

GAIL A. HAMMER
Rates & Regulatory Affairs
Tel: 503.226.4211, ext. 5865
Fax: 503.721.2516
email: gail.hammer@nwnatural.com



March 3, 2016

VIA ELECTRONIC FILING

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

Re: **LC 60, NW Natural's 2014 Integrated Resource Plan (IRP) Update**

In compliance with Oregon Administrative Rule (OAR) 860-027-0400(8), Northwest Natural Gas Company, dba NW Natural ("NW Natural" or the "Company"), hereby files the Annual Update to its 2014 Integrated Resource Plan that was previously filed on August 29, 2014 in Docket LC 60. This update is an informational filing and no Commission action is requested at this time.

Please contact me at (503)226-4211, extension 5865, if you have any questions.

Sincerely,

/s/ Gail A. Hammer

Gail A. Hammer
NW Natural

Enclosure

LC 60
2014 Oregon
Integrated Resource Plan
Update



NW Natural[®]

Forward-Looking Statements

This planning document contains forward-looking statements. Forward-looking statements include statements concerning plans, objectives, goals, strategies, future events and other statements that are other than statements of historical facts.

NW Natural's expectations, beliefs and projections are expressed in good faith and are believed to have a reasonable basis. However, each such forward-looking statement involves uncertainties that could cause the actual results to differ materially from those projected in such forward-looking statements.

All subsequent forward-looking statements, whether written or oral and whether made by or on behalf of NW Natural also are expressly qualified by these cautionary statements. Any forward-looking statement speaks only as of the date on which such statement is made. New factors emerge from time to time and it is not possible for NW Natural to predict all such factors, nor can it assess the impact of each factor or the extent to which any factor, or combination of factors, may cause results to differ materially from those contained in any forward-looking statements. The forecasts and projections included in this document have been developed for the purposes of integrated resource planning and should not be used for investment decisions. Disclosure of this information or use of the information for investment purposes could constitute a violation of federal securities laws.

Table of Contents

Chapter One - Executive Summary.....4
Chapter Two – Load Forecasting7
Chapter Three – Supply-side Resource Additions and Changes 12
Chapter Four – Demand-side Resources and Environmental Considerations 19
Chapter Five – Ongoing Activities 22
Appendix One – NW Natural’s 2014 IRP Action Plan..... 25

Chapter One: Executive Summary

1. Introduction

NW Natural filed its 2014 Integrated Resource Plan (IRP) on August 29, 2014 and the Public Utility Commission of Oregon (Commission) acknowledged the associated Action Items in Order No. 15-064, entered on March 5, 2015.

NW Natural is submitting this annual update in compliance with Oregon Administrative Rule (OAR) 860-027-0400(8). The Company is not seeking Commission acknowledgement of any action items in this update and, as such, is filing for informational purposes only.

A. Load Forecasting

For its 2016 IRP, which will be filed in August of this year, NW Natural has made significant improvements to its load forecasting methodologies and these are discussed in more detail in Chapter Two.

B. Resource Additions and Changes

Since the 2014 IRP was acknowledged, NW Natural has completed the following Supply Side Actions:

- 1) 30,000 Dth/day of Mist storage capacity was recalled and included in our most recent PGA.
- 2) The design and reliability studies for the Newport LNG Refurbishment project have been completed and planned refurbishment actions are in execution.
- 3) A new agreement with Northwest Pipeline (NWP) for 13,525 Dth/day of TF-1 (firm transportation) service effective November 1, 2015 was executed and included in the Company's 2015 PGA filings.
- 4) The Company provided a termination notice to NWP terminating its existing Plymouth LS-1 and TF-2 service agreements in October 2014 which became effective November 1, 2015. Plymouth is no longer part of the Company's peak day resource stack.
- 5) The Firm Interstate Storage Service Agreement with Portland General Electric (PGE) was amended so as to make available to the Core Utility an additional 45,000 Dth/day of Mist deliverability on an as needed basis for December 2018 through February 2019. This is subject to restrictions on the time periods which the Core Utility may use and includes billing credits to PGE for any actual use of this capacity by NW Natural.

NW Natural has also completed the following Distribution System Planning Project:

- 1) Clark County Distribution Project – 119th Street (completed in 2015).

Additionally, NW Natural completed its analysis regarding North Mist and filed it as an update on May 29, 2015.

Please see Chapter Three for more detail on Resource Additions and Changes.

C. Demand-side Resources and Environmental Considerations

As part of proceedings in UM-1622 the Commission asked Staff to investigate a hedge value of DSM proxy value for natural gas, whereby Staff asked NW Natural to propose a hedge value of DSM methodology. NW Natural proposed a proxy methodology and value that was agreed upon by stakeholders in Spring 2015. NW Natural will discuss and review this methodology with stakeholders as part of its 2016 IRP to see if improvements can be made to the proxy methodology proposed by NW Natural and hope to remove “proxy” from its name.

