BEFORE THE

PUBLIC UTILITY COMMISSION OF OREGON

**UG 435 / UG 411**

# NW Natural

# Reply Testimony of Kimberly A. Heiting and Ryan J. Bracken

# POLICY
# EXHIBIT 1700

June 6, 2022

# EXHIBIT 1700 – REPLY TESTIMONY – POLICY

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## I. INTRODUCTION AND SUMMARY

**Q. Ms. Heiting, please state your name and position with Northwest Natural Gas Company ("NW Natural" or "the Company").**

A. My name is Kimberly Heiting, and I am the Senior Vice President of Operations and Chief Marketing Officer at NW Natural.

**Q. Please describe your education and employment background.**

A. I received a Bachelor of Arts in Communications from the University of Iowa and a Master of Science in Communications from Northwestern University. I have worked at NW Natural since 2005 in leadership roles related to communications marketing, and operations with increasing responsibility. I have held my current position since 2018.

**Q. Mr. Bracken, please state your name and position with NW Natural.**

A. My name is Ryan Bracken, and I am Director of Strategic Planning at NW Natural.

**Q. Please describe your education and employment background.**

A. I have a Bachelor of Arts in Economics and Marine Science from the University of Hawaii at Hilo and a Master of Arts in Economics from Colorado State University. I have worked at NW Natural since 2014, and I have been in my current role since 2020. Prior to joining NW Natural, I was a senior economist at the Public Utility Commission of Oregon and an instructor of economics at the Colorado School of Mines, where I completed doctoral coursework in energy economics.

**Q. Are you jointly sponsoring this Reply Testimony?**

A. Yes, we are jointly sponsoring Sections II.A, II.B, II.C, and II.D of this testimony, and Ms. Heiting is individually sponsoring Section II.E.

**Q. What is the purpose of your Reply Testimony?**

A. Our Reply Testimony responds to testimony from the Oregon Citizens' Utility Board ("CUB") and Coalition of Communities of Color, Sierra Club, Verde, Climate Solutions, Oregon Environmental Council, Columbia Riverkeeper, and Community Energy Project (collectively, "the Coalition") regarding NW Natural's response to climate change, whether the Company can reduce its greenhouse gas ("GHG") emissions sufficiently to comply with Oregon's Climate Protection Program ("CPP"), and whether NW Natural should continue expanding its system to serve new customers, including by offering a line extension allowance to new customers. In addition, Ms. Heiting responds to the Coalition's concerns and proposed disallowances regarding lobbying and political activities and dues and membership expenses.

**Q. Please provide a high-level summary of the arguments made by CUB and the Coalition to which you will respond.**

A. In their testimony, both CUB and the Coalition make wide-ranging arguments that are intended to call into question whether NW Natural can meet the challenge of climate change and comply with the CPP, whether the gas utility model has any place in Oregon's decarbonized energy future, and more immediately, whether and under what terms NW Natural should serve new customers that desire gas service. These parties suggest that the only way to reduce GHG emissions is to electrify building load, and accordingly each proposes significant changes to NW Natural's line extension tariff designed to reduce the allowance provided to new natural gas customers.

CUB witness Mr. Jenks, in particular, details what he believes to be the three major challenges to the natural gas utility business model: (1) the supposed greater efficiency of electric space and water heating and cooking;[1] (2) the challenge of climate change and, in particular, his opinion that NW Natural does not have a reasonable plan to comply with decarbonization mandates, such as Oregon's CPP;[2] and (3) his concern that the increased cost of conventional natural gas, along with the expense of renewable natural gas ("RNG") and increased spending on energy efficiency, will significantly increase the cost of NW Natural's product.[3] Mr. Jenks argues that these challenges will cause, and indeed are causing, NW Natural customers to leave the gas system, which calls into question whether the assumed useful life of a pipe should be 60 years or more,[4] as well as concerns regarding stranded investments.[5] To address these concerns, CUB recommends that the Commission "phase out" the presumption of prudence associated with capital investments to add new customers.[6] CUB also recommends that the Company's line extension allowance be reduced over the next two years and eliminated in 2025.[7]

[1] CUB/100, Jenks/2-3.

[2] CUB/100, Jenks/3-5.

[3] CUB/100, Jenks/5.

[4] CUB/100, Jenks/6.

[5] CUB/100, Jenks/6.

[6] CUB/100, Jenks/14.

[7] CUB/100, Jenks/17.

Coalition witness Nora Apter also challenges the Company's business model, and in particular, the Company's projections of new customer additions over time, on the belief that gas service is detrimental to the environment and that NW Natural's expectations for CPP compliance are unrealistic.[8] On this point, Ms. Apter questions whether NW Natural's plan to supply its customers with RNG is feasible and beneficial.[9] Moreover, Ms. Apter asserts that adding customers to the Company's system increases the risk and cost to ratepayers compared to building electrification, which she claims is cheaper than direct use of gas and "all but inevitable."[10] This particular position dovetails with the testimony of Coalition witness Ed Burgess who makes some of the same points made by Mr. Jenks to support the Coalition's recommendation that NW Natural's line extension allowance be eliminated in this case.[11]

Coalition witness Charity Fain advocates that the Commission adopt policies that promote switching low- and middle-income customers away from gas utility service to electric service.[12] Coalition witness Greer Ryan opposes allowing NW Natural recovery for its participation in the CPP rulemaking, legislative

[8] Coalition/100, Apter/6-7, 17.

[9] Coalition/100, Apter/15-16.

[10] Coalition/100, Apter/7, 9-10, 13, 16-17.

[11] *See* Coalition/200, Burgess/4, 14-21.

[12] Coalition/300, Fain/4.

advocacy, and its engagement with the City of Eugene,[13] as well as recovery of expenses related to dues and memberships.[14]

**Q. Please summarize your testimony.**

A. CUB's and the Coalition's testimony are filled with broad statements and sweeping conclusions, all of which are grounded in two central beliefs:(1) NW Natural cannot decarbonize its system as required by the CPP; and (2) it is both possible and less expensive for Oregon's electric utilities to serve all new building load, along with their existing load and transportation load, both safely and reliably, with renewable energy. Based on these beliefs, CUB and the Coalition suggest that the only way for Oregon to reach its decarbonization goals will be to electrify building load, while discouraging the addition of new customers to the gas system and ultimately phasing out natural gas service over time. However, these parties' beliefs, and their ultimate conclusions, are unsupported by any persuasive analysis specific to Oregon and NW Natural's service territory, and in fact, are contradicted by initial analyses performed by NW Natural and brought into question by work by third-party experts, Environmental+Energy Economics ("E3"). For these reasons, the Commission should reject CUB's and the Coalition's arguments.

As an initial matter, before the Commission can evaluate the gas utilities' CPP implementation strategies—or any proposals to revise existing line extension policies—it will require significant additional information, as recognized by Staff in

[13] Coalition/400, Ryan/38-41.

[14] Coalition/400, Ryan/5, 42-48.

its Draft Report in the natural gas fact-finding docket, UM 2178 ("Fact-Finding docket"). Specifically, the Commission will require robust data about the natural gas utilities' ability to decarbonize their product. The Commission will also require analyses by the electric utilities regarding the cost and their ability to electrify additional load—both transportation and building load—without compromising reliability and while meeting the transformational requirements recently enacted in House Bill ("HB") 2021. NW Natural has advocated that the Commission sponsor an Oregon-specific, economy-wide decarbonization study that includes the gas, electric, and transportation sectors and explicitly models the capacity needed to maintain reliable service during extreme weather events when service interruptions are most dangerous to Oregonians. At present, there has been only one in-depth analysis as to the most efficient and cost-effective approach to decarbonizing the energy sector in Oregon while meeting peak heating loads; that study concludes that natural gas companies can continue serving existing and new customers and that this approach is likely less expensive for Oregonians than building electrification, particularly considering the types of electric heat pumps that are being installed in Oregon today. While this comprehensive study, like other deep decarbonization studies conducted in the Northwest, was completed before the CPP rules were enacted and HB 2021 was passed, and therefore may not be definitive on all relevant issues, it suggests that CUB's and the Coalition's rush to judgment on the future of natural gas is misguided and that rapid, wholesale electrification of building load is neither economical nor necessary for meeting Oregon's decarbonization targets.

Importantly, NW Natural's initial analysis performed in docket UM 2178 indicates that the Company can continue serving customers and responsibly grow its system, while also complying with the specific requirements of the CPP—contrary to CUB's and the Coalition's testimony. In fact, the UM 2178analysis shows that customers will be better off under the Company's proposed compliance scenarios than under a scenario that discourages or outright limits the Company's growth. Although the Company's CPP-compliance modeling is preliminary, and more robust modeling using more appropriate analytical tools is currently underway in NW Natural's integrated resource plan ("IRP"), the Company is confident that it can comply through a combination of energy efficiency and renewable gas (RNG, hydrogen, and synthetic gas) under a wide range of potential future market and policy conditions. Given the potential technical challenges and cost impacts of an "electrify everything" approach, these new and emerging renewable gas supplies may well be critical to Oregon's ability to maintain reliable energy while meeting climate goals. In fact, the Oregon legislature and Governor Brown have both specifically recognized the vital role RNG can play in helping Oregon meet its climate goals.[15] It is for precisely this reason that in its Draft Fact-Finding Report issued in docket UM 2178, Staff encouraged the gas utilities to continue to pursue RNG, hydrogen gas, and any new or emerging technologies to preserve maximum optionality for decarbonization.

[15] *See* Office of the Governor State of Oregon, Executive Order No. 20-04; S.B. 98, 80th Leg. Assemby, Reg. Sess. (Or. 2019).

Moreover, the Commission should reject outright CUB's claim that customers are already leaving the natural gas system in substantial numbers or are poised to do so,[16] as well as the Coalition's claim that Oregonians are broadly rejecting natural gas service.[17] CUB and the Coalition make these claims to argue that the gas utility model is failing and therefore any expansion of the gas system is certain to result in stranded costs.[18] These arguments, however, rest on a fallacy. As we demonstrate below, the actual data do not show an increasing trend in customers converting gas equipment to another fuel source or leaving the natural gas system. In fact, in making these arguments, the Coalition and CUB are not shining a light on a problem that already exists, but rather are striking a match to create one—by proposing line extension policies that will discourage customers from connecting to the gas system. The Commission should decline this invitation to drive a market result that is not "inevitable" or supported by Oregon legislative or regulatory policy.

On this point, NW Natural urges the Commission to consider the unintended consequences of a significant reduction in the Company's line extension allowance in this case. Even if the Commission were to take such an action on an interim basis,[19] while it gathers further information on GHG reductions, such a

[16] CUB/100, Jenks/3, 6-7.

[17] Coalition/100, Apter/11-14.

[18] *See* CUB/100, Jenks/6-7, 13; Coalition/200, Burgess/17; Coalition/300, Fain/23.

[19] *See In re Oregon Public Utility Commission Staff Natural Gas Fact Finding per Executive Order 20-04 PUC Year One Work Plan*, Docket UM 2178, Staff's Draft Report at 24 (Apr. 15, 2022) (identifying exploration of "interim, easily implemented approach to line extension allowance policy" as near-term action).

determination could signal that it has pre-decided a diminished role for gas utilities in Oregon's energy future, which in turn could impair the Company's financial health and its ability to access the resources necessary to pursue all available strategies for decarbonization. Presupposing NW Natural's system is not necessary or socially beneficial to realizing Oregon's clean energy future would be irresponsible in the absence of supporting, Oregon-specific analysis. In fact, making this kind of far-reaching policy change without a comprehensive assessment of energy system risks and costs would very likely, and unnecessarily, interfere with the state's ability to achieve its climate goals.

Finally, and perhaps most importantly, the Commission should reject the subtext underlying CUB's and the Coalition's proposals—the belief that it is the Commission's role to determine Oregon's path to decarbonization, and that the Commission possesses the authority to "choose" electrification over a route that allows natural gas utilities to demonstrate compliance with emissions reduction requirements. In fact, the policies proposed by CUB and the Coalition are far outside the scope of the Commission's jurisdiction, which is to oversee the utilities' compliance with *current* state decarbonization laws, as articulated by the legislature and the direction provided by Executive Order ("EO") 20-04. As discussed further below, those laws and policies are focused on emissions reductions, not fuel-switching, and they explicitly encourage the transition of gas utilities to RNG.

**Q. Do you include any exhibits with your testimony?**

A. Yes, our testimony includes the following exhibits:

- NW Natural/1701, Heiting-Bracken is an Oregonian article regarding electric utilities' challenges to decarbonize.
- NW Natural/1702, Heiting-Bracken is the Pacific Northwest Pathways to 2050 study conducted by Energy+Environmental Economics.
- NW Natura/1703, Heiting-Bracken is Building a Resilient Energy Future: How the Gas System Contributes to US Energy System Resilience.
- NW Natural/1704, Heiting-Bracken is the presentation of NW Natural's modeling results in the Fact-Finding, docket UM 2178.
- NW Natural/1705, Heiting-Bracken is a presentation by Enbridge regarding natural gas heat pumps.
- NW Natura/1706, Heiting-Bracken is the confidential ANSI/ASHRAE's Standard Methods of Determining, Expressing, and Comparing Building Energy Performance and Greenhouse Gas Emissions.
- NW Natural/1707, Heiting-Bracken is NW Natural's comparison of the efficiency of gas and electric heat pumps.
- NW Natural/1708, Heiting-Bracken is the American Gas Association, Review and Comments "Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Home," Environmental Science & Technology, 2022.

- NW Natural/1709, Heiting-Bracken is Issues that Render the Sierra Club/UCLA Study of *Effects of Residential Gas Appliances on Indoor and Outdoor Air Quality and Public Health in California* Not Useful for Decision-Making Purposes.
- NW Natural/1710, Heiting-Bracken is the Company's confidential response to UG 435 Coalition DR 158.
- NW Natural/1711, Heiting-Bracken is the Company's response to UG 435 Coalition DR 73.

## II. RESPONSE TO PARTIES' ARGUMENTS

### A. The Commission should not significantly alter the policies governing NW Natural's customer-acquisition framework in this rate case.

**Q. Please explain why, in the Company's view, the Commission should not entertain the parties' proposals to reduce and eliminate NW Natural's line extension allowance in this rate case.**

A. First, as context, we point out that NW Natural's current line extension policy has been in place for nearly a decade, and during that time, it has allowed new customers to obtain gas service while fairly and equitably recognizing the upfront costs to serve new customers, the margin revenues produced by the new customers, and the benefits that accrue to all customers when new costs are spread across an expanded base. The reasonableness of this line extension policy is detailed in the Reply Testimony of John Taylor of Atrium Consulting, NW Natural/1800, Taylor.

At NW Natural, we recognize the challenge of climate change that requires us to reevaluate all aspects of our retail energy markets, including the best approaches to reduce GHG emissions in the electric, gas, and transportation sectors. And we certainly acknowledge that it is fair for the State's policy makers to explore whether an expanded gas system is beneficial to customers and consistent with the State's climate goals, just as it is fair to ask whether the State can safely rely on electricity alone to heat our buildings while the electric utilities comply with HB 2021. In fact, these are pressing questions that must be addressed. However, the determination of the best path toward decarbonization is outside the scope of the Commission's authority, which is to assure utilities' compliance with current state laws and policies.

