stack selected in the Company's 2025 IRP, which includes the costs for a mix of CCIs, landfill and wastewater RNG, and synthetic methane from biomass, discounted over 18 years. These costs are incremental to the cost of environmental compliance instruments, such as renewable thermal credits, that are currently included in rates. Therefore, these are marginal environmental compliance costs for an individual customer based on that customer's choice to participate in the Hybrid Heating Program, rather than the system average cost across all throughputs. Existing customers avoid these costs by reducing their natural gas use, whereas the DCF model appropriately accounts for both natural gas environmental compliance cost associated with new construction's use of natural gas as well as the costs that the electric system avoids due to hybrid heating.

Q. Please further describe the Hybrid Heating Program new construction customer DCF model.

A. The new construction customer 18-year DCF model assumes a participating Hybrid Heating Program customer will use 313 therms annually, which includes both heat (furnace) and base (fireplace, cooktop, water heat, etc.) load. This model assumes the new construction customer brings to the system incremental environmental compliance costs associated with its natural gas usage and operations and maintenance ("O&M") expenses associated with its service. The assumed incremental compliance costs are equal to the avoided costs used in the existing customer DCF model ($1.07 per therm). The new construction customer DCF model further assumes an incremental electric system avoided cost benefit (described below) based on an all-electric counterfactual scenario, which offsets the cost of service associated with the Hybrid Heating Program incentive investment, the O&M expenses, and the incremental environmental compliance costs. These modeled costs are further offset by revenues from the $5.00 per month Hybrid Heating Charge. Whereas the environmental compliance avoided cost is modeled as a benefit in the existing customer DCF model, it is modeled as a cost in the new construction customer DCF model as explained above.

The new construction DCF model economically justifies an incentive of up to $11,060 with the Hybrid Heating Charge using a "reference case" that assumes incremental electricity is generated using non-emitting resources by 2045. A "no new gas capacity" sensitivity that assumes reference case electric generation plus battery storage replaces gas combustion turbines would justify an even higher

incentive (we discuss these scenarios in greater detail below). Although the new construction DCF model using the reference case justifies an incentive substantially higher (over three times higher) than $3,500 that would help to offset most of the program participant's equipment cost, we have proposed a $3,500 incentive for both existing and new construction customers. This is to ensure that the Hybrid Heating Program costs are the least cost CPP compliance pathway, as we explain further below, even though there are additional avoided electric system costs associated with new construction customers that are not captured in the $3,500 new construction incentive amount.

Q. Why is new construction eligible for the Hybrid Heating Program?

A. Hybrid heating avoids significant costs associated with meeting new construction space heating demands entirely with electricity. These avoided costs include generation, transmission, and meeting Oregon's clean energy requirements, such as HB 2021 and the renewable portfolio standard. Without the Hybrid Heating Program, homes that would otherwise be all-electric could not avoid such costs, burdening all Oregonians in NW Natural's service territory, including the Company's customers. However, by avoiding these costs through participation in the Hybrid Heating Program, new construction can be developed in a more equitable manner that better mitigates the costs associated with their incremental energy demand. At the same time, non-participating NW Natural customers' proportionate share of the gas system's fixed system costs does not increase. Rather, as explained above, participating customers will pay a $5.00 per month Hybrid Heating Charge that offsets their lower natural gas usage. Therefore, the

Hybrid Heating Program provides benefits to new construction customers without shifting fixed system costs to the rest of NW Natural's customer base.

Q. Does including new construction in the Hybrid Heating Program support energy choice in a manner that leverages the natural gas system to avoid costs on the electric system?

A. Yes. When it comes to deciding on how to heat and cool their homes, new construction homebuyers continue to value affordability, resiliency, and reliability, which drives the equipment types and configurations chosen by homebuilders. These equipment decisions create an immediate opportunity even before a home is built to promote those factors valued by homebuyers while incentivizing the most efficient use of the natural gas and electric systems. Rather than installing a heat pump sized for heating and cooling that places the entire home's energy demand (and energy reliance) on the electric system, a builder can install a natural gas furnace paired with a heat pump sized for cooling. The Hybrid Heating Program helps improve the homebuilder's upfront economics for choosing this resilient, dual-fuel, configuration, allowing the homebuyer the choice to make more efficient use of the energy system by using electric heating during milder weather and natural gas during colder conditions. The Hybrid Heating Program incentive and benefits of a hybrid configuration, therefore, directly pass from the homebuilder to the homebuyer.

Q. Why did NW Natural calculate the avoided electric system costs associated with new construction?

A. The electric system economics are an important factor in deciding how best to heat and cool a new construction home. Every therm of natural gas and every kilowatt-hour of electricity used in that home is incremental load. Any comparisons of equipment configuration for new construction homes must therefore account for the capacity and energy supply, as well as environmental compliance obligations associated with both energy systems, rather than treating electric service as having no incremental cost or emissions. The Company has worked with E3 to quantify the electric system costs a new construction hybrid heating home avoids relative to an all-electric home. The comparison is meaningful because installation of a hybrid heating configuration in a new construction home reduces incremental electric system resource adequacy issues compared to all-electric heating by limiting the electric system's cold-weather heating obligation. While the new construction hybrid heating configuration does result in incremental natural gas load, the compliance obligations associated with that load are evaluated against the electric system avoided costs, including the costs of meeting clean energy requirements in the Company's new construction DCF model. E3's avoided-cost work evaluates the latter benefit, providing an economic basis for assessing hybrid heating as a joint gas-electric system resource rather than solely as a gas conservation measure.[41]

[41] NW Natural/101, Dundon-Sprott-Wyman.

Q. How was the electric system avoided cost DCF model input calculated?

A. E3 quantified the electric system costs avoided when a new single-family home uses a hybrid heat pump rather than an all-electric heat pump. This work is central to the new construction economic analysis. It assigns a value to the electric heating load that Hybrid Heating Program participants shift to the gas furnace during cold weather, based on what the electric system would otherwise spend to serve that load. Comparing the hybrid home to an all-electric home isolates the electric system value of keeping the gas furnace available for cold-weather heating. As discussed above, the program helps homebuilders offer hybrid heating to new homebuyers. This supports efficient use of the energy system, affordability and resiliency.

E3 estimated four categories of avoided cost for 2025 through 2045:

- Generation capacity ($/kW-year, one annual value)
- Transmission capacity ($/MWh, by month and hour)
- Energy ($/MWh, by month and hour)
- Clean energy policy compliance ($/MWh, by month and hour)

E3 based these values on two models of the Pacific Northwest electric system. RESOLVE is a capacity expansion model, and RECAP is a reliability model. E3 calculated values for 2025, 2030, 2035, 2040 and 2045 and interpolated linearly between those years. All values E3 produced are in 2024 real dollars, which NW Natural adjusted to 2026 real dollars.