NW Natural continues to work with Energy Trust of Oregon (ETO) to acquire all available cost effective DSM and has worked with ETO to make substantial improvements to the avoided cost calculation methodology and its application to the cost effectiveness test to ensure that all cost effective energy efficiency is being acquired. These changes will be discussed with stakeholders as part of the 2016 IRP technical working groups and be included in the 2016 IRP.

D. All Other Activities

Order No. 15-064 refers to NW Natural’s request to open a new docket to investigate the Company’s long-term hedging policy. NW Natural is participating in Docket No. UM 1720.

Unless identified above, NW Natural is continuing to analyze or investigate as part of its 2016 IRP all other activities. Additionally, the Company continues to monitor all the ongoing activities as well.

Additional information on these activities can be found in the remaining portions of the update.

Chapter Two: Load Forecasting

A. Changes in Load Forecasting Methodologies

As recommended in Staff's Report¹:

Staff recommends that NW Natural reexamine its forecasting methodologies as described above, in its next IRP.

The Company is continuing to invest in and improve its quantitative analytical approaches. This can be seen in the numerous improvements NW Natural has incorporated in its 2016 IRP load forecast in response to Staff and other Stakeholder's comments. The Company presented its 2016 IRP Base Case load forecasts to Stakeholders at a recent 2016 IRP Technical Working Group meeting and discussed these changes.² NW Natural also discusses these changes in this Update.

NW Natural, in both the Company's 2014 and 2016 IRPs, uses a two-step process for separately forecasting Residential and Commercial Firm Sales customer loads. The Company first forecasts the number of future customers for components in each of these two customer classes. It then forecasts average use per customer (UPC) for these components of each class. Combining the customer forecasts with the use per customer forecasts and aggregating over the components provides load forecasts for each of the Residential and Commercial Firm Sales customer classes. Table 2.1 identifies each of these components.

Table 2.1 – Historical Monthly Data Used in 2014 IRP Customer Forecasts

Customer Forecast Component	Oregon	Washington
Residential Single Family New Construction	24 months	24 months
Residential Multi-family New Construction	72 months	NA
Residential Conversion	36 months	36 months
Commercial New Construction	36 months	36 months
Commercial Conversion	NA	NA

B. Changes in Customer Forecasting Methodologies

NW Natural's 2016 IRP incorporates a number of changes from the methodologies used to forecast customers in the 2014 IRP. Stakeholders in the Company's 2014 IRP suggested some of these changes.

A key change is to increase the timeframe of historical data used for econometric modeling. The 2014 IRP forecasts Residential and Commercial Firm Sales customers at a monthly frequency using models which were developed using data from a short number of years, as indicated in Table 2.1. NW Natural increased this to 25 years and used historical data from 1990 through

¹ Appendix A attached to Order No. 15-064, page 8.

² These forecasts did not include any revised DSM as it was not available at the time.

2014 to develop econometric models used to forecast customer additions in the 2016 IRP. The Company developed these forecasts at the state level and at an annual (calendar year) frequency. This approach incorporated the effects on forecast values of two complete business cycles³ plus seven years of the most recent business cycle.

To maintain a schedule culminating in NW Natural filing its 2016 IRP in late August 2016, the Company's schedule required completion of customer forecasts prior to year-end 2015. Therefore, the most recent ("up to date") historical data at an annual (calendar year) frequency available for use in the Company's econometric customer forecasting models is data from 2014.

NW Natural forecasts customer additions at a component level, such as new construction versus conversion, as different components have different levels of annual usage.

C. Changes to Average Annual Use per Customer

NW Natural developed models to estimate average daily use per customer (UPC) as a function of temperature using the Company's billing data from the period January 2012 through December 2014 for use in the 2016 IRP, and adjusts metered gas volumes for Btu content. NW Natural developed separate models for Residential and Commercial UPC.

A significant change in the 2016 IRP is to directly estimate average daily UPC as a piece-wise linear function of temperature versus the method used in prior IRPs, in which NW Natural developed non-linear functions of average daily UPC as functions of temperature and then linearized the results for use in the SENDOUT[®] software package the Company uses for modeling resource portfolios. NW Natural applied the new models to average daily temperatures over the period 1985 through 2014, which results in average daily UPC for Residential customer components and for Commercial customer components. The average daily temperatures over this period represent expected weather in the 2016 IRP.

NW Natural used average daily temperatures over the period January 2012 through December 2014 as a basis for developing annual UPC values. These temperatures are consistent with the geography of the customer components; i.e., components at the state level use weighted state values and components at the load center level use load center temperatures.

NW Natural used customer forecasts, the UPC models, and average weather to develop forecasts of annual load under normal weather.