Moreover, to the extent that the Commission is considering whether the Company's line extension tariff does comply with current laws and policies, that issue can only be responsibly debated in the context of facts and sound Oregon-specific analysis, as opposed to presupposition, bias and rhetoric. As such, it is critical that the Commission refrain from making significant changes to the Company's line-extension policy until it has gathered the relevant data and analysis. In this context, the Commission and the parties have more work to do. Specifically, the Commission should (1) allow the electric and gas utilities to complete their IRP processes in which they will present their detailed, fully analyzed plans for complying with the CPP, HB 2021, and other important policies; and (2) commission an Oregon-specific comprehensive analysis of the feasibility and cost of all available paths to decarbonizing the retail energy sector, including

electric, gas, and transportation that explicitly and deliberately considers reliability during extreme weather events.[20]

**Q. You testified that the Commission needs additional information and analysis to understand how gas and electric utilities can comply with decarbonization mandates and at what cost to customers. Will the necessary information be developed in the ongoing Fact-Finding docket, or is additional analysis necessary?**

A. It is crucial that the Commission consider additional analysis beyond what has been developed in the Fact-Finding docket to-date, which is necessarily preliminary in nature and higher level, given the posture and timeline of that docket. As Staff's Draft Report explained,

> The uncertainty in costs, performance risks, and availability of resource options for each pathway to decarbonize has raised ***many more questions to be addressed to ensure the planning and decision-making process supports the identification of the least-cost and least-risk approaches to future GHG emission compliance***. While the gas companies, stakeholders, policy makers, and regulators must chart a pathway to meet the CPP requirements, ***technology costs and performance remain highly speculative***. The analysis from the [Fact-Finding docket], while informative, made it clear that ***more robust modeling and rigorous vetting of resource assumptions within Integrated Resource Plans (IRPs) will be required to make informed assessments about least cost, least risk paths for compliance***.[21]

[20] NW Natural also notes that decisions about the future of natural gas in Oregon should likely occur in a proceeding that involves the other Oregon natural gas utilities, rather than in a single utility's rate case. The Coalition appears to agree that a generic investigation is an appropriate approach for setting policy regarding line extension allowances. Coalition/200, Burgess/30 (recommending investigation into line extension allowance for all gas utilities).

[21] Docket UM 2178, Staff's Draft Report at 9 (emphasis added).

**Q. Can you expand upon the type of additional information the Commission needs to consider?**

A. Yes. First, arguments that the Commission either should or should not adopt policies that will drive electrification of building loads must be addressed by current legislative direction. As noted above, building electrification is not the law in this state, and even if the Commission wished to consider that policy, it lacks authority to do so. Moreover, to the extent the Commission determines it must wade into this debate in the context of the parties' line extension proposals, it cannot make an informed decision regarding the necessity and impacts of altering NW Natural's line extension policy without understanding the ability of the electric system to reliably serve with clean energy the significant new loads that will result from electrification of buildings along with transportation electrification. This work has yet to be done at a utility-specific level where new annual and peak loads are modeled to be served on an hourly basis as part of a robust electric resource planning process.[22] As Staff notes, robust modeling through utilities' IRPs will provide insight regarding the utility's least-cost, least-risk paths for compliance,[23]

[22] PacifiCorp's recently filed IRP does not include analysis to understand what is required to meet HB 2021, and PGE's most recently filed IRP update forecasts increasing emissions to around 2030 rather than the 80 percent reduction by 2030, now required by HB 2021. Therefore, PGE's next IRP, which will be filed in 2023, must have drastic changes.

[23] Docket UM 2178, Staff's Draft Report at 9.

and additional information regarding the interactions between the gas and electric systems is needed.[24]

To enable the necessary coordination, Staff recommends that the Commission request that both gas and electric utilities develop and articulate individual electrification assumptions in future IRPs that others can reference.[25] NW Natural agrees that it is critical that the utilities include this information in their IRPs. In addition, NW Natural recommends that the Commission undertake an analysis that comprehensively examines Oregon's electric and gas systems to understand how electrification impacts each system's cost, reliability, and ability to decarbonize in the context of compliance with the CPP and HB 2021.

NW Natural acknowledges Staff's statements in the Fact-Finding docket Draft Report about the difficulties of conducting an analysis regarding the interactions between the gas and electric systems,[26] and the additional resources that would be required.[27] Because these issues are absolutely critical for our State and region, however, the Commission should at a minimum insist upon robust and coordinated IRP planning processes prior to making any significant changes to NW Natural's line extension policy.

[24] Docket UM 2178, Staff's Draft Report at 9 ("Oregon's carbon reduction goals cement the interrelatedness of gas and electric operations decisions more than ever before."); *Id.*at 28 (explaining the "need to understand the interdependency of the gas and electric systems in terms of costs and emissions that result from policies that shift load away from gas").

[25] Docket UM 2178, Staff's Draft Report at 23.

[26] Docket UM 2178, Staff's Draft Report at 15.

[27] Docket UM 2178, Staff's Draft Report at 2, 7, 23.

**B. Parties incorrectly assume that all building load can and must be electrified.**

**Q. Testimony from the Coalition, and to a somewhat lesser extent CUB, regarding the role of gas in a low-carbon future is premised upon the assumption that all or most building load can and should be electrified to meet Oregon's climate goals. Do CUB and the Coalition support their arguments with any persuasive analysis?**

A. No. The CUB and Coalition proposals rest on the unstated belief that the electric utilities in Oregon can serve all new (and over time much of the existing) building load and do so with fewer emissions and at a lower cost than gas. Notably, however, both CUB and the Coalition rely on high-level talking points that are unsupported by comprehensive, state-specific, objective, data-driven analysis and citations to analysis for other jurisdictions that are not fully applicable to Oregon's climate or existing energy system.

**Q. Is there any Oregon law or policy requiring, or even encouraging, the electrification of gas load?**

A. No, and in fact, Oregon law and policy recognize and support the ongoing role of RNG in Oregon's energy transition. Specifically, in Senate Bill ("SB") 98, which was passed in 2019 and authorizes Oregon natural gas utilities to procure RNG, the Oregon legislature found that RNG "provides benefits to natural gas utility customers and to the public" and that RNG development "should be encouraged

to support a smooth transition to a low carbon energy economy in Oregon."[28] The legislature further declared that "[n]atural gas utilities can reduce emissions from the direct use of natural gas by procuring [RNG] and investing in [RNG] infrastructure," and that RNG "should be included in the broader set of low carbon resources that may leverage the natural gas system to reduce [GHG] emissions."[29]

In addition, EO 20-04, which establishes GHG reduction targets, states that "transitioning the traditional natural gas supply to [RNG] can significantly reduce GHG emissions."[30] Notably, while EO 20-04 specifically discussed *transportation* electrification, it does not promote or even mention *building* electrification.[31] Finally, the CPP itself recognizes that RNG can be used in lieu of conventional natural gas to lower emissions and help Oregon's natural gas utilities comply with the program.[32]

**Q. Does NW Natural agree with the premise that building electrification is the only or best way to achieve Oregon's climate goals?**

A. No. NW Natural strongly disagrees with this premise for several reasons. First, currently, electric heating in Oregon is often more carbon-intensive than gas heating given the relative emissions intensity of the electric sector in Oregon and particularly given the ongoing widespread use of electric resistance heating in

[28] ORS 757.390(1).

[29] ORS 757.390(2).

[30] Office of the Governor State of Oregon, Executive Order No. 20-04.

[31] *See, e.g.*, Executive Order 20-04, Section 5(B)(2) (directing Public Utility Commission to encourage transportation electrification).

[32] *See* OAR 340-271-0110(4)(b)(B)(i).

existing homes and new construction. Second, there are significant questions regarding the electric utilities' ability to electrify building load—and potentially transportation load—while at the same time decarbonizing their generation portfolios as required by HB 2021. And third, even if the electric utilities are able to decarbonize while rapidly electrifying building and transportation load, it is in no way clear that they could decarbonize more economically than the gas system.

**Q. Please elaborate on your first statement—that currently, electric heating in Oregon is often more carbon-intensive than gas heating.**

A. At present, given market trends and relative emissions intensities, electrifying heating load in Oregon will not result in decreased emissions, depending on the customer's equipment and utility provider. While the electric system is working to decarbonize and must comply with HB 2021, and while it is critical that we plan for the long-term, near-term emissions reductions provide significant long-term climate benefits. To this point, the current GHG intensity of Oregon's electricity and, specifically, the electric heating equipment that continues to be installed, needs to be carefully considered.

At present, electrification of gas heating load using electric resistance heating would result in substantial emissions increases for nearly all gas utility customers in the state. Replacement of gas heating with the electric heat pumps most commonly installed today would not result in meaningful emissions reduction in the near-term, and, depending on the electric provider, would result in substantial emissions increases for a large share of Oregonians who are current or prospective gas utility customers.

There is very little emissions benefit to the state from electrification of gas heating (currently and in the years to come) when accounting for areas of the state where gas utilities and electric utilities have overlapping service territories, and weighing the emissions trajectories of heating with gas and electricity in the context of the CPP and HB 2021. Furthermore, if all gas heating in the state were replaced with the most commonly installed electric heat pumps tomorrow, it would reduce emissions in the state by roughly one percent with the current emissions intensity of electricity in Oregon where gas service is available. Given the prevalence of electric heating in Oregon, and that space-heating loads are most prevalent when the electric grid is more emissions intensive than the annual average, it is possible that it may not reduce emissions at all. The figure below shows (i) current Oregon emissions, (ii) the total portion that results from direct use of natural gas, (iii) the portion that results from direct use of natural gas by residential and commercial customers, (iv) the portion that results from direct use of natural gas for space heating, and (v) the portion that would be reduced if all direct use space heating were electrified with high efficiency heat pumps today.

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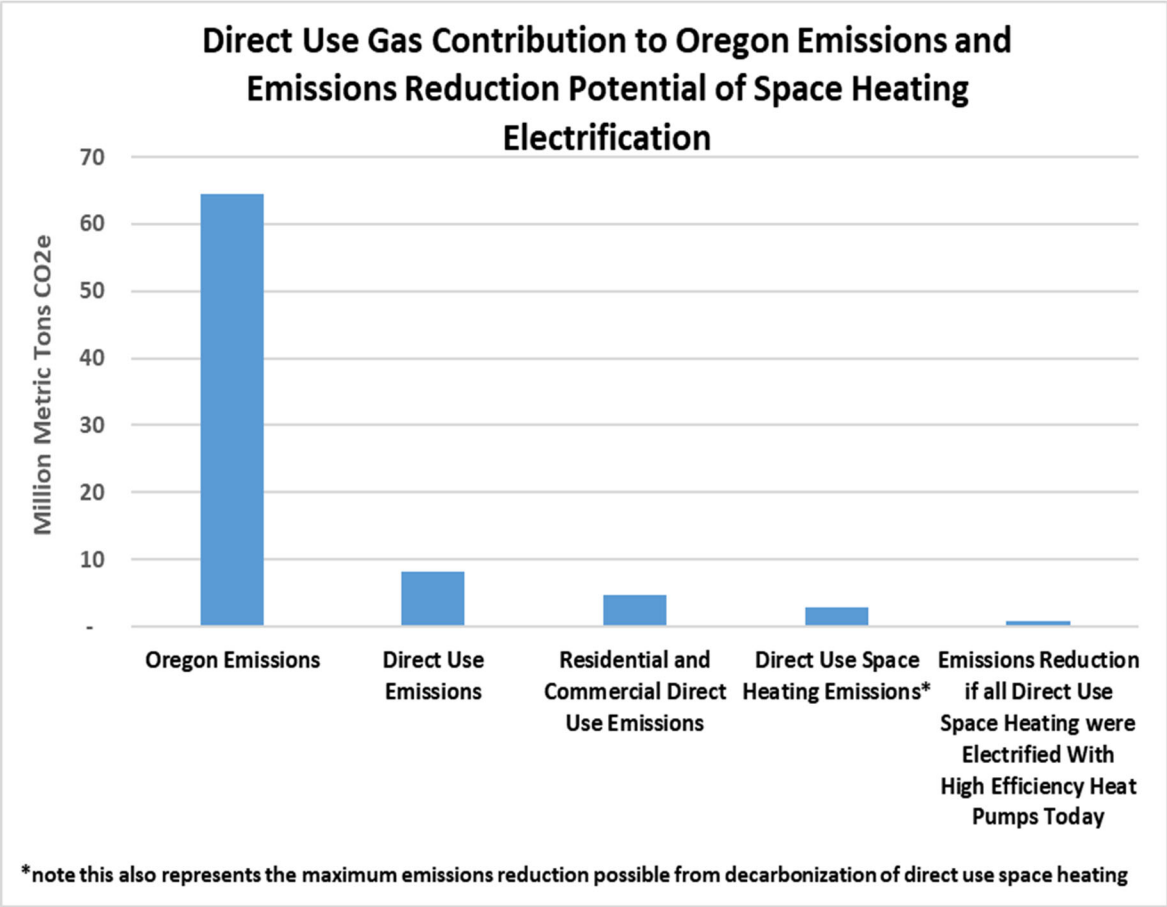
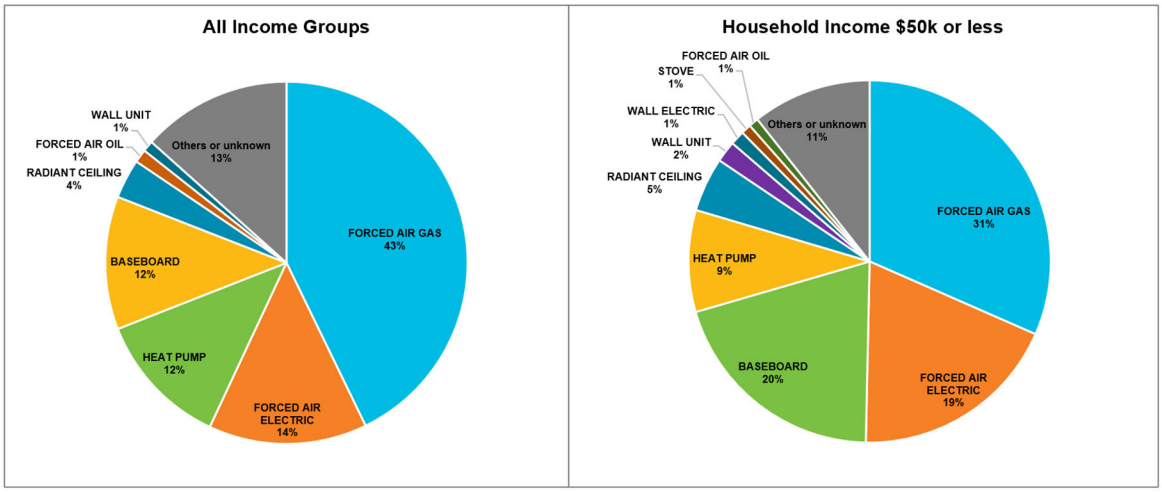



Comparatively, if electric resistance heat currently serving households in Oregon could instantly be transitioned to gas furnaces or electric heat pumps, the associated GHG emissions attributed to heating for those customers would be reduced by at least half, and these customers would also pay less than half of what they currently pay to heat their homes. Currently, inefficient resistance electric heating equipment, not heat pump technology, makes up the largest share of electric heating in NW Natural's service territory, as shown in the figure below.