E3 developed two scenarios and one sensitivity:

- Reference. 100% clean retail sales in Oregon and Washington by 2045.
- High Load. Same as Reference, with loads 18% higher by 2045.
- No new gas capacity. Battery storage replaces a new gas combustion turbine as the marginal capacity resource. This sensitivity changes only the generation capacity avoided cost.

E3 calculated each component in the following way:

- Energy**:** this is the short-run marginal cost of the gas unit that meets the last increment of net load in each month-hour.
- Generation capacity: this is the fixed cost of the marginal capacity resource, divided by that resource's effective load carrying capability (ELCC). E3 found that at least 90% of loss-of-load hours occur below 35°F, depending on scenario and year. It multiplied this share by the capacity cost and by the maximum electric load reduction of a hybrid heat pump compared with an all-electric heat pump.
- Transmission capacity**:** this is the cost of the one bulk transmission upgrade that RESOLVE builds in every scenario in the region. E3 held this value constant across scenarios and years and allocated it to month-hours in proportion to gross load.
- Clean energy policy**:** this is the gap between the cost of the marginal renewable resource and its energy market revenue, multiplied by the clean

energy requirement. The requirement follows the Oregon renewable portfolio standards (RPS) through 2035 and the HB 2021 target from 2040.

E3 did not quantify avoided distribution or local transmission costs. The results therefore exclude these costs and understate the avoided costs.[42]

The Company applied E3's avoided costs to hourly load shapes for an all-electric home and a hybrid home. The Company selected the National Laboratory of the Rockies' (formerly NREL) ResStock data and, with E3's assistance, adjusted the load shapes to reflect cold-weather conditions:

- Load data**.** The Company pulled hourly load profiles for both home types from ResStock Dataset 2024.2. It filtered for single-family detached homes built from 2000 to 2019 in cities within its service territory. In Oregon, these were Albany, Aloha, Beaverton, Corvallis, Eugene, Gresham, Hillsboro, Lake Oswego, Portland, Salem, Springfield and Tigard. In Washington, the city was Vancouver. ResStock uses 2018 weather and an ENERGY STAR heat pump operating at its rated capacity and efficiency.
- All-electric home. The Company used measure package 11: ENERGY STAR heat pump with electric backup, Light Touch Envelope, and Full Appliance Electrification with Efficiency.
- Hybrid home. The Company used measure package 14 (ENERGY STAR heat pump with gas furnace backup, Light Touch Envelope, and Full Appliance Electrification with Efficiency) and measure package 4 (ENERGY

[42] NW Natural/101, Dundon-Sprott-Wyman.

STAR heat pump with existing system as backup). Baseload usage (water heating, clothes drying and cooking) came from measure package 4. All other usage came from measure package 14.

- Annual consumption. With E3's assistance, the Company aligned ResStock annual electric consumption with building simulations by an outside consultant to ensure that they reflected real-world conditions. The adjustment accounts for differences in modeling assumptions and weather years to minimize bias.
- Peak load. With E3's assistance, the Company scaled the peak all-electric heat pump load to the 1-in-10 year minimum temperature in Multnomah County. It used the ratio of heating degree days (HDDs) at that temperature to HDDs at the 2018 minimum temperature. The Company then adjusted the hourly profile to match both the new peak and the annual consumption. Because the electric system already peaks in winter, E3 assumes this temperature correlates strongly with the 1-in-10 year loss-of-load event used to derive the generation capacity avoided cost.
- Weather year. The 2018 winter was warmer than a typical winter. E3 calculated 3,882 HDDs for Multnomah County in 2018, compared with 4,156 HDDs reported by American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) for Portland International Airport. Without an adjustment, the hybrid heat pump would run in electric mode more often than in a 1-in-10 weather year. With E3's assistance, the

Company scaled hourly temperatures to match the ASHRAE annual HDDs and the 1-in-10 year minimum temperature.

- Switchover. In the hybrid home, heating switches from the heat pump to the gas furnace below 35°F, based on the scaled hourly temperatures. Below 35°F, the only heating electric load is the furnace blower fan.

These steps produce an hourly load shape in kWh for each home type. The Company applied E3's avoided costs to the difference between the two load shapes.

Q. What was the overall result of the electric system avoided cost analysis?

A. The analysis concluded that a dual-fuel home avoids electric system costs during winter months because natural gas serves the heating load below 35 degrees Fahrenheit. The analysis evaluated only winter peaking periods and placed no value on summer months, and it values each avoided kWh at the avoided cost for the same month and hour. The result is a present value of $19,000 to $47,000 per participating new construction customer depending on which E3 scenario the Company selected, translating to $118.0 million to $292.0 million in total for the system over 18 years. An existing natural gas customer that adopts a dual-fuel heating system instead of fully electrifying will also avoid electric system costs, but the Company (as explained above) has conservatively not quantified those additional benefits for deriving the incentive amount in the existing customer DCF model. We do, however, model these benefits in the new construction customer DCF model.

The timing of these electric system benefits is critical. Annual electricity consumption alone does not capture the cost of serving heating demand during winter periods when the system is constrained. By matching avoided electricity use to the avoided cost in the same month and hour, the E3 work connects the hybrid system's operating profile to the economic value of limiting cold-weather electric load. This is the link between the winter reliability challenge described in Section II of our testimony and the electric system avoided-cost input used to evaluate the new construction incentive.

Q. In summary, how is the Hybrid Heating Program incentive economically justified?

A. The Hybrid Heating Program is economically justified because the benefits of the program exceed the costs of the program when evaluated at the customer and energy system level. The hybrid heating incentive makes a dual-fuel heating configuration more economically accessible for NW Natural customers who choose to install a heat pump instead of central air conditioning. In return, the program avoids natural gas environmental compliance costs (for existing homes) and electric system costs (for new construction homes), and it delivers dual-fuel resiliency and electric resource adequacy benefits. On an 18-year DCF basis, those avoided costs, together with the hybrid program charge, exceed the cost of the incentive, making the program cost-effective.

C. Rate Design

Q. Please describe the rate design for the Hybrid Heating Program.

A. Customers that meet all program eligibility requirements and receive the Hybrid Heating Program incentive will remain on and retain the rate structure (volumetric and fixed monthly charges), conditions, and provisions associated with residential Rate Schedule 2. Once the hybrid heating system is installed, all program participants will separately be assessed a Hybrid Heating Charge of $5.00 per month through Schedule 354, Hybrid Heating Program.