NW Natural discussed the methodologies the Company uses in the 2016 IRP to develop average UPC on an annual basis and annual loads under normal weather in its Technical Working Group meeting held January 13, 2016.

³ The National Bureau of Economic Research dates U.S. recessions as beginning in July 1990, March 2001, and December 2007. See at <http://www.nber.org/cycles.html> (accessed February 1, 2015).

D. Changes to Peak Day Use per Customer

Peak day load forecasts, like the annual load forecasts, result from multiplying numbers of customers by use per customer values under specified weather (and potentially other) conditions; specifically under those weather conditions on the peak day. NW Natural made numerous changes to the methodologies by which the Company forecasts load on its peak day.

The prior methodology for peak day load forecasts relied on billing data. Under Company's updated methodology, the peak day load forecast is made at a system level using high frequency gas control data from gate stations, storage facilities, and large customers. This high frequency data provides information about load on cold days that is not available using billing data that averages extreme cold day information with other non-extreme days for a monthly (~30 day) average.

In addition to average temperature, Peak day UPC models now include wind velocity, solar radiation, precipitation, day of the week, and the average temperature of the previous day to predict peak day UPC. Incorporating these additional variables has resulted in a model which better explains historical variation in Firm Sales UPC, with particular improvements at extreme cold temperatures.

Previously NW Natural used the average of the high and low temperature in a calendar day as the measure of temperature. The Company uses a more complete gas day temperature measurement in the 2016 IRP, which is the average of hourly temperatures for the gas day. This average of hourly values for the gas day is also applied to the additional variables included as drivers in the forecast for the first time. This greatly reduces unexplained variation in measurement of Firm Sales UPC by temperature.

Another change NW Natural made in forecasting peak day UPC is to incorporate dynamic system weighting of load center values of explanatory variables versus the static system weighting used in prior IRPs. Additionally, models now incorporate a trend in UPC on peak.

NW Natural discussed these methodological changes to its peak day forecast during its Technical Working Group meeting held January 13, 2016.

E. Action Items Specific to Load Forecasting

NW Natural's 2014 IRP included several Action Items related to load forecasting.

1. Continue to refine growth projections for the Clark County load center.

As described above, NW Natural made substantial changes in methodologies used to forecast customers for the 2016 IRP. More specifically, NW Natural examined multiple models for forecasting Residential and Commercial new construction and conversion customer additions for the 2016 IRP. Some models for forecasting new construction customer additions included growth in population or households of the three Washington counties in which NW Natural

provides service: Clark, Skamania, and Klickitat.⁴ The Company determined that the number of Oregon housing starts was more compelling as an explanatory variable than Washington county level growth in either population or households.

NW Natural developed time trend econometric models to forecast both Residential and Commercial conversion customer additions. The Company believes this approach to be an improvement over the use of a fixed annual number of conversions over most of the forecast horizon, as was done for the 2014 IRP.

2. Create a demand forecast scenario based upon the assumed construction of Northwest Innovation Work's (NWIW) methanol plants.

Upon further analysis, NW Natural expects that the Northwest Innovation Works (NWIW) methanol plants would most likely either directly connect to an interstate pipeline or be a transportation customer. If built, the Company does not believe NWIW plants would impact the Company's firm sales demand forecast. However, from a planning perspective, if built, the plants could potentially impact the Company in several other aspects. Firstly, they could impact transportation system planning if a plant were built within NW Natural's service area, such as at Port Westward. The Company's transmission system – the existing North Coast Feeder and prospective North Mist Pipeline – could help bring supplies to the site and potentially avoid constructing a new pipeline across the Columbia River from NW Pipeline's mainline in Washington that would otherwise be required. Secondly, the entrance of a major new industrial load could impact gas prices and basin differentials which may in turn impact the relative net present value associated with various resource options. Lastly, it could potentially become a new low-cost peaking resource for NW Natural via a future recall agreement or as a potential new interruptible resource. The first two impacts were analyzed in the 2014 IRP where the Company explored multiple combinations and prices of future pipeline resources which would be driven by large industrial customers. There is still too much uncertainty at this time to model this last potential impact but NW Natural will continue to monitor the situation and explore getting a better understanding of the parameters that such a peaking service might entail.

⁴ Based on values from the 2010 U.S. Census, over 93 percent of the aggregate population of these three counties in 2010 resided in Clark County. See at <http://ofm.wa.gov/pop/april1/poptrends.pdf> (accessed February 4, 2015).

Chapter Three: Supply-side Resource Additions and Changes

A. Near Term Supply-side Resources

i. Mist Recall

Recall 30,000/day of Mist storage capacity from the interstate storage account effective May 2015 to serve the core customer needs reflected in the Base Case load forecast.