**About half of low-income households are using the costliest, least comfortable and highest emitting electric resistance heat.**

Source: Corelogic/Espolin – 2021, NW Natural Service Territory; Includes Single Family and Multifamily Housing

**Q. Please explain your second point—that there are questions regarding the electric utilities' ability to rapidly and completely decarbonize their existing load while also serving the significant increase in load that would result from electrifying transportation and buildings.**

A. Under HB 2021, Oregon's electric utilities must dramatically reduce their emissions. As recently as last year, spokespersons for PacifiCorp and Portland General Electric Company ("PGE") acknowledged that the electric utilities do not currently have a plan to achieve 100 percent emissions reductions by 2040.[33] In fact, both PacifiCorp and PGE have acknowledged that achievement of these reductions will require advancements in technology—such as storage—and construction of massive amounts of generation and transmission on an expedited timeframe. We note that HB 2021 includes a "reliability pause" that allows

[33] *See* NW Natural/1701, Heiting-Bracken.

regulators to temporarily exempt the electric utilities from meeting the bill's targets if necessary to maintain reliability.[34]

In making this point we are not critical of the electric utilities. Like the gas utilities, they have been charged with a monumental task—to rapidly decarbonize their service without sacrificing reliability and to do so at a reasonable cost. So, it makes perfect sense that they do not yet know exactly how they will meet this challenge. We are pointing this out only to emphasize that in this respect, the gas and electric utilities are similarly situated.

**Q. Please explain your third point—that it is not clear that a decarbonized electric system can more economically serve electrified building load.**

A. Assuming Oregon's electric sector will be able to meet the obligations in HB 2021, significant questions remain regarding the electric system's ability to reliably serve the increase in load that would result from building electrification at a cost that is lower than or comparable to decarbonization of the direct use gas system. To date, there has been no state-sponsored,[35] Oregon-specific study or other detailed analysis that fully evaluates the feasibility and cost of electrifying transportation *and* buildings, the impacts of electrification on the reliability of the electric grid, the costs of electrifying everything that will be paid for by electric customers, and the emissions under different electrification scenarios in comparison to direct

[34] H.B. 2021, 81st Leg. Assemb., Reg. Sess. at 6-7 (Or. 2021).

[35] NW Natural supports a state-sponsored study because such a study would best ensure participation and buy-in. State sponsorship is likely the best way to ensure all industry and utility actors are required to produce the necessary information and that the study results are accepted as credible by all interested parties.

decarbonization of gas utility load. Accordingly, racing ahead to electrify new construction in Oregon—which is what it appears the Coalition and CUB are seeking to accomplish with their proposed changes to NW Natural's line extension policy—without understanding these dynamics is not a responsible or effective plan. Indeed, Staff recognized these concerns in the Fact-Finding docket Draft Report, noting the potential for electrification to shift cost and risk onto electric ratepayers,[36] and impact electric utilities' winter reliability and ability to comply with the aggressive decarbonization requirements in HB 2021.[37] Moreover, the most comprehensive Oregon-specific analysis conducted to-date to study the role of buildings in economy-wide decarbonization shows that electrifying building load could prove to be a high-cost route to achieving the state's climate goals, and that continued direct gas use is a viable option for decarbonizing building loads.

**Q. Please explain the Oregon-specific analysis regarding the ability of both natural gas and electric utilities to reduce GHG emissions in Oregon while reliably serving winter peak heating loads.**

A. In 2018, NW Natural contracted with E3 to perform an independent analysis evaluating the technology implications and potential costs of different strategies to achieve 80 percent reduction of GHG emissions in Oregon and Washington below 1990 levels by 2050 ("E3's Oregon Study").[38]

[36] Docket UM 2178, Staff's Draft Report at 16.

[37] Docket UM 2178, Staff's Draft Report at 23.

[38] *See* NW Natural/1702, Heiting-Bracken (E3 analyzed Washington and Oregon separately, and our testimony discusses the Oregon-specific information, so we refer to the study as "E3's Oregon Study").

E3's Oregon Study focused on the role of buildings with special attention to building space heating during periods of cold temperature when the electric and gas systems concurrently experience peak demand.[39] E3's analysis considered what would be required of the winter-peaking electric system if it were to also be responsible for the gas system's "substantial "winter peak heating needs."[40] E3 specifically evaluated four scenarios:

(1) maintaining gas use in buildings and primarily using gas furnaces to provide heat, the "Gas Furnace Scenario";

(2) maintaining gas use in buildings and primarily using natural gas heat pumps to provide heat, the "Gas Heat Pump Scenario";

(3) transitioning and retrofitting buildings currently using natural gas for heating to use electric heat pumps that are more efficient than required under current building codes, the "Electric Heat Pump Scenario"; and

(4) transitioning and retrofitting buildings to use cold-climate electric heat pumps ("CCHP"), the "Cold Climate Heat Pump Scenario."[41]

Like comparable deep decarbonization studies, E3's Oregon Study assumes that all current electric resistance heating is replaced with ductless electric heat pump systems in all scenarios.[42] The electric-heat-pump scenario relies on electric heat pumps that are more efficient than the average systems

[39] *Id.* at 17. E3 explained that a "key take-away from the existing literature on decarbonizing heat, both in and outside the Northwest, is the importance of accounting for peak conditions." *Id.* at 35.

[40] *Id.* at 35.

[41] *Id.* at 19.

[42] *Id.* at 51.

being installed today,[43] and the CCHP scenario relies on CCHPs, which are more efficient and perform better under cold weather conditions but make up only a small share of heat pumps currently being installed in the Pacific Northwest.

**Q. What did E3's Oregon Study conclude?**

A. E3 concluded that maintaining gas heat in buildings is a feasible strategy to achieve 80 percent GHG reduction by 2050,[44] and stated: "This study suggests that continued use of the natural gas distribution system is a cost-effective strategy to meet the region's climate goals while also reliably serving winter peak demands."[45] When assessing electrification of space heating, E3's projected costs to the Oregon economy show that using non-CCHP electric heat pumps is the most expensive strategy for decarbonizing the State's energy needs.[46] E3 explained, "some electrification measures are more cost effective than others, so like other emission reduction opportunities, *electrification must be used strategically*. An important consideration when evaluating the costs of electrification are the potential impacts to the electric system's peak demand and associated infrastructure costs."[47]

[43] *Id.* at 74 (assumed standard heat pumps in the study are HSPF of 9.2 systems, which is more efficient than current code and is more efficient than typical system installed in the Pacific Northwest today).

[44] *Id.* at 95-97.

[45] *Id.* at 100.

[46] Importantly, electrification of space heating using non-CCP heat pumps is precisely the result that would be accomplished if we were to move forward with an electrification policy in the current Pacific Northwest heating market.

[47] NW Natural/1702, Heiting-Bracken/31 (emphasis added).

It is important to note that E3's Oregon Study was completed before the passage of HB 2021 and does not require electricity to be 100 percent carbon free (though in all scenarios the electric generation is more than 95 percent emissions free in 2050), nor does the study prohibit the construction of new natural gas power generation. To keep costs as low as is shown in E3's results would require large-scale new development of natural gas peaking plants to provide the firm service needed to serve peak needs, which is unlikely following HB 2021.

**Q. How do the projected costs of E3's four scenarios compare?**

A. The figures below compare the costs over time of the four scenarios E3 analyzed. The first figure, from E3's Oregon Study, shows the incremental costs to Oregon's economy of each scenario to meet the same emissions reduction goal,[48] and the second figure compiles the individual results into one graph for ease of comparison.[49]

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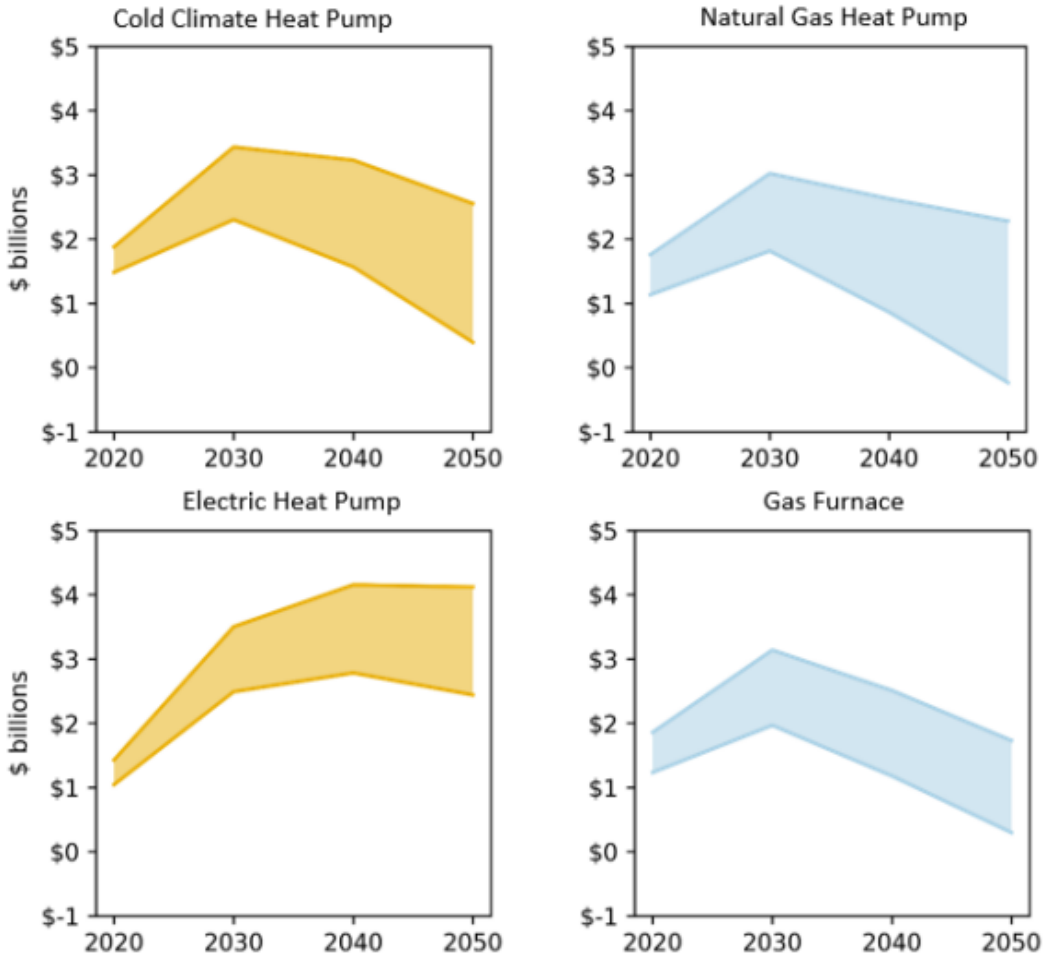
[48] *Id.* at 121. Scenario costs shown are for Oregon only and represent incremental cost to the Oregon economy for meeting the state's emissions goals. Scenarios all have the same emissions profile through time and are meant to be compared based on cost.

[49] The results of the two heating electrification scenarios are shown as one range (in blue) and the results of the two gas heating scenarios are shown as one range (in green). The mid-point of each range is shown with a hashed line.


Cold Climate Heat Pump
Natural Gas Heat Pump
Electric Heat Pump
Gas Furnace
$ billions
$5
$4
$3
$2
$1
$0
$-1
2020
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2050

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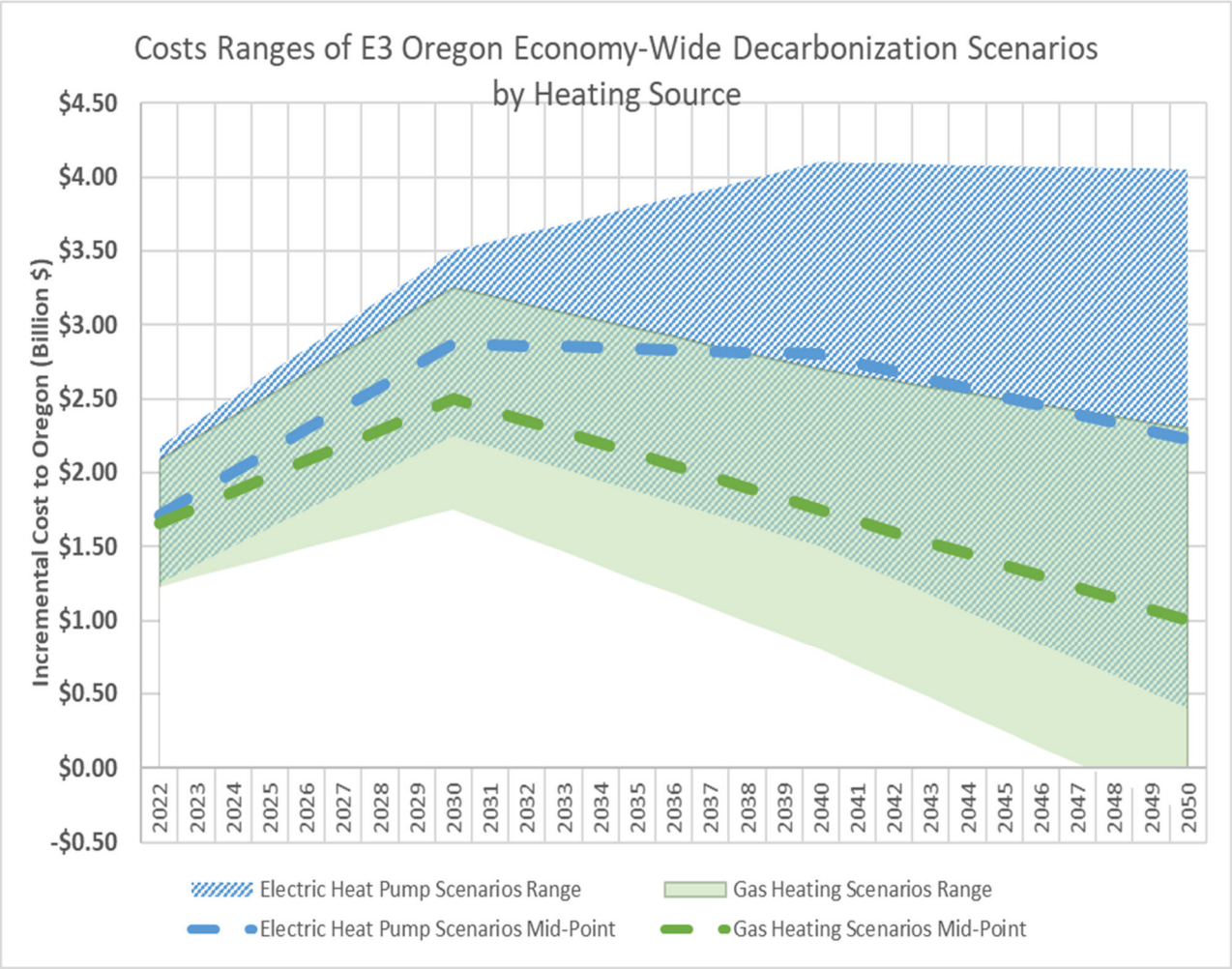



E3's Oregon Study is the most comprehensive state-wide decarbonization analysis performed to date that focuses on reliably serving building loads under deep decarbonization, and it concludes that using the gas system for space heating is a feasible method of meeting the state's climate goals. These findings contradict the Coalition's and CUB's assertions that the state must move rapidly toward building electrification to meet its climate goals in a cost-effective way.

**Q. Please describe the challenges E3 identified for achieving 80 percent GHG reductions under each scenario.**

A. E3 concluded that all scenarios will require technological innovation,[50] and that it is likely that near-complete electrification of the transportation sector,[51] which is the largest source of GHG emissions in Oregon and Washington, would be beneficial.[52] All scenarios also rely upon carbon-neutral biofuels displacing gaseous fuels.[53] For the scenarios that rely upon natural gas remaining the primary source for heating needs, continued research, development, and investment would be needed to bring significant amounts of carbon-neutral fuels such as RNG to market.[54] The electrification scenarios would require transforming the HVAC and water heater market and rapid consumer acceptance and conversion to electric appliances.[55] In addition, the non-CCHP-electrification scenario was by far the highest cost of the scenarios "based on the relatively poor performance of the conventional heat pumps in cold weather,"[56] and E3 opined that "from a grid perspective," consumers should install the more expensive cold-

[50] NW Natural/1702, Heiting-Bracken/96.

