

**BEFORE THE PUBLIC UTILITY COMMISSION
OF OREGON**

LC 64

In the Matter of

NORTHWEST NATURAL GAS
COMPANY, dba NW NATURAL, 2016

Integrated Resource Plan

Staff Comments

The Public Utility Commission of Oregon Staff (Staff) files these initial comments on Northwest Natural Gas Company's (NWN or Company) 2016 Integrated Resource Plan (IRP or Plan), filed on August 26, 2016. Staff's comments are organized according to subject and address Staff's primary areas of initial focus. Staff continues to evaluate the Company's plan, conduct discovery and will review the participants' comments prior to submitting its Final Comments on December 29, 2016. A final order is expected to follow the Commission Public Meeting on February 21, 2017.

The series of informal technical working group meetings which initiate the IRP process began in January of 2016. The informal process included five technical meetings between January of 2016 and June of 2016.¹ Many participants attended and participated in these technical meetings, including Staff, Washington Utilities and Transportation Commission, Citizens' Utility Board of Oregon, Northwest Industrial Gas Users, Northwest Gas Association, Energy Trust of Oregon, and Northwest Pipeline Corporation.

Following the technical working group meetings, NWN filed a draft IRP on June 28, 2016. Informal comments regarding the draft plan were submitted by some of the technical working group participants in July 2016.

The Action Plan

Resource Additions and Changes

NWN's 2016 IRP Action Plan, 4.1. Joint Multiyear Action Plan on page 1.18 of the Plan, includes the following:

Resource Investments:

1. *Plan to recall 30,000 Dth/day of Mist storage capacity from the interstate storage account effective May 2019 to serve the core customer needs, subject to a review based on an update of the annual load forecast in the summer of 2018.*

¹ Technical working group meetings were held on January 13, 2016, February 10, 2016, March 17, 2016, May 24, 2016, and June 22, 2016, respectively.

2. *Replace or repair, depending on relative cost-effectiveness, the large dehydrator at Mist's Miller Station. Replacement is currently estimated to cost between \$6 million and \$7 million based on estimates obtained from a third-party engineering consulting firm engaged by NWN.*
3. *Proceed with the SE Eugene Reinforcement project to be in service for the 2018/2019 heating season and at a preliminary estimated cost of \$4 million to \$6 million.*

Demand-side resources and environmental actions:

1. *Consistent with methodology in chapter 6, NWN will ensure Energy Trust has sufficient funding to acquire therm savings of 5.1 million therms in 2017 and 5 million therms in 2018 or the amount identified and approved by the Energy Trust Board.*
2. *Work with Energy Trust of Oregon to further scope a geographically targeted DSM pilot via accelerated and/or enhanced offerings ("Targeted DSM" pilot) to measure and quantify the potential of demand-side resources to cost-effectively avoid/delay gas distribution system reinforcement projects in a timely manner and make a Targeted DSM pilot filing with the Oregon Public Utility Commission in late 2017 or early 2018.*
3. *Work with Energy Trust of Oregon to track peak day savings from DSM programs in addition to the typical Energy Trust metric of total annual savings to better understand if the capacity costs projected to be avoided with peak day savings in the DSM savings projection are being saved.*
4. *Investigate the viability of developing a pilot project to reduce upstream emissions of methane and, if viable, NWN will bring this pilot forward for Commission review and approval. The pilot design would test whether reductions can be achieved at a level consistent with the Base Case carbon values incorporated into the IRP and the range of costs for a larger scale effort. If it is determined that the cost to move the market exceeds the carbon values in the IRP, the Company may alternatively consider advancing the work as a project proposal under SB 844.*

NWN's current action plan differs from its previous IRP in structure as it separates the action plan into two parts, which includes a joint plan with proposed activities applicable to both Oregon and Washington, and a second action plan with activities specific to Washington. These action plans can be found in Chapter 1 on pages 1.18 and 1.19.

Staff's comments below address its concerns by subject matter with individual action items in NWN's 2016 Action Plan.