NW Natural recalled 30,000 Dth/day of Mist storage capacity (to increase its peak day capability to 967,000 Dth/day) effective May 2015 and this was included in our most recent PGA filing.

NW Natural filed Advice No. 15-12 with the Commission in Docket No. UG 298 on July 31, 2015. Included in the advice filing was an update to Schedule 187 "Special Rate Adjustment for Mist Capacity Recall," reflecting the rate effects of the recall of 30,000 Dth/day of Mist reservoir capacity and 30,000 Dth/day of compression capacity for use by the Company's core customers. This filing was updated with subsequent advice filings.

The Commission, in Order No. 15-323 issued on October 19, 2015, adopted Staff's recommendation that the Commission find that NW Natural's "recall of 30,000 Dth/day of Mist storage capacity from the interstate storage account was prudent."

Consistent with the 2014 IRP⁵, there will be no recall of Mist storage deliverability/capacity from the interstate storage account in 2016.

ii. Newport Refurbishment Project and Portland Gasco Investigation

A principal conclusion in NW Natural's 2014 IRP is the need to invest in the Company's Newport LNG facility.⁶ This need is included in Action Item 2.1.c. of the 2014 IRP, as repeated below:

Proceed with the Newport refurbishment project and continue investigating Portland Gasco refurbishment alternatives. Estimated timing of Newport refurbishment is over the next three years at an estimated cost of \$25 million.

The Commission adopted the Action Plan in NW Natural's 2014 IRP with certain revisions and additional requirements, including Action Item 2.1.c. to proceed with the Newport refurbishment project.⁷

The refurbishment project has subprojects currently at four levels. The reliability study has been completed. Subprojects that are at least 40 percent completed, with completion expected in 2016, include a pre-treatment system, turbine modernization, tank valve actuators, and pump relief piping. The following subprojects, with the estimated year of completion indicated, are

⁵ See page 7.13 of the 2014 IRP.

⁶ See page 1.2 of the 2014 IRP.

⁷ See page 2 of Order No. 15-064 in Docket No. LC 60.

either not underway or are less than 10 percent complete: the control system upgrade (2016), the control building (2016), the glycol piping (2016), cold box replacement (2017), vaporizer H-1 replacement (2017), tank davit crane replacement (2018), and emergency power generation (2018). See Table 3.1 below.

Table 3.1 – Newport LNG Refurbishment Project Activities

Newport LNG Refurbishment Project		
Project	Status	Est. Completion Date
Reliability Study	Completed	
Pre-Treatment System	About 40% Complete	2016
Turbine Modernization	Over 90% Completed	2016
Tank Valve Actuators	About 50% Completed	2016
Pump Relief Piping	About 70% Completed	2016
Control System Upgrade	About 8% Completed	2016
Control Building	About 2% Completed	2016
Glycol Piping	Not yet started	2016
Vaporizer H-1 Replacement	Not yet started	2017
Cold Box Replacement	Not yet started	2017
Tank Davit Crane Replacement	Not yet started	2018
Emergency Power Generation	Not yet started	2018



23 Forecast Material (contains assumptions) – Strictly for IRP Use – Not for Use for Investment Purposes

NW Natural, based on updated cost estimates, anticipates the cost of the total project to be \$25 to \$28 million. NW Natural discussed the status of the Newport LNG refurbishment project in its 2016 IRP Technical Working Group meeting held February 10, 2016.

The engineering reliability assessment of the Portland LNG facility has been completed. Results identified several small scale repairs and/or minor upgrades which are scheduled to be completed in 2016. In addition, one of two vaporizers has been identified as having reached end of asset life requiring replacement to maintain current vaporization capacity at 120,000Dth/day. The replacement is scheduled for 2017 and is currently estimated to cost about \$2.5 million.

iii. South Salem Feeder

Continue the pre-construction phase of the South Salem Feeder Project (e.g., studies, permitting, etc.) and conduct a Request for Proposal (RFP) for Recallable Agreements in the Salem load center. Provide the Commission with the results of additional analysis (e.g., results of RFP, accelerated DSM analysis,

future load growth specific to the Salem load center) related to the South Salem Feeder Project prior to moving beyond the pre-construction phase of the project. While the studies are being undertaken, ETO will maintain the current energy efficiency programs in the Salem area.

Upon further investigation, NW Natural has determined that a more granular view of the Salem load center is required to more adequately understand the system demand as well as the delivery capacities to the load center. NW Natural is currently disaggregating Salem into four different load centers. For the 2016 IRP, using this disaggregation, its most current load forecast as well as updated assumptions, NW Natural is continuing to study the supply needs of the Salem load area. Results of the analysis will be presented in the 2016 IRP. Additionally, NW Natural is preparing a system-wide Request for Proposal (RFP) for Recallable Agreements, which will address the Commission's direction related to the Salem area. Lastly, while the Company continues its investigations of the Salem area, ETO is continuing to provide energy efficiency programs that were current as March 5, 2015; the date of the acknowledgement order.

