BEFORE THE WASHINGTON
UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of Cascade Natural Gas Corporation 2023 Integrated Resource Plan	**DOCKET UG-220131**

COMMISSION STAFF COMMENTS REGARDING 2023 NATURAL GAS INTEGRATED RESOURCE PLAN RCW 80.01.040 and RCW 80.04.160 WAC 480-90-238

April 28, 2023

Contents

Introduction

Background

WAC 480-90-238 requires each natural gas utility regulated by the Commission to develop an integrated resource plan (IRP or plan), describing the mix of natural gas supply and conservation selected to "meet current and future needs at the lowest reasonable cost to the utility and its ratepayers."[1] In preparing an IRP, utilities are required to consider changes and trends in energy markets, resource costs, state and federal regulatory requirements, and other shifts in the political and market landscape. The rule requires that each investor-owned utility (IOU) conduct a comprehensive analysis of the costs and benefits. The intent is for each IOU to develop a strategic approach that fits its unique situation, while minimizing risks and costs for the company and its ratepayers.

Executive Summary

Summary

While some positive changes are noted, Staff finds the final analysis in the document does not adequately address the requirements of WAC 480-90-238. In the months leading up to the final filing, Staff met with the Company on several occasions to discuss these issues and identified them in draft comments. Cascade responded to some of Staff's concerns during the advisory group process and drafting of the IRP. However, this ongoing voluntary compliance did not assuage all of Staff's concerns. Staff notes Cascade's demand forecast does not account for changing building codes (current public policy), or consumer responses to changing prices. Additionally, Staff has questions about Cascade's strategy for compliance with the Climate Commitment Act, namely the Company's reliance on Price Ceiling Units. Further, Cascade does not include Renewable Natural Gas (RNG) as a compliance resource to reduce Greenhouse Gas (GHG) emissions. This is significant because gas companies are required by WAC to assess commercially available nonconventional gas supplies and gas companies are required to plan to meet customer demand at the lowest reasonable cost.[2] As will be cited and discussed at greater length in Staff Analysis, Cascade **did not:**

- WAC 480-90-238(3)(g),[3]
    - consider Renewable Natural Gas as part of its lowest reasonable cost analysis.

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[1] *See* WAC 480-90-238(2)(a).

[2] WAC 480-90-238(3)(c) &(g) "(3) Content. At a minimum, integrated resource plans must include: (c) An assessment of conventional and commercially available nonconventional gas supplies.... (g) The integration of the demand forecasts and resource evaluations into a long-range (e.g., at least ten years; longer if appropriate to the life of the resources considered) integrated resource plan describing the mix of resources that is designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers."

[3] (g) The integration of the demand forecasts and resource evaluations into a long-range ... integrated resource plan describing the mix of resources that is designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers.

  - consider state building codes and statutes relevant to public policies regarding resource preferences adopted by Washington state such as RCW 19.27A.020(2)(a) and RCW 19.27A.160.[4]
  - substantively analyze the economic risks imposed on ratepayers due to compliance with the Climate Commitment Act or evolving building codes.
  - consider the effects of hydrogen-blended fuels on system operations.[5]
- WAC 480-90-238(3)(a)[6]
  - consider the impacts of Climate Commitment Act compliance on the price competitiveness of their services.
- WAC 480-90-238(3)(c)[7]
  - consider Renewable Natural Gas for Climate Commitment Action compliance nor as part of a lowest reasonable cost portfolio.
- WAC 480-90-238(3)(d)[8]
  - consider storage of hydrogen or hydrogen-blended fuels.
- WAC 480-90-238(3)(e)[9]
  - consider distribution and transmission system capability, reliability, and safety for hydrogen or hydrogen-blended fuels.

Staff recommends the Commission direct Cascade to file a comprehensive, detailed work plan within the next two months to begin working with Staff and interested parties earlier in the planning process to ensure that the recommendations contained in Staff comments are incorporated into the 2025 IRP.

Further, Cascade plans to expand capacity in Eastern Oregon, (which includes Washington Customers in Walla Walla) by contracting additional capacity from Gas Transmission Northwest (GTN) to take advantage of the GTN Xpress capacity expansion project. The Commission previously acknowledged Cascade's projected demand shortfall and need for additional capacity in 2018. However, given the changed legal landscape, it is no longer clear to Staff that Cascade's analysis demonstrating the analysis of the prudency of the expanded capacity resource is either adequate or accurate. Staff's analysis will be discussed at length below.

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[4] WAC 480-90-238(2)(b) ""Lowest reasonable cost" means the lowest cost mix of resources determined through a detailed and consistent analysis of … public policies regarding resource preference adopted by Washington state or the federal government,"

[5] (b) "Lowest reasonable cost" means the lowest cost mix of resources determined through a detailed and consistent analysis of ... resource effect on system operations...

[6] (a) A range of forecasts of future natural gas demand in firm and interruptible markets for each customer class that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type, and efficiency of natural gas end-uses.

[7] (c) An assessment of conventional and commercially available nonconventional gas supplies.

[8] (d) An assessment of opportunities for using company-owned or contracted storage.

[9] (e) An assessment of pipeline transmission capability and reliability and opportunities for additional pipeline transmission resources.

Major Staff Concerns

While Staff provides numerous recommendations in response to Cascade's IRP, the central and principal concerns for Staff are the (1) Demand Forecast, and (2) CCA analysis. These two components are the keystones of the IRP. The central question of the IRP document is to "meet current and future needs at the lowest reasonable cost to the utility and its ratepayers."[10] The demand forecast defines the need and the CCA drives much of the future cost analysis.

As will be explained in further detail below, Cascade notes that growth in customer counts drives the demand forecast. Staff finds that Cascade does not consider the impact of building codes and building code statutes that will significantly impact customer counts. Recent building code changes are substantially reducing the ability of customers to install natural gas furnaces in some new buildings. By statutory mandate, these restrictions should continue to tighten in the future. Further, the State Building Code Council has a statutory goal of reducing emissions from fossil fuels in new buildings to zero by 2031. Combined, Staff finds these statutes and code changes should result in zero customer growth by 2031. After which time, the natural rate of building stock attrition should consistently decrease customer counts. These clear statutory bounds on customer counts contrast sharply with Cascade's assumptions about demand growth every year indefinitely into the future.

As will be discussed at greater length below, Staff identified significant issues with Cascade's limited analysis of the CCA. The Company bears additional costs through the requirement to purchase emissions allowances or other compliance resources. Previously, gas utilities typically only had to analyze the lowest reasonable cost between natural gas and conservation. In 2023, gas utilities are required to assess the lowest reasonable cost with regards to natural gas, free allowances, auctioned allowances, offsets, RNG, various green synthetic fuels, as well as penalties for non-compliance. Staff notes that Cascade does not consider RNG, limitations on the number of allowances sold at auction, nor problems with relying upon Price Ceiling Units. Staff finds that failing to include these compliance resources and limitations in its analysis makes Cascade's lowest reasonable cost analysis inadequate. The purpose of an IRP is to examine a range of resources and forecasts of future natural gas demand in order to develop a "short-term plan outlining the specific actions to be taken by the utility in implementing the long-range integrated resource plan during the two years following submission.[11]"

The IRP lacks an accurate demand forecast and CCA analysis, which introduces risk into planning of current or potential acquisition(s) of resources. The regulatory landscape has shifted dramatically since the last IRP in 2020. These changes have large implications for ratepayers, and it is imperative that gas utilities conduct accurate analysis now so that foreseeable harm can be avoided.

[10] WAC 480-90-238(2)(a)
[11] WAC 480-90-238(3)(h)

Recommendations

Due to the deficiencies noted above, **Staff recommends the Commission direct Cascade to file a comprehensive, detailed work plan within the next two months to begin working with Staff and parties earlier in the planning process to ensure that the recommendations contained in Staff comments are incorporated into the 2025 IRP. Staff notes that addressing all of Staff's recommendations is a considerable amount of work that might stress the limitations of a normal IRP technical advisory timeline. Therefore, Staff is requesting an earlier start and longer work time to collaborate with Cascade to bring the Company into full compliance.** Staff includes recommendations throughout Staff comments in **bold**. These comments are intended to bring Cascade into compliance and improve the quality of the analysis with respect to current Washington public policies more generally. These recommendations are also summarized at the end of Staff comments for ease of reference.

Key Components of 2023 IRP and Comparison to Previous Plan

Staff Acknowledgement of Rapidly Changing Regulatory Landscape

The Company has faced considerable changes in the gas utility regulatory landscape in the last two years, including:

- The Climate Commitment Act introduced a cap and invest program to reduce greenhouse gas emissions.
- Upstream and distribution system emissions measurement and leak mitigation statutes.
- Building code changes.
- Growing awareness and imperatives regarding utility system equity, especially as embodied in the Cascade General Rate Case final order.

Further, Cascade's IRP differs considerably from their previous filing. Staff acknowledges that the Company has put forth significant effort in the development of this IRP. The Company was responsive to Staff's request to discuss issues throughout the development of the IRP during advisory group meetings, and met with staff to better understand Staff's specific areas of concerns. Staff also highlights that Cascade has advanced the IRP in the following areas, and commends the Company on its analysis and response to feedback from interested persons and parties on the following topics:

- Analysis related to replacing the price regressor with an income regressor in an attempt to better capture customer behavior;
- Including climate change in Heating Degree Day analysis
- Updating its IRP website to improve accessibility.
- Demonstrating progress toward providing Renewable Natural Gas

Staff Analysis

Demand Growth

Despite significant changes in the policy landscape, Cascade's demand forecast changed only mildly between the 2020 and 2023 IRP. In 2020, Cascade forecasted average load growth of 1.56 percent per year.[12] In the current IRP, Cascade estimates an average load growth of 1.1 percent per year.[13] As will be discussed in greater length, Staff finds this demand forecast is unreasonable.

Cascade emphasizes the role of new customers in its demand forecast; "Load growth is primarily a result of increased customer counts."[14] Figure 3-31 shows that Cascade anticipates a total annual Washington customer growth of 1.41 percent.[15] Similarly, Figure 3-19: shows peak day capacity requirements increasing indefinitely into the future.[16] However, Cascade does not account for changes to the Washington State Energy Code (WSEC):

> "Cascade has been monitoring the building code changes and will continue to monitor the impacts the current and future building code changes have. Due to the COVID-19 Pandemic, the 2018 WSEC did not go into effect until February 1, 2021. Cascade had one year's worth, which is a relatively small sample size, of historical data included in the customer and load forecast models for this current IRP. In future IRPs, once Cascade has gathered more data regarding the impacts of the 2018 and 2021 WSEC, the Company will investigate the impact these building code changes will have on the load and customer forecast."[17]

Staff views the apparent "wait and see" approach as inadequate; the Company should not wait to anticipate the effects of currently existing building codes. As Figure 3-5 indicates, Cascade anticipates rapid code changes, with new codes every three years.[18] If Cascade only relies on seeing the impacts of building codes *before it can estimate the impacts*, Cascade's analysis for the next seven years will routinely lag building code changes without ever anticipating future impacts. In contrast, the reduction in energy use is clearly telegraphed by the State Building Code Council (SBCC) in Figure 3-5. Further, 2018 and 2021 WSEC both constrain the types of buildings that can have certain types of natural gas appliances installed. While Cascade might not be able to generate exacting estimates of the impacts of these code changes as they happen, these code changes are substantial and will reduce the number of new customers in Washington.