Gas Requirement Forecast

Staff submitted information requests (IRs) to obtain the data used in NWN's econometric forecasting models. Staff issued the IRs to help understand the

assumptions and methodology used by the Company in developing its load forecast. Based upon this review, Staff offers the following observations:

Discussion

Comparisons to NWN's 2014 IRP Forecasting Methodology

Staff's final comments on NWN's 2014 IRP described that, "for each customer class, a single econometric forecast was developed for each state (OR and WA) and then allocated to load. Developing separate econometric forecasts at the load center level would facilitate the incorporation of intrastate regional economic factors into the forecast. This would be particularly useful in Oregon where the Company oversees a variety of geographically distinct load centers."

In both its 2014 and 2016 IRPs, NWN uses load center specific data for its peak day forecasts, but not for its number of customer forecasts.

Staff recommends that the Company explore using load center specific data for its number of customer forecasts. Having said that, Staff finds the changes the Company made to its use-per-customer forecasts reasonable.

In its response to Staff's information requests the Company provided the data files and statistical program code files used to produce its peak day gas requirements forecast in a format that allowed replication of the Company's results on Staff's computers. The Company's statistical code files included comments to describe the operations that each section of the code performed. NWN having made files available upon request which allow replication of their results facilitated Staff's ability to perform detailed analyses.

Commercial Forecasts

The Company forecasts the number of commercial "new construction" customers to predict new construction additions. Models that include load center specific economic data should be explored as a potential improvement. For example, Portland and Eugene have not had identical economic performance, thus including economic variables for Eugene and NWN's other load centers would be expected to improve the accuracy of the commercial new construction model.

Industrial Forecasts

The Company uses internal information obtained from account managers to develop its forecasts of industrial load. The Company forecasts industrial load in total and allocates this to load centers and customer types, including sales versus transportation. While the Company could perform its forecasts at a more granular level, Staff finds its current approach reasonable because it can capture general trends in customers switching between sales and transportation schedules.

Staff recommends that the Company describe in its Reply Comments how it uses transportation prices to determine if industrial customers will continue to be on firm sales service or will switch to firm transportation service.

Emerging Markets Forecasts

In the emerging markets base case the Company forecasts that five new combined heat and power (CHP) facilities will be in service next year.

Staff recommends that the Company update in its Reply Comments its CHP assumption based on proceedings in UM 1744.

The Company's response to Staff information requests indicate that in the base case 4% of emerging market's annual energy usage would be from firm sales, while the remaining 96% would be firm transportation, which is not considered for planning purposes.

Staff recommends NWN closely follow whether its 4 percent assumption matches experience and update it as necessary.

Peak Day Forecasts

In its 2016 IRP, NWN made many changes that are likely to improve the Company's ability to explain variations in historical peak usage. For example the Company now includes variables to capture the impact of wind speed, precipitation, solar radiation and day of week on peak day usage. The Company finds that day of week impacts peak day usage such that weekends and Fridays have lower usage than Monday through Thursday. The Company then computes its planning period peak day forecast under the assumption that the coldest temperature and a Monday through Thursday day of week will occur simultaneously. Rather than assuming a repeat of the highest heating requirement day in 30 years, the Company is creating a worst-case scenario by combining factors that did not actually occur on the historical highest heating requirement day.

Staff recommends that the Company explore in its Reply Comments whether this approach overestimates the planning period peak day requirement.

Residential Energy Forecast

NWN forecasts residential use by separately forecasting the number of customers and use per customer. The number of customer forecast has three components, new construction, conversion, and losses. NWN finds a strong relationship between new construction customers and housing starts. NWN estimates an econometric model of new construction customers using housing starts and change of employment. NWN forecast of new construction customers appears reasonable. NWN estimates an econometric model of conversion customers using a trend variable. NWN allows the trend to differ after 2000 to account for technological change. Customer losses are forecasted as the average customer loss rate between 2010 and 2014. NWN forecasts customers on a state basis, and allocates the forecasted customers to load centers based on historic load center growth rates.

