

BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON

Docket No. LC 71

In the Matter of

Third Update to NW Natural's 2018
Integrated Resource Plan

Opening Comments

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Introduction

NW Natural's (Company or NWN) Integrated Resource Plan (IRP) Update is an opportunity for stakeholders to comment on changes to the Company's planning assumptions, methodologies, and near-term action items before the filing of the next IRP, scheduled for July of 2022.¹

NW Natural's IRP Update emphasizes that the Company's long term planning process is in a state of uncertainty until the Oregon Department of Environmental Quality (DEQ) rules associated with Executive Order 20-04 (EO 20-04) and the Climate Protection Program (CPP) are in place. The IRP Update attempts to focus on updating important IRP inputs, explaining methodological changes, and proposing relatively low-risk, near-term resource actions, without making significant changes to the Company's long-term resource portfolio. NW Natural explains that any long-term planning at this moment could quickly become out-of-date depending on the final rules in the DEQ CPP. The Company plans to update its long-term resource portfolio in the next IRP.

Significant changes to methodology are limited to a few key areas: extending the planning horizon to 2050, adding climate impacts to weather modeling, updating greenhouse gas prices, and including effects of Oregon SB 98 and the Oregon Public Utility Commission's (OPUC) Renewable Natural Gas (RNG) investigation.

Areas of the IRP which received simple input updates include the natural gas price forecast, peak planning standards, and greenhouse gas (GHG) policy modeling. These updates do not change the methodology of the 2018 IRP, but simply update the inputs to the methodology already reviewed by Staff in the 2018 IRP.²

The IRP Update requests acknowledgement of two near-term distribution system upgrades which were selected because they are based on current system needs, and not subject to the same uncertainty as investments justified based on long-term forecasts. As NW Natural explains, the Company has developed a plan to allow it to delay major capacity expansion needs until the CPP rules are finalized. The Action Items in the Update were selected because they are relatively low risk in the current environment of uncertainty.

NW Natural's IRP Update explains that the Company will begin hosting an expedited version of the usual stakeholder technical workshops as soon as possible after the cap-and-reduce rulemaking at DEQ is complete and will file its IRP on or before July 30, 2022.³

¹ See Docket No. LC 71, Order No. 21-013, January 13, 2021.

² See the Table 2 on page 3 of the IRP Update for a comprehensive list of updates and methodology changes.

³ Docket No. LC 71, NWN'S PETITION FOR TEMPORARY EXEMPTION FROM OAR 860-027-0400(3), page 6.

Background

NW Natural's 2018 Integrated Resource Plan (IRP) was acknowledged by the OPUC on February 26, 2019. NW Natural provided two interim updates on April 17, 2019 and November 7, 2019. On December 1, 2020, NW Natural requested a waiver that would allow it to delay filing its next IRP until July, 2022. The company explained that it would provide an additional IRP update, with opportunities for stakeholder comments, in 2021. The OPUC granted this waiver on January 5, 2021 and the third update to the 2018 Integrated Resource Plan (IRP Update or Update) was filed March 1, 2021.

Near-term Action Items

In the IRP Update, NW Natural is requesting acknowledgement of a North Coast feeder distribution reinforcement and the replacement of the Newport LNG cold box. These two near-term projects were reported to minimize risks to customers because they are relatively low cost and are needed in the near-term without relying on load forecast or other uncertain planning assumptions.

Newport Cold Box

In its IRP Update, NW Natural proposes to replace the Cold Box at the Newport LNG plant (Newport). Newport is one of the Company's three on-system storage facilities used to augment the gas supplies transported to NW Natural's system from external regional supply sources. Gas is placed into storage at Newport during off-peak periods through the liquefaction process. When called upon, Newport provides gas directly to NW Natural's system.

Newport serves as both a winter peaking supply and as an emergency supply source for customers served by the 90-mile Central Coast Feeder pipeline from the McMinnville-Amity gate station to Lincoln City to Newport. During planned and unplanned outages of the Central Coast Feeder pipeline, Newport is the sole source of natural gas for the towns of Lincoln City, Newport, and the surrounding communities. A wildfire in September 2020 caused an eight-day pipeline disruption during which Newport was the sole gas supply for 10,000 customers in Newport, Toledo, and Lincoln City.