[51] *Id.* at 99.

[52] *Id.* at 29.

[53] *Id.* at 99.

[54] *Id.* at 96-97. NW Natural notes that much of this research, investment, and development is now underway since the study was completed, as discussed below.

[55] *Id.* at 97.

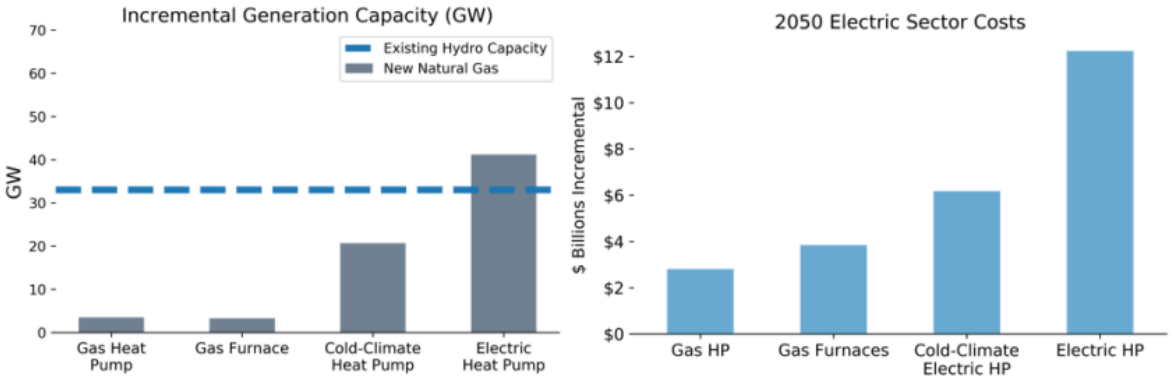
[56] *Id.* at 88.

climate heat pumps "to avoid the highest system-wide cost impacts to the electric grid."[57]

**Q. Did E3 evaluate reliability impacts of the electrification scenarios?**

A. Yes, the study focused on the cost of the electric system to reliably meet peak heating load under scenarios where the majority of space heating continues to be served by gaseous fuels in comparison to scenarios that employ full building electrification. E3 noted that wholesale building electrification would add new weather-dependent electric loads that would drive the need to install ***20,000 to 40,000 MW*** of new electric generation capacity by 2050 to maintain reliable service during cold weather events, which would also require significant investment in new transmission and distribution infrastructure.[58] For comparison, the entire hydroelectric system in the Pacific Northwest represents 33,000 MW of installed capacity, as shown by the dotted line in the figure below.[59]

**Figure 29. 2050 incremental firm capacity build by scenario and 2050 electricity sector cost by scenario**




[57] *Id*. at 97.

[58] *Id*. at 97-98.

[59] *Id*. at 84.

**Q. The Coalition references several studies in their testimony: (1) an E3 study that concluded building electrification leads to lower energy bills in California ("E3's California Study");[60] (2) a Washington study that found electricity is the cheapest option to decarbonize buildings in Washington State;[61] and (3) a Rocky Mountain Institute report finding that all-electric homes in Seattle are cheaper than those that use gas.[62] Why are these studies less applicable to Oregon than the E3 Oregon Study ?**

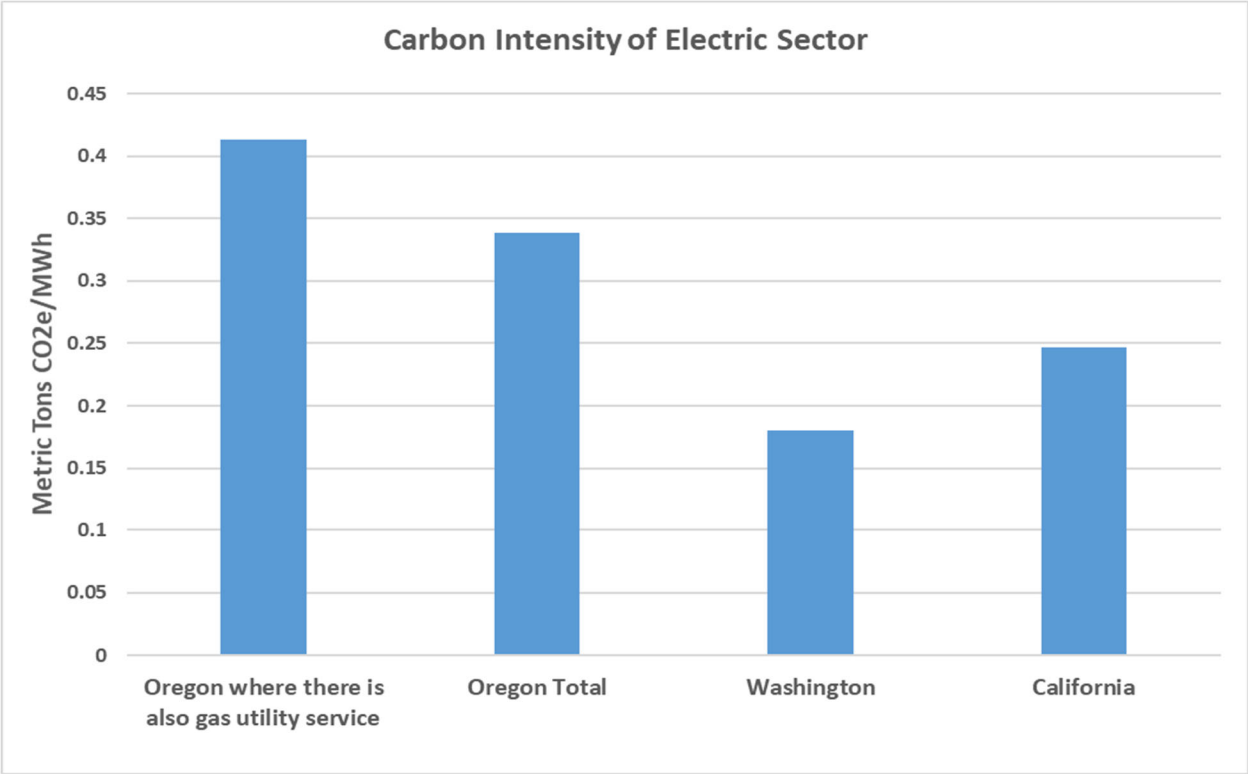
A. To be clear, the studies referenced by the Coalition were conducted for other places, like California and Washington. There are meaningful differences between Oregon and both California and Washington that the Coalition failed to account for in their testimony, which render the studies they referenced inapt. Specifically, Oregon's electric sector is far more emissions intensive than Washington's or California's, particularly where the electric and gas systems overlap, as shown in the figure below.[63]

[60] Coalition/100, Apter/16-17.

[61] Coalition/100, Apter/17.

[62] Coalition/200, Burgess/20.

[63] Electric sector emissions in the figure above come from the most recent year of data available from the official greenhouse gas inventories in Oregon (Oregon Department of Environmental Quality ("ODEQ")), Washington (Washington Department of Ecology), and California (California Air and Resource Board). Oregon electric deliveries are also sourced from ODEQ, while California and Washington electric sector deliveries are sourced from the U.S. Energy Information Administration. Per NW Natural's analysis, a weighting of 61 percent for PGE, 27 percent for PacifiCorp, and 12 percent for the average of public power in Oregon were applied to the emissions intensities of these utilities from data reported to ODEQ from the respective utilities.




We will briefly respond to each of the Coalition's referenced studies:

First, the E3 California Study referenced by the Coalition as justification for moving forward with building electrification was prepared for the California Energy Commission, analyzed California's buildings, and specifically directed readers to take care in applying its conclusions outside of California: "This study finds that electrification in buildings is likely to be the lowest-cost means of dramatically reducing GHG emissions *from California's buildings*. However, *this finding is influenced, in part, by California's relatively mild winter climate*."[64] The study also discusses the reduced efficiency of electric heat pumps in colder temperatures,

[64] E3, *The Challenge of Retail Gas in California's Low-Carbon Future* at 15 (Apr. 2020) (available at: https://www.energy.ca.gov/sites/default/files/2021-06/CEC-500-2019-055-F.pdf) [hereinafter California E3 Study] (emphasis added).

the challenges of meeting peak heating needs in colder climates with renewable electricity, and the "ongoing role for low-carbon gas as a 'peak-heat' capacity resource" in colder climates—specifically citing E3's Oregon Study.[65] Thus, the California E3 Study is consistent with E3's findings in the Oregon-specific study we discussed—and inconsistent with the Coalition's advocacy that Oregon's buildings should be electrified to meet the State's climate goals.

The second study the Coalition references was conducted by Washington State.[66] As shown above, Oregon's electric sector is twice as emissions intensive as Washington's, and 2.5 times as emissions intensive where there is gas utility service in the state, meaning that Washington's power generation currently contributes much less to the state's emissions than Oregon's power generation does. Correspondingly, only 16 percent of Washington's emissions come from electricity,[67] versus 29 percent for Oregon.[68] While these percentages may vary from year-to-year based on hydro conditions and weather, Washington's electric

[65] California E3 Study at 15 ("Electric heat pumps are an efficient means to deliver heating and cooling, but the associated efficiency decreases as the outdoor air temperature drops. Electric resistance heating is commonly used as a supplemental heat source in cold climates, but this use can also lead to substantial new electric-peak demands and the needs for new electric infrastructure in colder climates. Cold climate heat pumps are making important technology strides, but 'peak-heat' challenges have been identified as legitimate concerns in colder climates, including parts of northern Europe (Strbac, 2018) and the northern United States (Aas, 2018). Peak heat needs occur during the coldest periods of the year when demand for heating in buildings in highest. These cold periods become particularly challenging when they correspond to periods of low renewable electricity availability. ***Research in those colder jurisdictions tends to find a plausible ongoing role for low-carbon gas as a 'peak-heat' capacity resource***." (emphasis added) (citing NW Natural/1702, Heiting-Bracken)).

[66] *See Washington State 2021 Energy Strategy-First Draft* (Nov. 2020) (available at: https://www.commerce.wa.gov/wp-content/uploads/2020/11/WA-2021-State-Energy-Strategy-FIRST-DRAFT-2.pdf) [hereinafter *Washington Energy Strategy*].

[67] Washington Energy Strategy at 7.

[68] Docket UM 2178, NW Natural's Comments at 3 (July 2, 2021).

system currently is much cleaner than Oregon's. This results in two important differences when comparing building electrification in Washington and Oregon: (1) electrification of direct use natural gas loads in Oregon results in far less emissions reduction (and in many cases results in increased emissions) in the near term, and (2) with or without building electrification, the cost to decarbonize the electric grid in Oregon will be more expensive per unit of delivered electricity than in Washington because more decarbonization is required. It is worth noting however, that even though Washington's electric generation is comparatively clean, the study's electrification scenario still found that the state would need to import 43 percent of its power by 2050—mostly from Montana and Wyoming wind.[69] To accomplish this, the study assumes "*[s]ix GW* of new transmission (the maximum permitted in the model) are added between Montana and Washington *and 5 GW* between Idaho and Washington by 2050."[70] Permitting and constructing such a massive amount of new transmission capacity would be extremely challenging on the timeline assumed—if not impossible—calling into question the validity of the study's conclusion that building electrification is the cheapest way to decarbonize

[69] Washington Energy Strategy at 25.

[70] *Washington Energy Strategy* at 26 (emphasis added).

buildings in Washington, and the Coalition's suggestion that the same conclusion would apply in Oregon.[71]

Third, as explained in detail in Company witness John Taylor's Reply Testimony (NW Natural/1800, Taylor), the Rocky Mountain Institute study of a home in Seattle is also inapposite because there are important differences between the electric generation mix serving Seattle (more than 90 percent hydroelectric) and the electric generation mix serving most Oregonians.

NW Natural continues to believe that E3's Oregon Study discussed in our testimony provides the best available information for Oregon produced to-date, but at a minimum, the competing studies cited by the Coalition confirm the need for additional analysis before making significant policy decisions.

[71] *See, e.g.*, Kavya Balaraman, *'Imagine the unimaginable': How the Pacific Northwest is trying to build a reliable grid in a changing climate*, UTILITY DIVE (Nov. 8, 2021), https://www.utilitydive.com/news/pacific-northwest-reliable-grid-changing-climate/608959/ (discussing efforts to plan and maintain grid reliability, including through constructing new transmission, as extreme weather, changing climate, and electrification efforts create uncertainty and challenges); John Harrison, *One big detail could derail Northwest's clean-energy goals*, THE COLUMBIAN (Mar. 27, 2022) https://www.invw.org/2022/03/29/one-big-detail-could-derail-northwests-clean-energy-goals/ (discussing need for additional transmission, the challenges of constructing new transmission, and the lengthy timeline required to do so). To understand the challenges with permitting a transmission line of this type, the Obama administration identified certain transmission projects for "expedited permit streamlining" in 2011. *See* Jon McCaull, *Obama Administration Fast Track for Transmission Projects Does Little for Western Geothermal Interests,* RENEWABLE ENERGY WORLD (Oct. 28, 2011) https://www.renewableenergyworld.com/baseload/obama-administration-fast-track-for-transmission-projects-does-little-for-western-geothermal-interests/#gref. Over a decade later, two of the projects, Boardman-to-Hemingway and SunZia, are still in the permitting process, and another transmission project, Cascade Crossing, failed to make it past the permitting process. To date, PacifiCorp has only been able to build a portion of its Gateway West transmission project. A transmission project, such as Boardman-to-Hemingway would need to be replicated many times over to add several GW of transmission import capacity to the Pacific Northwest.

**Q. To be clear, what <u>additional</u> analysis does the Company contend is needed before Oregon's policymakers can make informed decisions as to the best path to decarbonization?**

A. In order to make responsible policy determinations, we need an Oregon-specific, detailed decarbonization analysis that incorporates HB 2021 and CPP targets, timelines and risks; the emissions and relative costs of different technologies and combinations, including hybrid heating systems; the feasibility and cost of electrifying transportation *and* buildings; the impacts of electrification on the reliability of the electric grid; and the comparative energy system resiliency risks of an all-electrification approach.

**Q. Are there benefits to an energy future that relies on <u>both</u> gas and electricity—rather than electricity alone—that the Commission should consider when evaluating the parties' policy recommendations?**

A. Yes. There are significant advantages to the continued use of an integrated energy system that relies on electricity and natural gas. Specifically, maintaining the direct use natural gas system would contribute to the reliability, resiliency, and capacity of Oregon's energy system.

**Q. Please explain how the natural gas system contributes to the reliability of Oregon's energy system.**

A. As coal plants retire and the electric system transitions to carbon-free generation, there are significant concerns that there will not be adequate capacity resources to serve Oregon's electric demand. Continued use of the existing gas system—

which currently serves roughly 70 percent of Oregon's space heating needs[72]—will help ensure that Oregonians have the utility service they need for their daily lives. In contrast, shifting significant load from the gas system to the electric system—as would occur by rapidly electrifying both transportation and buildings—only increases the risk that Oregonian's energy needs will not be met.