NWN forecasts use per customer separately for four residential customer groups: existing, conversion, single family new construction, and multifamily new construction. Existing use per customer is forecasted separately by load center. The remaining three

groups are forecasted by state. NWN estimates an econometric model of use per customer per day using degree days per day as an explanatory variable. NWN approximates a nonlinear heat response with a spline model. This segments the heat response coefficient estimate into the parts depending on the magnitude of the degree day variable.

Conclusion

Annual residential energy use is forecasted by multiplying the customer forecast and use per customer separately for each forecast group, and aggregating to the system level. Staff's preliminary evaluation finds that NWN's current approach to forecasting residential energy use is reasonable. However, Staff has a few minor ongoing concerns. First, NWN's use of a four year average for customer losses is relatively undocumented, and may not accurately represent losses on an ongoing basis. Second, NWN's method of allocating growth to load centers may be overestimating growth in Coos County. Coos County has elevated growth rates because it is a recently established service territory. Growth rates in the future, particularly for conversion customers, will likely be lower than historic growth rates. Staff intends to continue evaluating the statistical results of the Company's econometric models.

Supply-Side Resources

NWN's 2016 IRP includes the following action item related to its Supply-Side Resources in 4. Multiyear Action Plan, 4.1 Joint Multiyear Action Plan, *Resource Investments*:

2. Replace or repair, depending on relative cost-effectiveness, the large dehydrator at Mist's Miller Station. Replacement is currently estimated to cost between \$6 million and \$7 million based on estimates obtained from a third-party engineering consulting firm engaged by NWN.

Discussion

NWN has demonstrated that it has a comprehensive and robust supply planning process in its 2016 IRP, to ensure reliable service to its sales customers.

NWN's current supply portfolio includes:

- Gas supply contracts or spot gas;
- Storage (both underground, and above-ground tanks); and
- Recall Agreements (three recall agreements currently exist and are shown in Table 3.5, on page 3.10 of the Plan).

The Company's supply contracts for the 2015-2016 heating season are shown in Figure 3.1, on page 3.4 of the Plan.

NWN utilizes four different storage facilities in its current resource stack, including:

- Mist (underground storage);
- Jackson Prairie (underground storage);
- Gasco (Liquefied natural gas (LNG) storage); and
- Newport (LNG storage)

The Company's firm storage resources as of 2015 are shown in Table 3.3, on page 3.8 of its Plan.

NWN's Mist Storage is a valuable resource for its customers. Mist recall has been and continues to be a least cost resource, delaying the need to acquire more expensive alternative options that would otherwise be needed to serve firm customers. This facility has been in operation for more than 25 years and requires replacement or repair of the large dehydrator at Mist's Miller Station. NWN will retain a specialized consultant, within the next year, to determine if this piece of equipment can be repaired or if it needs to be replaced. The Company will analyze the costs and other tradeoffs of repair versus replacement. Current estimates for replacing the large dehydrator are between \$6 million and \$7 million. This is an action item in NWN's 2016 Action Plan.

NWN holds firm transportation contracts for capacity on the following interstate pipeline systems:

- Northwest Pipeline Corporation (NWP);
- Gas Transmission Northwest (GTN);
- TransCanada's system in southeastern British Columbia (Foothills);
- TransCanada's Alberta system (NGTL or Nova);
- Westcoast Energy Inc. (WEI); and
- Fortis BC Inc.'s Southern Crossing Pipeline (SCP).

The Company's firm capacity transportation is shown in Table 3.2, on page 3.7 of its 2016 IRP. All of NWN's supplies must flow on NWP except for a small amount of locally produced natural gas from the Mist field. NWP is fully subscribed at this time.

NWN is addressing immediate capacity deficiencies using segmented capacity² as a resource. This is one of multiple resources described in Chapter 3 of its 2016 IRP to address capacity deficiencies. New load impacts the availability of the use of segmented capacity and is assumed to be available only until November of 2020.