The Newport storage facility was commissioned 44 years ago in 1977. It was designed for a 25-to-30-year life. Many of the primary components have been replaced in recent years, but the Cold Box is 44 years old and well past its design life. The Cold Box is essential to the liquefaction process. It cools natural gas to cryogenic temperatures to convert the gas to liquid. Once liquefied, gas is pumped from the Cold Box to the onsite insulated storage tank where it can later be used.

The performance of the Cold Box has degraded due to age and contamination. Contamination has fouled the interior of the heat exchangers, causing differential pressure in the system that

is higher than design limits, reducing production capacity. NW Natural considered cleaning the heat exchangers but determined that cleaning was likely to cause further damage with no guarantee of restoring performance.

The Company hired a consultant to study the Cold Box. The consultant recommended replacing the Cold Box with a modern system. The current Cold Box heat exchanger design was found to be outdated, more prone to failures, and not repairable upon failure. Replacement upon failure would take up to 2 years, during which Newport would not be able to supply customers during peak and emergency periods. The consultant determined that modern Cold Box design and pretreatment processes can better address the higher levels of CO₂ and heavy hydrocarbons found in the gas supply than were present when the Newport facility was designed. Modernization would also allow the removal from Newport of an LNG pressure vessel that lacks secondary containment. NW Natural upgraded the Newport facility's gas pretreatment system in 2016 and is currently implementing additional improvements. The Company provided a detailed cost estimate for replacing the Cold Box, which totals \$18.15 million.

The Company considered two alternatives to replacing the Cold Box. The first alternative is to contract for additional pipeline capacity to one of two different city gates that can supply the affected area. To secure the same capacity benefit offered by Newport, the two locations considered would require annual demand payments of \$23 and \$43 million, respectively, in addition to potential gate station and distribution upgrade costs. The Company dismissed this option because the annual costs in both locations exceed the one-time capital costs of Cold Box replacement. The second option is to construct 25 miles of new high-pressure transmission pipeline between Newport and the Central Coast Feeder to provide an alternate supply route to the central coastal communities. The Company estimated the capital costs to construct the new pipeline at \$171 million, which far exceeds the estimated \$18 million cost to replace the Cold Box. Therefore, the Company also dismissed this option.

Staff finds that this action item, replacing the Newport Cold Box, is a reasonable step in order to meet the Company's obligation to provide safe and reliable service and, based on the information provided by the Company, is the lowest cost option available.

North Coast Feeder

In its IRP Update, NW Natural proposed its North Coast Feeder System Reinforcement Project. In 2018, the Company identified, via system modeling, a potential pressure drop violation in the northwest area of its service territory. In November 2019, the Company verified these violations by collecting data from its Cannon Beach District Regulator, via one of its Electronic Portable Pressure Recorders (EPPR). Data revealed significant pressure drop violations, such that the Company determined the violations posed an unacceptable risk to safety and reliability. The Company again gathered pressure data in January 2021 via a second EPPR and again observed high pressure drops. The Company also indicated in its filing that these pressure drops occurred on non-peak times in its heating season. Modeling also indicated that, if left

unmitigated, pressure drops could potentially reach 0 pounds per square inch guage (psig). To mitigate these observed and potential drops in pressure, the Company is proposing uprating 6.6 miles of high-pressure gas main on one section of its system and uprating another 22.2 miles of high-pressure gas main on another section of its system. The estimated cost is between \$5.1 and \$10.2 million.⁴

Staff reviewed the project information available in the IRP Update and finds the action item to be reasonable. The ongoing replacement of infrastructure for safety purposes is part of the Company's basic obligation to provide safe and reliable service. The Company also supported its acknowledgment request with relevant data and verification of system modeling, and Staff encourages the Company to continue to provide high-quality data for Action Items in future IRPs.