Q. What is the economic justification for the tariff rider with the Hybrid Heating Charge?

A. The economic justification for the $5.00 per month Hybrid Heating Charge is two-fold: First, it ensures that costs and benefits are aligned in the DCF models such that the Company can offer a higher hybrid program incentive that makes a hybrid heating configuration more economically accessible for existing customers and new homebuyers. The Hybrid Heating Charge is set at an amount to maximize the program incentive for this reason, yet as we explain below, ensure the Hybrid Heating Program is the least cost CPP compliance pathway relative to alternative compliance resources.

Second, this application of the Hybrid Heating Charge is an equitable approach to rate design because it ensures that customers who participate in the Hybrid Heating Program continue to pay the same proportionate share of fixed system costs even as their natural gas usage is substantially lowered (in the case of existing customers) or begins at a lower-than-average baseline (in the case of

new construction customers). As a result, customers who do not or are unable to participate will not pay a disproportionate share of the fixed costs attributable to hybrid program participants, mitigating cross-subsidization within the residential rate class.

Q. Will only customers who receive the $3,500 incentive to install a hybrid heating system pay the Hybrid Heating Charge?

A. Yes. The Hybrid Heating Charge tariff rider is intended only for customers who have received the hybrid program incentive.

V. CUSTOMER EXPERIENCE AND BENEFITS

Q. How will customers be informed about the Hybrid Heating Program?

A. Once the Hybrid Heating Program is approved, the Company will begin a marketing campaign through bill inserts, website notices, and other channels that will include information on program rules, eligibility requirements, the incentive, and rate design. The campaign will be directed at customers with older air conditioning units (or no air conditioning units) and newer natural gas furnaces who may wish to add a heat pump to their heating and cooling system.

Q. How will NW Natural deploy the program?

A. NW Natural will deploy a targeted, multi-channel marketing and education strategy tailored to both the existing home and new construction market segments.

In the existing home segment, NW Natural will use customer-focused marketing campaigns, the specifics of which are still being developed, to educate homeowners about the benefits, requirements, and application process of the Hybrid Heating Program. These campaigns will be designed to increase customer

awareness, encourage consideration of hybrid systems during equipment replacement cycles, and drive participation through clear and consistent messaging about system performance and value.

In the new construction segment, NW Natural will engage homebuilders and HVAC contractors through direct outreach, one-on-one builder meetings, industry events, and educational seminars. Supporting resources, including additional marketing tools still under development, will explain program benefits, requirements, and the application process.

Q. Will the Company proactively reach out to potential customers and homebuilders it believes are eligible or would be interested in program participation?

A. Yes. The Company intends to proactively engage prospective customers and homebuilders who may be eligible or interested in participating in the Hybrid Heating Program.

Q. How will potential program participants be connected with trade allies that can install program-eligible equipment?

A. In the existing home segment, potential program participants will be connected with qualified trade allies through NW Natural's established network of HVAC contractors, distributors, and industry partners. The Company will promote participating trade allies through customer communications, marketing materials, and other program outreach, helping customers identify contractors capable of installing eligible hybrid heating equipment.

NW Natural will also leverage its existing trade ally relationships to provide ongoing education and training delivered by subject matter experts. These efforts will help ensure that HVAC contractors and sales professionals understand program requirements, the benefits of hybrid heating systems, and installation best practices.

Q. What are the estimated bill impacts for existing customers that participate in the Hybrid Heating Program?

A. The Company analyzed the potential changes to existing customers' gas-only and total energy costs once they participate in the program. The Company estimates that program participants who are existing customers will realize a usage decrease from 670 therms annually to 339 therms annually. Accounting for the $5.00 per month Hybrid Heating Charge, existing customers who participate in the Hybrid Heating Program will realize natural gas bill reductions of about 38 percent. Figure 1 below shows estimated average existing customer annual gas bills for non-participating and participating customers, at existing rates and inclusive of the $5.00 per month Hybrid Heating Charge.

Figure 1

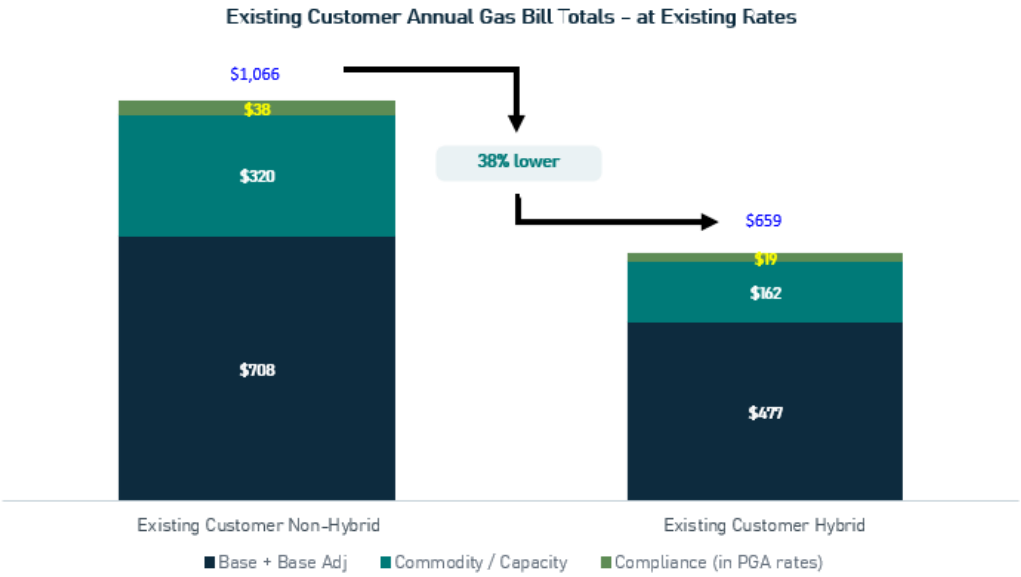
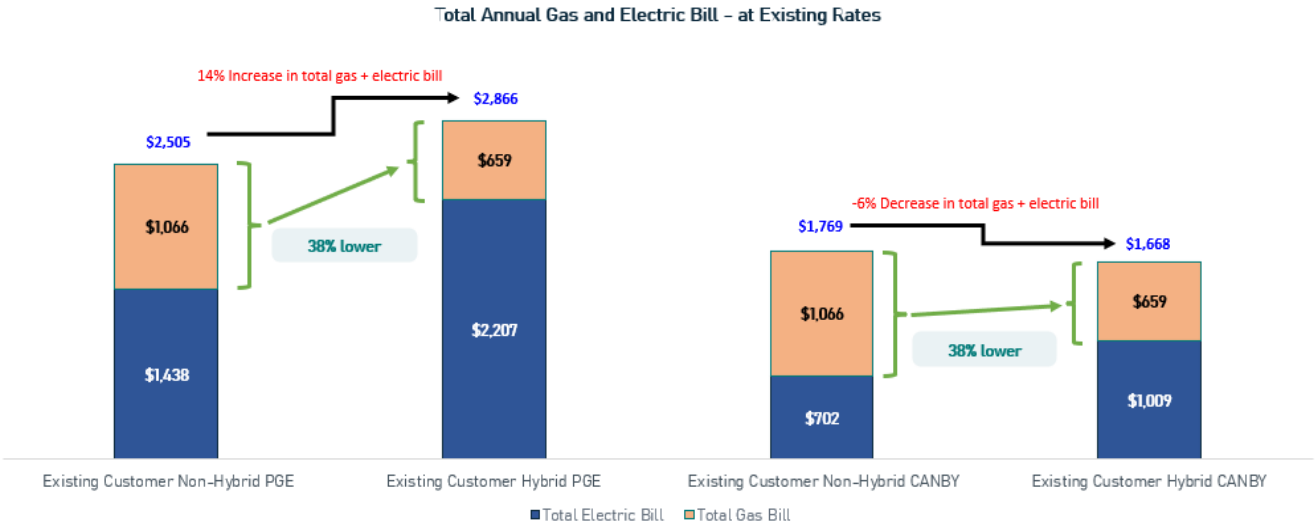