B. Additional Actions Related to Changes to Resource Stack

- i. Given that segmented capacity is an interim solution, continue working with Northwest Pipeline (NWP) to investigate options regarding both the Plymouth and Jackson Prairie storage facilities.

In April 2015, the Company signed a Memorandum of Understanding (MOU) with NWP that included the proposed acquisition of 13,525 Dth/day of TF-1 (firm transportation) service to help address both its MDDO gap in Clark County as well as to help replace the need to rely on subordinate TF-2 transportation capacity from Jackson Prairie. A description of the components of the MOU and the analysis performed by the Company was provided to the Commission in the LC 60 IRP Update filing dated May 8, 2015. The proposed TF-1 agreement subsequently was included in the Company's 2015 PGA filings, which were approved by the Commission. Accordingly, the new TF-1 agreement from Jackson Prairie commenced service effective November 1, 2015. This resolves the Jackson Prairie transportation issue identified in the 2014 IRP.

The Company continues to work with NWP to investigate alternatives to using segmented capacity and requested that NWP analyze the reliability risk of relying on segmented capacity. That analysis has been performed and will be included in the 2016 IRP (LC 64).

- ii. Explore alternatives with NWP for increasing contracted Maximum Daily Delivered Obligation (MDDO) capacity at Vancouver gates, including but not limited to, TF-1 contract extensions and/or subscription for additional contract demand capacity at some future date.

As mentioned above, the new TF-1 agreement from Jackson Prairie provides an additional 13,525 Dth/day of MDDOs of use to Clark County. Another provision of the April 2015 MOU with NWP was the early segmentation of an existing TF-1 agreement that was acquired by the Company from the March Point Cogeneration Company in 2008, but which does not pass to

NW Natural's control until January 1, 2017. The March Point contract quantity is 12,000 Dth/day, with primary firm receipt points in the Rockies and a primary firm delivery point at Sedro/Woolley, Washington (near Anacortes). Normally, any attempt at segmentation would have to wait until the month prior to the shipper taking on a contract, which in this case would mean December 2016. However, with the MOU, NWP has committed to the segmentation desired by the Company, which will create a segment that makes 12,000 Dth/day of MDDOs available at points relevant to Clark County deliveries.

The 2016 IRP will analyze whether additional actions are needed to resolve all MDDO concerns.

- iii. Provide termination notice to NWP on the Company's existing Plymouth LS-1 and TF-2 service agreements by October 31, 2014 (effective November 1, 2015), unless NWP offers a viable economic alternative solution before that notice cut-off date.

Consistent with action item 2.b.iii, the Company provided notice to terminate its existing Plymouth LS-1 and TF-2 service agreements to NWP in October 2014 effective November 1, 2015 and Plymouth is no longer part of the Company's peak day resource stack.

- iv. From the 2014 IRP, Chapter 3, page 3.45 - It is now possible that all Mist Recall will be utilized within the planning horizon of the IRP, necessitating the evaluation of potential expansion capacity that was previously thought unnecessary for utility use (the North Mist expansion).

In an amendment dated May 1, 2015, the Company and PGE negotiated an amendment of PGE's firm interstate storage service agreement such that the Company has the ability to modify the withdrawal ratchet profile to effectively have access to 45,000 Dth/day of firm Mist deliverability should it be needed within the period December 2018 through February 2019. There is a high volumetric billing credit to PGE should the Company actually use this capacity by serving notice to PGE, but no cost if notice is not given. In addition, use of this Mist capacity is subject to restrictions on the time periods in which the Core Utility may use. Negotiating the alternate withdrawal ratchet profile was considered advisable in light of the 2014 load growth projections, increase in Mist recall volumes from prior NW Natural IRPs, and PGE's need for "gap services," i.e., bridging the gap in time until the North Mist expansion for PGE is completed and in-service. This amendment helped satisfy both needs. And if projected loads are reduced in the 2016 or subsequent IRPs, or if actual loads in 2018/19 fall short of design day requirements, there is no cost to the Company from not utilizing this amendment.

C. Analysis to be Performed for Future Pipelines and Alternative Resources

- i. Complete analysis regarding North Mist: refine cost estimates; quantify the value of the project's optionality created by upsizing the associated takeaway pipeline near-term versus at some future date(s); and research applicability of the Company's Hinshaw Exemption. NW Natural will submit this analysis for the Commission's review by May 2015.

The Company completed the North Mist analysis and submitted it on May 29, 2015. Additionally, the Company will be updating costs in its 2016 IRP regarding this alternative.