NWN estimates that the Northwest region will need to add more gas infrastructure within the next 5-10 years to meet increasing demand with large drivers such as power generation and industrial sectors. The Company evaluated the potential acquisition of interstate pipeline capacity in several different forms, which it describes in detail on pages 3.32 and 3.33 of its Plan. Of the various potential pipeline projects evaluated, NWN stated that the NWP Sumas Expansion is the only option considered flexible and simple enough to be available as early as November 2019.

The Commission received comments from Columbia Riverkeeper with questions and concerns regarding a potential Methanol Project Resource sharing Agreement, described on page 3.38 of NWN's 2016 IRP. Columbia Riverkeeper raises concerns about the fundamental impact such an agreement might have on the gas supply and demand balance in the Northwest region. The comments have been added to Docket No. LC 64, and continue to be investigated by Staff in its review of NWN's 2016 IRP.

² Segmented capacity is explained in detail on pages 3.13 – 3.16 of NWN's 2016 IRP (LC 64).

Conclusion

Staff continues to review NWN's Supply-Side Resource Planning, including the concerns raised in comments received by Columbia Riverkeeper. However, at this time Staff does recognize the necessity of the near-term required maintenance at Mist's Miller Station. Also, Staff recognizes NWN's vigilant review and cost analysis of potential regional pipeline projects, as new information on which projects are moving forward becomes available, and encourages appropriate updates of its findings with IRP stakeholders.

Energy Policies and Environmental Considerations

NWN's 2016 IRP includes the following action item related to its Energy Policies and Environmental Considerations in 4. Multiyear Action Plan, 4.1 Joint Multiyear Action Plan, *Demand-side resources and environmental actions*:

4. Investigate the viability of developing a pilot project to reduce upstream emissions of methane and, if viable, NWN will bring this pilot forward for Commission review and approval. The pilot design test whether reductions can be achieved at a level consistent with the Base Carbon values incorporated into the IRP and the range of costs for a larger scale effort. If it is determined that the cost to move the market exceeds the carbon values in the IRP, the Company may alternatively consider advancing the work as a project proposal under SB 844.

Discussion

Staff commends NWN for its sustainability efforts and its willingness to devote resources to addressing climate change on behalf of customers. Staff is impressed with NWN's commitment to addressing climate change, "NWN takes the issue of climate change seriously, is working to limit emissions from our own operations and is partnering with our customers to limit the impact of their use of natural gas. To the extent possible we want to deploy natural gas in a manner and for end uses that help drive down overall emissions."³

Chapter 4 of NWN's IRP shows not only an excellent understanding and commitment to tracking carbon policy which may affect the Company, its customers, Oregonians and natural gas markets, but also demonstrates NWN's long commitment, as a natural gas LDC, to the environment and environmental justice stewardship.

However, NWN notes through the totality of the programs and policies reviewed in its 2016 IRP in Chapter 4 that neither the State of Oregon nor the federal government directly or through agency action is currently requiring the Company to take any action to lower its greenhouse gas emissions or the greenhouse gas emissions of its end users. "Currently, there is no federal regulation addressing emission from the

³ NWN IRP page 4.14

distribution sector.”⁴ Staff is sympathetic to NWN’s frustrated intentions where voluntary action is currently the only market or regulatory signal to undertake greenhouse gas emission reductions. Staff highlights the success of NWN’s customer program Smart Energy, which has not only worked to lower carbon emission and develop sources of renewable natural gas, but has also supported Northwest farmers and businesses. Through partnership with the Commission and customers, NWN has also undertaken a system-wide effort to change out older pipe to become “among the tightest distribution companies in the country.”⁵ Not only did this investment save gas by addressing potential leakage, addressing safety, and reduced carbon emissions, but it may also have a long term benefit of reducing regulatory risk.

Staff is aware that natural gas production accounts for 30 percent of the gas industry’s methane emissions. As NWN points out in its IRP, the US Environmental Protection Agency (EPA) has, this year, undertaken regulatory action to address greenhouse emission from the oil and natural gas industry. The EPA’s new regulations apply to equipment at natural gas transmission compressor stations to limit emissions from compressors, pneumatic controllers and pneumatic pumps.