NW Natural also submitted an Appendix in which it describes reinforcement standards it utilizes to determine when a transmission, high pressure distribution, or certain parts of its distribution system needs to be reinforced. Staff reviewed the Company's reinforcement standards and found them prudent and normal for operations and workflow, with no apparent impacts or conflicts with maintaining compliance with safety standards.

Finally, in an effort to begin a conversation about distribution upgrades and the transition to low-carbon energy, Staff has submitted an Information Request (IR) regarding whether the North Coast feeder uprate would be able to safely accommodate 10, 20, or 30 percent hydrogen. Staff hopes to continue this conversation regarding distribution system upgrades in the 2022 IRP development process and beyond and encourages the Company to provide information about the ability to accommodate varying amounts of hydrogen each time that it proposes a distribution system upgrade in the 2022 IRP and beyond.

Near term resource planning

The IRP Update explains that the company plans to depend on city gate deliveries for capacity in addition to Mist Recall in the 2021-2022 winter. This is a slight change from the Action Plan in the 2018 IRP, which depended only on Mist Recall. In the 2018 IRP, NWN explained that for short term resource needs, citygate deliveries are common.⁵ In the IRP Update, Staff sent IRs to the Company regarding city gate deliveries. Based on the company's confidential replies, Staff now understands that city gate deliveries are preferred over Mist Recall because SENDOUT modeling shows that **[Begin confidential]** [REDACTED]

[REDACTED]

⁴ Based on a 20-year PVRR.

⁵ NW Natural's 2018 Integrated Resource Plan, page 6.42.

Input and Methodology Updates

Staff reviewed the key input and methodology updates in this IRP Update, and has questions, comments, or recommendations regarding several topics, including the RNG market and project update, avoided costs, and load forecast.

RNG and Hydrogen Projects

Regarding RNG, NW Natural has included an update to its RNG development plans, reporting that it has formed a partnership with BioCarbN, and holds the option to convert biogas from some Tyson Foods facilities to RNG. The Company's first project will be in Lexington, Nebraska. This project will be reviewed in OPUC Docket Nos. UM 2145 and UI 451. Staff is interested in discussing NW Natural's long-term RNG acquisition plans in a general sense as part of the IRP Update process. Specifically, Staff would like to begin a conversation about whether RNG projects located near to NW Natural's load in Oregon provide a reliability and resiliency value that may not be fully considered in the Company's current RNG evaluation methodology. For example, local RNG may provide a buffer to regional shortages of conventional gas and the associated high gas prices or lack of gas availability.

Staff is generally supportive and interested in learning more about NW Natural's plan to engage with Eugene Water and Electric Board (EWEB) and Bonneville Environmental Foundation (BEF) to invest in a power-to-gas methanation pilot.

Power to gas was selected as a part of the decarbonization scenario in NW Natural's 2018 IRP, indicating that it may be a cost-effective way to achieve emissions reductions. Power to gas with methanation is an emerging technology that brings the potential for blending much higher quantities of low-carbon fuel into the distribution system than either RNG or hydrogen. Local RNG supply is limited and the portion of hydrogen that can safely be blended into existing pipelines is also limited. Since methanation generates synthetic methane, which is similar to natural gas, it could be used to add low-carbon gas into existing pipelines in much higher amounts than either local RNG or hydrogen.⁷

Technologies that can reduce emissions while providing a reliable, local source of energy will be key to a robust and diverse energy supply in the region moving forward. The timing seems very appropriate for NW Natural to begin considering a power-to-gas methanation pilot project,

⁶ NW Natural's response to Staff IR 106.

⁷ NW Natural's Third 2018 Integrated Resource Plan Update. page 18.

given that there may be a substantial learning curve for this technology, and that greenhouse gas reduction is likely to be an important part of NW Natural's service moving forward.

Recommendations:

NW Natural should respond in its Reply Comments regarding whether RNG located near to Oregon load may provide reliability and resiliency value that has not yet been considered in the RNG evaluation methodology.

Staff requests that, if NW Natural plans to request any cost recovery for the pilot from ratepayers, the Company should reach out to Staff and stakeholders to begin a conversation about the best way to request approval and/or cost recovery.