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[12] Docket UG-190714, "2020 Integrated Resource Plan" (2020 IRP), at pg. 3-2.
[13] Docket UG-220131, "2023 Integrated Resource Plan" (2023 IRP), at pg. 3-2.
[14] 2023 IRP, pg. 3-18
[15] 2023 IRP, pg. 3-18
[16] 2023 IRP, pg. 3-22
[17] 2023 IRP, pg. 3-14
[18] 2023 IRP, pg. 3-13

For example, peer utilities recently provided a range of analyses, which were more expansive.[19] **Staff recommends that Cascade use a first order approximation of current building code impacts on customer counts and use per customer, until it can collect enough data for a more exacting estimate of customer count impacts.[20]**

Beyond looking at existing building codes, Cascade fails to include other energy-related building standards (e.g., RCW 19.27A.020(2)(a) and RCW 19.27A.160) in its long-term planning. These statues are not new, they have been law since 2009.[21] The Washington State Building Code Council is tasked with a 70 percent reduction in net annual energy consumption in newly constructed residential and nonresidential buildings by 2031. Additionally, RCW 19.27A.020(2)(a) states that the Washington state energy code shall be designed to construct increasingly energy efficient homes and buildings that help achieve the broader goal of building zero fossil-fuel greenhouse gas emission homes and buildings by 2031.[22] Customer and demand forecasts should reflect this future. Incorporating these separate statutes should result in declining growth until 2031 whereupon customer growth should effectively stop and then begin to decrease. **Where the specifics of future codes are unknown, Staff recommends that the Utility project a forecast trend that accords with statutory goals and mandates.[23] Staff recommends Cascade develop a building stock attrition rate to represent the loss of customers due to buildings being demolished, remodeled without gas service, or otherwise leaving gas service unrelated to changes in the price competitiveness of gas services.[24, 25] Staff further recommends that these assumptions be adopted as the "current expectations" found in Figure 9-3, where sufficient data about current building and future codes is not available.[26, 27]**

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[19] Docket UG-210094, "2022 NW Natural Integrated Resource Plan," Figure 1.7, at pg. 20-21, pgs. 288-331

[20] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider ... market-volatility risks, demand-side resource uncertainties, ... public policies regarding resource preference adopted by Washington state ..."

[21] **2009 c 423 § 4**; Chapter 423, Laws of 2009, 61st Legislature, 2009 Regular Session, FILED May 11, 2009

[22] Diane Glenn, State Building Code Council Chair, WASHINGTON STATE ENERGY CODE Progress toward 2030, 2018 Report to the Legislature, November 25, 2020. Available at https://sbcc.wa.gov/sites/default/files/2020-12/Final 2018 Report.pdf

[23] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider ... public policies regarding resource preference adopted by Washington state ..."

[24] This attrition rate could be estimated based on the Utility's own customer and address data, county records, or various studies on the longevity of various types of structures.

[25] WAC 480-90-238(3)(a) "A range of forecasts of future natural gas demand in firm and interruptible markets for each customer class that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type and efficiency of natural gas end-uses."

[26] 2023 IRP, pg. 9-5

[27] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider... public policies regarding resource preference adopted by Washington state ..."

Further, it is not clear within the IRP document how Cascade incorporated their own climate change impacts analysis into their demand forecast. **Staff recommends that Cascade more plainly communicate the impacts of climate change in narrative as well as in Figure 3-14: System Baseload vs DSM.**[28] Note there are more extensive Staff comments about climate change modeling in the section on climate change modeling.

Staff acknowledges that changes to customer rates are determined in rate cases, *separately* from resource planning. However, estimating potential impacts of different **scenarios** or **portfolios** in an IRP can help regulators, customers, and consumer advocates interpret how planning decisions might affect energy affordability.[29] The Cascade IRP document offers no analysis of the expected bill impacts upon the demand forecast. For example, the CCA requires the acquisition of costly compliance resources: auction allowances, offsets, and alternative fuels. Cumulatively, these costs will add up. Without reductions in customer counts, these additions can result in total system costs increasing approximately four-fold.[30] These total system costs translate into bill impacts that can be estimated by different scenarios or portfolios. Cascade's states that its base case scenario results in a 33 percent increase in bills by 2050 for residential customers, a roughly 45 percent increase for commercial customers, and 50 percent increase for industrial customers.[31] However, some of Cascade's scenarios feature residential bill increases of about 215 percent, commercial bills increasing nearly 300 percent, and Industrial increasing 225 percent.[32, 33] In these more extreme scenarios the bill impacts are driven by fixed costs being spread out over a shrinking customer base. Staff also highlights that these bill impact estimates are averages. Behind this average is the distribution of customer bill impacts. Some residential customers will be affected by *more* than 215 percent. **Staff recommends that Cascade analyze**

[28] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider ... market-volatility risks, demand-side resource uncertainties, ... public policies regarding resource preference adopted by Washington state or the federal government, the cost of risks associated with environmental effects including emissions of carbon dioxide..."
[29] *Reimagining Resource Planning Report* (January 2023) Rocky Mountain Institute at p. 62.
[30] 2023 IRP, pg. 9-19
[31] Appendix K, Bill Impacts Analysis, 2023 IRP, pg. 3-5
[32] Staff notes that these bill impacts are mitigated by PLEXOS speculatively banking allowances and expending allowances in the final moment of the analysis period for maximum effect. Cascade notes that these bill impacts would be greater as the Cap and Invest program will extend beyond 2050 and therefore banked allowances would have greater value if banked beyond 2050.
[33] Appendix K, Bill Impacts Analysis, 2023 IRP, pg. 12, 13

these risks to customers and the distributional effects through the lens of equity, energy justice, and access to energy efficiency resources. [34, 35]

Cascade clearly recognizes that the price competitiveness of gas services relative to electric utility services is integral to customers choosing natural gas. On the Company's website it states:

> "Clean, energy-efficient natural gas. The comforts of home at a fraction of the cost of electricity. Check out the Frequently Asked Questions below to get more information about appliances or services."[36] "WHY NATURAL GAS? According to the U.S. Census Bureau, here are just a few of the reasons home buyers prefer homes heated with natural gas: Natural gas is more economical[;] Gas can significantly cut your energy bills, depending on where you live and your energy usage."[37]

This is especially the case for industrial and non-core customers, the latter of which make up 78 percent of Cascades service.[38]

> "Energy Costs can be one of the major factors in a company's decision to expand or relocate its operations. At Cascade Natural Gas, we commit to providing our customers with the most cost-effective, clean, and efficient energy source for their business needs. Cascade assists commercial and industrial businesses with solutions to their energy needs, by providing a number of specialized services including customized cost modeling and **comparisons to alternate energy sources**."[39] [emphasis added by Staff]

Staff agree that comparative costs between utility services is a central driver of adoption/switching of energy sources. **Therefore, Staff recommends that Cascade dynamically model the anticipated comparative costs between its natural gas services and electric utility services into the future as well as the interplay of customers, by class,**

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[34] WAC 480-90-238 (2)(b)"At a minimum, this analysis must consider resource costs, market-volatility risks, demand-side resource uncertainties, the risks imposed on ratepayers, resource effect on system operations, public policies regarding resource preference adopted by Washington state or the federal government, the cost of risks associated with environmental effects including emissions of carbon dioxide, and the need for security of supply."
WAC 480-90-238(3)(g) "The integration of the demand forecasts and resource evaluations into a long-range (e.g., at least ten years; longer if appropriate to the life of the resources considered) integrated resource plan describing the mix of resources that is designated to meet current and future needs at the lowest reasonable cost to the utility and *its ratepayers*." [emphasis added by Staff]

[35] Docket UG-210755, "Final Order 09, Approving and Adopting Settlement Agreement Subject to Conditions" (GRC), at pg. 19 para 58, & pg. 18 para 56.

[36] Cascade Natural Gas Corporation, "Residential Services," April 18, 2023. Available at https://www.cngc.com/rates-services/residential-services/

[37] Cascade Natural Gas Corporation, "Rates and Services," April 18, 2023. Available at https://www.cngc.com/rates-services/

[38] 2023 IRP, pg. 2-2

[39] Cascade Natural Gas Corporation, "Business Service," April 18, 2023. Available at https://www.cngc.com/rates-services/business-services/

responding to changing comparative cost.[40] Staff recommends that this comparative cost analysis incorporate the distributional analysis recommended above.[41]

Finally, Staff would like to voice its appreciation for Cascade's responsiveness to some feedback from interested parties. "Through the TAG process, specifically TAG 2, stakeholders suggested Cascade replace the price regressor with an income regressor in an attempt to better capture customer behavior. Cascade is excited to perform this analysis in the next demand forecast."[42] Staff supports this methodological change.