NWN’s concern over methane emission is warranted as methane is an extremely potent greenhouse gas. The global warming potential of methane emission is far greater than carbon itself. While CO₂ persists in the atmosphere for centuries, or even millennia, methane warms the planet for a decade or two before decaying to CO₂. The Global Warming Potential (GWP) metric was developed to allow comparisons of the global warming impacts of different gases CH₄ emitted today lasts about a decade on average, which is a much shorter period of time than CO₂. However, CH₄ also absorbs much more energy than CO₂. The net effect of the shorter lifetime and higher energy absorption is that methane warms the planet by 86 times as much as CO₂, according to the Intergovernmental Panel on Climate Change (IPCC). Additionally, there have been arguments before the IPCC that Methane may be more detrimental than the current metrics account for. Some policy makers are now arguing that the current accounting method for GWP stretches out methane’s warming impacts over a century, which makes the gas appear more benign than it is.

Recommendation

As the United States has become a world leader in natural gas production and as the EPA has taken action to address wellhead leakage, coupled with NWN’s progressive stance to address its corporate carbon footprint, Staff understands why the Company would propose an action item to allow the company to explore upstream methane reduction. However, as NWN notes in its IRP, current federal action “applies to large emission sources and to emission sources upstream of the point of custody transfer at the citygate. It’s unlikely that a source within the NWN distribution system would fall within the threshold.”⁶

⁴ NWN IRP page 4.6

⁵ NWN IRP page 4.15

⁶ NWN IRP page 4.5

Ultimately, Staff does not believe the IRP is the proper forum for program development. Staff notes this without prejudice as to the merits of the program. The IRP has been a forum for the utility to share with the Commission its plans and for the Commission and stakeholders to offer guidance on those plans. It would strain current practice and precedence to forecast tacit approval of program within the context of the IRP. Of immediate concern to Staff is the lack of detail provided by NWN regarding the program for which it seeks or might seek acknowledgement.

Therefore, Staff recommends NWN file for program approval in a separate proceeding. This will give Staff, the Commission and stakeholders the opportunity to better understand the program envisioned by NWN before resources are committed. Therefore, *Demand-side resources and environmental actions* Item 4 is not appropriate for the Action Plan or for acknowledgement at this point in time.

Avoided Costs

Between its past two IRP's NWN updated its avoided cost (AC) methodology by adding four new elements to the calculation in its 2016 IRP. These new elements cover the following:

- Financial Risk: Hedge value of Demand Side Management (DSM)
- Environmental Risk: Future, state carbon policy
- Infrastructure Risk: Peak day supply capacity resources
- Infrastructure Risk: Distribution capacity

These changes added value to many DSM and Energy Efficiency (EE) measures. Using the 2016 IRP data the new elements increased avoided costs by the following percentages:

- Residential Space Heating: 72 percent
- Commercial Space Heating: 67 percent
- All Base Load Uses: 26 percent
- Interruptible Loads: 19 percent

The overall effect of including the new elements is that they compensate for low natural gas prices in the near-and long-term. Absent these additions, NWN's avoided costs would have dropped over 23 percent in this IRP, on a 20 year levelized basis. This would have impacted long-term DSM efforts by Energy Trust in Oregon and Washington.

Discussion

Staff appreciates NWN's leadership on this issue and believes the Company should be recognized for its efforts. The added elements are a good attempt to better reflect the actual costs avoided by DSM activities.

While Staff is open to NWN's proposed changes to AC methodology, Staff is uncertain if an IRP filing is the appropriate forum in which to effect such large changes to the methodology.

Staff recommends the Commission open a docket to handle the ongoing issues related to the utilities' avoided cost methodologies, and the process by which their EE avoided costs are updated.