Avoided Costs

In the IRP Update, the Company provided new calculations for avoided costs that indicate, depending on the energy end use, a roughly 50 percent increase in total avoided costs over values provided in the 2018 IRP. The Company indicated that these increases in costs are largely attributed to increases in greenhouse gas policy cost and updates to distribution system capacity values.

Staff agrees that the increase in values can be attributed to the new values for greenhouse gas compliance and distribution system costs. Staff has confirmed that greenhouse gas policy assumptions have doubled, resulting in a significant increase across all end uses. Staff finds such an increase to be a reasonable way to address the risks of greenhouse gas policy that is likely to be more aggressive than has been assumed in past IRPs. Distribution costs have also increased by roughly seventy percent, which impacts loads during the peak more than other gas uses.

Staff also notes that commodity prices have decreased, and the risk reduction value has increased. These changes have a smaller impact on the overall value.

Staff thanks the Company for providing updated numbers. Staff will continue to review these numbers and the source of their changes in preparation for Staff's final recommendation on acknowledgement of the avoided costs in this IRP Update and the inclusion of the updated values in Docket No. UM 1893. Staff is especially interested in the changes to distribution values and changes to the risk reduction value.

Staff also notes that the Company is applying the same end use profiles as in the 2018 IRP. Staff reminds the Company of Staff Recommendation No. 6 from the 2018 IRP:

Work with staff to review any proposed end use load profiles that deviate from those used by other independent regional organizations as part of UM 1893 and in their next

IRP filing. The review may potentially involve third parties and additional supporting research.⁸

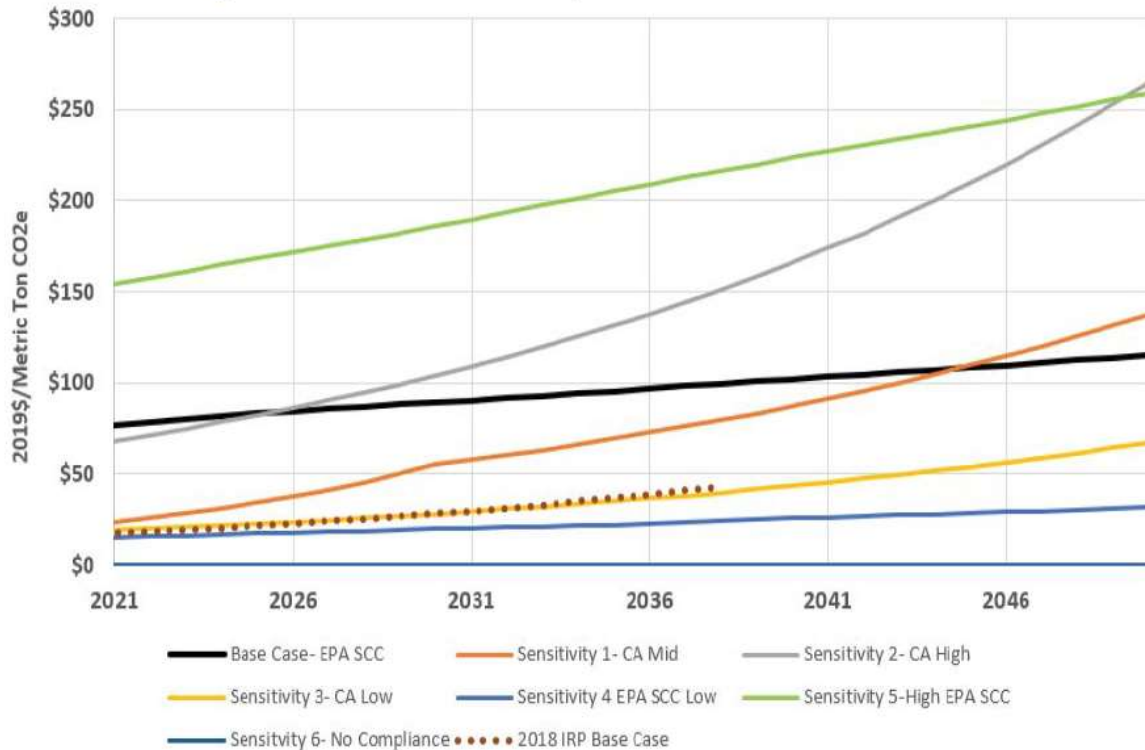
Recommendation:

Staff notes that the load profiles used in this IRP Update have not yet been reviewed in compliance with Order No. 19-073 and that different load profiles are used for the annual calculation of avoided costs in Docket No. UM 1893. Staff suggests that the Company take steps to address this Staff Recommendation before the next IRP is filed.