Renewable Natural Gas

Cascade's renewable natural gas (RNG) planning is inadequate. While Cascade intends to bring some RNG onto its system as part of a voluntary RNG program, Cascade does not consider RNG as a compliance resource for the purposes of the CCA nor as part of its lowest reasonable cost analysis. Therefore, Staff concludes that Cascade has not fully analyzed conventional and commercially available nonconventional gas supplies as required by WAC.[43]

Cascade explains:

> "For the 2023 IRP, Cascade has adopted this assumption that, while existing RNG projects will continue to generate gas through the planning horizon, no new RNG projects may be added to the portfolio beyond 2040."[44]
>
> "Ecology placed some geographic limitations for qualifying RNG outside of Washington for this exclusion within the WAC 173-441 GHG reporting rule and Cascade has placed limits on RNG accordingly as a compliance option in IRP modeling."[45]

However, this interpretation appears unique to Cascade as other contemporaneous IRP documents from Northwest Natural Gas Company, Avista, and Puget Sound Energy all include or consider RNG in their resource portfolios to comply with the CCA and lowest reasonable cost analysis.[46, 47, 48] **Staff recommends that Cascade update their analysis to consider RNG as a**

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[40] WAC 480-90-238(3) (a)" A range of forecasts of future natural gas demand in firm and interruptible markets for each customer class that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type and efficiency of natural gas end-uses."
[41] WAC 480-90-238(3) (a)" A range of forecasts of future natural gas demand in firm and interruptible markets for each customer class that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type and efficiency of natural gas end-uses."
[42] 2023 IRP, pg. 3-12
[43] WAC 480-90-238(3)(c) (3) Content. At a minimum, integrated resource plans must include: (c) An assessment of conventional and commercially available nonconventional gas supplies.
[44] 2023 IRP, pg. 4-16
[45] 2023 IRP, pg. 2-22
[46] Docket UG-210094, "2022 NW Natural Integrated Resource Plan," at pg. 268
[47] Docket UG-220242, "2023 Gas Utility Integrated Resource Plan," at pg. 2.15
[48] Docket UG-220131, "2023 Natural Gas Integrated Resource Plan," at pg. 6-6.

valid CCA compliance resource and as part of a lowest reasonable cost portfolio.[49] This recommendation is also in line with peer utilities' analyses.[50]

Finally, Staff is perplexed that Cascade is progressing with seven projects for Cascade's voluntary RNG tariff, but the Company fails to adequately consider RNG as a valid compliance resource. Six of these projects have a projected in-service date within the next two years.[51] These six will result in the addition of 10.4 million therms annually.[52]

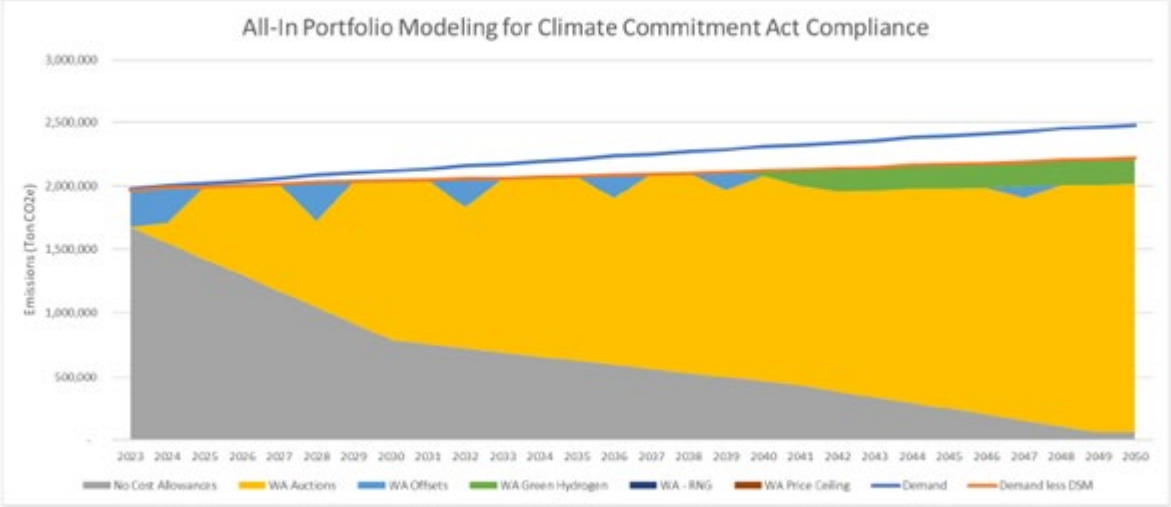
The Climate Commitment Act [RCW 70A.65]

The CCA has dramatic implications for natural gas utilities in Washington. The act introduces a cap-and-invest program that places a cap and a price on emissions. Gas companies are required to purchase emission allowances at auction. These allowances can be sold, traded, or retired to comply with the CCA. Gas companies can also comply with the CCA by purchasing offsets, adopting low or zero-emission fuels or promoting cost-effective energy efficiency programs. Staff have concerns about Cascade's compliance planning.

Cascade estimates their current core and non-core emissions at 5.85 million metric tons of emissions.[53] Cascade projects a need of 1,957,210 allowances in 2050. Despite the apparent discrepancy with the value cited immediately above, this 2050 projection appears little changed from their near-term allowances and offsets (see Figure 9-14 below).[54]

[49] WAC 480-90-238(2)(b)" At a minimum, this analysis must consider resource costs...public policies regarding resource preference adopted by Washington state or the federal government, ... the need for security of supply."
WAC 480-90-238(2)(a) "Integrated resource plan" or "plan" means a plan describing the mix of natural gas supply and conservation designated to meet current and future needs at the *lowest reasonable cost* to the utility and its ratepayers." [emphasis added by Staff]
[50] Docket UG-210094, "2022 NW Natural Integrated Resource Plan," at pg. 268
[51] One of these projects is located in Oregon, while the others are in Washington.
[52] 2023 IRP, pgs. 4-11 to 4-14.
[53] 2023 IRP, pg. 6-25.
[54] 2023 IRP, pg. 9-20

Figure 9-14: WA Projected Resource Stack for CCA Compliance



Staff questions whether Cascade will be able to purchase that many allowances by 2050, let alone many of the interim years. These purchases will be made from Price Ceiling Units (PCUs). PCUs are purchases from Ecology at the auction ceiling price when a regulated entity does not have enough compliance resources.[55] PCUs are not normal allowances: they cannot be banked, or traded, and must be retired when purchased. Staff are concerned that these stop-gap compliance instruments are being used for long-term compliance planning.

Next, staff further questions the compatibility of Cascade's plan considering the state-wide emissions cap of five million tons of emissions.[56] Cascade's strategy does not appear congruent with this cap. Furthermore, Staff questions Cascade's strategy in light of explanations offered by Ecology.[57] Ecology has "taken steps to avoid the need to sell price ceiling units, which increase the cap.... the auction parameters Ecology has set, including front loading the Allowance Price Containment Reserve, will help minimize the need for selling price ceiling units."[58] Ecology further notes "Ii]n general, to ensure overall declining emissions under the cap, Ecology, as required by the CCA, is decreasing the annual allowance budget each year, and has designed the program to avoid as much as possible the need to sell price ceiling units."[59] This indicates that Ecology has designed compliance with the CCA to avoid reliance on PCU purchases. Ecology

[55] RCW 70A.65.160(2)
[56] RCW 70A.45.020(1)(a)(iv). "(iv) By 2050, reduce overall emissions of greenhouse gases in the state to five million metric tons, or ninety-five percent below 1990 levels."
[57] See Washington Dept of Ecology, *Concise Explanatory Statement Chapter 173-446 WAC Climate Commitment Act Program: Summary of Rulemaking and Response to Comments*, September 2022, Publication 22-02-046. (Ecology CES)
[58] Ecology CES, pg. 131
[59] Ecology CES, pg. 131

also provided commentary on the importance of the emissions cap stating. "Ecology agrees that it is critically important to maintain the integrity of the cap on GHG emissions. The legislature, in designing the Climate Commitment Act (CCA) also made it clear that maintaining the integrity of the cap is a central goal of the program. The CCA is clear that the cap in the cap and invest program must be based on emissions from the covered sectors of the economy."[60] Therefore, Staff is concerned that Cascade's compliance strategy is incongruent with the statutory emissions cap and that Cascade is imprudently relying upon a stop-gap regulatory instrument in a manner for which it was not intended.[61] **Staff recommends that Cascade plan to comply with all applicable laws, including the CCA and the statutory emissions cap.[62] Staff recommends that Cascade further evaluate and analyze the prudence of its planned reliance on PCUs.**

In Scenario 4, Cascade models electrification.[63] Cascade says, "In this scenario, customer growth in Cascade's residential, and commercial rate classes gradually slows to zero growth in 2025 and afterwards, residential and commercial customer count reduced to 10 percent by 2050."[64] The IRP document offers no explanation why industrial customers are omitted from this analysis. The resultant scenario yields only a 50 percent reduction in emissions. **Staff recommends that Cascade dynamically model Industrial customers in all scenario modeling as well as industrial customers' responses to changing market conditions and changing utility service price competitiveness.[65]**

Of final note related to the CCA, Cascade explains that:

> "This alarming difference [referring to bill impacts] reaffirms the Company's position that any efforts to undertake a dramatic move toward electrification must not be done

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[60] Ecology CES, pg. 131
[61] RCW 70A.65.160(2) (2) In the event that no allowances remain in the allowance price containment reserve, the department must issue the number of price ceiling units for sale sufficient to provide cost protection for covered entities as established under subsection (1) of this section. Purchases must be limited to entities that do not have sufficient eligible compliance instruments in their holding and compliance accounts for the current compliance period and these entities may only purchase what they need to meet their compliance obligation for the current compliance period. Price ceiling units may not be sold or transferred and must be retired for compliance in the current compliance period. A price ceiling unit is not a property right.
[62] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider resource costs, market-volatility risks, demand-side resource uncertainties, the risks imposed on ratepayers, resource effect on system operations, public policies regarding resource preference adopted by Washington state or the federal government, the cost of risks associated with environmental effects including emissions of carbon dioxide, and the need for security of supply."
[63] 2023 IRP, pg. 9-30
[64] 2023 IRP, pg. 9-30
[65] WAC 480-90-238(3)(a) "A range of forecasts of future natural gas demand in firm and interruptible markets for each customer class that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type and efficiency of natural gas end-uses."

> without a detailed understanding of the regional impact of such a shift of load. While Cascade's cost may be lower, this comes as the consequence of a significant load increase to regional electric utilities, with all of the risks associated with the ability to serve such a dramatic influx of customers. Additionally, those utilities are presumably already utilizing their lowest cost, lowest risk resources to serve their existing customers. The costs to add these new customers may force those utilities to explore higher cost resources for electricity generation and their own emission mitigation. This does not even account for the significant cost to customers to replace existing gas units with their electric counterparts, a cost that will need to be accounted for in a regional electrification analysis before any action should be undertaken."[66]

Staff affirms the need for regional utility coordination and regional impact analysis of electrification. Staff do **not** affirm the imperative for a region-wide halt in electrification until a multi-year or ongoing, detailed, regional impact assessment is completed. **Staff recommends that that Cascade develop a decarbonization plan akin to the Avista general rate case settlement[67] with the added objectives of avoiding instability, reducing impacts on customers, and fully assessing the lowest cost mix of fuels and conservation (including electrification where appropriate).[68]**

Conservation

Cascade's Demand Side Management efforts are anticipated to slow the annual demand growth rate by about 41 percent from a baseline of 0.98 percent growth annually to 0.41 percent.[69] Cascade anticipates 48 million therms of energy saved by energy efficiency efforts through to 2045.[70] This compares to the previous estimate of 45.22 million therms of energy saved over 20 years in the previous IRP.[71] This equates to, on average, a decrease of 79,000 fewer therms saved annually or a 3.5 percent overall decrease.