The inputs into the new element "supply capacity value" are based on Energy Trust's EE activities fully avoiding the construction of the new North Mist II storage facility in 2026. Staff needs clarification from NWN as to the amount of additional EE that must be installed on its system, given projected rates of growth, for Energy Trust's EE activities to avoid the construction of this new storage capacity in less than 10 years.

To this end, Staff intends to continue to work with NWN and other stakeholders to determine if the type and amount of additional, cost-effective EE exist in Energy Trust long-term projections. Also, Staff will need to ascertain whether Energy Trust's current level of acquisition activities put Energy Trust on a trajectory to avoid the construction of this new storage capacity by 2026, given the IRP's growth projections. NWN's costs for Energy Trust are a pass through to ratepayers. As such, Staff, NWN and stakeholders must work to avoid the unwanted result where NWN ratepayers pay for EE services to avoid the construction of North Mist II but the storage facility is still built.

The Company believes that the value of an energy efficiency measure's peak reduction is only to be found in its percent of reduction of load on a peak day. The Company asserts that measures such as water heating and savings from interruptible customers avoid little to zero supply capacity costs associated with a peak day. However, a natural gas grid is not instantaneous. Gas can be stored within the system. Less energy demanded overall requires fewer overall injections and withdrawals from the grid's storage, in theory freeing up capacity during the peak. Staff is still unclear whether the Company's methodology could be underestimating the overall peak capacity benefit of these measures.

Current Energy Trust goals and performance metrics are not orientated around peak-capacity reductions. While they are an element of any given EE measures, cost-effectiveness calculation, peak-capacity reductions are not a specific goal. Given the value NWN places on peak-capacity reduction embedded within these revised AC calculations, it is still to be determined if Staff and stakeholders should work with Energy Trust to develop peak-capacity goals.

In much of its work behind the scenes and with customers, Energy Trust uses a weighted average blend of avoided costs for all gas measures across all three gas utilities served Energy Trust. NWN comprises approximately 80 percent of Energy Trust's gas customer base. Given this, Staff will need to continue to work with stakeholders to determine what conversations NWN and Energy Trust have had with Cascade and Avista about the potential spillovers of NWN higher avoided costs. Also, Staff seeks clarification about whether Energy Trust is already applying this new methodology in its 2017 incentives and other calculations, or whether it is intended only for planning purposes.

While carbon risks and costs will vary by organization they are not necessarily specific to a utility territory. This raises the question as to what precedent NWN is setting for all Oregon utilities in explicitly building in a carbon price into its avoided costs. A determination will need to be made regarding whether NWN's approach that adopts a carbon cost in the avoided cost methodology is in line with Commission Orders 07-002 and 08-339.

Conclusion

At this stage of the investigation into NWN's 2016 IRP, Staff will continue to work with stakeholders to address the issues raised regarding NWN's avoided cost methodology, and will discuss this topic further in Staff's Final Comments.

Demand-Side Management

In NWN's 2016 IRP, due to the following several factors Demand Side Management (DSM) savings projections are higher than in the 2014 IRP:

- Increases in Avoided Costs
- Improved modeling software at Energy Trust
- Inclusion of new measures, including emerging technology, in the forecast
- Improved market insights

Figure 6.15, on page 6.17 of the IRP, graphically captures this difference and is worth reviewing.

Discussion

NWN's Oregon "achievable potential" detailed in Table 6.1 does not match its Oregon "achievable potential" in Figure 6.3 on the following page.

Staff requests the Company to provide in its Reply Comments an explanation of this difference.

Staff further requests the Company to state whether it meant for the terms "conventional" and "commercially available" to be used synonymously on page 6.10.

Staff further requests the Company to explain Northwest Energy Efficiency Alliance's (NEEA) new activities in gas market transformation can be characterized in terms of sectors being impacted and potential future savings and given the technologies NEEA chooses to focus on, if they have any impact on NWN peak-capacity.

In Figure 6.13, Staff is uncertain whether the space heating savings projections will be enough to avoid the construction of North Mist II by 2026, given current growth projections.