- ii. Preserve the optionality of participating in both the Cross-Cascades and Pacific Connector interstate pipelines by working with the Project Sponsors and exploring what preserving this optionality requires. Timing is contingent on other parties. Updates will be provided at the annual updates.

Cross-Cascades, the proposed interstate pipeline connecting GTN's mainline north of Madras, Oregon to the gate station at Molalla, has been renamed Trail West. Both Trail West and the Pacific Connector interstate pipeline associated with the Jordan Cove LNG export facility are both options. The Company continues to keep in contact with the project sponsors to stay abreast of activities regarding potential open seasons. Both of the alternatives will be updated and analyzed as part of the 2016 IRP process.

NW Natural, as of the date of this Update, continues to explore what is required to preserve any optionality embedded in either of these prospective pipelines. See also Action Item 4b.

- iii. Conduct cost risk analysis on acquiring capacity on the proposed Pacific Connector pipeline to ensure that the Company has fully analyzed its options should the project move forward. These analyses will be included in the next IRP.

As discussed above and in the action item, the Company will analyze Pacific Connector as part of its 2016 IRP process. NW Natural will include these analyses in its 2016 IRP. See also Action Item 4b.

D. Actions Related to Distribution System Planning

i. Clark County Distribution Projects

A principal conclusion in NW Natural's 2014 IRP is the need to invest in the Company's Clark County infrastructure.⁸ This need is reflected in Action Item 2.1.b. of the 2014 IRP, as repeated below:

Complete Clark County distribution projects to address Vancouver load center needs—estimated timing of projects is over the next five years with an estimated total capital cost of \$25 million.

The Company included as a Key Finding, in Chapter 6 discussing distribution system planning, that it identified five projects to complete within the next five years to address resource needs in the Vancouver load center.⁹ A list of these five projects, including each project's name, location, a brief description, an estimated cost and year of anticipated construction, appears on page 6A.1 in Appendix 6 of the 2014 IRP.

⁸ See page 1.2 of the 2014 IRP.

⁹ See page 6.9 in Chapter 6 of the 2014 IRP.

There are several aspects of the Vancouver distribution system projects to update. These are listed by project below and as they were identified in the 2014 IRP.

119th Street

- This project is now complete.

Camas Reinforcement

- The Sierra Drive to Pacific Rim project was identified as the Camas Reinforcement project in the 2014 IRP. Estimated completion is now 2016 with an estimated cost of \$5.1 million.

Washougal Extension

- The Washougal Reinforcement project was identified in the 2014 IRP as the Washougal Extension project. This project involves extending eastward the existing high pressure system approximately 1.5 miles for feeding the Washougal core area. NW Natural anticipates completion in 2018 at an estimated cost of \$4.5 million.

119th Street to Salmon Creek

- This project involves installing approximately 12,700 feet of 8-inch pipe connecting the Salmon Creek gate station to the completed 119th project referenced above. Completion of this project is still planned for 2017 at an estimated cost of \$6.1 million.

Vancouver Core Replacement

- NW Natural described the Vancouver Core project in the 2014 IRP as a single 1.8 mile 12-inch pipeline. Subsequent detailed investigation identified two somewhat independent distribution system issues in the core area requiring individual solutions. Phase 1 involves installing 3,700 feet of 8-inch high pressure pipe at an estimated cost of \$2.4 million, with completion anticipated in 2016.
- Phase 2 of the Vancouver Core project will address the existing issues directly east of the Phase 1 project's location with completion anticipated in 2018. As alternative solutions to these issues have yet to be developed, estimated costs are to be determined.

In addition to the distribution system pipeline projects listed above, NW Natural has identified a need to upgrade several gate stations in the Vancouver load center. These are the North Vancouver, Camas, Salmon Creek, and West Vancouver gates. These projects include capacity increases and equipment upgrades, including meters, regulators, odorizers, and line heaters.

NW Natural reviewed the six Clark County distribution system projects with Stakeholders in its Technical Working Group meeting on February 10, 2016.

Chapter Four:
Demand-side Resources
and
Environmental Considerations

A. Activities Related to Demand Side Resources and Environmental Considerations

The Company's action plan included in Order No. 15-064 contained the following items.

3. Demand-side Resources and Environmental Considerations

- a. Explore assessing a premium value to account for any natural gas price volatility hedging value associated with demand side management (DSM) energy savings.

As per Order No. 14-332 as part of its Docket No. UM 1622 investigation, the Commission requested that Staff report back by April 1, 2015 with a proxy value for the hedge value of DSM. In turn, Staff requested NW Natural put forth a proposal for a proxy hedge value. On February 17, 2015 NW Natural put forth its proposed methodology.

NW Natural and Stakeholders have met multiple times regarding the best method for calculating the hedge value of DSM. The proposed proxy methodology will be revisited with stakeholders as part of the 2016 IRP process and NW Natural looks forward to determining if improvements to the methodology can be made.