Cascade attributes this decrease to the following factors:

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[66] 2023 IRP, pg. 9-32, 9-33
[67] Full Multiparty Settlement Stipulation, Docket UE-220053, p. 12 section 12(d) (filed Dec. 12, 2022).
[68] WAC 480-90-238 (2)(b) "Lowest reasonable cost' means the lowest cost mix of resources determined through a detailed and consistent analysis of ... public policies regarding resource preference adopted by Washington state or the federal government, ..."
(6) "The Commission will consider the information reported in the integrated resource plan, when it evaluates the performance of the utility in rate and other proceedings."
RCW 80.28.010(1) "(1) All charges made, demanded, or received by any gas company... for gas... or for any service rendered or to be rendered in connection therewith, shall be just, fair, reasonable and sufficient.
(2) "Every gas company, ... shall furnish and supply such service, instrumentalities and facilities as shall be safe, adequate and efficient, and in all respects just and reasonable."
[69] 2023 IRP, pg. 3-20
[70] 2023 IRP, pg. 7-2
[71] 2020 IRP, pg. 7-2

> "The long-term discount rate, tied to the average 30-year mortgage rate, increased from 3.40% in 2020 to 5.06% in 2022. The average Avoided Cost per therm decreased from ~$0.57 in 2020 to ~$0.43 in 2022 representing an average decrease of ~24%. Average heating degree days also declined slightly compared to the 2020 forecast as future weather assumptions now include a warming climate scenario with gradually decreasing heating degree days over time."[72]

Despite this long-term decrease, Cascade still anticipates near term year-over-year increases in therms saved. Cascade expects the most recent biennium therm savings to increase approximately 41 percent from the previous reporting biennium.[73]

Further, Staff notes that within the Demand Side Management goals and budget, the low-income residential goals are about 3 percent of total residential goals.[74] The American Community Survey, relied upon by Cascade to estimate the number of customers in poverty, indicates that about 11 percent of Cascade's customers fit into the low-income category. This suggests that low-income customers are underserved by Cascade's Energy Efficiency efforts. **Staff recommends that Cascade work with Community Action Agencies in its service territory to improve their internal capacity[75]. Further, Staff recommends that Cascade, in collaboration with its Conservation Advisory Group, Low-Income Advisory Group, and Equity Advisory Group, identify other means of improving capacity of Demand Side Management programs, as well as researching other delivery mechanisms to increase low-income program goals.[76] Additionally, Staff recommends that Cascade assess the distributional equity implications of its Demand Side Management programs, and, where inequitable gaps are identified, to research, design, and implement improvements that adhere to clear benchmarks toward program equity.**[77]

Finally, Cascade has applied a 10 percent adder to *all* elements of avoided cost, instead of only commodity and environmental compliance costs as in prior IRPs.[78] Staff recognizes and commends this improvement. Staff notes, however, that Cascade incorrectly refers to this as an environmental adder for non-quantifiable environmental benefits as recommended by the Northwest Power and Conservation Council. The Regional Act conservation credit is not intended to be a substitute for any non-quantifiable impacts. The 10 percent conservation adder,

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[72] 2023 IRP, pg. 7-2
[73] 2023 IRP, pg. 7-13
[74] 2023 IRP, pg. 7-16, figure 7-5
[75] WAC 480-90-238 (2)(a) "Integrated resource plan" or "plan" means a plan describing the mix of natural gas supply and conservation designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers."
[76] WAC 480-90-238 (2)(a) "Integrated resource plan" or "plan" means a plan describing the mix of natural gas supply and conservation designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers."
[77] GRC pg. 18 para 56 and GRC pg. 19 para 58,
[78] 2023 IRP, pg. 5-5,

as standard practice by the Commission and consistent with the NWPCC, is a *preference adder for the energy efficiency resource*.[79]

Price Forecasting

Fundamentally, Cascade's price forecast methodology is unchanged from the previous IRP. The long-term analysis remains largely unchanged, though the new forecast trendline appears to be shifted about 50¢/dth higher.[80]

Staff offer some recommendations to improve the long-term planning utility of the price forecast as well as the readability of the IRP document.

Cascade relies upon the price forecast for scenario testing and modeling.[81] For these other applications, Cascade adjusts the price trend by 10 percent higher or lower, as well as a Brownian motion stochastic process. No graphic presentation of these processes is provided. **Staff recommends the addition of figures similar to Figure 4-9 to communicate these methods.[82] Similarly, Staff recommends the inclusion of these methods and figures in Chapter 4 under the subheading of Natural Gas Price Forecast as Staff views, they are part of the price forecast.**

Staff is concerned that Cascade's methodology does not engage with the fundamental uncertainty of the future. The Company's analysis does the following:

- The Company weights multiple sources to generate a price trend line.[83]
- The Company considers scenarios where price is 10 percent above or below the trend line.[84]
- The Company models Brownian motion of the price based on historical data.[85]

The analysis does not consider long-term movements in the trend line itself. **Staff recommends that Cascade model the uncertainty in the trend line itself.[86]**

Climate Change Modeling

The 2023 IRP improves on previous IRPs by introducing climate change modeling into the weather modeling. Staff lauds Cascade for beginning this work. Staff have recommendations that are essential to improving the accuracy of this work.

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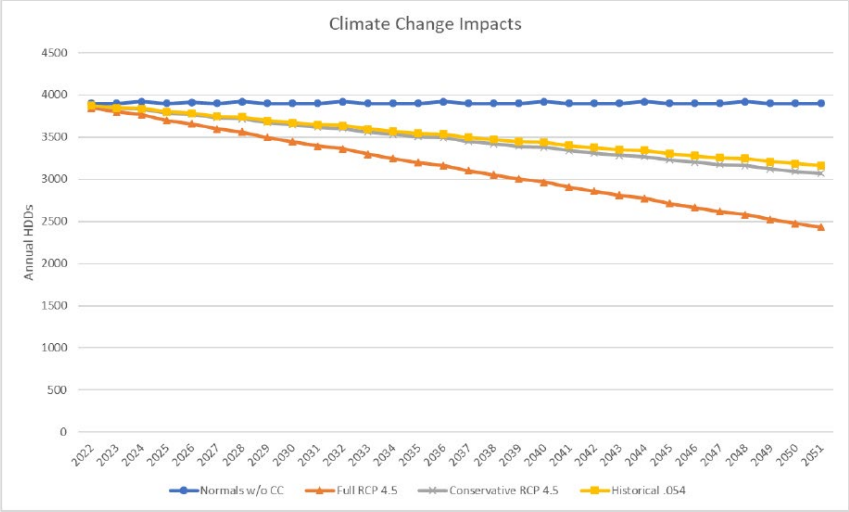
[79] 16 U.S.C. § 839a of the Pacific Northwest Electric Power Planning and Conservation Act.
[80] 2023 IRP, pg. 4-24, 2020 IRP pg. 4-11
[81] 2023 IRP, pg. 9-6 & 9-10
[82] 2023 IRP, pg. 4-24
[83] 2023 IRP, pg. 4-24
[84] 2023 IRP, pg. 9-6
[85] 2023 IRP, pg. 9-10
[86] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider resource costs, market-volatility risks..."

Cascade states "Cascade chose the Conservative Representative Concentration Pathway (RCP) 4.5 forecast as it best represents the Western North America emission goals and was labeled as the most probable baseline scenario."[87,88] **Staff recommends that Cascade not cite to Wikipedia.**[89] Climate change is a global phenomenon. **Staff further recommends that the RCP pathway should align with expected global emissions rather than the expected emissions of Western North America.**[90] **Cascade should adopt RCP 8.5 as it is relied upon by the Northwest Power and Conservation Council.** This would bring Cascade's modeling in line with other gas utility IRP climate modeling already submitted to the Commission. **Staff also recommends that Cascade include Heating Degree Days (HDD) data related to peak days in its appendices.**[91]

Figure 3-2: Climate Change Impacts



[87] RCP stands for Representative Concentration Pathway. Each RCP represents a possible trajectory that emissions might take globally. RCP 4.5 represents global emissions peaking in 2040 and starting to decrease in 2050. RCP 8.5 represents a global business-as-usual scenario.
[88] 2023 IRP, pg. 3-6.
[89] 2023 IRP, pg. 3-6.
[90] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider... public policies regarding resource preference adopted by Washington state or the federal government, the cost of risks associated with environmental effects including emissions of carbon dioxide..."
[91] WAC 480-90-238 (3)(a) & (b) "A range of forecasts ... that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type, and efficiency of natural gas end-uses.
(b) An assessment of commercially available conservation, including load management, as well as an assessment of currently employed and new policies and programs needed to obtain the conservation improvements."

Next, Cascade notes "Historical 054: This represents the Environmental Protection Agency's noted historical temperature change (.54 F per decade since 1979)."[92] The rate of temperature change due to climate change is not consistent between years. Rather the rate of temperature change is accelerating; the year-to-year difference grows with time. **Staff recommends that Cascade model all climate change impacts in a non-linear fashion.**[93]

Finally, Staff recommends that Cascade incorporate climate change into its peak day methodology.[94] Depending on the scale of climate change impacts on peak days, the addition of climate change analysis could substantially impact resource choices. For example, Figure 3-2, indicates a decline of approximately 500 HDDs by 2030.[95] This is a decrease in excess of 12 percent. Assuming this impact transfers proportionally to peak HDDs, then a previously planned peak day of 70 HDD temperatures would translate to a 61 HDD temperature by 2030. This has implications for portfolio selection, the length of contracts in the future, and the ability of Cascade to recuperate costs should the anticipated demand not manifest.

Hydrogen

In each portfolio scenario Cascade provides "Projected Resource Stack for CCA Compliance."[96] It appears that every scenario considered by Cascade relies on hydrogen as a compliance resource. While hydrogen is a promising resource for decarbonization of the energy system, Staff remains skeptical of the technology, and any utility relying on it for long-term planning faces a high burden of proof to demonstrate that it is a viable, lowest-reasonable cost solution. Further, WAC 480-90-238(2)(b) defines "lowest reasonable cost" as determined through a detailed and consistent analysis of a wide range of *commercially available* sources. Staff questions some of the Company's assumptions about hydrogen regarding emission reductions, safety, reliability, and future availability.