**Q. Please explain how the natural gas system contributes to the resiliency of Oregon's energy system.**

A. As extreme events become more common, having natural gas available as an emergency backup fuel could be critical to Oregonians' health and safety. Both electric and natural gas utilities inherently face risks that each must work hard to mitigate every day: extreme weather, system and equipment failures, wildfires, cyber threats, and technical outages. Neither system is without risk. Diversification and redundancy of our energy system provides the greatest opportunity to achieve our clean energy goals without sacrificing reliability. If, as parties advocate, Oregon's above-ground electric system serves all new homes, businesses, and facilities—along with all future transportation needs—the risk to customers from failure of that single system is very high. A 2021 report, prepared by Guidehouse and commissioned by the American Gas Foundation, outlines a number of incidents in recent years that support why two decarbonizing energy

[72] NW Natural/1702, Heiting-Bracken/72 ("[direct use] natural gas serves 68% of regional space-heating needs despite being the primary source of heating for just over half of the residential housing units in Oregon and Washington.").

systems will be important to energy system resiliency and recovery in the years to come.[73]

Two recent examples punctuate this point. In 2021, in Oregon, an ice storm severely impacted the power grid and hundreds of thousands of electric customers lost power during a time of very cold temperatures. NW Natural was able to continue serving customers with much-needed heat, hot water, and the ability to cook. As another example, California's electric grid faced a state of emergency in 2021, and the state was forced to build five new, temporary natural gas plants to meet peak demand and avoid blackouts.[74] This example shows that legislation like California's mandate for a 100 percent renewable electric system does not automatically mean that a reliable, carbon-free electric system will result, as CUB and the Coalition appear to assume. In fact, Oregon's HB 2021, which applies to the electric sector, has cost and reliability off-ramps that would allow utilities to continue to rely on natural-gas-fired generation.[75]

**Q. Please explain how the natural gas system can contribute to the capacity of Oregon's energy system.**

A. The natural gas system has significant existing storage capacity that could be utilized to store excess variable renewable generation on a long-term basis.

[73] *See* NW Natural/1703, Heiting-Bracken ("in all of these case studies, the gas system provided significant support to the energy system in maintaining resilience and ensuring that energy service was maintained to customers").

[74] Mark Chediak and Naureen S Malik, *California to Build Temporary Gas Plants to Avoid Blackouts*, BLOOMBERG (Aug. 19, 2021) https://www.bloomberg.com/news/articles/2021-08-19/california-to-build-temporary-gas-plants-to-avoid-blackouts.

[75] H.B. 2021 at 6-8.

Specifically, NW Natural's existing gas system will support "power-to-gas" technology, which uses electricity to create hydrogen gas from water through a process called "electrolysis." Hydrogen gas itself is carbon-free, so if the electricity used to produce the gas is carbon-free, then the product is non-emitting, and blending hydrogen gas with conventional gas reduces overall GHG emissions. Electrolysis can be timed to use renewable energy that might otherwise be curtailed when variable renewable energy production exceeds demand. In effect, this process stores excess electricity in the form of hydrogen gas for later use, and the hydrogen gas can be stored indefinitely in existing underground storage facilities, which is much more effective and cost-effective than batteries for longer-duration storage. In this way, NW Natural's modern and tight distribution system can safely move and store renewable molecules, thereby increasing the capacity of Oregon's energy system.

**C. NW Natural can comply with the CPP while serving new customers.**

**Q. Both the Coalition and CUB argue that NW Natural will be unable to comply with the CPP if it continues to add new customers, or that doing so would be too costly. Are they correct?**

A. No. We disagree with CUB's and the Coalition's claims that NW Natural cannot comply with the CPP while serving new customers. NW Natural has been working to decarbonize its system for over a decade and has a strong foundation already in place, including concrete plans to acquire significant RNG and hydrogen gas. While we are currently in the process of conducting robust modeling of CPP compliance in our IRP, our preliminary modeling completed in docket UM 2178

suggests that we will be able to comply with the CPP while adding new customers, and that, on a per-customer basis, it is likely cheaper for the average existing customer if additional customers are added to the system while NW Natural meets its emissions obligations.

**Q. Both CUB and the Coalition have criticized NW Natural for seeking to continue with "business as usual," but you mentioned that the Company has been working on decarbonization for over a decade. Can you please explain?**

A. NW Natural strongly takes issue with the suggestion that it is not addressing climate change in any serious fashion and merely continuing with "business as usual." On the contrary, for over a decade NW Natural has been focused on strategies for reducing its GHG emissions and has long been a leader in the industry in recognizing the need to respond to the challenge of climate change. NW Natural is prepared to meet the challenge posed by the climate crisis and intends to decarbonize its gas system and achieve carbon neutrality by 2050,[76] consistent with our customers' priorities and expectations. Given the challenges of electrification and the progress the Company has already made on a variety of fronts, parties' insistence that NW Natural will be unable to achieve its decarbonization goals or that the Company does not take the climate crisis seriously are unfair and unsupported.

[76] NW Natural/100, Anderson-Kravitz/11, 14.

**Q. Can you please summarize the Company's past work to decrease emissions?**

A. Yes. NW Natural was one of the first natural gas utilities to establish a decoupling mechanism in 2003 to align the Company's and its customers' incentives to reduce usage and, consequently, emissions.[77]

In 2007, NW Natural launched its Smart Energy program, becoming the first stand-alone gas utility to offer our customers a voluntary carbon offset program. The Company has roughly 10 percent of its customers enrolled in the program, who have funded over one million metric tons of emissions reductions.

In 2015, the Company was among the first to replace all cast iron and bare steel, making our system one of the tightest in the country. As a result, NW Natural's modern system is well prepared to safely incorporate renewable gasses.

In 2017, NW Natural was the first utility to establish a voluntary carbon savings goal from across the gas value chain associated with customer and company use—a goal we are now exceeding.

In 2018, NW Natural revised its gas purchasing practices to incorporate consideration of the GHG emissions of its natural gas suppliers and prioritize purchasing from suppliers that report lower GHG emissions from production. NW Natural is one of the first utilities in the nation to develop and implement an emissions-screening tool that allows us to analyze EPA Subpart W emissions data reported by U.S. producers and understand the carbon intensity of gas supplies.

[77] NW Natural/100, Anderson-Kravitz/13.

With this capability, we can include environmental impact as one of the key considerations in our supply purchases (alongside other key purchasing criteria such as price, credit worthiness and geographic diversity) and reward lower emitting producers with our contracts. Since implementing this scorecard, we have prioritized purchases from among the lowest-emitting producers, which has reduced the methane leakage rate associated with our purchases from the Rocky Mountain region by roughly 20 percent, avoiding methane emissions accounting for roughly 60,000 metric tons of carbon dioxide ("$CO_2$") annually.

Also in 2019, NW Natural was instrumental in the drafting and passage of Senate Bill ("SB") 98 to facilitate RNG procurement by natural gas utilities, and we are actively working to rapidly acquire a diverse portfolio of RNG resources—including the Lexington RNG project discussed in Anna Chittum's testimony in this case.[78] Our plans to procure increasing amounts of RNG under SB 98 and CPP obligations will help reduce the Company's emissions below current levels. NW Natural also has been testing renewable hydrogen gas over the past 18 months and will be requesting the Commission's approval of a renewable hydrogen pilot project in the near future.

Finally, through the Energy Trust of Oregon ("ETO"), NW Natural supports energy-efficiency improvements such as cost-effective equipment upgrades and insulation in homes and businesses, as well as building improvements that last for many years. While the original purposes of energy efficiency were to lower bills

[78] NW Natural/1100, Chittum/6.

and reduce peak resource capacity requirements, we now see it as a critical tool for emissions reductions and our modeling shows the benefit of expanded energy efficiency programs in the context of compliance with the CPP. In this area, NW Natural has been a leader in developing avoided cost calculation methodologies that better show the value of energy efficiency to NW Natural's customers, including proactively including expected environmental compliance costs years before they came to pass with the CPP, resulting in more energy efficiency showing as cost-effective for ETO programs. In 2019, NW Natural and its customers provided funding that covered approximately $30 million of ETO activities and generated nearly 5.5 million therms in energy savings.

Through all of these actions, and others, NW Natural has proactively and successfully taken steps to decrease its carbon-footprint. There is simply no support for the notion that the Company either is or intends to carry on with business as usual.

**Q. Have these existing efforts put the Company in a strong position to comply with the CPP?**

A. Yes. As a result of these existing efforts, we projected the emissions associated with customers' Oregon gas usage would decline even as new customers join the system. We further projected that even before passage of the CPP, meeting SB 98 RNG targets alone may be sufficient to comply with the CPP for the first compliance period (2022-2024).

**Q. Despite these voluntary efforts, NW Natural still must comply with the CPP and significantly reduce its overall emissions, right?**

A. Yes. Specifically, the CPP requires NW Natural to reduce regulated GHG emissions 50 percent by 2035 and 90 percent by 2050.[79]

**Q. Did NW Natural file a Petition for Review of the CPP with the Oregon Court of Appeals?**

A. Yes. While NW Natural has specific legal concerns with the CPP, the Company remains committed to decarbonizing and understands that, regardless of the outcome of the appeal, NW Natural will likely be subject to decarbonization mandates in the future. Moreover, NW Natural's customers support aggressive efforts to decarbonize its gas supply in a cost-effective manner. Therefore, we continue to analyze the best approach to decarbonization and to implement strategies to comply with the CPP and to work toward the Company's goal of being a carbon-neutral energy provider by 2050.

**Q. Has NW Natural analyzed whether and how it can comply with the CPP?**

A. NW Natural has conducted preliminary analysis in the context of docket UM 2178. That analysis was necessarily high-level due to the expedited timeline, and, because the CPP was not finalized at the time, the docket UM 2178 analysis used the decarbonization requirements from the draft CPP, which were less aggressive than the requirements that were ultimately adopted in the CPP.

[79] From a baseline that averages 2017, 2018, and 2019.

The Company is currently conducting more in-depth, rigorous analysis to prepare its IRP, which will be filed in July 2022. As Staff noted in the Fact-Finding docket Draft Report, "[a]ll parties agreed that the rigor and analysis that comes with a full IRP would be needed for more definitive modeling conclusions."[80] Assertions that the Company cannot comply with the CPP are not supported by the analysis completed in docket UM 2178 and are likely to be refuted by analysis in the next full IRP, and therefore, any action proposed in this case based on the conclusion that the Company cannot comply is inappropriate.

**Q. Did the Company's preliminary analysis in docket UM 2178 suggest that NW Natural will be able to comply with the CPP?**

A. Yes. In docket UM 2178, NW Natural modeled how the Company would comply with the CPP under a number of sensitivities with different assumptions as directed by Commission Staff.[81] Our modeling indicates we can comply with the CPP using a combination of reducing demand, decreasing the carbon intensity of our gas supply, and judicious use of community climate investments (CCIs) and a wide range of potential developments moving forward.[82] Although the final CPP rules included some provisions different than the draft rules upon which the docket UM 2178 analysis was conducted due to timing, our IRP analysis conducted to-date indicates the same strategies identified in the docket UM 2178 process will enable us to comply with the CPP.

[80] Docket UM 2178, Staff's Draft Report at 10.

[81] Docket UM 2178, Staff's Draft Report at 8-9, App. A.

[82] *See* NW Natural/1704, Heiting-Bracken.

***1. Demand-side Reduction Strategies***

**Q. Can you please explain at a high level how NW Natural envisions significantly decreasing demand?**

A. Yes. We expect to further reduce demand in the future through a combination of energy efficiency measures that will include shell measures as well as advances in appliance technology. For example, we can work to encourage the adoption of dual-fuel "hybrid" heating systems and high-efficiency natural gas heat pumps. Over time and with the help of incentives, gas customers can replace their current gas furnaces and water heaters with either hybrid systems or natural gas heat pumps. We note that in docket UM 2178, Staff acknowledges an ongoing role for natural gas heating in Oregon's energy mix by specifically recommending that the Commission direct the ETO to expand training for vendors on electric *and* gas heat pump technology, including dual-fuel and gas-powered heat pump technology.[83]

**Q. What is "dual-fuel" or "hybrid" heating?**

A. In a "dual-fuel" or "hybrid" heating system, a natural gas furnace serves as the backup to an electric heat pump to supplement or serve the needs of a building during cold weather events. Dual-fuel systems are lower cost for customers to operate and are less emissions intensive than an electric heat pump backed up by electric resistance heating, and can reduce gas usage within a home in our climate by as much as 80 percent. Hybrid heating also helps address resource adequacy issues on the regional power grid by having natural gas utilities continue to serve

[83] Docket UM 2178, Staff's Draft Report at 27.

the majority of space heating demand during peak cold weather events while electricity provides space heating during milder heating periods.

**Q. What are natural gas heat pumps?**

A. Natural gas heat pumps are an existing technology for multifamily, commercial, and industrial applications. They are being rapidly developed for single family use and are expected to be available for that use beginning in 2023. Natural gas heat pumps use the heat of combustion to run a compressor that takes heat from the air. Natural gas heat pumps are up to 160 percent efficient and, unlike most electric heat pumps, do not require a back-up heat source at low temperatures.[84] Considering the delivery efficiency benefits of the natural gas system compared to the energy losses during electric generation, a 160 percent efficient gas heat pump is on par with a 467 percent efficient electric heat pump.[85]

**Q. CUB testifies that the Company's CPP-compliance analysis is flawed and its plan to comply with the CPP is unreasonable because NW Natural's energy efficiency assumptions rely on new technologies that have not yet been commercialized—specifically natural gas heat pumps.[86] Please respond.**

A. First, we would reiterate that the docket UM 2178 analysis is preliminary, and the Company's IRP will include a more robust analysis showing that we can comply with the CPP using a variety of technologies and strategies—not just through use

[84] NW Natural/1705, Heiting-Bracken/6, 28.

[85] *See* Confidential NW Natural/1706, Heiting-Bracken; NW Natural/1707, Heiting-Bracken.

[86] CUB/100, Jenks/4; CUB/102, Jenks/5, 9.

of natural gas heat pumps. If natural gas heat pumps ultimately are not widely adopted, the Company has many other strategies that can fill the gap.

Second, our preliminary modeling in docket UM 2178 considers how to substantially decarbonize by 2050, so it is reasonable to assume new technologies will be available over time. Similarly, utility-scale batteries now being built to support electric system reliability were not widely available and represented virtually no capacity on the electric grid a few years ago. If the utility-scale batteries had not been included in resource planning exercises at that time, they would not have shown as cost-effective resources to justify them being built as prudent resources today. Resource planning exercises have always scanned the landscape to analyze options for meeting customer needs in a least cost-least, risk manner.

Specific to natural gas heat pump technology, NW Natural has supported the Gas Technology Institute's ("GTI") research and development progress for gas heat pump technology. GTI has a long and proven track record of advancing innovative high-efficiency equipment solutions and has partnered with the USDOE and manufacturers to advance gas heat pump technology—providing a giant leap in efficiency with the potential for up to a 50 percent reduction in gas throughput.[87]

[87] GTI, *Gas Technology Innovations: Focus on Gas-fired Heat Pumps* at 24, 27 (Sept. 17, 2019) (available at: https://s3.amazonaws.com/ilsag/Gas_Tech_Innovations-GTI_ILSAG_09-17-19.pdf).

New advancements offer greater efficiency benefits at a size for use in commercial businesses and homes.[88]

NW Natural is also a member of the North American Gas Heat Pump ("NAGHP") Collaborative. Gas utility involvement in the NAGHP Collaborative is substantial, with membership now representing approximately 33 percent of the natural gas end-use market in North America. In 2022, in-home installation trials conducted by NAGHP member companies will conclude, with the next step of product commercialization targeting a 2023 and 2024 timeframe.[89] Northwest Energy Efficiency Alliance ("NEEA") is an active participant in the NAGHP Collaborative. Many of the same technical and market-transformation experts who delivered the electric heat pump to this market are now actively involved in the residential gas heat pump efforts. Not long ago, newer electric heat pump technologies were at this pre-commercialization stage, and the gas industry now

[88] SMTI, *The New Anesi Gas Heat Pump* (Jan. 30, 2022), https://stonemountaintechnologies.com/the-new-anesi-gas-heat-pump/#:~:text=The%20Anesi%20Gas%20Heat%20Pump,replacing%20an%2080%25%20AFUE%20furnace; Enbridge, *More comfort, less climate impact*, https://www.enbridgegas.com/-/media/Extranet-Pages/Sustainability/Municipal-Solutions/Energy-Solutions-for-Muncipalities/gas-heat-pumps-sell-sheet.ashx?rev=a2da08d97dce435a8c6ffae72ee49366 (last visited June 5, 2022); Fortis, *Pilot program success stories*, https://www.fortisbc.com/about-us/projects-planning/future-of-energy-efficiency/success-stories (last visited June 5, 2022).