- b. Consistent with the methodology presented in Chapter 4, NW Natural will ensure ETO has sufficient public purpose charge funding to acquire the therm savings identified and approved by ETO's board of approximately 5.2 million therms in 2015 and 5.4 million therms in 2016.

NW Natural continues to work annually with ETO to ensure that collections under Schedule 301, Public Purpose Funding are sufficient to acquire all available cost effective DSM.

NW Natural filed Advice No. 14-24 with the Commission on November 17, 2014, revising, in the Company's Schedule 301, the portion of public purpose funds allocated ETO for the administration of residential and commercial energy efficiency programs to ensure ETO has program funding in 2015 sufficient to acquire 5.2 million therm savings. The associated rates took effect on January 1, 2015.

NW Natural filed Advice No. 15-18 with the Public Utility Commission of Oregon on November 19, 2015, revising, in the Company's Schedule 301, the portion of public purpose funds allocated ETO for the administration of residential and commercial energy efficiency programs to ensure ETO has program funding in 2016 sufficient to acquire 5.3 million therm savings.¹⁰ The associated rates took effect on January 1, 2016.

- c. As part of its next IRP process, NW Natural must convene discussions with Staff and stakeholders to discuss potential impacts associated with: (1) new regulations to reduce

¹⁰ ETO's 2016 Annual Budget and 2016 – 2017 Action Plan identified **3.9 million** annual therms savings as NW Natural's (2014) IRP Target for 2016 (Net) on page 14. Accessed February 23, 2016 at http://assets.energytrust.org/api/assets/plans/2016_Annual_Budget_Action_Plan.pdf.

methane emissions; and (2) potential increases in natural gas prices stemming from increased demand for natural gas for generation under Section 111(d) of the Clean Air Act.

NW Natural's Third Technical Work Group meeting scheduled for March 17, 2016 will be discussing environmental considerations and will specifically discuss and request stakeholder feedback on both methane regulations and Section 111(d) of the Clean Power Plan and its implications on planning. NW Natural will also be discussing additional potential environmental regulations that could impact its plan.

Chapter Five: Ongoing Activities

NW Natural's Action Plan in the Company's 2014 IRP included a number of ongoing and noteworthy items. The Company provides the status of these Action Items below.

4. Ongoing Activities and Noteworthy Items for future IRPs:

- a. Continue monitoring the data and sources used for the customer growth forecast.

NW Natural continues to monitor the data and sources available for the customer growth forecast.

- b. Continue monitoring pipeline projects that have been identified in the IRP and that are associated with liquefied natural gas (LNG) export facilities.

NW Natural continues to monitor potential pipeline projects that could present as potential future resources. As part of its 2016 IRP process, the Company's Technical Working Group meeting on February 10, 2015 focused on resources. The pipeline companies, NW Pipeline and TransCanada, each presented, providing updates regarding their respective projects.

- c. Continue reviewing national and regional supply and price forecasts and their sensitivity to environmental regulation, LNG exports, and other factors.

NW Natural continues to review national and regional supply and price forecasts and their sensitivity to environmental regulation, LNG exports, and other factors and will integrate its findings in the 2016 IRP process.

- d. Continue exploring the load implications from the emerging growth markets of power generation, industrial, and transportation.

NW Natural continues to explore the load implications from the emerging growth markets of power generation, industrial, and transportation and will integrate its findings in the 2016 IRP process.

- e. Continue updating and refining resource cost estimates included in modeling and options considered such as satellite compressed natural gas/LNG.

NW Natural continues to update and refine resource cost estimates included in modeling and options considered such as satellite compressed natural gas/LNG and will integrate its findings in the 2016 IRP process.

- f. Continue monitoring greenhouse gas legislation, State or Federal action, and work with Staff and stakeholders to identify the appropriate analysis of the impact of climate change on the Company's risks and opportunities.

NW Natural continues to monitor greenhouse gas legislation, State or Federal action, and work with Staff and stakeholders to identify the appropriate analysis of the impact of climate change on the Company's risks and opportunities and will integrate its findings in the 2016 IRP process.

- g. Continue developing more statistically sophisticated approaches for probabilistically measuring reliability risk management. Explore other modeling tools for potentially supplementing SENDOUT. Develop a database that allows the Company to more effectively analyze reliability risk.

NW Natural plans to incorporate in its 2016 IRP a more statistically sophisticated approach for probabilistically measuring risk. The Company remains concerned about reliability and the implicit assumption that its resources are available 100 percent of the time. To this end, NW Natural has begun developing a process to capture and document information on those times when resources are not available. Additionally, the Company will continue to explore reliability and risk, and to integrate mitigation measures into its planning process.