1. **Staff questions if hydrogen-blended fuels will result in emissions reductions.** Cascade did not assess the possibility of fugitive hydrogen gas (H2) emissions. H2 is GHG with a carbon dioxide equivalent (CO2e) of 11. This means that when released into the atmosphere H2 has warming impact 11 times more potent than a similar mass of CO2.[97] Depending on the scale of fugitive emissions it is foreseeable that these emissions may

[92] 2023 IRP, pg. 3-5.
[93] WAC 480-90-238 (2)(b) "At a minimum, this analysis must consider ... the cost of risks associated with environmental effects including emissions of carbon dioxide..."
[94] WAC 480-90-238 (2)(b) "At a minimum, this analysis must consider ... market-volatility risks, demand-side resource uncertainties, the risks imposed on ratepayers, resource effect on system operations, public policies regarding resource preference adopted by Washington state or the federal government, the cost of risks associated with environmental effects including emissions of carbon dioxide, and the need for security of supply."
[95] 2023 IRP pg. 3-5
[96] 2023 IRP, pg. 9-18 – 9-39
[97] Nicola Warwick et al, "Atmospheric implications of increased Hydrogen use," April 22nd 2022. Available at https://www.gov.uk/government/publications/atmospheric-implications-of-increased-hydrogen-use

outweigh any avoided emission benefits of the fuel blend. Blending hydrogen with natural gas decreases the energy per volume of fuel combusted by end users.[98] This lower energy per volume will need to be compensated with added compression which will require more energy, or it will mean the delivery of a product with noticeably different heating properties.

2. **Staff further questions if end-use behaviors with blended fuels will result in emissions savings.** Cascade notes "Cascade is confident through conversations with various subject matter experts in this field that the blended product would result in less than 1 percent loss of efficiency, creating a negligible need for additional use of the blend."[99] Cascade provides no corroboration to this appeal to authority.[100] It is further unclear which use cases were considered. Specifically, Staff has reservations about the net emissions savings of hydrogen-blended fuels as it pertains to non-spacing-heating and non-water heater heating applications – e.g., boiling water for cooking. With a lower energy per volume output, it will take longer for desired applications to "come up to temperature" and as a result more heat energy is lost to the local environment and more fuel volume will be expended in these applications. It is non-obvious that the emissions avoided by hydrogen will offset the increased total fuel volume expended.
3. **Staff questions the safety and reliability of hydrogen-blended fuels**. Cascade states "Hydrogen is being proven to be a safe, reliable option in specific applications and as a replacement option to tradition[sic] natural gas."[101] Cascade provides no citation for this claim. A review of relevant literature suggests that there are substantial safety and reliability concerns that have not been resolved.[102] These concerns include:

- Hydrogen-blended fuels have a wider window of flammability and a lower ignition energy.[103] Industry leader, Air Liquide, referring to 100 percent H2 pipelines, notes "H2 pipeline ruptures always catch fire."[104]
- Hydrogen gas embrittles steel making it more prone to leaks and fractures.

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[98] "Hydrogen is about one-third less energy dense (per unit volume) than natural gas, so an equal percent by volume results in 3 times less heat input." PCI Energy Solutions, "Can Hydrogen Help Decarbonize Your Turbine Fleet?" January 2023. Available at Can Hydrogen Help Decarbonize Your Turbine Fleet? | PCI (pcienergysolutions.com)

[99] 2023 IRP, pg. 4-14,4-15

[100] Stanford Encyclopedia of Philosophy, "Fallacies," April 18, 2023. Available at https://plato.stanford.edu/entries/fallacies/#CorFal

[101] 2023 IRP, pg. 4-15

[102] Topolski, Kevin, Evan P. Reznicek, Burcin Cakir Erdener, Chris W. San Marchi, Joseph A. Ronevich, Lisa Fring, Kevin Simmons, Omar Jose Guerra Fernandez, Bri-Mathias Hodge, and Mark Chung. 2022. *Hydrogen Blending into Natural Gas Pipeline Infrastructure: Review of the State of Technology*. Golden, CO: National Renewable Energy Laboratory. NREL/TP-5400-81704. https://www.nrel.gov/docs/fy23osti/81704.pdf.

[103] Topolski et al. pg. 8

[104] Air Liquide, Questions and Issues on Hydrogen Pipelines, Doe Hydrogen Pipeline Working Group Meeting, August 31, 2005, slide 23, available at https://www.eere.energy.gov/hydrogenandfuelcells/pdfs/hpwgw_questissues_campbell.pdf

- Line pack greatly diminishes as an ad hoc storage resource with hydrogen-blended fuels.[105]
- Due to the lower pressure of hydrogen-blended fuels, line pressures will need to be increased to maintain the previous energy flow. This presents increased energy costs.[106]
- Due to embrittlement, pipelines will likely need to operate at reduced pressure.[107] Notably a crude oil pipeline carrying hydrogen ruptured after six months of use due to hydrogen corrosion at a pressure of only 700 PSI.[108,109]
- Changing fuel mixtures can lead to customer meter inaccuracies.[110]
- The maximum blending ratio will be likely be determined by the weakest link in a utility's system.[111] Older vintage pipe steels contain more latent defects and warrant greater evaluation for fatigue and fracture behavior.[112] Cascade has some pipeline stock at least circa 1963 qualifying as older vintage by the cited literature.[113]
- Hydrogen also reduces the strength of elastic materials commonly used for seals, diaphragms, gaskets, flanges etc.[114]
- Cascade does not discuss hydrogen storage and whether the company plans to store fuels separately or as a blended fuel.
- Hydrogen-oxidizing bacteria and archaea exist underground and can result in 2-4 percent losses in hydrogen stored underground. Cascade relies on underground storage for natural gas. Hydrogen stored in aquifers can be lost by dissolving in brine.[115] Cascade relies on aquifer storage for natural gas.[116]
- The Pacific Northwest National Laboratory maintains a database, "H2 Tools", of hydrogen industry incidents.[117] Numerous reports list pressure-related component failure, and fatalities.
- Staff also highlights its own concerns around indoor air quality related to partial combustion of fuel mixes resulting from the lower combustion heat.[118]

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[105] Topolski et al. pg. 14
[106] Topolski et al. pg. 14
[107] Topolski et al. pg. 14
[108] Air Liquide, Questions and Issues on Hydrogen Pipelines, DOE Hydrogen Pipeline Working Group Meeting, August 31, 2005, slide 10, available at https://www.eere.energy.gov/hydrogenandfuelcells/pdfs/hpwgw_questissues_campbell.pdf
[109] It is unclear to staff whether this incident or pressure is representative. However, the firm operating the line thereafter ran it at about half the original pressure.
[110] Topolski et al. pg. 19
[111] Topolski et al. pg. 35.
[112] Topolski et al. pg. 13.
[113] Cascade, IRP Technical Advisory Group Meeting #4, August 10, 2022, Slide 105
[114] Topolski et al. pg. 22
[115] Topolski et al. pg. 25
[116] 2023 IRP, pg. 12-7
[117] Pacific Northwest National Laboratory, "Lessons Learned," April 18, 2023. Available at Lessons Learned | Hydrogen Tools (h2tools.org)
[118] The New York Times, "Gas Piped into Homes Contains Benzene and Other Risky Chemical, Study Finds," April 10, 2023. Available at Gas Piped Into Homes Contains Benzene and Other Risky Chemicals, Study Finds - The New York Times (nytimes.com),

Hydrogen presents additional concerns and questions. These include competing use cases, and availability of water rights.

Cascade did not analyze the impacts of competing use cases upon the future availability of green hydrogen. Hydrogen has possible use cases for industry, steel production, transportation, electricity generation, and fertilizer production.[119] Depending on the ultimate viability of these technologies, they may present a substantial economic competition for use of the scarce fuel. Furthermore, it is still not clear that generating hydrogen and saving it for peak use is more efficient if used directly in space heating rather than generating electricity to meet the same demand via heat pumps. Cascade did not analyze this alternative.

Further, Cascade did not assess the availability of water rights to produce green hydrogen. Electrolysis requires water as an input. Producing hydrogen at a utility scale will require non-negligible amounts of water. The intermountain west, which overlaps considerably with Cascade's service territory, is famously arid or semi-arid, and water limited. Therefore, siting hydrogen production facilities locally within its service territory may prove difficult.

Staff questions the feasibility of Cascade's hydrogen portfolio options as presented since it leaves important interstitial questions unanswered. Staff further notes that these unanswered questions are not unique to Cascade. Rather this is more attributable to the nascence of the technology rather than any particular oversight by Cascade. Regardless, the need for answering these questions is fast approaching as Cascade plans to include hydrogen in Oregon before the end of this decade.[120]

Upstream and Distribution Emissions [RCW 80.28.395 and 80.28.380]

As of 2019, gas companies must account for "emissions occurring in the gathering, transmission, and distribution of natural gas."[121] The IRP document is sparse on quantification of emissions. Cascade provides an estimate "in the range of 0.06 and 0.10 percent (annual volume of methane emitted per total annual methane throughput volume)."[122] Cascade also updated "the upstream U.S. Rockies emissions rate to 1.43% from 1.00%"[123] Cascade provides no quantification of distribution system emissions as required by RCW 80.28.395. Cascade estimates their upstream emissions at 4,680 CO2e g/MMBtu.[124]

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[119] Smart Electric Power Alliance, An Introduction to Hydrogen: Applications, Technological Challenges, and Long-Term Potential, 2023, slide 25.
[120] 2023 IRP, pg. 9-20
[121] See RCW 80.28.395
[122] 2023 IRP, pg. 6-30
[123] 2023 IRP, pg. 6-31
[124] 2023 IRP, pg. 6-31

Cascade has not demonstrated that these values were included in the cost-effectiveness analysis for the acquisition of conservation measures as required by RCW 80.28.380. **Staff recommends that Cascade quantify all of its emissions occurring in the gathering, transmission, and distribution of natural gas.[125,126] Staff recommends that Cascade comply with RCW 80.28.380 and include these emissions estimates in its lowest reasonable cost analysis where appropriate. Staff recommends that Cascade corroborate measurement of distribution system emissions with reference to accounting the difference between natural gas volumes purchased by Cascade and the volumes sold.**

PLEXOS

Cascade has adopted a new modeling software, PLEXOS.[127] Generally, Staff views PLEXOS as an improvement over the previous software, SENDOUT, as it allows for carbon emission modeling. While Staff generally supports the change, Staff also has concerns. Because of the type of optimization done by PLEXOS, the results carry various quirks, artifacts, and anomalies that warrant caution and should inform any interpretation of its results.