[89] NW Natural/1705, Heiting-Bracken/9. S*ee also*, *FortisBC brings high-efficient gas heat pumps into B.C. homes for the first time* (May 26, 2022), https://www.fortisbc.com/news-events/media-centre-details/2022/05/26/fortisbc-brings-high-efficient-gas-heat-pumps-into-b.c.-homes-for-the-first-time; *SMTI Delivers first Prototype to Canada for Tests* (Jan. 17, 2020), https://stonemountaintechnologies.com/smti-delivers-first-prototype-to-canada-for-tests/; *ThermoLift & FortisBC Launch First Residential Gas Heat Pump Field Trials* (July 6, 2021), https://ifnc.campaign-view.com/ua/viewinbrowser?m=1&mrd=131cdc060d0a0c63&n=11699e4c03b042d&od=3zf7714b4695370a5bd59788165fdad00e2dd216119a546b182589036b4e1a7920&rd=131cdc060d0a3156&sd=131cdc060d0a0c75; *SMTI Commissions 'Heat Pump Furnace' Field Test Prototypes* (Jan. 4, 2019), https://stonemountaintechnologies.com/smti-commissions-heat-pump-furnace-field-test-prototypes/.

has the benefit of lessons learned from the electric industry's experiences with this type of product launch.

Moreover, it is important to keep in mind that compliance with decarbonization requirements presents technological challenges for both gas and electric utilities. On the electric side, successful decarbonization will require widespread adoption of CCHPs that are not economically viable for the vast majority of consumers today. It will require those heat pumps to be properly installed and operated at modeled set points, with ongoing maintenance performed by a highly skilled contractor network to achieve the necessary emissions benefits assumed. Decarbonizing the electric grid requires a massive build out of new renewable resources, as well as distribution and transmission infrastructure that will face long and contentious community and environmental siting challenges. There will also be economic, environmental, and geopolitical obstacles to providing the level of battery storage needed for a functional electric grid reliant on renewable resources.[90]

In short, decarbonization will require a full transformation of the entire energy system, requiring both gas and electric utilities to invest and innovate extensively and more rapidly than ever before. No one knows exactly how this transformation will unfold over the next three decades which is why a diversified energy system serving existing and new communities that is driving toward a

[90] *See* IEA, *The Role of Critical Minerals in Clean Energy Transitions* (May 2021), https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions.

variety of decarbonization options as fast and cost-effectively as possible helps protect against high regret decisions.

**Q. CUB testifies that electric heat pump technology for space and water heating is more efficient than natural gas.[91] How do you respond to CUB's claim?**

A. End use equipment efficiency is not the appropriate metric—and is a very misleading one—to evaluate the relative value of different types of space and water heating equipment in the context of state decarbonization goals. Rather, the metrics that are most important are the cost to customers to heat their homes and business, and the emissions impact of doing so.

To understand why end use equipment efficiency is only one factor that impacts emissions and cost, it is important to understand that an electric heat pump having a higher efficiency in percentage terms relative to a gas furnace simply means that the gas furnace uses more energy (British thermal units ("Btu")) *in the equipment* to heat a building with gas as compared to electricity. However, when one considers that on a per-Btu basis NW Natural's customers pay roughly one-third the price of electricity per Btu and that electricity used in Oregon has roughly three times as much GHG emissions associated with each Btu used, it becomes clear that simply comparing the end use efficiency of a natural gas furnace (approximately 95 percent) to an electric heat pump (approximately 250 percent) is incomplete and inappropriate in the context of understanding the emissions impact of heating a home or business.

[91] CUB/100, Jenks/2-3.

Another way to evaluate this issue is to consider the source efficiency of natural gas use between gas used directly and electricity that was generated using natural gas.[92] A simple cycle natural gas power plant is roughly 30 percent efficient and a combined cycle gas turbine is roughly 50 percent efficient. If one assumes that the average efficiency of natural gas generation serving Oregon is 40 percent, with five percent line loss, serving an electric heat pump that is 250 percent efficient (per CUB's testimony[93]), the entire heating system is around 95 percent efficient—roughly the same efficiency as a direct use natural gas furnace that is connected to the same natural gas network as the power plant that generates the electricity.

Thus, the more appropriate way to compare space and water heating technologies is using the metrics shown on the figures presented earlier in this testimony that compare the emissions and lifecycle costs of gas furnaces and electric heat pumps.

With respect to electric heat pump efficiency, as E3 explained in the California Study: "Electric heat pumps are an efficient means to deliver heating and cooling, but the associated efficiency decreases as the outdoor air temperature drops."[94] In climates like Oregon, electric heat pumps nearly always have a backup heat source to maintain comfort in cold temperatures—most commonly an electric resistance furnace, which is about twice as emissions-intensive as a

[92] Roughly half of the natural gas associated with energy use in Oregon is not used directly but instead is used in generating electricity used by Oregonians.

[93] CUB/100, Jenks/2.

[94] California E3 Study at 15.

natural gas furnace and costs customers more than double to run. Specialized CCHPs are more effective in cold temperatures, but they are also extremely expensive to install—roughly double the cost of either a high-efficiency gas furnace or a standard electric heat pump per the ETO Study[95]—and must be oversized relative to standard HVAC installation practices to be able to serve all of the heating needs of a home or business during cold weather events.

**Q. CUB testifies that customer preference for heat pumps is growing and that over time customers will install electric heat pumps, rather than gas furnaces.[96] Is CUB correct, and if so, is it valid to assume in your modeling that natural gas will have an ongoing heating role if customers prefer electric heat pumps?**

A. CUB's assertion that natural gas customers will leave the system in large numbers and install heat pumps is not supported by gas connection data or the research cited by CUB. In fact, since 2012, those customers and non-customers surveyed who stated they would "definitely/probably" purchase an electric heat pump increased by only 2 percent from 36 percent to 38 percent,[97] despite substantial ratepayer and manufacturer heat pump promotion and incentives.

CUB also fails to account for the fact that in the future, customers may replace a natural gas furnace with a hybrid or natural gas heat pump. While we have not surveyed customers regarding their specific heat pump preferences, it is

[95] ETO Study at ii-iii.

[96] CUB/100, Jenks/3, 6, 8.

[97] CUB/108, Jenks/22.

reasonable to assume that the same customers interested in installing an electric heat pump may also be interested in a hybrid or natural gas heat pump that also offers air conditioning—a main driver of heat pump interest.

**Q. CUB also testified that NW Natural is already falling behind in its effort to meet the CPP through reduced demand, because NW Natural forecasted average use per residential customer of 602 therms/year in 2022 in its docket UM 2178 modeling, but in this case, NW Natural forecasts usage of 628 therms/year.[98] Please respond.**

A. First, we note that the annual weather normalized usage per residential customer forecast in this case is 633 therms, not 628 as CUB states.[99] Second, CUB's assertion that the Company is "already falling behind" in its efforts to meet its compliance obligations is incorrect.[100] While it is understandable CUB would compare the average residential usage in this rate case with the work done in docket UM 2178, the discrepancy in the figure is explained by something other than CPP expectations or compliance action. The difference is caused primarily by different definitions of normal weather for the forecast in this rate case and for the forecast used in the modeling in docket UM 2178. The weather estimate included in this rate case that yielded a residential use per customer of 633

[98] CUB/100, Jenks/5.

[99] NW Natural/1400, Wyman/13.

[100] CUB/100, Jenks/5.

therms/year uses an expectation of colder weather over a year[101] than the estimate in the docket UM 2178 modeling of 602 therms/year. The estimate in this rate case defines normal weather as the daily average heating degree days for the past 25-years whereas the estimate in docket UM 2178 uses a climate change adjusted weather model to predict heating degree days for each year in the future. The former definition is more standard in rate cases and is supported by Staff in this case.[102] Regarding the latter definition, NW Natural is a leader in moving toward a climate change adjusted weather modeling approach in its IRP work and established a methodology in its most recent IRP Update that accounts for climate change in our normal weather definition. This approach was also supported by Staff and other stakeholders in that process.[103] Given that the climate is warming, the number of heating degree days in 2022 used to generate the load forecast in this rate case are greater than those used to provide the forecast in docket UM 2178, resulting in a higher load forecast in this case. Hence the difference in forecast has nothing to do with changing expectations for CPP compliance.

In addition, it is important to note that the rules for the CPP were finalized less than six months ago, and we are currently less than half a year into the first

[101] All forecasts use the weather from what is defined as "normal" for each year in the forecast, like year 2022 in this discussion. No year has "normal" weather, but the general idea is that half of actual years will have colder weather than normal and half will have warmer weather than normal.

[102] *See* Staff/400, Bain/2, lines 2-6 ("Staff found NWN's load forecasts to be sound and reasonable after scrutiny with the only adjustment recommended to be continued discussion of appropriateness for the future inclusion of a COVID intervention variable for the Commercial UPC forecast.").

[103] *In re Northwest Natural gas Company, dba NW Natural, 2018 Integrated Resources Plan,* Docket LC 71, Staff's Opening Comments at 10-11 (available at: https://apps.puc.state.or.us/edockets/edocs.asp?FileType=HAC&FileName=lc71hac162944.pdf&DocketID=21497&numSequence=60).

compliance year in the program. NW Natural has stated consistently throughout docket UM 2178 that the analysis completed in that docket is preliminary and a full analysis using the appropriate analytical tools, including a full risk analysis, is necessary to construct a compliance plan.

***2. Decarbonizing the Company's Gas Supply***

**Q. You stated that decreasing the carbon intensity of the Company's gas supply will help NW Natural comply with the CPP. Can you please summarize the renewable supply options included in the Company's modeling that allow the Company to substantially decarbonize by 2050?**

A. Yes, at the current time we expect to decarbonize our supply over time by adding biofuel RNG, clean hydrogen, and synthetic gas to our gas portfolio to comply with the CPP. Our preliminary modeling shows RNG from biofuels as the cheapest option for gas supply decarbonization until about 2030. The model also shows that hydrogen becomes cheaper, and hydrogen blending reaches the 20 percent targeted amount around 2035. In the 2040's, synthetic gas derived from hydrogen projects is estimated to be the least cost of the available options.

**Q. Please summarize the Company's plans and progress with respect to RNG.**

A. Since the passage of SB 98, NW Natural has moved rapidly to study and acquire RNG developed from animal, agricultural, forestry, and human waste streams—which we will refer to as biofuel RNG—as a substitute for conventional natural gas. In this way, biofuel RNG turns captured emissions from existing waste streams currently contributing to atmospheric methane release into a powerful climate solution using the existing pipeline network and appliances, sustainably solving a

waste problem at the same time. As discussed in the Company's Opening Testimony, SB 98 has RNG portfolio targets for natural gas companies to add as much as 30 percent RNG, including biofuel RNG and renewable hydrogen.[104] In less than two years from rules being implemented, NW Natural's gas portfolio has reached approximately one percent RNG, and the Company has already signed agreements to develop three percent of its supply as RNG.[105] Putting this swift progress into context, wind and solar generation nationally are 12 percent of electric generation after decades of development.[106] The Company aims to increase the amount of RNG it sells to customers to five percent by 2025 and to 10 percent soon thereafter, consistent with the targets in SB 98.

**Q. Please provide some background regarding hydrogen gas**.

A. The term "hydrogen gas" refers to the hydrogen molecule ("H2") in a gaseous state. It can be blended with natural gas to produce heat for homes and businesses and for industrial applications. This includes hydrogen gas blending into the existing system directly, distribution of synthetic gas at unlimited amounts, or dedicated hydrogen gas networks for certain customers or even new communities in the future. Hydrogen gas has been successfully delivered to

[104] NW Natural/100, Anderson-Kravitz/13-14.

[105] These percentages are a share of NW Natural's gas supply portfolio, comporting with the rules established in OPUC docket AR 632, and do not include gas delivered – but not sold – by NW Natural on transportation rate schedules. It is important to note that gas delivered on transportation rate schedules is part of NW Natural's covered party obligations in the CPP and that deliveries on transportation schedules represent more than one-third of the energy delivered by NW Natural's system in a given year.

[106] U.S. Energy Information Administration, *Electricity explained* (Apr. 19, 2022), https://www.eia.gov/energyexplained/electricity/electricity-in-the-us.php.

customers through gas distribution systems for over half a century. One example is Hawaii Gas which has been using about a 12 percent blend of hydrogen gas since the 1970s in its natural gas distribution system without issue.[107]

NW Natural is actively working to develop hydrogen gas supplies to incorporate into its system. As discussed in detail in the Company's Opening Testimony, NW Natural has one of the most modern and tightest systems[108] in the country and is well prepared to safely distribute natural gas blended with hydrogen gas.[109] For the last 18 months the Company has successfully completed five percent hydrogen gas blend tests in our system and in end-use equipment at our Sherwood training facility. In 2022, testing protocols will increase by five percent increments with the goal of 15 percent by year end and 20 percent by 2023, pending performance verification. The Company is also working in partnership with Eugene Water and Electric Board and the Bonneville Environmental Foundation to propose the development of a 1 MW electrolyzer project in Eugene, Oregon. There are a growing number of similar U.S. projects already underway,

[107] Hawai'i Gas, *Decarbonization and Energy Innovation*, https://www.hawaiigas.com/clean-energy/decarbonization (last visited June 5, 2022). In the 1970s, Hawaii Gas began producing and using hydrogen to convert naphtha, a by-product from the local oil refineries, for the manufacture of synthetic natural gas on the island of Oahu. Today, up to 15 percent of the gas in its Oahu pipeline is hydrogen—the highest concentration of hydrogen reported by any gas utility in the U.S.

[108] NW Natural consistently leads the industry in the lowest number of leaks per mile of distribution pipeline—a ratio of approximately 0.80 leaks per 100 miles in 2020. For comparison, the industry average was 7.65 leaks per 100 miles in 2019, based on U.S. DOT Annual Report data for natural gas operators reporting more than 7,000 miles of distribution main.

[109] NW Natural/100, Anderson-Kravitz/15-16.

including:[110] Centerpoint Energy has a 1 MW electrolyzer project and New Jersey Natural Gas has a 175 kW electrolyzer project, both projects deliver five percent hydrogen gas; [111] Pacific Gas & Electric has announced its "Hydrogen to Infinity" transmission blending study and demonstration facility;[112] and SoCal Gas has a solar hydrogen home now under construction.[113] NW Natural is also following and analyzing data through an international hydrogen consortium, HyReady, from numerous projects that are integrating higher blends of hydrogen into gas systems.[114] According to the Hydrogen Council's Hydrogen Update released in February 2021, 228 large-scale hydrogen projects had been announced across the value chain, with 85 percent located in Europe, Asia, and Australia;[115] and more than 30 countries have hydrogen roadmaps, including 31 energy companies

[110] More than a dozen North American utilities are actively working on hydrogen as a resource. Some have hydrogen already being blended in (Enbridge and NJNG), some are under construction (CenterPoint), and others are looking at pure research and development. These include Atco, Chesapeake Utilities, Enbridge, CenterPoint Energy, Dominion Energy, Enbridge Gas, National Grid, New Jersey Resources, ONE Gas, San Diego Gas & Electric, SoCalGas, Southern Company Gas, and Southwest Gas. *See* American Gas, *The Hydrogen Race* (Apr. 2021), https://read.nxtbook.com/aga/american_gas_magazine/american_gas_april_2021/the_hydrogen_race.html.