Greenhouse gas policy assumptions

Staff finds that the increase in greenhouse gas policy cost assumptions in the IRP Update represents an improvement in NW Natural’s consideration of carbon policy risk. The IRP Update utilizes a range of reasonable carbon price assumptions in its carbon risk assessment:

Figure 2: Greenhouse Gas Policy Costs – Base Case and Sensitivities



The base case carbon policy in the IRP Update is the Social Cost of Carbon value provided by the US Environmental Protection Agency (EPA) and the Washington Utilities and Transportation Commission (WUTC). The US EPA’s Interagency Working Group (IWG) social cost of carbon is a

⁸ Order No. 19-073, Appendix A pages 8-9.

standard value that is rapidly becoming a focal point of carbon policy in the US, with the states of New York, Colorado, and Washington among those applying it to state-level policy and/or utility long-term planning. The NW Natural IRP Update considers several variations of the EPA's SCC, as well as low, medium, and high policy scenarios from California's cap and trade program, and the result is a thorough study of a diverse group of possible carbon policies.

Even after NW Natural's updates to its carbon price assumptions, the Company's emissions forecast in this IRP Update falls short of the emissions goals in Oregon's EO 20-04 for 2035 and 2050.⁹ Staff expects that, once the DEQ's CPP rules are finalized, NW Natural will update its long-term plan to be consistent with DEQ's rules. Staff looks forward to the information coming forth from Staff's Natural Gas Fact Finding and the draft DEQ rules being posted on May 25, 2021.

Load Forecast

The Company's most significant load forecasting change in the IRP Update is to forecast future weather with a warming trend for the expected and design day weather. Staff is generally supportive of this change.

The Company changed several of its load forecasting formulas since its initial IRP. Staff reviewed these changes and agrees with the Company that they are each an attempt to produce a more accurate forecast.

Two of Staff's main concerns described in IRP final comments have not been alleviated. First, the Company continues to use multiple interaction terms in its forecast whereas Staff recommends a principle of parsimony. Second, Staff still has significant concerns with the Company's coldest weather day for its peak day load forecasts. The Company's plan to address Staff's concerns in future Technical Working Group (TWG) workshops is acceptable because, as NW Natural explains in response to a Staff IR, the "updated load forecasts are not drivers of the need for the projects in the Action Plan of IRP Update #3."¹⁰ (Although not discussed in detail related to the IRP Update, Staff's other IRP Final Comments load forecasting concerns have also not been alleviated and will be discussed in the future, for example, the blending of Subject Matter Expert and econometric forecasts and the use of industrial sector level forecasts.)

Warming trend in future weather

For the expected and design day forecast, the Company uses data from climate models from the Intergovernmental Panel on Climate Change. The Company uses values from multiple climate models to better capture a wide range of potential climate effects.¹¹

⁹ NW Natural's Third Integrated Resource Plan Update. page 19.