Cascade provides the following description and caveat about the use of PLEXOS:

> The model knows the exact load and price for every day of the planning period based on input and can therefore minimize costs in a way that would not be possible in the real world. It is important to acknowledge that PLEXOS provides helpful but not perfect information to guide decisions.[128]

As Cascade admits, the model uses information and assumptions in a way that does not mirror the limited knowledge of human agents and presents potential path dependency issues. For example, the future viability of hydrogen and various other green synthetic fuels is currently unknown. Currently, Cascade can model a scenario in which hydrogen fuel is viable and available in the future. In this scenario, PLEXOS would optimize the current portfolio as well as the interstitial portfolio until hydrogen comes online while planning to accommodate the new fuel in the future. Further, Cascade can model a scenario in which hydrogen is not viable in the future. And, in this scenario, PLEXOS would optimize the portfolio with this assumption. PLEXOS, however, cannot model a scenario in which it believes hydrogen will be available but, when the time comes to add it to Cascade's system, the technology is not viable or has a chance of viability. The software cannot hedge the design of the portfolio. Similarly, PLEXOS cannot

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[125] RCW 80.28.395 "For the purposes of RCW 80.28.380, the cost of greenhouse gas emissions resulting from the use of natural gas, including the effect of emissions occurring in the gathering, transmission, and distribution of natural gas to the end user…."
[126] WAC 480-90-238(3)(g) "The integration of the demand forecasts and resource evaluations into a long-range (e.g., at least ten years; longer if appropriate to the life of the resources considered) integrated resource plan describing the mix of resources that is designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers." Lowest reasonable cost should include the social cost of GHGs which should include distribution system and transmission emissions.
[127] 2023 IRP, pg. 1-11
[128] 2023 IRP, pg. 1-11

iteratively design a hedged portfolio, where at each time interval the model can only probabilistically plan for the next time interval. Staff are concerned that overreliance on PLEXOS without acknowledging these shortcomings could lead to path dependency issues.

Next, the perfect knowledge of PLEXOS allows it to engage in speculation of emissions allowances. A review of Appendix K reveals that the bill impacts analysis for scenario 4 includes a massive plummet in 2050.[129] This drop is the result of PLEXOS speculating on the value of emissions allowances. Or more specifically, the model assumes that the cost of emissions allowances will increase over time and that allowances can be banked indefinitely. The planning horizon ends in 2050, so PLEXOS liquidates the stock of cheaper allowances from earlier compliance periods resulting in a plummet in bill impacts and a decrease in total costs for the 2023-2050 planning period. This scenario is not plausible for various reasons. First, real life does not have a finite planning period, therefore Staff expects speculative allowances to be sold, traded, or used sporadically over time rather than in a single year. Second, entities subject to the Climate Commitment Act have a holding limit, an upper bound to the number of allowances that may be held for trade or use.[130] Third, Ecology has an Emissions containment reserve allowance that allows Ecology to withhold allowances if prices are too low to secure further emissions reductions.[131] Fourth, PLEXOS's optimization goal is the total portfolio cost minimization, a dramatic billing decrease in 2050 will have very little meaning in terms of lowest reasonable cost to customers today all the way through 2049. These customers will be, quite literally, paying for the lower costs in that one year. Finally, allowance costs may not increase in the predictable manner assumed by Cascade's model. Therefore, predictable speculation of this nature won't be feasible in reality and therefore much less lucrative and much less useful for lowest reasonable cost analysis. **Staff recommends that Cascade consult with their Low-Income Advisory Group, and Equity Advisory Group to design a better method for considering lowest reasonable cost to avoid impractical model outcomes.[132]**

Additionally, PLEXOS' perfect knowledge creates scenario outcomes that are interesting, raise questions about possible solutions to future problems, but are, given current technology and fuel availabilities, impractical. Consider scenario 6 in figure 9-36.[133] In this scenario Cascade models a massive disruption in supply in 2034.[134] Part of PLEXOS's solution to this problem is the short-term addition of hydrogen. This addition of hydrogen lasts the duration of the disruption and then ceases. This brief blip of hydrogen is 6-9 years before hydrogen is introduced consistently to portfolios in other scenarios. Hydrogen does not return to the portfolio in scenario 6 until 5 years later. Staff questions if it can be economically feasible for a new fuel to be "turned on" and almost immediately "turned off" without creating stranded assets or prohibitive

[129] 2023 IRP, Appendix K, pgs. 12-14
[130] WAC 173-446-020
[131] WAC 173-446-020
[132] WAC 480-90-238(2)(a) "`Integrated resource plan' or 'plan' means a plan describing the mix of natural gas supply and conservation designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers."
[133] 2023 IRP, pg. 9-37
[134] 2023 IRP, pg. 9-36

economic friction. Staff questions the accuracy of customer meters due to their need for recalibration and other system wide impacts in a scenario where fuel mixtures are changed rapidly.[135] While Cascade notes that typical adoption of hydrogen fuels by PLEXOS starts in 2040 and in this scenario in 2034, **Staff highlights that Cascade's Oregon modeling indicates adoption of hydrogen as soon as 2028 or 2029**.[136] **Staff recommends that Cascade rapidly resolve the technical and economic questions related to the integration of Hydrogen and other synthetic fuels to ensure the fuels are accurately incorporated into optimized portfolios.**

In light of these issues with PLEXOS, **Staff recommends that Cascade highlight and offer appropriate cautions in its analysis wherever PLEXOS yields results or behaviors that would be unlikely to be anticipated or enacted by a human planner. Staff further recommends that Cascade highlight and offer appropriate caution in its analysis wherever PLEXOS uses resources in its portfolio in a manner that does not accord with current best practices or current technological means.**

GTN Xpress

The GTN Xpress is a pipeline expansion project proposed by Gas Transmission Northwest and currently under consideration by FERC. The expansion is affected by the modification of three compressor stations. One of these compressors is in Washington. It would increase capacity by 150 million cubic feet per day.[137]

This pipeline expansion is a contentious issue that has garnered considerable opposition in the State of Washington. The States of Washington, Oregon, and California have all motioned to intervene in the FERC proceedings. In the State's motion, Attorney General Bob Ferguson noted various grounds for opposing the expansion. "The record shows minimal, if any, public benefits from the project. As discussed above, there is scant evidence of a public need for the methane gas the project will transport. The lack of need alone is sufficient to deny the certificate."[138] The motion also noted environmental equity concerns "The Draft EIS further notes that a predominately Latinx community lives within one mile of the Starbuck station. Draft EIS 4-23, 25. Increasing pollution in a community of color overburdened by pollution is against the public interest."[139] The state of Washington further characterized its opposition to the project stating, "Authorizing expanded infrastructure to bring more methane into our States is against the public's interest, manifest in their state and local laws."[140]

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[135] Topolski et al. pg. 19
[136] 2023 IRP, pgs. 9-37 and 9-38
[137] FERC, Final Environmental Impact Statement, Docket CP22-2-000, November 2022.
[138] FERC, Joint motion to intervene and protest by the states of Washington, Oregon, and California, Docket No. CP22-2-000, August 22, 2022, page 27.
[139] FERC, Joint motion to intervene and protest by the states of Washington, Oregon, and California, Docket No. CP22-2-000, August 22, 2022, page 27.
[140] FERC, Joint motion to intervene and protest by the states of Washington, Oregon, and California, Docket No. CP22-2-000, August 22, 2022, page 25.

The pipeline expansion is similarly reflected in public comments received for this docket. As of this writing,[141] 310 comments were submitted from Washington citizens as well as various environmental advocacy groups. Every comment but one opposes an expansion of natural gas use in Washington, and most object, in particular, to the GTN Xpress capacity expansion project and Cascade's supply contract. They emphasize that the project is inconsistent with state emissions goals, building code changes, and environmental justice principles, while also lacking a basis in customer demand.

Staff similarly urge Cascade's IRP be brought into compliance as it relates to the GTN Xpress project. As will be evidenced, Cascade's analysis on this capacity resource is conspicuously inadequate, and inconsistent with a long term lowest reasonable cost analysis required by WAC 480-90-238(2)(b).

Cascade's GTN Xpress analysis is predominantly and conspicuously in the past tense. That is, the IRP document cites previous IRP filings in Oregon and Washington a total of 10 times compared to only three references to the instant IRP or analysis conducted for the current IRP. Such frequent citation to previous IRP documents is not present elsewhere in the IRP. WAC 480-90-238(2)(a) states, in part, "'"Integrated resource plan" or "plan" means a plan describing the mix of natural gas supply and conservation designated to meet **current** and **future needs**" (emphasis added by Staff.) Cascade's contractual obligations aside, for the purposes of the instant IRP, the GTN Xpress resource addition must be justified based on current and future needs, not on past assessments or needs.

Looking only at current and future needs, Cascade only presents four justifications for the GTN Xpress: unserved demand (shortfalls) modelling, the demand forecast, claims about future prices, and peak day modeling. Each of these will be discussed.

Cascade's first justification for the GTN Xpress capacity resource is a claim about avoided shortfalls:

> In the 2020 and 2023 IRP, Cascade included the 20,000 dth of GTN Cascade contracted for beginning November 1, 2023, in the modeling. Since this new contract was included in the modeling Cascade did not identify any shortfalls in the 2020 IRP and identified a small shortfall on GTN in the 2023 IRP, but not until late 2040's.

This claim omits pertinent information. Since the model presumes the inclusion of the GTN resources in question there is no control. No information is presented on the imminence of a shortfall if the GTN resource were not included in the portfolio, nor is there information provided on the scale of the shortfall. Furthermore, this claim relies upon demand forecasts that are likely inaccurate. **Staff recommends that Cascade reevaluate the demand shortfalls by 1. Updating the demand forecast consistent with Staff's other recommendations noted above in the section on demand growth, price forecasting, and climate change modeling; and 2.**

[141] 4/26/23

Running a control analysis without the GTN capacity increase.[142] Staff believes this analysis should have been done through the course of the advisory group process.

Cascade's next justification for the GTN Xpress resource is that "In this 2023 IRP, Cascade shows in the Demand Forecast chapter that the Company anticipates growth to continue to rise even with the carbon compliance around the CPP."[143] However, Cascade's demand estimates do not account for current statutes and building codes. Cascade anticipates annual load growth of .54 percent out to 2050 driven by increasing customer counts.[144] It is unclear that if Cascade's load forecast aligned with existing statutes and building codes whether any shortfalls would arise prior to 2031 without the addition of further GTN resources. Staff views Cascade's analysis as woefully inadequate to accurately determine if the resource choice is warranted by demand or not.

Next, Cascade attempts to justify the GTN resource addition with reference to future costs. The IRP states "The cost of acquiring 20,000 dths of capacity now will more likely be cheaper than capacity four years from now. It is Cascade's understanding that GTN is nearly fully subscribed."[145] No further context or justification is provided for this assessment. No cost of the capacity resource is provided, and no comparative costs of other resources are indicated. It is not clear that a lowest cost analysis was applied to justify the acquisition of this capacity resource.