APPENDIX 1

NW Natural's 2014 IRP Action Plan

NW NATURAL'S 2014 IRP ACTION PLAN

1. Load Forecasting

- 1.1. Continue to refine growth projections for the Clark County load center.
- 1.2. Create a demand forecast scenario based upon the assumed construction of Northwest Innovation Work's (NIW) methanol plants.

2. Resource Additions and Changes

- 2.1. Create a demand forecast scenario based upon the assumed construction of NIW's methanol plants. Acquire resources in the near-term consistent with meeting the Base Case firm sales load forecast
 - i. Recall 30,000 Dth/day of Mist storage capacity from the interstate storage account effective May 2015 to serve the core customer needs reflected in the Base Case load forecast.
 - ii. Complete Clark County distribution projects to address Vancouver load center needs—estimated timing of projects is over the next five years with an estimated total capital cost of \$25 million.
 - iii. Proceed with the Newport refurbishment project and continue investigating Portland Gasco refurbishment alternatives. Estimated timing of Newport refurbishment is over next three years at an estimated cost of \$25 million.
 - iv. Continue the pre-construction phase of the South Salem Feeder Project (e.g., studies, permitting, etc.) and conduct a Request for Proposal (RFP) for Recallable Agreements in the Salem load center. Provide the Commission with the results of additional analysis (e.g., results of RFP, accelerated DSM analysis, future load growth specific to the Salem load center) related to the South Salem Feeder Project prior to moving beyond the pre-construction phase of the project. While the studies are being undertaken, ETO will maintain the current energy efficiency programs in the Salem area.

2.2 Additional Actions Related to Changes to Resource Stack

- i. Given that segmented capacity is an interim solution, continue working with Northwest Pipeline (NWP) to investigate options regarding both the Plymouth and Jackson Prairie storage facilities.
- ii. Explore alternatives with NWP for increasing contracted Maximum Daily Delivered Obligation (MDDO) capacity at Vancouver gates, including but not limited to, TF-1 contract extensions and/or subscription for additional contract demand capacity at some future date.
- iii. Provide termination notice to NWP on the Company's existing Plymouth LS-1 and TF-2 service agreements by October 31, 2014 (effective November 1, 2015), unless NWP offers a viable economic alternative solution before that notice cut-off date.

2.3 Analyses to be Performed for Future Pipelines and Alternative Resources:

- i. Complete analysis regarding North Mist: refine cost estimates; quantify the value of the project's optionality created by upsizing the associated takeaway pipeline near-term versus at some future date(s); and research applicability of the Company's Hinshaw Exemption. NW Natural will submit this analysis for the Commission's review by May 2015.
- ii. Preserve the optionality of participating in both the Cross-Cascades and Pacific Connector interstate pipelines by working with the Project Sponsors and exploring what preserving this optionality requires. Timing is contingent on other parties. Updates will be provided at the annual updates.
- iii. Conduct cost risk analysis on acquiring capacity on the proposed Pacific Connector pipeline to ensure that the Company has fully analyzed its options should the project move forward. These analyses will be included in the next IRP.

3. Demand-Side Resources and Environmental Considerations

- 3.1 Explore assessing a premium value to account for any natural gas price volatility hedging value associated with demand side management (DSM) energy savings.
- 3.2 Consistent with the methodology presented in Chapter 4, NW Natural will ensure ETO has sufficient public purpose charge funding to acquire the therm savings identified and approved by ETO's board of approximately 5.2 million therms in 2015 and 5.4 million therms in 2016.
- 3.3 As part of its next IRP process, NW Natural must convene discussions with Staff and stakeholders to discuss potential impacts associated with: (1) new regulations to reduce methane emissions; and (2) potential increases in natural gas prices stemming from increased demand for natural gas for generation under Section 111(d) of the Clean Air Act.

4. Ongoing Activities and Noteworthy Items for future IRPs:

- 4.1 Continue monitoring the data and sources used for the customer growth forecast.
- 4.2 Continue monitoring pipeline projects that have been identified in the IRP and that are associated with liquefied natural gas (LNG) export facilities.
- 4.3 Continue reviewing national and regional supply and price forecasts and their sensitivity to environmental regulation, LNG exports, and other factors.
- 4.4 Continue exploring the load implications from the emerging growth markets of power generation, industrial, and transportation.

- 4.5 Continue updating and refining resource cost estimates included in modeling and options considered such as satellite compressed natural gas/LNG.
- 4.6 Continue monitoring greenhouse gas legislation, State or Federal action, and work with Staff and stakeholders to identify the appropriate analysis of the impact of climate change on the Company's risks and opportunities.
- 4.7 Continue developing more statistically sophisticated approaches for probabilistically measuring reliability risk management. Explore other modeling tools for potentially supplementing SENDOUT. Develop a database that allows the Company to more effectively analyze reliability risk.