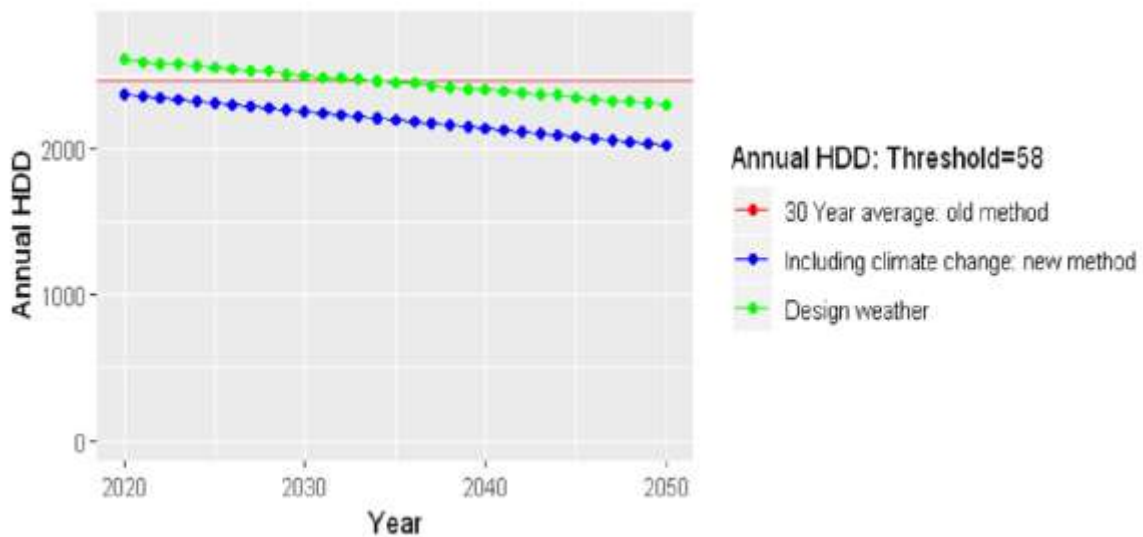
¹⁰ NW Natural's response to Staff IR 120.

¹¹ NW Natural's response to Staff IR 111.

The Company incorporates the weather trend into its expected forecast by selecting a representative year to create a daily shape for the purpose of modeling the dispatch of storage resources. The Company picked 2012 as a representative year because it was close to the median of historic years.¹²

The Company incorporates the climate change trends into its design day forecast. This results in a noticeable warming trend as shown in Figure 1 reproduced from NWN’s IRP Update below:

Figure 1: Annual HDD Over Time - Portland



Staff asked the Company about the use of a 58 degree heating degree day (HDD) threshold and the Company responded that, “the selection of the HDD defining temperature is material in terms of the impact of climate change modeling on load, particularly in the Pacific Northwest as we have many days that have an average of the high and low temperatures in the high 50’s or low 60’s, particularly in the fall and spring” and the Company’s response includes heating threshold values that differ by customer segment (residential versus commercial) and by area location.¹³ Staff is supportive of the Company’s granular approach to modeling weather sensitivity.

Load forecasting formula changes

Staff asked about the changes to the forecast drivers used in the Company’s industrial load forecasts. The Company provided a well-reasoned explanation of the modeling tradeoffs facing the Company, by describing that the previous forecast driver (industrial employment) is

¹² NW Natural’s response to Staff IR 112.

¹³ NW Natural’s response to Staff IR 113.

sensitive to automation where a business has the same output but fewer employees and by describing that Oregon-specific economic variables are not necessarily best since Oregon businesses have significant exports.¹⁴ Staff is satisfied with the Company's rationale to switch to use a new forecast driver (industrial production).

Staff appreciates that the Company provided its IRP forecasts made in 2017 versus the actual 2017-2020 industrial and transport loads.¹⁵ In recent IRP comments for other utilities, Staff has recommended that each Company use cross validation to compare how well its forecasts performed versus actual data in order to inform future forecasting model changes.

The Company described the impact that incorporating forecast changes had on its load. The peak forecast fell about two percent between the IRP and the IRP Update as new inputs were included, including an updated energy efficiency forecast. The fall in the peak forecast meant Mist Recall was not needed.¹⁶

Order 19-073 Staff Recommendation – interaction terms

In the 2018 IRP, Staff explained that the Company used nine interaction terms in its load forecast.¹⁷ Staff recommended that NW Natural instead should follow a forecasting principle of parsimony when selecting load forecasting interaction terms, including them only when they are believed to help explain changes in the load forecast.¹⁸ Staff would again like to emphasize that using multiple interaction terms has a risk of overfitting of the load forecasting models, while Staff's recommendation of a forecasting principle of parsimony can prevent model overfitting.