Finally, Cascade provides an anecdote of weather on December 22, 2022. On this day "Cascade flowed approximately 66,000 dth along GTN" corresponding to a 52 HDD temperature.[146] Cascade notes that, without the added GTN capacity, there would only be a capacity of 72,603 dth putting Cascade within 6,000 dth of exceeding upstream pipeline contracted capacity.[147] Cascade further adds that the modeled peak is a 70 HDD temperature.[148]
This evidence must be thoroughly deconstructed:

- First, no analysis is given about the date itself; i.e., why it was chosen. It is not clear if this date was a particularly cold date or representative in some other fashion.
- Relatedly, Cascade does not clarify if the 66,000 dth was caused by the 52 HDD temperatures. 78 percent of Cascade's throughput is non-core or transportation customers.[149]
- Cascade does not provide any context when they claim ". . . Cascade was about 6,000 dth from exceeding upstream pipeline contracted capacity while experiencing cold, but not

[142] WAC 480-90-238(2)(a) "Integrated resource plan" or "plan" means a plan describing the mix of natural gas supply and conservation *designated to meet current and future needs* at the lowest reasonable cost to the utility and its ratepayers." [emphasis added by Staff]
[143] 2023 IRP, pg. 4-22
[144] 2023 IRP, pg. 3-19
[145] 2023 IRP, pg. 4-21
[146] 2023 IRP, pg. 4-21
[147] 2023 IRP, pg. 4-21
[148] 2023 IRP, pg. 4-21
[149] 2023 IRP, pg. 2-5

peak day temperatures."[150] It is not clear that this number is a narrow margin. There is no description of the degree to which the system was stressed meeting this demand. It is also unclear if Cascade has curtailable demand available to meet more extreme weather. Cascade notes elsewhere that some transportation arrangements on GTN are interruptible.[151]

- Next, Cascade's modeled peak of a 70 HDD temperature should be scrutinized. Going back to 1993, Cascade's historical 30-year peak HDD in Redmond, Oregon was a 63.7 HDD temperature. It is unclear to Staff where this 70 HDD value comes from or how Cascade arrived at this value in its 99th percentile peak day simulations. Cascade provides no HDD data in the appendices or IRP document to corroborate the inferences of the anecdote presented here. Staff notes that the same year that Cascade's IRP first noted the GTN Xpress capacity resource is the same year that Cascade switched from a 30-year peak analysis to a 99th percentile peak day simulation for upstream modeling purposes. Staff further notes that Cascade continues, elsewhere, to use the 30-year peak weather analysis for distribution system planning.[152]
- Cascade does not state how much supply would be necessary to meet the 99th-percentile-method peak HDD of 70. Nor do they state which HDD temperature would have resulted in a shortfall without the GTN capacity increase.
- Finally, Staff notes that the GTN Xpress contract is a 30-year annual contract. That is, it is a contract to provide an additional 20,000 dth per day, every day of the year, rather than a more targeted winter-capacity contract. Cascade is attempting to demonstrate the need for this contract using a peak day event it anticipates happening less than every 30 years.

For these reasons Staff cautions against accepting this evidence of a "cold, but not peak day temperature" for the inference that Cascade's capacity would be stressed but for the addition of a further 20,000 dth/day capacity from GTN Xpress.

Staff further notes that the size of the GTN Xpress contract is of concern. Cascade explains "Base load contracts can range from as small as 500 dths/day to quantities in excess of 10,000 dths/day. Blocks of 1,000, 2,500, 5,000 and 10,000 dths/day are standard as these are the most operationally and financially viable blocks for suppliers."[153] The GTN Xpress contract is for 20,000 dth. This value exceeds the typical contracts described by Cascade. Given this exceptional size, the GTN Xpress contract warrants greater attention and scrutiny. Staff is further concerned that, given the scale of the contract, that it might lock in an unnecessary expense for the next 30 years. Further, since Cascade already models capacity as if the 20,000 dth/day is part of the portfolio, Staff makes a conjecture that it may act as a sunk cost or friction for PLEXOs and thereby prevent the optimization software from selecting other capacity resources. This could lead to a path dependency issue as the State and regulated entities seek to decarbonize and minimize impacts to ratepayers.

[150] 2023 IRP, pg. 4-21
[151] 2023 IRP, pg. 12-15
[152] 2023 IRP, pg. 8-5
[153] 2023 IRP, pg. 4-4

Finally, Staff notes that the GTN capacity expansion was noted in the 2018 IRP and the Commission agreed with Cascade's 2019-2020 Action Plan.[154] Pursuant to this action plan Cascade "signed a non-binding term sheet between GTN and the Company on April 18, 2019," and later "On September 13, 2019, consistent with GSOC's authorization, Cascade executed a binding precedent agreement with GTN to acquire 20,000 dths/day of GTN capacity as part of the GTN Express project."[155] Since that acknowledgment letter, the regulatory landscape has fundamentally changed with the CCA, standards changes, and other policies. The evidence presented by Cascade does not adequately substantiate its claims about customer demand or respond to the changed regulatory landscape. Consequently, it is unclear to Staff whether Cascade will ever experience a peak load event where it will be necessary to call upon this added capacity. **Therefore, Staff makes the following recommendations: Cascade should analyze the impacts on ratepayers for when this capacity resource becomes a stranded asset.[156] Cascade should clarify the role of non-core/transportation customers in peak day events and provide quantitative and graphic analysis of the size of curtailable contracts.[157] Cascade should demonstrate lowest reasonable cost analysis by demonstrating that other capacity resources were considered.[158] Cascade should demonstrate the need for 20,000 dth/day contract is tailored to meet demand on a 70 HHD temperature day. Cascade should demonstrate that an annual capacity contract is appropriate and tailored for a winter-peaking event.[159] If the Commission shares Staff's concerns on this issue Staff requests that the Commission communicate those concerns to the Company.**

Other Staff Comments

In Chapter 8 Cascade discusses considerations for distribution system enhancements. Cascade explains:

> The feasibility of looping a pipeline depends upon the location where the pipeline will be constructed. Installing gas pipelines through private easements, residential areas, existing asphalt, environmentally sensitive areas, and steep or rocky terrain can increase the cost to a point where alternative solutions are more cost effective.[160]

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[154] Docket UG–171186, "Cascade 2018 IRP Acknowledgement Letter," Attachment, July 8, 2019, at pg. 6.
[155] 2023 IRP pg. 4-21
[156] WAC 480-90-238(2)(b) "At a minimum, this analysis must consider resource costs, market-volatility risks, ... the risks imposed on ratepayers, ..."
[157] WAC 480-90-238(3)(a) "A range of forecasts of future natural gas demand in firm and *interruptible markets for each customer class* that examine the effect of economic forces on the consumption of natural gas and that address changes in the number, type and efficiency of natural gas end-uses." [emphasis added by Staff]
[158] WAC 480-90-238(3)(f) "A comparative evaluation of the cost of natural gas purchasing strategies, storage options, delivery resources, and improvements in conservation using a consistent method to calculate cost-effectiveness."
[159] WAC 480-90-238 (2)(a) "'Integrated resource plan' or 'plan' means a plan describing the mix of natural gas supply and conservation designated to **meet** current and future needs at **the lowest reasonable cost** to the utility and its ratepayers." [emphasis added by Staff]
[160] 2023 IRP, pg. 8-8

Staff questions if the siting of fossil fuel infrastructure might exacerbate environmental inequities. **Staff recommends that Cascade include an equity analysis of its pipeline siting.**[161] **Staff further recommends that if inequities are identified in the siting of pipelines and other infrastructure that Cascade research, design, and implement equity siting protocols that adhere to clear benchmarks toward distribution system siting equity and include that analysis within future IRP documents.**[162]

In Chapter 4, Cascade presents "Incremental Supply Side Resource Options." This is a list of pipeline capacity resources, storage opportunities, and other alternative gas supply resources.[163] **Staff recommends a graphic that synthesizes the data, and communicates the scale of unmet demand and the scale and cost of these supply resources.**[164]

Public Comments

As of writing, the docket has received 310 public comments.[165] All but one of these comments is in opposition to the Cascade IRP in some fashion. Nearly all of these comments are directed explicitly or by inference at the GTN Xpress capacity expansion and Cascade's contract to expand capacity. Comments note the incongruity between the capacity expansion or Cascade's growth forecasts, and the imperative of mitigating climate change and state policies to reduce the use of fossil fuels. Many comments note the unnecessary expense to ratepayers and risks of global and localized harms. Taken in totality, the public comments complement many of the concerns presented in Staff comments.

The one comment in favor provides no basis for its support of expanded natural gas use.

Public Outreach/Engagement

Staff would like to commend Cascade for their open-mindedness and responsiveness to improving public outreach during the technical advisory groups (TAG). Staff followed up TAG one and two with comments to improve public outreach. Cascade met with Staff to talk at length about these comments and adopted many suggestions leading to accessibility improvements to Cascade's IRP website. These improvements included customer friendly language outlining what an IRP is, a clear invitation for customers and interested parties to participate, a simple explanation of the IRP drafting process, a description of expectations for participation,

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[161] GRC pg. 19 para 58
[162] GRC pg. 18 para 56
[163] 2023 IRP, pg. 4-26 to 4-31
[164] WAC 480-90-238(3)(f) "A **comparative evaluation** of the cost of natural gas purchasing strategies, storage options, delivery resources, and improvements in conservation using a consistent method to calculate cost-effectiveness." [Emphasis added by Staff]
[165] As of 4/26/23

descriptions of how to access accommodations for the process, as well as easy access to the materials and recordings of each TAG and the resultant IRP document and appendices.[166]

There is still considerable headway to be made in improving access and inclusions to the IRP process as well as Cascade's various customer programs.

Cascade provides bill inserts in English and Spanish. Spanish language bill inserts are limited to public safety information, and a single line on the Washington Energy Assistance Fund insert stating that Spanish-speaking customer services are available. Spanish bill inserts do not include messaging for the IRP process or customer programs like conservation. Bill inserts are not available in any other languages. **Staff recommends Cascade improve the language accessibility of bill inserts.[167]**

Cascade's website has a translation function into 13 languages. However, Staff notes this is a machine translation function rather than colloquial/professional translation. **Staff recommends that Cascade hire professional translators to translate Cascade's website.[168]**

Cascade has the capacity to engage in targeted direct mail and email efforts to target commercial customers who already participate in customer programs, as well as the capacity to target specific business types in the business sector for relevant measures such as boilers for schools, cooking equipment for restaurants etc. However, Cascade lacks the technical ability to target customers for parameters such as income, or renter status. **Staff recommends that Cascade collaborate with its Conservation Advisory Group, Low-Income Advisory Group, and Equity Advisory Group to develop the technical ability to target communications to customers who are renters, low income, non-English speaking, and other energy equity-related parameters.[169]**

Additionally, Cascade's IRP discusses their work with community-based organizations. For example, "When able the EE Department works with local nonprofit groups including Clean Air Agencies to promote more efficient use of natural gas over alternative heating fuels like

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[166] Cascade Natural Gas Corporation, "NATURAL GAS – INTEGRATED RESOURCE PLAN," April 18, 2023. Available at Washington Integrated Resource Plan - Cascade Natural Gas Corporation (cngc.com)

[167] GRC pg. 18 para 56, "Procedural justice which focuses on inclusive decision-making processes and seeks to ensure that proceedings are fair, equitable, and inclusive for participants, recognizing that marginalized and vulnerable populations have been excluded from decision-making processes historically."