Figure 2 below shows average existing customer annual energy bills (for both gas and electric combined) for non-participating and participating customers of IOU and consumer owned utility ("COU") electric utilities, at existing rates and inclusive of the $5.00 per month Hybrid Heating Charge. As Figure 2 indicates, the overall rates depend on whether a customer's electric utility is an IOU or a COU (we modeled existing PGE and Canby Utility rates, respectively). In either scenario, the estimated natural gas bill reduction is about 38 percent. For COU customers, the estimated combined bill is lower (about 6 percent). Although the estimated combined bill is higher (about 14 percent) for IOU customers, we note that these amounts, which are based on current billing rates, do not include the direct benefit from the hybrid incentive, which makes replacement of older AC equipment more economically accessible for these customers, nor does it include indirect resource adequacy and energy system resilience benefits.

Figure 2



Q. For new construction customers that do not currently have energy bills, what is value proposition for participating in the Hybrid Heating Program?

A. For new construction customers, there is no before-and-after program participation bill comparison. The Company did analyze, however, the new customer value proposition (i.e., the benefits and costs a potential homebuyer or homebuilder would weigh when considering whether to install a hybrid system and participate in the program). The Company estimates that participating new construction customers will use 313 therms and 8,121 kWh of electricity annually. The value proposition, shown in Figure 3 below, compares higher equipment costs, lower gas and higher electric energy costs, higher CPP compliance costs, and the incentive against an all-electric scenario for both IOU and COU electric utility customers across an 18-year period.

Figure 3



Figure 3 shows a positive value proposition for both scenarios over the analysis period ($1,230 and $5,220 for COU and IOU electric utility customers, respectively). In addition to the direct costs modeled in Figure 3, new construction hybrid program participants will also promote other customer and energy system benefits not shown, including electric system avoided costs and energy system reliability.

Q. Has the Company considered equity in its development of the Hybrid Heating Program?

A. Yes. The Company considered equity in terms of customer access, affordability, energy burden, and the potential benefit of the program given different customer circumstances. The hybrid heating incentive reduces the upfront cost of installing a dual-fuel heating system for customers replacing their aging air conditioning equipment, and it may provide energy cost benefits depending on factors such as the customer's electric service territory and existing equipment.

The Company also recognizes that the benefits and affordability of hybrid heating will vary among customers. Accordingly, the Company considered hybrid heating within the context of its broader portfolio of income-based programs and resources, including those specifically designed to address the needs of lower-income customers.

Q. How does the Hybrid Heating Program fit within the Company's portfolio of offerings for lower-income customers?

A. The Company considers customer need and the function of a particular offering as part of its equity analysis. Hybrid heating expands the range of technologies available to customers and may provide meaningful benefits where housing conditions, existing equipment, and individual customer circumstances align with the technology. It is one resource, within the Company's broader portfolio of resources, that addresses different customer needs.

For income-qualified customers, that portfolio includes the Oregon Low Income Energy Efficiency ("OLIEE") program, a comprehensive energy efficiency program. The OLIEE program fully funds approved energy efficiency and weatherization measures, including health, safety, and structural repairs. Its broad scope allows the program to address equipment and underlying housing conditions that affect energy use, affordability, health, and comfort.

For many customers experiencing high energy burden, OLIEE and complementary resources such as bill discounts, weatherization, health and safety improvements, bill assistance, and arrearage support may address affordability needs more directly than hybrid heating. These interventions address different

needs and provide different forms of customer benefit. The Company's equity approach therefore considers which resources are best positioned to address identified customer needs, rather than assuming that a single intervention provides equivalent value for all customers.

Q. Does this mean that lower-income customers are prohibited from enrolling in the Hybrid Heating Program?

A. No. Income does not prohibit an otherwise eligible customer from participating in the Hybrid Heating Program, but the Company does not intend to target outreach to income-eligible customers when better options are available for them. The program remains available to all eligible customers, while targeted outreach reflects the intended function and potential benefits of the program, as well as the availability of other resources that may better address particular customer needs.

Q. How will the Company know whether the program is working as intended?

A. The Company will evaluate program performance using a third-party measurement and verification ("M&V") consultant. The Company anticipates that M&V will consider participation and conversion rates, verification that qualifying systems were installed, actual natural gas and electric usage where available, calculated emissions reductions, customer bill impacts, program delivery costs, participation by builders and trade allies, and feedback from customers and other stakeholders.

Q. What happens if program results differ from expectations?

A. The Company will review program results at two established checkpoints and adjust assumptions, eligibility, tariff terms, targeting, or program design as needed, as well as complete an additional review when program spending reaches a $10

million cap. The checkpoints will be based on the dollars distributed as incentives. Specifically, a 50 percent checkpoint review will occur when incentives reach $5 million (half of the $10 million cap) and a 75 percent checkpoint review will occur when incentives reach $7.5 million (three-quarters of the $10 million cap).