Order 19-073 Staff Recommendation – peak day weather

In the 2018 IRP, NW Natural changed its capacity standard to focus on meeting peak demand in each gas year with 99 percent certainty, instead of meeting the standard of the coldest day in 30 years. Staff was concerned that this change utilized an unnecessarily long time horizon, which was unnecessary for reliability, and could mask climate trends.¹⁹ Staff recommended a TWG focused on change.²⁰ NWN will host this TWG in June 2021.²¹

In its third IRP Update, the Company made two improvements to its peak day forecast. First, stochastic customer counts are replaced with high and low customer count forecasts which

¹⁴ NW Natural's response to Staff IR 116.

¹⁵ NW Natural's response to Staff IR 115, even without adjusting for weather effects, the actual loads were fairly similar to NWN's IRP forecasts made in 2017.

¹⁶ NW Natural's response to Staff IR 118.

¹⁷ Order No. 19-073 at page 3 of Appendix A.

¹⁹ Order No. 19-073 at page 8 of Appendix A.

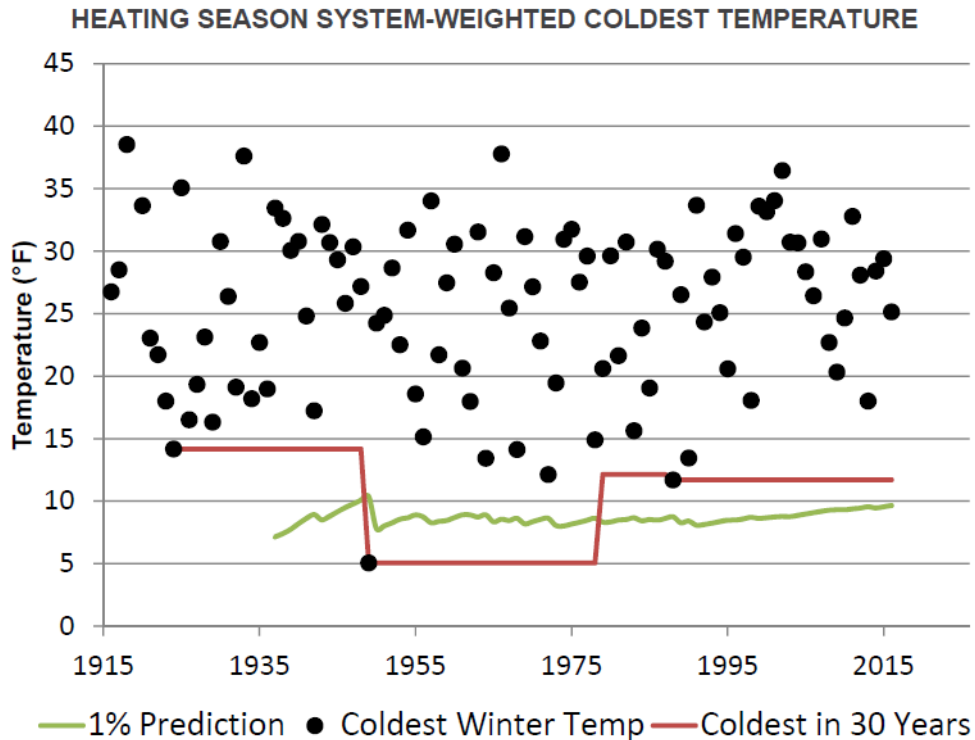
²⁰ NW Natural's response to Staff IR 114.

²¹ *ibid.*

helps ensure that the peak day simulations are focused on the impacts of weather. Second, the Company consistently uses a single weather station in Portland instead of using data from a different site for older weather years.²²

Leading up to the June 2021 TWG, Staff reiterates its concerns. Figure 2 below, reproduced from IRP Page 3.43, shows that the coldest day under the new methodology is above the actual coldest day in 100 years but below the coldest day in the most recent 30 years:

Figure 2: Relative Stability of a Risk-based Planning Standard



Staff’s concern is that the Company is including too cold of a peak day. For instance, in the figure above, the most recent 20 years of data visually would have a very significantly warmer coldest day than the Company’s new 99 percentile approach.