[168] GRC pg. 18 para 56, "Procedural justice which focuses on inclusive decision-making processes and seeks to ensure that proceedings are fair, equitable, and inclusive for participants, recognizing that marginalized and vulnerable populations have been excluded from decision-making processes historically."

[169] GRC pg. 18 para 56, "Procedural justice which focuses on inclusive decision-making processes and seeks to ensure that proceedings are fair, equitable, and inclusive for participants, recognizing that marginalized and vulnerable populations have been excluded from decision-making processes historically."

uncertified wood burning fireplaces" and "Cascade partners with local community-based energy programs to support their energy reduction efforts and leverage the opportunity to promote the EEIP to the public. The Company will continue to seek partnerships and support EE efforts throughout its service territory."[170] However, Cascade provides no information regarding the frequency, scale, or outcomes of this work. **Staff recommends that Cascade, where possible, quantify these efforts and outcomes.[171] Staff recommends that Cascade collaborate with its Conservation Advisory Group, Low-Income Advisory Group, Equity Advisory Group, and community-based organizations in its service territory to develop and expand these relationships as well as the capacity and outcomes of these partnerships were consistent with equity goals and lowest reasonable cost analysis.[172]**

Closing Remarks

Staff closes its comments and remarks by highlighting the recent GRC Final Order, Docket UG-210755. The order stresses the importance of addressing equity in <u>all</u> public interest considerations. Staff believes that the imperatives outlined in this order are highly relevant to the work and analysis contained in integrated resource planning. **Staff recommends that Cascade <u>thoroughly review the order</u> and prepare to implement its imperatives in its 2025 IRP.** Staff looks forward to collaborating with and assisting Cascade in this endeavor and learning process.

The Commission provided guidance on how it will view equity investments in its order approving a settlement in Cascade Natural Gas' 2022 rate case:

> So that the Commission's decisions do not continue to contribute to ongoing systemic harm, we must apply an equity lens in all public interest considerations going forward. Recognizing that no action is equity-neutral, regulated companies should inquire whether each proposed modification to their rates, practices, or operations corrects or perpetuates inequities. Companies likewise should be prepared to provide testimony and evidence to support their position. Meeting this expectation will require a comprehensive understanding of the ways in which systemic racism and other inequities are self-perpetuating in the existing regulatory framework absent corrective intervention. It is incumbent upon

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[170] 2023 IRP, pg. 7-25
[171] GRC pg. 18 para 56, "Distributional justice which refers to the distribution of benefits and burdens across populations. This objective aims to ensure that marginalized and vulnerable populations do not receive an inordinate share of the burdens or are denied access to benefits."
[172] GRC pg. 18 para 56, "Distributional justice which refers to the distribution of benefits and burdens across populations. This objective aims to ensure that marginalized and vulnerable populations do not receive an inordinate share of the burdens or are denied access to benefits."
WAC 480-90-238(2)(a) "Integrated resource plan" or "plan" means a plan describing the mix of natural gas supply and conservation designated to meet current and future needs at the lowest reasonable cost to the utility and its ratepayers.

> regulated companies to educate themselves on topics related to equity just as it is incumbent upon the Commission to do the same.[173]

Staff recommends that Cascade thoroughly review the order and prepare to implement its imperatives in its 2025 IRP. Staff looks forward to collaborating with and assisting Cascade in this endeavor and learning process.

Summary of Staff Recommendations:

For Compliance with Order, Rule, and Public Policies, Staff believes the Commission should direct Cascade to file a comprehensive, detailed work plan within the next two months to begin working with Staff and parties earlier in the planning process to ensure that the recommendations contained in Staff comments are incorporated into the 2025 IRP. The Company should plan future meetings with staff and interested persons and parties to prioritize and incorporate: (1) RNG resources into its Climate Commitment Act compliance resource portfolio and lowest reasonable cost analysis, and (2) Ensure that the other recommendations contained in Staff comments are appropriately addressed in the 2025 IRP. As detailed in the categories below, Cascade should:

Renewable Natural Gas

- Update their analysis to consider RNG as a valid CCA compliance resource and as part of a lowest reasonable cost portfolio.

Demand Forecast

- Use a first order approximation of current building code impacts on customer counts and use per customer, until Cascade can collect enough data for a more exacting estimate of customer count impacts.
- Where the specifics of future codes are unknown, the utility should project a demand forecast trend that accords with statutory goals and mandates. This specifically refers to RCW 19.27A.020(2)(a) and RCW 19.27A.160.
- Develop a building stock attrition rate to represent the loss of customers due to buildings being demolished, abandoned, condemned, remodeled without gas service, or otherwise leaving gas service.
- Adopt the assumptions about building code goals and mandates, as well as building stock attrition as the "current expectations" found in Figure 9-3, where sufficient data about current building and future codes is not available.
- Communicate the impacts of climate change in narrative as well as in Figure 3-14: System Baseload vs DSM.
- Analyze the risks associated with rapidly increasing bill impacts upon customers and the distributional effects through the lens of equity, energy justice, and access to energy efficiency resources.

[173] Final Order 09, UG-210755 (Aug. 23, 2022).

- Dynamically model the anticipated comparative costs between Cascade's natural gas services and electric utility services into the future as well as the interplay of customers, by class, responding to that changing comparative cost.
- Incorporate the distributional analysis recommended above within the comparative cost analysis.

Climate Commitment Act

- Plan to comply with all applicable laws, including the CCA and the statutory emissions cap.
- Evaluate and analyze the prudence of its planned reliance on PCUs.
- Dynamically model Industrial customers in all scenario modeling as well as industrial customers' responses to changing market conditions and changing utility service price competitiveness.
- Develop a decarbonization plan akin to the Avista general rate case settlement with the added objectives of avoiding instability, reducing impacts on customers, and fully assessing the lowest cost mix of fuels and conservation (including electrification where appropriate).

Conservation

- Work with Community Action Agencies in their service territory to improve Community Action Agencies' internal capacity. In collaboration with its Conservation Advisory Group, Low-Income Advisory Group, and Equity Advisory Group, identify other means of improving capacity of Demand Side Management programs, as well as researching other delivery mechanisms to increase low-income program goals.
- Assess the distributional equity implications of its Demand Side Management programs, and, where inequitable gaps are identified, to research, design, and implement improvements that adhere to clear benchmarks toward program equity.

Price Forecasting

- Add figures similar to Figure 4-9 to communicate the price methods used later in the scenario modeling.
- Include these methods and figures in Chapter 4 under the subheading of Natural Gas Price Forecast as Staff believes they are part of the price forecast.
- Model the uncertainty in the trend line itself.

Climate Change modeling

- Do not cite Wikipedia.
- Align the RCP pathway with expected global emissions rather than the expected emissions of Western North America.
- Adopt RCP 8.5 as it is relied upon by the NWPCC and would bring Cascade's modeling in line with other gas utility IRP climate modeling already submitted to the UTC.
- Include HDD data related to peak days in its appendices.
- Model all climate change impacts in a non-linear fashion.

- Incorporate climate change into its peak day methodology.

Upstream and Distribution Emissions

- Quantify all of its emissions occurring in the gathering, transmission, and distribution of natural gas.
- Comply with RCW 80.28.380 and include these emissions estimates in its cost-effectiveness analysis where appropriate.
- Corroborate measurement of distribution system emissions with reference to accounting the difference between natural gas volumes purchased by Cascade and the volumes sold.

PLEXOS

- Consult with their Low-Income Advisory Group, and Equity Advisory Group to design a better methodology for considering the lowest reasonable cost, which includes examination of its decision-making framework related to integrated resource plan modeling.
- Highlight and offer appropriate cautions in its analysis wherever PLEXOS yields results or behaviors that would be unlikely to be anticipated or enacted by a human planner.
- Highlight and offer appropriate caution in its analysis wherever PLEXOS uses resources in its portfolio in a manner that does not accord with current best practices or current technological means.
- Rapidly resolve the technical and economic questions related to the integration of Hydrogen and other synthetic fuels to ensure the fuels are accurately incorporated into optimized portfolios.

GTN Xpress

- Reevaluate the demand shortfalls by: (1) Updating the demand forecast consistent with Staff's other recommendations noted above in the section on demand growth, price forecasting, and climate change modeling, and (2) Running a control analysis without the GTN capacity increase.
- Analyze the impacts on ratepayers for when the GTN capacity resource becomes a stranded asset.
- Clarify the role of non-core/transportation customers in peak day events and provide quantitative and graphic analysis of the size of curtailable contracts.
- Demonstrate the lowest reasonable cost analysis by demonstrating that other capacity resources were considered.
- Demonstrate that a 20,000 dth/day annual contract is tailored to meet demand on a 70 HHD temperature day.
- Demonstrate that an annual capacity contract is appropriate for a winter-peaking event.

Other Staff Comments

- Include an equity analysis of its pipeline siting.

- If inequities are identified in the siting of pipelines and other infrastructure then research, design, and implement equity siting protocols that adhere to clear benchmarks toward distribution system siting equity and include that analysis within future IRP documents.
- Include a graphic that synthesizes the data and communicates the scale of unmet demand and the scale and cost of Incremental Supply Side Resource Options.

Public Outreach and Engagement

- Improve the language accessibility of bill inserts.
- Hire professional translators to translate Cascade's website.
- Collaborate with its Conservation Advisory Group, Low-Income Advisory Group, and Equity Advisory Group to develop the capacity to target communications for customers who are renters, low income, non-English speaking, and other energy equity-related parameters.
- Where possible, quantify collaboration with local non-profits and community-based organizations and outcomes of that collaboration.
- Collaborate with its Conservation Advisory Group, Low-Income Advisory Group, Equity Advisory Group, and community-based organizations in its service territory to develop and expand these relationships as well as the capacity and outcomes of these partnerships.
- Thoroughly review the GRC final order and prepare to implement its imperatives in its 2025 IRP.

Further, if the Commission shares Staff's concerns regarding the GTN Xpress capacity expansion Staff requests that the Commission communicate those concerns to the Company.