Q. What does a 50 percent and 75 percent checkpoint review look like?

A: The 50 percent and 75 percent checkpoint reviews will look at various aspects of the program including but not limited to:

- How is the program performing compared to expected participation?
- What equipment is being installed by existing customers? What equipment is being installed by new construction builders/customers?
- What about the program and process is working? What about the program and process could benefit from improvements?
- Are there any unanticipated barriers preventing program uptake?
- Reconfirm expected timeline to reach the $10 million cap in committed incentives.

Q. What happens when the $10 million cap is met?

A. NW Natural proposes a formal review using the M&V report to prepare recommendations for–next steps of the program. Based on this formal review process, NW Natural may request changes to the program at this point or continue to administer the program without changes.

Q. What will be covered in the M&V report?

A. The M&V report will evaluate and document the program's actual energy and cost savings, as well as reductions in emissions, providing an objective assessment of program results. A request for proposals will be issued and responses may help to refine the scope and timing of the evaluation. NW Natural also proposes an independent third-party process evaluation, including interviews with participating customers, installers, and homebuilders, to assess program practices and identify opportunities for improvement. This may or may not be part of the same M&V report.

Q. Will this review be made public?

A. Yes. NW Natural proposes that the M&V report and supporting materials be filed in this docket once completed and after the $10 million cap is met.

VI. A LOW-COST, LOW-RISK CPP COMPLIANCE RESOURCE

Q. How does the proposed Hybrid Heating Program support CPP compliance?

A. Under the Oregon Department of Environmental Quality's CPP, NW Natural holds the compliance obligation for all of its customers' GHG emissions from natural gas use, except for customers defined as Emissions-Intensive, Trade-Exposed ("EITE") facilities. This obligation includes emissions from residential gas home heating. The Company's proposed Hybrid Heating Program will shift some of a residential customer's home heating to an electric heat pump during milder weather. This shift reduces existing customers' gas consumption, resulting in fewer emissions and a lower CPP compliance obligation for NW Natural. By 2030, the emissions savings on the natural gas system from participating existing customers

is anticipated to save about 74,000 metric tons of CO2e. For new construction customers, while our modeling for this program assumes additional CPP compliance costs, the overall cost for NW Natural to serve this additional space heating in colder weather is lower than the avoided electric system costs as explained above.

Q. How does the Hybrid Heating Program compare to other CPP compliance resources?

A. Based on modeled gas savings of 331 therms per year per existing customer program participant over an 18-year life, the cost per metric ton ("mt") of GHG savings is modeled to be $130.94/mt CO2e. As we discussed above, for new construction program participants, we have modeled incremental CPP compliance costs on the gas system, as well as the other costs that NW Natural will incur to this incremental load, and these costs are lower than the avoided electric system costs that include compliance with applicable clean energy requirements for electric utilities (i.e., the renewable portfolio standard and HB 2021). The cost per mt of GHG savings includes the $3,500 incentive, marketing, delivery, M&V, and administrative costs for the Hybrid Heating Program. In NW Natural's 2025 IRP Update, supply-side and demand-side resources were compared to identify the least-cost means of complying with the CPP. Figure 4 below compares the program's costs to those analyzed in the 2025 IRP Update (with costs updated to 2027 dollars) and shows that the cost of GHG savings per mt for existing customer Hybrid Heating Program participants is the lowest cost relative to other compliance resources:

Figure 4

Resource	Cost (2027$/mt CO2e)
Hybrid Program Existing Customer	$ 130.94
CPP Community Climate Investment (CCI)*	$ 139.87
Long Term RTC	$ 577.08
RNG Landfill Gas (Low Cost)	$ 167.29
Hydrogen (Blue)	$ 427.11
Synthetic Methane (Biomass Low Cost)	$ 384.65
CCUS (Industrial Customers)	$ 158.63

*CCI 2027 cost estimated using an assumed 3.9% rate of inflation,

As shown in Figure 4 above, the Hybrid Heating Program for existing customers is the lowest cost compliance resource for CPP. Additionally, the hybrid program will result in quantifiable therm reductions at the time of payment because equipment must be installed to receive the incentive. This is in contrast to the CCI program, in which money is transferred to a nonprofit and is designed to generate some emissions savings at some point in the future, although such savings are not guaranteed. Also, by rule, the price of a CCI increases every year, increasing the cost difference between these compliance resources.[43] For these reasons, the Hybrid Heating Program for existing and new construction is a prudent compliance resource for CPP.

Q. Why is it important for CPP compliance to offer the program to both new construction and existing customers?

A. The CPP does not differentiate between new construction and existing customers. All gas combustion is treated the same and contributes equally to NW Natural's

[43] OAR 340-273-0820.

compliance obligation. Therefore, it is important to consider gas conservation programs for both new and existing customers as CPP compliance resources. Additionally, energy usage and emissions should be looked at holistically. Although electric utilities are not subject to the CPP, NW Natural has calculated the costs of the electric system to serve incremental space heating load, including compliance with applicable clean energy requirements, as well as additional capacity, energy, and transmission costs. By including new construction in the Hybrid Heating Program, the electric system avoids these costs, which are greater than NW Natural's costs to provide space heating in colder weather inclusive of CPP compliance costs. As such, hybrid heating is both lower cost and lower risk than all-electric new construction, especially considering the electric system's resource adequacy issues in colder weather and reliance on emitting resources during these periods (see Section II of our testimony above).

Q. How does the Hybrid Heating Program interact with other customer energy efficiency offerings and programs?

A. The program can be layered with funding from other customer energy efficiency offerings, as long as therm and emissions savings are not double counted. Some federal funding programs, such as the U.S. Department of Energy's Home Electrification and Appliance Rebate ("HEAR") program funded through the Inflation Reduction Act, can be layered because they do not have cost-effectiveness criteria based on emissions savings attribution. For incentive programs that require savings attribution, such as programs delivered by Energy Trust on behalf of NW Natural, layering of funds will not be possible.

Q. Why do you describe the program as a low-risk way to reduce emissions?

A. The technology is proven and already widely installed in NW Natural customers' homes. Participation is voluntary, and the gas system, rather than the electric grid, carries home heating during the coldest hours, when the regional electric system is most strained, as it was during the January 2024 winter storms. As explained above, spending is capped at $10 million, with checkpoints to review results and adjust the program before any further spending. The hybrid heating charge ensures participants continue to pay their share of fixed system costs, so nonparticipants do not subsidize the program. Finally, the emissions reductions are direct and measurable. They come from reduced natural gas combustion in customers' homes, unlike compliance resources such as CCIs, which may not achieve the emissions reductions that they represent. And as the table above shows, these reductions are expected to cost less per metric ton than CCIs and the other compliance resources evaluated in the IRP program costs and accounting treatment.