The Company’s methodology described on pages 3.38-3.43 of the IRP appears to relate to a negative binomial distribution of weather. The Company argues that its modeling results in a one percent chance of actual colder weather. However, because the distribution of actual weather is unlikely to match the Company’s modeled weather distribution, Staff prefers using actual coldest weather to model the peak day. Staff looks forward to the upcoming June 2021

²² Ibid.

discussion with the Company to discuss the appropriate use of coldest weather in planning for the peak day.

Moving Forward

NW Natural plans to hold a stakeholder process to discuss with stakeholders how NW Natural should implement DEQ's program in 2021, once draft rules for DEQ's Climate Protection Plan are issued. Staff looks forward to working with the Company during the technical working groups to help the Company explore how to most cost-effectively meet DEQ's requirements.

It is Staff's position that the 2022 IRP should fully consider low-carbon fuel options as well as any infrastructure needed to facilitate their addition to NW Natural's resource portfolio, especially in the case of hydrogen fuel.

Regarding system investments, Staff has requested information from the company regarding a schedule of upcoming expected retirements of system infrastructure. Staff additionally requests that NWN include a section in its next IRP flagging all major expected system retirements/upgrades needed for the next ten years. This information will help facilitate a discussion of changes that may be needed to facilitate higher levels of hydrogen and other low-emissions alternatives on NW Natural's system.

Recommendation:

Staff would like the 2022 IRP to demonstrate that NW Natural is fully considering the implications of a range of potential future hydrogen blends when making distribution infrastructure investments. This should include studying potential issues that could arise under a range of potential future hydrogen blend percentages and adjusting distribution upgrade plans to accommodate a reasonably expected blend of hydrogen in the Company's distribution system moving forward.

Additionally, NW Natural should provide a schedule of upcoming expected retirements of major system infrastructure and a discussion of the potential for replacement with infrastructure that better meets the needs of a low-carbon system, whether through improved hydrogen transport capability, locational energy efficiency, or other technologies.

Conclusion and Recommendations


Staff thanks NW Natural for providing this update regarding its IRP inputs, methodologies, and near-term plans. Staff finds the changes in this Update to be mostly reasonable, and has four recommendations for the Company:

1. NW Natural should respond in its Reply Comments regarding whether RNG located near to Oregon load may provide reliability and resiliency value that has not yet been considered in the RNG evaluation methodology.
2. Staff requests that, if NW Natural plans to request cost recovery for the power to gas methanation pilot from ratepayers, NW Natural should bring the project to the Commission for review through the SB 844 process, or as a pilot project.
3. Staff notes that the efficiency load profiles used in this IRP Update have not yet been reviewed in compliance with Order No. 19-073 and that different load profiles are used for the annual calculation of avoided costs in Docket No. UM 1893. Staff suggests that the Company take steps to address this Staff Recommendation before the next IRP is filed.
4. Staff would like the 2022 IRP to demonstrate that NW Natural is fully considering the implications of a range of potential future hydrogen blends when making distribution infrastructure investments. This should include studying potential issues that could arise under a range of potential future hydrogen blend percentages and adjusting distribution upgrade plans to accommodate a reasonably expected blend of hydrogen in the Company's distribution system moving forward.

Additionally, NW Natural should provide a schedule of upcoming expected retirements of major system infrastructure and a discussion of the potential for replacement with infrastructure that better meets the needs of a low-carbon system, whether through improved hydrogen carrying capability, locational efficiency, or another potential technology.

This concludes Staff's Opening Comments.

Dated at Salem, Oregon, this 14th Day of May, 2021.



Rose Anderson

Senior Economist

Energy Resources and Planning Division

CERTIFICATE OF SERVICE

LC 71

I certify that I have, this day, served the foregoing document upon all parties of record in this proceeding by delivering a copy in person or by mailing a copy properly addressed with first class postage prepaid, or by electronic mail pursuant to OAR 860-001-0180, to the following parties or attorneys of parties.

Dated this 14th day of May, 2021 at Salem, Oregon

/s/ Kay Barnes

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