Referring to the discussion on page 6.19, Staff requests NWN to provide in its Reply Comments the percentages of Energy Trust's 2015 NW residential, commercial and industrial savings, which resulted from energy efficiency measures that have an

exception. Staff further requests the Company explain what impact the change in Avoided Cost for the 2016 IRP will have on these measure's benefit cost ratios.

On page 6.20 NWN claims to have "decoupled" its low-income energy efficiency program from federal programs and funding. Due to concerns about ratepayer equity, given NWN's high goals for low-income home participation over the next three years (page 6.21), Staff intends to discuss with NWN the parameters around their low-income program.

Staff agrees with the Action Item on page 6.23. However, if the avoided cost methodology or the inputs change, NWN and Energy Trust should be allowed to update their savings projections.

Staff believes that NWN's request to conduct a targeted DSM pilot is good. Staff supports Commission acknowledgement of this request and appreciates NWN's proposed approach of filing a pilot proposal with the Commission due to the innovative and novel nature of targeted DSM, and also because of past experience with project selection.

The South Salem pilot project

Per Commission direction from its last IRP, NWN identified a needed capacity upgrade in South Salem that might be able to be avoided/delayed using accelerated/targeted DSM in the area. NWN proposed a South Salem capacity deferral project pilot. Somewhat abruptly, NWN canceled the project in 2015. NWN stated the capacity was no longer needed. There were several reasons for the cancellation, but one was a forecast error by the Company. Staff notes that if the Commission had allowed NWN to install the additional metering proposed within this IRP for the South Salem project, ratepayers would have incurred unnecessary costs and Energy Trust may have overspent on accelerated/targeted DSM acquisition.

Distribution System Planning

NWN's 2016 IRP includes the following action item related to its Distribution System Planning in 4. Multiyear Action Plan, 4.1 Joint Multiyear Action Plan, *Resource Investments*:

3. *Proceed with the SE Eugene Reinforcement project to be in service for the 2018/2019 heating season and at a preliminary estimated cost of \$4 million to \$6 million.*

Discussion

NWN's distribution system is described on page 7.1 of its Plan. It consists of approximately 14 thousand miles of distribution mains, of which approximately 87 percent are in Oregon and the remaining 13 percent are in Washington. In Oregon there are 42 gate stations and approximately 990 regulator stations. In Washington there are 15 gate stations and approximately 75 district regulator stations. The

Company also maintains other distribution equipment⁷ for short-term and localized use in support of cold weather operations or while conducting pipeline maintenance procedures.

NWN's planning process requires forecasting local growth in peak hour demand, determining potential distribution system constraints, analyzing alternative potential solutions, and assessing the costs of each viable alternative.

NWN has developed a new approach to distribution system planning. The Company describes its new approach on pages 7.2 and 7.3 of its 2016 IRP. It is explained as providing a more forward-looking emphasis, versus the previous approach, incorporating specific IRP-related models such as growth, customer demand, and design weather projections into the system performance models.

The Company's new distribution planning approach includes documentation of system modeling and modeling results, an initial route selection, an associated high-level cost estimate, and an analysis of alternatives including the possibility of customer-specific geographically focused interruptibility agreements.

NWN identifies and describes two areas requiring distribution system reinforcements in its Plan. One of the reinforcement projects will include construction of approximately 2.5 miles of an 8-inch high-pressure pipeline connecting an existing high-pressure facility with the distribution system in the area projected to experience low pressure on a peak hour, in SE Eugene. This project has a cost estimate of \$4 million to \$6 million, with an associated \$10 million of present value of revenue requirements. Construction on this project is planned for 2018. This is an action item in NWN's 2016 IRP.

NWN analyzed an alternative to the SE Eugene reinforcement project that resulted in a much higher cost estimate by comparison. The higher cost alternative is described on page 7.11 or the Company's Plan.

Conclusion

While Staff continues to review NWN's overall distribution system planning, Staff views the Company's enhanced distribution planning as positive. Staff earlier provided on page 4 of these Comments its conclusions about the Company's gas requirement forecast methodology that impacts distribution planning specifically regarding peak day forecasts.