VII. PROPOSED COSTS AND ACCOUNTING TREATMENT

Q. What are the estimated costs of the Hybrid Heating Program?

A. The costs are estimated to be about $2.3 million in year one, $10.3 million in year two, and $10.6 million in year three, based on assumed program uptake of 500 customers in year one, 2,470 customers in year two, and 2,600 customers in year three. The program costs consist of the expected cost of the incentives, marketing costs, M&V costs, initial program startup costs, and an assumed 15 percent cost of program administration. The Company proposes an overall program cost cap of

$10.0 million, which is anticipated to be reached early in year two as explained above.

Q. How does the Company propose that Hybrid Heating Program costs be recovered?

A. NW Natural proposes to capitalize the program costs, including the incentive, marketing, administration and M&V, which will be included in rate base within the Company's revenue requirement in a future rate case proceeding. NW Natural will seek a prudence determination for these costs when the Company requests recovery in customer rates. These details are described in the Application for Accounting Order filed concurrently in a separate docket.

VIII. CONCLUSION

Q. What actions are you asking the Commission to take?

A. NW Natural respectfully requests that the Commission approve Schedule 354, Hybrid Heating Program, which provides a one-time $3,500 incentive to homeowners or homebuilders who install a ducted air-source heat pump sized for air conditioning and space heating in milder weather. A natural gas furnace will serve homeowners' colder-weather space heating needs. Schedule 354, Hybrid Heating Program also includes a $5.00 per month Hybrid Heating Charge on participating customers' bills so that non-participating customers continue to pay the same proportionate share of fixed system costs, thereby mitigating residential class cross-subsidization. NW Natural proposes that Schedule 354, Hybrid Heating Program and the Hybrid Heating Charge take effect on April 1, 2027.

NW Natural's Hybrid Heating Program implements a commitment the Company made in its 2025 IRP, builds on the hybrid heating pilots the Company has already supported, and answers Staff's call to make progress on hybrid heating a top priority.

Q. Does this conclude your testimony?

A. Yes.

BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

OPUC Advice No. 26-10

NW Natural

Exhibit of Kellye Dundon, Andrew Sprott and Robert J. Wyman

HYBRID HEATING PROGRAM
EXHIBIT 101

November 6, 2026

Energy+Environmental Economics
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Avoided Cost Methodology

November 3, 2026

Introduction

Energy and Environmental Economics (E3) developed a set of avoided electric system costs for NW Natural, for the years 2025 through 2045, under three scenarios. The main purpose of this set of avoided costs is to evaluate the electric system costs of hybrid vs all-electric heat pumps for single-family residential new construction in the NW Natural service territory. E3 also provided guidance to NW Natural in the development of electric load shapes, including in weather year adjustment techniques. This memo documents the overall avoided cost framework and the development of individual cost components.

E3 is an energy consulting firm founded in 1989 and headquartered in San Francisco, with offices across North America. For more than three decades, E3 has advised utilities, regulators, system operators, developers, and public agencies on the economics of the electricity and natural gas sectors, with a particular focus on resource planning, resource adequacy, and the cost-effectiveness of distributed energy resources and building electrification. E3 developed and maintains the Avoided Cost Calculator used by the California Public Utilities Commission to evaluate the cost-effectiveness of demand-side programs, and its RESOLVE capacity expansion and RECAP resource adequacy models have been used by regulators and utilities in California, New York, Hawaii, and other jurisdictions for integrated resource planning and reliability assessment. In the Pacific Northwest, E3 has conducted regional resource adequacy studies and supported utilities and state agencies in evaluating the clean energy policies of Oregon and Washington. The avoided costs presented in this memo apply this same framework and modeling toolkit, which have been subject to extensive stakeholder and regulatory review.

Avoided Cost Modeling Framework

Avoided costs are the marginal costs the electric system incurs to serve one additional unit of load, or equivalently the costs it avoids when load decreases by one unit, measured relative to a planned resource portfolio. Avoided costs are marginal, meaning that they reflect the resources that would be dispatched or built at the margin in response to a change in load, rather than the embedded cost

of serving existing load. E3 quantified costs for energy, generation capacity, transmission capacity, and implied costs to meet clean energy policy.

The avoided costs rest on two bulk-grid models of the Pacific Northwest: RESOLVE, a long-term capacity expansion models, and RECAP, a reliability model. Results of both models are based on a recent E3 study on the current and future resource adequacy conditions in the Pacific Northwest region.[1]

Note that this study is exclusively focused on avoided costs related to electric supply and resource adequacy. This includes generation and transmission costs associated with delivering new generating resources to loads. E3 did not quantify avoided distribution or local transmission costs that may be incurred in instances where electrification increases peak demands.

Long-term capacity expansion: RESOLVE

RESOLVE is a capacity expansion model developed by E3 that selects least-cost portfolios of new resources that meet all energy, capacity and clean energy constraints, given inputs such as load forecasts, existing generation fleet and planned retirements, the cost and availability of candidate resources, transmission limits and upgrade costs, and fuel prices. E3 modeled the NW region in six discrete zones. Four zones comprise Washington and Oregon; these are broken into four cardinal directions: PNW_{NW}, PNW_{NE} PNW_{SW}, and PNW_{SE}. One zone, labeled "Inland NW," represents Northwestern Energy. Central west includes Idaho Power and PacifiCorp East.

The following RESOLVE outputs feed E3's avoided cost calculation:

- The resource portfolio in each year, which identifies the marginal capacity resource and the marginal renewable resource
- The short-run marginal cost assumptions for the thermal fleet, which anchor the energy avoided costs
- The transmission builds selected to deliver new resources, which anchor the transmission avoided cost

Reliability and loss-of-load probability: RECAP

RECAP is a loss-of-load probability model developed by E3. Taking the RESOLVE portfolio for a given scenario and year, RECAP simulates the system across many years of weather-driven load, hydro, wind, and solar conditions, combined with random generator outages, to evaluate system reliability and produce the loss-of-load probability (LOLP) in each hour. The hours with the highest LOLP are those in which the system is most capacity-constrained and in which incremental load is most costly to serve.