[111] S&P Global, *New Jersey Resources starts up 1st East Coast green hydrogen blending project* (Nov. 10, 2021), https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/new-jersey-resources-starts-up-1st-east-coast-green-hydrogen-blending-project-67570888.

[112] *PG&E Launches the Nation's Most Comprehensive Study on Hydrogen's Feasibility Within Gas Pipelines* (May 2, 2022), https://www.pge.com/en_US/about-pge/media-newsroom/news-details.page?pageID=66b8ed99-3175-48da-95d6-1a1fde0a4f18&ts=1651546270622.

[113] SoCalGas, *[H2] Hydrogen Home*, https://www.socalgas.com/sustainability/h2home (last visited June 5, 2022).

[114] DNV, *HyReady - Joint Industry Project*, https://www.dnv.com/article/hyready-219355 (last visited June 5, 2022). https://hydrogencouncil.com/wp-content/uploads/2021/07/Hydrogen-Insights-July-2021-Executive-summary.pdf

[115] Hydrogen Council, *Hydrogen Insights 2021* (July 15, 2021), https://hydrogencouncil.com/en/hydrogen-insights-2021/. The July 2021 update notes an additional 131 project announcements, bringing the total to 359. *Id*.

across 28 European countries that have analyzed how to re-use the existing gas system to distribute hydrogen by 2040 to help Europe achieve its decarbonization goals.[116]

These developments punctuate the increasing recognition globally that hydrogen gas in the gas system will be essential to achieving decarbonization of building load and the energy system.

**Q. Please provide some background regarding synthetic gas.**

A. In addition to renewable hydrogen gas produced from wind, solar, or hydro that can be blended directly and efficiently into the natural gas system, there are other forms of clean hydrogen gas that offer significant carbon benefits. Synthetic gas leverages renewable electricity and waste $CO_2$ from an industry process or power generation to produce a product that is interchangeable with conventional natural gas and can be distributed and stored without limits in the existing gas system. To put this into context: NW Natural's 20 billion cubic feet of underground storage at Mist, Oregon, equates to 6 million megawatt hours of renewable storage capability. To replicate this storage capacity as a battery would cost $2 trillion[117]—and it would still fail to provide the long-duration storage benefit of Mist. So, from a decarbonization cost perspective, synthetic gas can be very competitive when paired with the existing gas system infrastructure. Additionally, other hydrogen

[116] *See* Gas for Climate, *European Hydrogen Backbone* (July 2020), https://gasforclimate2050.eu/wp-content/uploads/2020/07/2020_European-Hydrogen-Backbone_Report.pdf.

[117] NREL, *Cost Projections for Utility-Scale Battery Storage* (June 2019), https://www.nrel.gov/docs/fy19osti/73222.pdf.

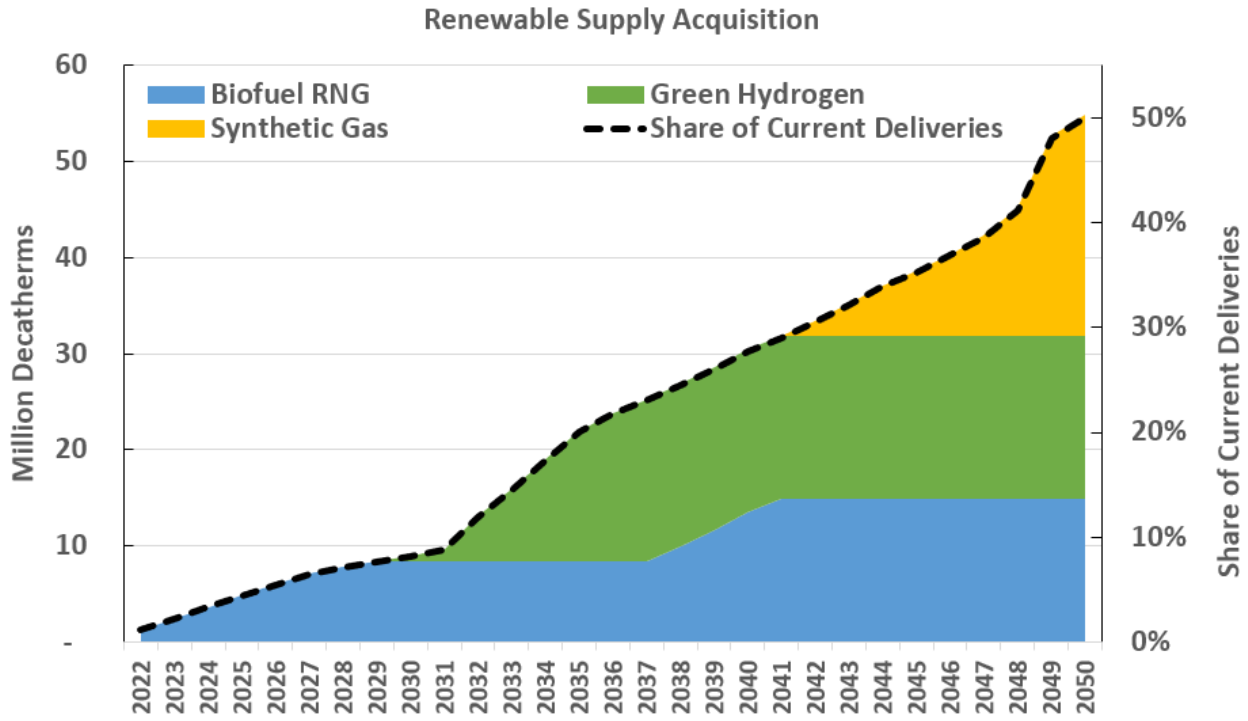
gas solutions look quite promising in the nearer term, including blue hydrogen produced from natural gas and paired with carbon capture, and turquoise hydrogen made using a process called methane pyrolysis to produce hydrogen gas and solid carbon, which can then be re-used in materials such as tires or batteries. NW Natural continues to actively research and assess all forms of clean hydrogen to inform its decarbonization plans and priorities.

**Q. How do you respond to the Coalition's claim that there is not enough RNG to decarbonize NW Natural's network?[118]**

A. To be clear, we do not envision serving customers with 100 percent RNG, even in 2050. Our preliminary modeling from docket UM 2178 deploys a cost-effective amount of biofuel RNG in 2050 at a volume that is less than 15 percent of current deliveries, as shown on the right side of the figure below from NW Natural's docket UM 2178 presentation.[119] We envision supplementing biofuel RNG with increasing amounts of hydrogen and synthetic gas as those products become more cost-effective, and the majority of deliveries in 2050 are expected to be from hydrogen-derived fuels.

[118] Coalition/100, Apter/15; Coalition/200, Burgess/19.

[119] NW Natural/1704, Heiting-Bracken/44.




In response to the Coalition's claims, we do expect to be able to obtain as much biofuel RNG as necessary to accomplish our decarbonization goals. As explained in Anna Chittum's Reply Testimony,[120] the study on which the Coalition relies was performed five years ago and does not reflect the potential for RNG today. More recent studies by the same group (ICF) project significantly increased amounts of RNG in the country. And as Ms. Chittum explains, the number of RNG projects operating and under construction, and RNG production capacity, has increased substantially since 2020.[121]

Looking to Europe, which leads in positive policy support for RNG, one can see the rapid growth potential to displace conventional supplies. For example,

[120] NW Natural/2100, Chittum/4-5.

[121] NW Natural/2100, Chittum/4.

Denmark has 25 percent of its total gas throughput as RNG today.[122] France is also expanding rapidly with more than 900 RNG projects identified throughout the country.[123] According to GRDF, France's largest gas utility, the total number of biomethane "projects recorded stands at 1,085, representing total capacity of 24 TWh/year."[124] This corresponds to the average annual consumption of 3.6 million new gas-heated housing units.[125] According to the French Environment and Energy Management Agency, by 2050, 56 percent of the gas circulating in the distribution grid could be RNG.[126]

Additionally, RNG development research is already finding different combinations of feedstocks yield higher production rates, which is likely to further increase overall supply and reduce costs.[127] Finally, it is important to note parallels to renewable energy acquisition in the context of Oregon's aggressive policy requirements. Just as Oregon electric utilities already have, and expect to

[122] *Bioenergy*, https://stateofgreen.com/en/focus-areas/energy-transition/bioenergy/ (last visited June 5, 2022).

[123] *Biomethane: the future of natural gas*, https://www.grdf.fr/english/biomethane-main-projects (last visited June 5, 2022).

[124] Id.

[125] Id.

[126] *Id*.

[127] *See* C. Okoro-Shekwaga, A. B. Ross, M. A. Camargo-Valero, *Improving the biomethane yield from food waste by boosting hydrogenotrophic methanogenesis*, 254 APPLIED ENERGY (Nov. 14, 2019) (available at: https://core.ac.uk/display/226768620?source=2); Jutta Speda,1 Mikaela A. Johansson, et al., *Enhanced biomethane production rate and yield from lignocellulosic ensiled forage ley by in situ anaerobic digestion treatment with endogenous cellulolytic enzymes,* 10 Biotechnol Fuels (May 2017) (available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5434626/); Brent Wittmeier, *New technique could accelerate waste-to-methane production*, UNIVERSITY OF ALBERTA (Jan. 10, 2020), https://www.ualberta.ca/folio/2020/01/new-technique-could-accelerate-waste-to-methane-production.html.

continue acquiring, more than their populated share of the nation's 12 percent wind and solar generation today, NW Natural is on a path to do so for RNG as well.

**Q. CUB and the Coalition also question whether carbon-free gas supply options are available at a reasonable cost.[128] Are their concerns well-founded?**

A. No. First, CUB compares the energy cost of carbon-free gas with the energy cost of conventional gas, which is an incomplete comparison of the costs of RNG versus conventional gas. NW Natural's low carbon gas evaluation methodology approved by the Commission compares the "all-in cost", or the total cost of delivering RNG or conventional gas to customers to make a more complete comparison. Additionally, CUB uses a near-term comparison of conventional gas and RNG prices without noting that low carbon gas prices—particularly hydrogen gas and hydrogen derived synthetic gas prices—are expected to decrease through time. Comparing the price projections of the third-party sources that were used for the modeling in docket UM 2178, the all-in cost of renewable hydrogen is expected to fall below the all-in cost of conventional gas by 2050. Also, given the fact that for residential and commercial customers the cost of gas currently represents a relatively small portion of overall revenue requirement, increases in the cost of gas are not expected to lead to unreasonable customer bills for gas service, particularly when compared to historical prices in real terms.

[128] CUB/100, Jenks/5; CUB/102, Jenks/4; Coalition/100, Apter/16.

**Q. Do the Company's cost projections include assumptions about state or federal support for developing renewable gas?**

A. No. Costs projected to date are without state or federal support. We anticipate, as recognition spreads for the necessity of a comprehensive approach to climate change increases and the associated need for RNG to assist in decarbonizing our economy is better understood, federal support will be provided for RNG, similar to what has enabled wind and solar development, thus bringing down the direct costs to our customers. In fact, NW Natural's preliminary modeling in docket UM 2178 found that a 30 percent federal production tax credit for renewable gases could cut the incremental cost of these gases to customers roughly in half.

**Q. The Coalition claims that any environmental benefits associated with RNG are "negated" because of methane leakage.[129] Is this a valid concern?**

A. No. First, NW Natural's infrastructure is fully modernized. Corrosion-prone vintage pipeline types were replaced in the Company's system by 2016. System modernization is the most important step that a pipeline operator can take to reduce incidence of leakage. As a result, NW Natural has one of the lowest leak-rates in the country.[130]

Second, it is important to consider the alternative to capturing and using RNG in the gas system. According to the EPA, the interstate pipeline system

[129] Coalition/100, Apter/16.

[130] NW Natural consistently leads the industry in the lowest number of leaks per mile of distribution pipeline—a ratio of approximately 0.80 leaks per 100 miles in 2020. For comparison, the industry average was 7.65 leaks per 100 miles in 2019, based on U.S. DOT Annual Report data for natural gas operators reporting more than 7,000 miles of distribution main.

leakage rate is 1.4 percent.[131] Therefore, to transport RNG across interstate delivery systems, the potential losses via pipeline fugitive emissions would be 1.4 percent as compared to the potential 100 percent methane losses realized when an RNG project is not developed.

Third, methane emissions from the gas system have decreased significantly and we expect this trend to continue. Nationally, emissions from natural gas utility systems declined 69 percent from 1990 to 2019, even as gas utilities added more than 788,000 miles of pipeline to serve 21 million more customers, bringing the number of customers served to 180 million.[132] NW Natural will continue its work with others in the industry to further reduce methane emissions.

**Q. The Coalition also worries that NW Natural "might invest in thermal gasification of energy crops and forest and agriculture residues and use methane from sources that would be better eliminated through alternative resource and waste management processes."[133] Is there a basis for this concern?**

A. No. While it is not entirely clear what exactly the Coalition fears NW Natural will do, we assume they are worried that NW Natural will invest in growing crops specifically to convert them to biofuels. However, NW Natural has no intention of doing so, and this is not an approach included in the Company's docket UM 2178

[131] *See* USEPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2020* at 3-104 (2022) (available at: https://www.epa.gov/system/files/documents/2022-04/us-ghg-inventory-2022-main-text.pdf).

[132] American Gas Association, *2021 Playbook*, https://playbook.aga.org (last visited June 5, 2022).

[133] Coalition/100, Apter/16.

or IRP modeling. To the contrary, as discussed in Ms. Chittum's Reply Testimony (NW Natural/2100, Chittum), NW Natural is not acquiring RNG from crops grown specifically for that purpose and the Company has no intention of doing so.[134]

**Q. The Coalition claims that NW Natural's strategy of investing in RNG will allow it to continue with business-as-usual and earn profit for shareholders while polishing its image.[135] Please respond.**

A. NW Natural strongly disagrees with this characterization. As we explained previously, significant RNG investment is one of the Company's key strategies for decreasing the carbon-intensity of our product so we can meet the Company's vision of achieving carbon-neutrality for the energy we purchase and deliver to customers, meet the targets set in SB 98, comply with the CPP, and meet our customers' expectations. We will be held accountable by our regulators, customers, and investors to ensure these investments are prudent and provide emission-reduction benefits. In this way, RNG investments are no different than electric utility investments in the wind and solar generation also needed to decarbonize electric generation.

[134] NW Natural/2100, Chittum/5.

[135] Coalition/100, Apter/17.

### *3. Cost of Complying with the CPP*

**Q. CUB and the Coalition express concern that the costs of complying with the CPP will cause significant increases in NW Natural's rates.[136] Do you agree?**

A. Our preliminary modeling suggests that we can decarbonize our system at a reasonable cost. While the analysis indicates that the costs of CPP compliance are significant, the impact to the annual bill customers are expected to pay for gas utility service—which is a better metric than billing rates—over the thirty-year horizon is estimated to increase at a relatively modest level for residential and commercial customers. For example, we estimated the average residential customer bill would be nine percent higher and the average commercial bill 15 percent higher in 2030 under CPP compliance than in a world where the CPP were not established, which is not out of line with where customer bills have been periodically over the last couple of decades in real terms.