Linear Programming and the Company's Resource Choices

NWN's 2016 IRP includes the following action item related to its Linear Programming and the Company's Resource Choices in 4. Multiyear Action Plan, 4.1 Joint Multiyear Action Plan, *Resource Investments*:

⁷ NWN has two large compressed natural gas (CNG) trailers each rated at 1,000 therm capacity; a liquefied natural gas trailer rated at 8,500 therm capacity, and assorted small CNG trailers rated below 100 therm capacity.

1. *Plan to recall 30,000 Dth/day of Mist storage capacity from the interstate storage account effective May 2019 to serve the core customer needs, subject to a review based on an update of the annual load forecast in the summer of 2018.*

Discussion

Using a gas supply and optimization software called Sendout, NWN uses linear programming to integrate the significant planning components and to generate and evaluate long-term resource plans. The Company describes the objective function of the linear programming in Sendout as, “seeks to minimize system costs associated with meeting daily load subject to capacity constraints. The resource mix optimization module selects the least-cost resources to meet load based on the associated fixed and variable costs of the resource. The Monte Carlo module provides risk planning analysis around hundreds of weather and price simulations. This allows portfolios to be evaluated from a probabilistic standpoint.”

NWN shows Future Resource and Portfolio Options in Table 8.1, on page 8.3 of its Plan, which includes multiple resources and descriptions of each and differentiates between resources that can be chosen by the Company and those that are beyond its control (i.e. certain pipeline projects moving forward. Table 8.2 depicts a Future Resource Comparison, including the cost, size, type, and supply location.

Scenarios modeled by NWN are described on pages 8.5 – 8.7 of its Plan. Deficiencies are displayed in Figures 8.1 and 8.2 in meeting customer demand over the planning horizon. Table 8.4, on page 8.8 illustrates Cost of Resource Portfolios with Base Load Growth for scenarios 1 – 4, which include:

- Scenario 1 – No regional Pipeline Projects
- Scenario 2 – Jordon Cove LNG exports with Pacific Connector Pipeline
- Scenario 3 – Trail West Pipeline is Built
- Scenario 4 – Sumas Expansion (Regional Project) is Built

NWN provides a description of its portfolio results under base load growth scenarios, alternative load growth scenarios, and with early interstate pipeline build dates on pages 8.8 – 8.14 of its Plan.

Conclusions

Staff continues to review NWN’s resource choices considering the vast number of inputs and assumptions; Staff would like to recognize NWN for having provided updates to IRP stakeholders throughout its last IRP process as new analysis and results became available. At this time, Staff does not note any initial concerns. Staff believes it is critical to emphasize the importance of the Company’s regular IRP updates as well as out of cycle updates as a result of unknown future resource options.

Stochastic Supply Resource Risk Analysis

Discussion

With regard to the Company’s Stochastic Supply Resource Risk Analysis, in NWN’s 2016 IRP the Company did not use stochastic methodologies to aid its expansion

decision process, and possibly did not need to. Staff understands that this is partly because the Mist Recall capacity resource expansion option is clearly a superior solution. Instead, the subject chapter was put forth as a trial exercise in working with those methodologies.

Staff submitted information requests to NWN that are still pending. Staff continues to review the Company's IRP to determine whether the Monte Carlo outputs were reasonable. Also, Staff's ongoing evaluation is seeking clarification about whether the Company intends to use the stochastic mechanisms for their intended purpose, i.e., to enable risk distinctions among candidate portfolios.

Staff will provide additional input about the Company's Stochastic Supply Resource Risk Analysis in its Final Comments.

Conclusion

Staff appreciates the amount of work that has gone into the completion of NWN's 2016 IRP, the tremendous time and effort that has been required throughout the process, and the Company's ongoing willingness to work with stakeholders.

This concludes Staff's comments.

Dated at Salem, Oregon, this 3rd day of November, 2016.



Lisa Gorsuch
Senior Utility Analyst
Energy Resources and Planning Division