The following RECAP outputs feed the avoided cost calculation:

[1] E3 (2026). Resource Adequacy and the Energy Transition in the Pacific Northwest. https://www.ethree.com/ra-pnw/

- The effective load carrying capability (ELCC) of the marginal capacity resource, which converts its nameplate cost into perfect-capacity terms
- The LOLP distribution by month and hour shapes the generation capacity avoided cost and sums up to 1 for each modeling year. The LOLP is developed assuming that the system meets the reliability standard of one loss-of-load event per 10 years.
- The hourly gross and net load profiles, which shape the transmission and energy avoided costs respectively

E3 developed avoided costs for two main scenarios:

- Reference: Load assumes current policies persist for EV programs. Market trends persist for building electrification. Federal, Biden-era policies are rolled back. In the electric sector, 100% clean retail sales are assumed for WA and OR by 2045. Only commercially mature candidate technologies are considered for candidate resources in RESOLVE. Overall, 95% GHG reductions are achieved by 2045, relative to 2025 emissions.
- High Load: This scenario is identical to the reference scenario for the allowable candidate technologies, as well as the electric sector policies in place. More load growth is expected, however; it is assumed that additional state policies create higher electric sector demand. Overall, loads are 18% higher by 2045.

E3 also developed a "no new gas capacity" sensitivity scenario, in which no new gas-fired generation may be built in the Pacific Northwest. This scenario only impacts generation capacity avoided costs by assuming battery storage, rather than gas combustion turbine, be the marginal capacity resource. For more on these scenarios please refer to documentation on the NW Resource Adequacy study.[2]

Avoided Cost Components and Structure

Avoided costs are produced for five snapshot years, 2025, 2030, 2035, 2040, and 2045, for each scenario. These are the years for which RESOLVE portfolios and RECAP reliability results are available. Values for the years in between are interpolated linearly between adjacent snapshot years.

The total avoided cost is the sum of four components: energy, generation capacity, transmission capacity, and clean energy policy.

For energy, transmission capacity, and clean energy policy costs, the costs vary by month and by hour of day for each model year, giving 288 month-hour values per component per year. Values do not vary by day: every day within a month shares the same 24-hour profile. This time resolution captures the daily and seasonal characteristics required to evaluate electric system resource adequacy given each combination of load forecast and generation portfolio. Each component is reported in $/MWh in 2024 real dollars, which are the dollar value used in RESOLVE. For generation

[2] E3 (2026). Resource Adequacy and the Energy Transition in the Pacific Northwest. https://www.ethree.com/ra-pnw/

capacity, one annual value applicable to all-electric vs hybrid heat pump loads is reported in $/kW-yr, in 2024 real dollars.

Energy

The energy avoided cost represents the short-run marginal cost (SRMC) of generating one additional MWh in a given month-hour. In E3's modeling, most resources are treated as must-run resources (e.g., nuclear) or renewable resources with zero marginal costs (e.g., solar, wind) and therefore dispatched ahead of the gas fleet, so the marginal MWh is supplied by a thermal unit, and the energy avoided cost is set by the SRMC of the thermal unit that meets the last increment of net load. E3 calculated net load in each hour from RECAP as gross load less generation from the resources dispatched ahead of the natural gas fleet:

$$Net\ load = Gross\ load - (Solar + Wind + Hydro + Nuclear + Coal)^{3}$$

Net load is the portion of demand that must be met by dispatchable thermal units. It varies by scenario and year with both the load forecast and the resource portfolio in RESOLVE.

E3 constructed a supply curve for each scenario and snapshot year from the gas units in the RESOLVE portfolio, ranking them from lowest to highest SRMC. Each unit's SRMC reflects its heat rate, fuel price, and variable O&M costs, using the same assumptions as RESOLVE.

For each month-hour, E3 dispatched the supply curve against net load. The SRMC of the last unit needed to meet net load is the clearing price and is reported as the energy avoided cost for that month-hour.

Generation Capacity

The generation capacity avoided cost is the cost of the capacity the system must add to remain reliable as load grows. Incremental load when the system is already constrained raises the capacity requirement, while load reductions in constrained periods defer or avoid new capacity. E3 calculated this component in two steps: an annual value for each scenario and year, and the probability that constrained periods occur when the hybrid heat pump would switch to gas backup, below the assumed cutoff temperature of 35 F.

E3 identified the marginal capacity resource in each scenario and year from the RESOLVE portfolio, which is a new gas combustion turbine in the Reference and High Load scenarios and battery storage in the no new gas capacity sensitivity. The annual value is the fixed cost of that resource in $/kW-yr of nameplate capacity, consisting of annualized capital cost and fixed O&M. E3 then scaled the nameplate cost up to the cost of perfect capacity, i.e., capacity available in every hour of system

[3] Hydro is netted out of gross load rather than treated as the marginal resource. Although hydro may operate on the margin in some hours, it is energy-limited, which means that an increment of load served by hydro draws down water storage that could otherwise displace gas in a nearby hour. Since incremental hydro generation in one hour therefore results in incremental gas generation in a different hour, thermal short-run marginal cost is used as the appropriate energy avoided cost.

need, by dividing by the marginal resource's ELCC from RESOLVE. Marginal capacity cost is typically netted against the energy and ancillary service revenues the marginal resource earns. E3 did not apply this deduction but compared the derived values to the planning reserve margin shadow prices in RESOLVE, which represent the marginal cost of meeting one additional MW of the reserve margin requirement net of the energy value RESOLVE credits to the resource, and found the two to be similar.

Across all weather years modeled in RECAP, E3 investigated the correlation between temperature and loss of load. Loss of load probability was found to be strongly correlated to cold temperatures. At least 90% of hours with loss of load occur at temperatures below 35 F, depending on the scenario and forecast year. E3 multiplied this ratio by the levelized cost of the marginal capacity resource and the maximum electric load savings of hybrid heat pumps compared to all electric heat pumps. The result reflects the marginal capacity cost that hybrid heat pumps could avoid compared to all-electric heat pumps, for each scenario and forecast year.

Transmission Capacity

The transmission capacity avoided cost is the cost of the bulk transmission upgrades needed to deliver energy to load as load grows. It follows a two-step calculation structure: an annual value is established first and then allocated to month-hours.

E3 held the transmission value constant across all scenarios and years, because the new transmission selected by RESOLVE does not vary materially across scenarios. The value is based on the upgrade from the southwest to the southeast of the Pacific Northwest system, the only transmission line that RESOLVE builds consistently in every scenario.

E3 allocated the annual value across the 288 month-hours in proportion to gross load from RECAP, since transmission upgrades are triggered by total demand. The value in each month-hour is then converted to $/MWh:

$$\textit{Capacity avoided cost (m,h) (\$/MWh)} = \textit{Annual value (\$/kW-yr)} \times [\textit{Gross load(m,h)} \div \Sigma\ \textit{Gross Load}] \div \textit{Days(m)} \times 1{,}000$$

where Gross Load(m,h) is the gross load in hour h of month m, Σ Gross Load is the sum across all 288 month-hours, and Days(m) is the number of days in month m.

Clean Energy Policy

The clean energy policy avoided cost is the incremental cost of complying with Oregon and regional clean energy targets as load grows. Compliance obligations are set as a percentage of retail load, so each additional MWh of load requires the utility to procure additional clean energy equal to its obligations, and each MWh of load reduction reduces that obligation.

The cost of compliance is the "missing money" per MWh of clean generation: the gap between what the marginal renewable resource costs to build and operate, measured by its levelized cost of energy (LCOE) in $/MWh, and what it earns in the energy market, expressed in $/MWh. This gap is the value a renewable energy certificate (REC), or clean energy equivalent, must cover for the resource to be built. Multiplying by the RPS compliance requirement converts it to a cost per MWh of load:

Clean energy policy avoided cost ($/MWh) = (Clean energy LCOE − Clean energy revenue)

× Clean %

E3 calculated the three terms as follows:

- **Clean energy LCOE.** E3 calculated the LCOE of candidate renewable resources, including utility-scale solar and wind, using cost and performance assumptions aligned with RESOLVE.[4] The cheapest resource is assumed to be the marginal renewable for the given year. The marginal resource is wind in the near-term and solar in the long-term.
- **Clean energy revenue.** E3 multiplied the hourly generation profile of the marginal renewable resource by the energy avoided cost in each month-hour and divided by annual generation to obtain a generation-weighted energy value in $/MWh.
- **Clean energy compliance requirement.** Through 2035, the targets are the Oregon RPS.[5] From 2040, the binding requirement becomes the HB 2021 clean energy target, under which electric companies must reduce greenhouse gas emissions 100% below baseline by 2040 and every year thereafter.[6] Washington's Clean Energy Transformation Act also requires 100% renewable and non-emitting supply by 2045.[7]

Taken together, the four components give NW Natural a set of hourly avoided costs for 2025 through 2045 that are internally consistent: the same RESOLVE portfolio and RECAP reliability results underlie the energy, generation capacity, transmission capacity, and clean energy policy values in each scenario. The resolution captures the winter peaks and spring hydro surpluses that drive marginal costs in the Pacific Northwest, which are crucial for comparing hybrid and all-electric heat pumps. The Reference and High Load scenarios, along with the no new gas capacity sensitivity, provide a range of outcomes so that the comparison can be tested under different possible futures of the regional grid.

Weather Year Adjustments

NW Natural obtained annual heat pump electric load estimates from building simulations done by an outside consultant. NW Natural then applied a load shape obtained from the National Lab of the Rockies' ResStock simulations, to estimate hourly electric loads that could be paired with the electric system avoided costs. The ResStock model uses a 2018 weather year and an EnergyStar rated heat pump that operates at its rated capacity and efficiency. Since the modeling assumptions

[4] E3 (2026). Resource Adequacy and the Energy Transition in the Pacific Northwest: Technical Appendix. https://www.ethree.com/wp-content/uploads/2026/04/E3-NW-RA-Technical-Appendix_040826.pdf
[5] ORS 469A.052 Large utility renewable portfolio standard. https://oregon.public.law/statutes/ors_469A.052
[6] ORS 469A.410 Clean energy targets. https://oregon.public.law/statutes/ors_469A.410
[7] RCW 19.405.050 Clean energy implementation. https://app.leg.wa.gov/RCW/default.aspx?cite=19.405.050

and weather year used for the ResStock simulation and for the simulations done by the outside consultant did not perfectly align, E3 assisted NW Natural in adjusting the ResStock load shape and magnitude to appropriately account for the differences. The adjustments achieved three objectives:

1. Aligning the ResStock simulation's annual electric consumption with the outside consultant's building simulations.
2. Aligning the ResStock simulation's peak electric load with the 1-in-10 year minimum temperature.[8] This is assumed to correlate strongly with the 1-in-10 year electric system design loss of load event, as used to derive the avoided capacity cost, as the electric system is already winter peaking.
3. Aligning hybrid switchover operations with a weather year that matches the annual heating degree days (HDDs) reported by ASHRAE.

These objectives were achieved using the following steps:

1. The peak all-electric heat pump load associated with the 1-in-10 year minimum temperature is calculated by linearly scaling the ResStock simulation hourly peak heat pump load by the ratio of the HDDs associated with the 1-in-10 minimum temperature to the HDDs associated with the ResStock simulation's minimum 2018 temperature, in Multnomah County (where Portland, the area's largest population center, is located).
2. The hourly all-electric heat pump profile from ResStock was adjusted to meet the peak load calculated in #1 and the annual electric load calculated from the outside consultant's building simulations using the formula below.

$$Hourly_{new} = m * Hourly_{old} + (peak_{new} - m * peak_{old})$$

where: $m = (Annual_{new} - 8766 * peak_{new})/(Annual_{old} - 8766 * peak_{old})$

3. Since the 2018 weather year used in the ResStock modeling has a relatively warm winter compared to the 1-in-10 weather year,[9] the hybrid heat pump would likely operate more often in electric mode in the ResStock modeling compared to this 1-in-10 weather year. To better align hybrid operation with an assumed switchover temperature of 35 F to the ResStock load profile, hourly temperatures were scaled such that the annual HDDs matched the HDDs reported by ASHRAE, as well as the 1-in-10 year minimum temperature, using the same equation as above. Now accounting for hourly temperatures aligned to a 1-in-10 weather year, hybrid heat pump operation was set to switchover to a gas backup furnace below the temperature of 35 F. Below this temperature, the only electric loads reported by ResStock assumed to be present were the blower fan loads, related to the operation of the gas backup furnace.

[8] ASHRAE (2025), Portland Intl Airport. https://ashrae-meteo.info/v3.0/index.php?lat=45.59&lng=-122.60&place=%27%27&wmo=726980&ashrae_version=2025

[9] E3 calculates 3882 HDDs for Multnomah County in 2018, relative to the 4156 HDDs for a typical winter reported by ASHRAE for Portland International Airport.

These steps provide an all-electric heat pump and hybrid heat pump load shape per home in kWh for each hour of the year, with the hybrid heat pump load shape based on a switchover temperature of 35 F.