**Q. Both CUB and the Coalition express concern that the rising cost of conventional natural gas will also render gas utility service unaffordable.[137] What is your response?**

A. While natural gas prices are expected to remain higher this summer, they are forecasted to drop in 2023 as natural gas production increases, liquefied natural gas ("LNG") export slows, and storage levels increase.[138] The increase this

[136] CUB/100, Jenks/5; Coalition/300, Fain/30.

[137] Coalition/200, Burgess/16-17; CUB/100, Jenks/5-6.

[138] U.S. Energy Information Agency, *Short-Term Energy Outlook* (May 10, 2022), https://www.eia.gov/outlooks/steo/report/natgas.php.

summer is not expected to be prolonged due to the vast domestic supply of natural gas. It should also be noted that Oregon electric utilities rely on as much natural gas for power generation as all the gas utilities deliver to customers each year.

**Q. CUB claims that NW Natural plans to increase its energy efficiency spending more than 20-fold as part of its modeled CPP Compliance.[139] Is this correct?**

A. No. CUB states: "In 2022, NW Natural will spend about $22 million on energy efficiency. In 2025, it forecasts expenditures of about $124 million. In 2030 it is — forecasting around $200 million in energy efficiency, and it keeps growing to more than $400 million/year."[140] NW Natural is unable to interpret CUB's exhibit on which it is basing this claim; however, we can confirm that CUB is incorrect and has misinterpreted NW Natural's analysis. While it is true NW Natural is projecting a large increase in energy efficiency spending in order to comply with the CPP, it is nowhere near the scale CUB cites in its testimony. The highest annual cost associated with energy efficiency work is approximately $150 million in 2047—not $400 million. It is important to note that the analysis shows the highest annual cost *for the entirety of activities modeled for CPP compliance*, including energy efficiency, renewable supply resources, and payments for community climate investments is $331 million in 2047. This figure is best put in context through the projected impact on customer bills discussed in the previous responses and in

[139] CUB/100, Jenks 5.

[140] CUB/100, Jenks 5-6.

comparison to current revenues collected by ETO from PGE customers, a figure near $100 million annually.[141]

**Q. Both CUB and the Coalition testify that adding customers to the gas system will increase the cost of CPP compliance, which will be passed on to gas customers.[142] Please respond.**

A. While it is true that increased load will increase the *total* cost of compliance with the CPP *for* NW Natural as a covered party, what is more important is the amount individual customers pay NW Natural for gas service and how that amount changes under different possible compliance strategies or possible futures. Importantly, our preliminary modeling in docket UM 2178 showed that the average expected bills for customers were *lower* in scenarios with customer additions relative to scenarios where new customers are not allowed to connect to NW Natural's system—the more electrification assumed in the scenario, the larger the impact to the typical customer bill. Therefore, CUB's and the Coalition's concerns regarding the impact of adding new customers are unfounded, and their recommendations to change NW Natural's line extension policy would actually drive the increase in customer bills they are framing their policy recommendation as protecting against.

[141] ETO, *2021 Annual Report to the Oregon Public Utility Commission & Energy Trust Board of Directors* at 30 (Apr. 15, 2022) (available at: https://energytrust.org/wp-content/uploads/2022/04/2021-Annual-Report.pdf) ($95 million was collected from PGE customers by the public purpose charge in 2021).

[142] CUB/100, Jenks/10-11, 14-15; Coalition/100, Apter/7, 9-10, 14-15; Coalition/200, Burgess/19.

Furthermore, to the extent that CUB is truly more concerned about total costs of CPP compliance—as opposed to cost-per-customer—that concern will drive policies that are opposed to both economic and population growth. NW Natural does not believe that it is either helpful or beneficial for the state to discourage new businesses or immigration, particularly when there is a path to decarbonization that can be achieved at a reasonable cost per customer. Moreover, if CUB's logic were extended to Oregon electric utilities' need to comply with HB 2021, we would have to conclude that electric utilities should not seek to electrify transportation or buildings, as doing so would necessarily require more investment to serve this additional load while meeting the emission-reduction requirements of HB 2021.

**D. CUB's and the Coalition's claim that significant numbers of customers are or will leave the system is without basis.**

**Q. Please summarize parties' claims regarding customers leaving NW Natural's system.**

A. Both CUB and the Coalition point to factors other than cost that they claim are driving customers from the gas system, and based on these perceived trends, CUB and the Coalition argue that adding new customers may or will result in stranded costs, and therefore may no longer be prudent. CUB specifically raises the concern that customers are increasingly replacing gas furnaces with electric heat pumps such that fewer and fewer customers will be required to pay for the fixed

costs of the system.[143] CUB also questions whether it is appropriate to assume that the useful life of a pipe is 60 years or more.[144] The Coalition claims that objections to natural gas as a fossil fuel[145] and concerns about indoor air quality[146] will cause customers to depart leaving fewer and fewer customers holding the bag.[147] These claims are unsupported.

**Q. Please respond to CUB's claim that customers are increasingly replacing gas furnaces with electric heat pumps, which could result in stranded costs.[148]**

A. NW Natural disagrees that increasingly customers are choosing to live in all-electric homes and convert gas equipment to electric equipment. CUB provided no evidence to show that customers are actively leaving NW Natural's system or converting gas equipment to electric equipment at rates out of step with long term trends. The Company's data do not show an increasing trend to electrify in recent years. The best metric to understand customer choices is the actual choices customers make. The graph below shows the share of newly constructed homes that chose to connect to NW Natural's system through time as a share of building permits opened in the Company's service territory.[149]

[143] CUB/100, Jenks/3, 6, 13-14.

[144] CUB/100, Jenks/6, 13-14.

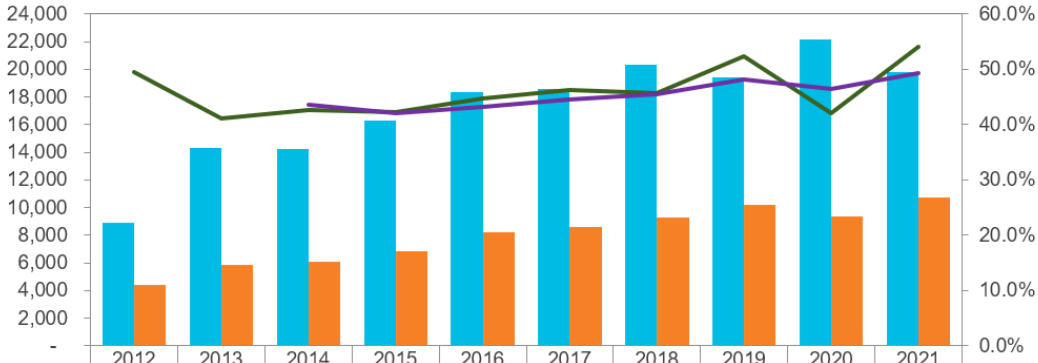
[145] Coalition/100, Apter/11.

[146] Coalition/100, Apter/14; Coalition/200, Burgess/20-21.

[147] Coalition/200, Burgess/17; Coalition/300, Fain/23.

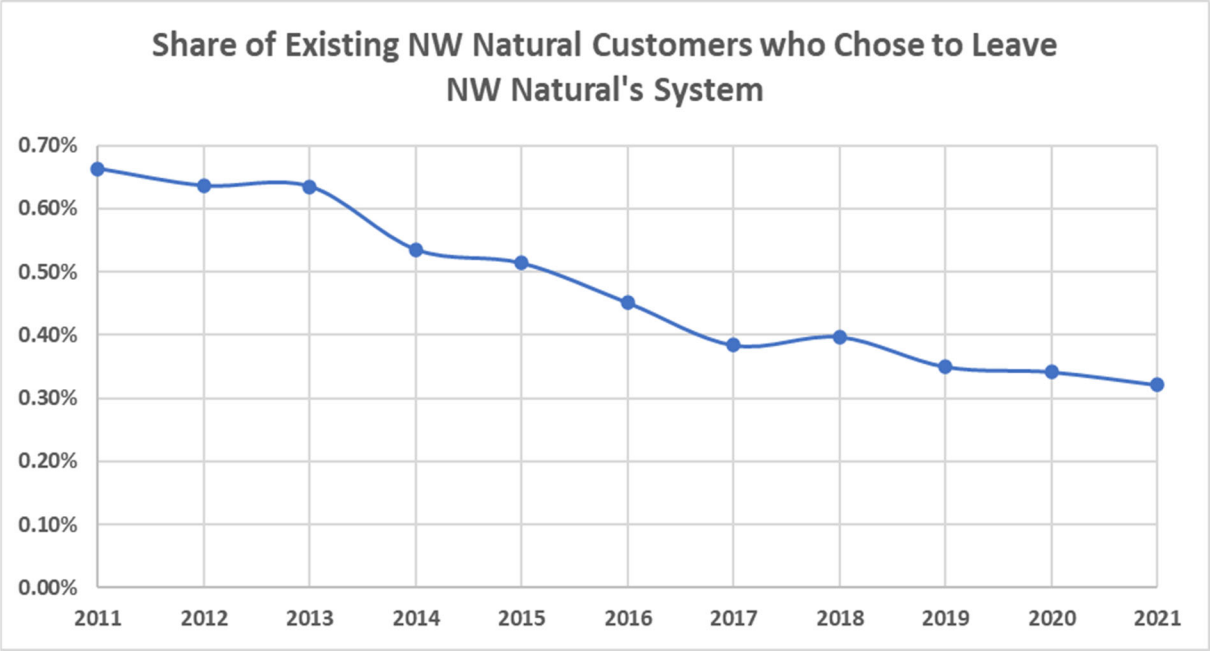
[148] CUB/100, Jenks/13-14.

[149] Note that not all new building permits are in locations that are served by NW Natural, even if in the Company's service territory.




| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|
| Permits | 8,924 | 14,328 | 14,209 | 16,273 | 18,365 | 18,577 | 20,353 | 19,458 | 22,181 | 19,811 |
| Meters | 4,419 | 5,894 | 6,052 | 6,871 | 8,227 | 8,589 | 9,312 | 10,203 | 9,345 | 10,730 |
| Market Share | 49.5% | 41.1% | 42.6% | 42.2% | 44.8% | 46.2% | 45.8% | 52.4% | 42.1% | 54.2% |
| 3-Yr Average Market Share | | | 43.7% | 42.0% | 43.3% | 44.5% | 45.6% | 48.1% | 46.6% | 49.3% |

This data suggests that in the most recent years, newly constructed buildings have been connecting to NW Natural system at rates consistent with long-term trends. The following graph shows the share of NW Natural customers who left NW Natural's system (i.e. stopped being NW Natural customers) in a given year.




These graphs show that in recent years new customers have been choosing to connect to NW Natural's system at rates in step with the longer-term historical

trend and that through time, fewer and fewer of NW Natural's existing customers have chosen to leave the Company's system, which is at odds with the assertions made by CUB and the Coalition. Additionally, while it is more difficult data to analyze, analysis suggests that NW Natural's customers who use gas as their primary space heating fuel are not converting to other fuels for space heating in recent years at a rate out of step with longer-term historical trends, either.[150]

**Q. Please respond to CUB's and the Coalition's suggestion that customers *will* leave NW Natural's system or electrify their gas equipment due to public opposition to fossil gas.[151]**

A. CUB and the Coalition argue that many factors will drive NW Natural customers to choose to leave the gas utility system entirely or electrify the gas equipment, particularly space and water heating, to electric heat pumps in support of their recommendation the Commission alter the Company's line extension policy. This conclusion about what customers will do is speculative and out of step with the response to the previous question.

Additionally, the Coalition's references to public opposition to proposed LNG export operations in the state are inapt.[152] NW Natural does not export LNG, and the Coalition does not explain how customer opposition to LNG export results

[150] NW Natural's data shows only usage of NW Natural's customers. If a customer stops using natural gas for space heating, the Company cannot say what the customer converted their heating to (be it a propane furnace, a wood stove, or an electric heat pump).

[151] Coalition/100, Apter/11.

[152] Coalition/100, Apter/11.

in customers declining to use natural gas in their homes and leaving Oregon's natural gas system.

**Q. The Coalition also testifies regarding the health hazards associated with gas stoves.[153] Please respond.**

A. I would start by pointing out there are no documented risks to respiratory health from proper use of natural gas stoves, including associated combustion related emissions, by the government agencies and advisory committees responsible for protecting residential consumer health and safety, including the Federal Interagency Committee on Indoor Air Quality and the Consumer Product Safety Commission. What federal agencies and peer-reviewed scientific studies conclude is that proper ventilation when cooking with any fuel source is the most important step you can take to mitigate potential cooking-related indoor air quality problems, because cooking activities themselves (*e.g.*, grilling, frying, broiling, baking) are a source of indoor air emissions, including particulate matter—which is why kitchen exhausts are required for all new homes, whether they have gas or electric cooking. In other words, you need to properly ventilate when cooking on a gas or electric stove to address potential cooking-related health concerns. Conversely, if you removed your gas cooktop for an electric one, but do not properly ventilate, you will still have a potential air quality problem. We believe this critical omission by the Coalition and others advocating for electrification is

[153] Coalition/100, Apter/14; Coalition/200, Burgess/20-21; Coalition/400, Ryan/22.

irresponsible because it leaves the public with misinformation that could negatively affect their health.

This issue has been misrepresented by advocates for electrification. The reports cited by the Coalition and funded or influenced by anti-natural-gas groups, such as Sierra Club and Rocky Mountain Institute, have clear methodology and testing protocol shortcomings that lead to many unsupported or misleading conclusions. These shortcomings are addressed in the attached Exhibits.[154]

**Q. Do the parties' proposals in this case help address their concerns regarding stranded costs resulting from customers leaving the system?**

A. No. CUB's and the Coalition's proposals to phase out or eliminate the line extension allowance would cause a decrease in the Company's customer base over time, which in turn would yield the very result about which the parties are concerned—increased costs for remaining customers. Thus, rather than responding to a phenomenon that is already occurring (customers leaving the system), CUB and the Coalition are actually recommending a policy change that will cause the phenomenon to occur in the future (fewer customers in the future).

[154] *See* NW Natural/1708, Heiting-Bracken; NW Natural/1709, Heiting-Bracken.

**Q. CUB requests that the Commission phase out the presumption of prudence associated with capital investments to add new customers.[155] How do you respond?**

A. As an initial matter, I am not certain I understand Mr. Jenks's statements regarding the "presumption of prudence" and what specific change(s) to the Company's tariff, the Commission's rules, or the State's statutes he is proposing. While NW Natural is required to extend service to new customers within its service territory, it must do so prudently and consistent with its tariff.[156] To the extent Mr. Jenks is suggesting NW Natural should *not* be required to serve new customers or permitted to recover for the costs of serving new customers under the terms of its tariff, this would be a drastic change with potentially drastic consequences.

## E. Other Issues

### *1. Lobbying and Political Activities*

**Q. Please describe your understanding of the Coalition's arguments related to NW Natural's lobbying and political activities.**

A. Based on my understanding of the Coalition's testimony, the Coalition is arguing that NW Natural is improperly seeking cost recovery of lobbying and political activities related to local jurisdictions' climate policies, the CPP rulemaking, and statewide legislation.[157] After the Coalition describes these activities, *to which I will respond below*, the Coalition states that NW Natural admits to seeking recovery

[155] CUB/100, Jenks/14-15.

[156] OAR 860-021-0050(1), OAR 860-021-0051.

[157] Coalition/400, Ryan/39-41.

of its recent engagement with the City of Eugene relating to the City's climate action plan.[158] The Coalition does not specifically assert that NW Natural has sought recovery of any of the other activities mentioned in this section of its testimony.

**Q. How do you respond to the Coalition's argument?**

A. I strongly disagree with the Coalition's testimony and the argument that the Company is inappropriately seeking cost recovery of political and lobbying activity. The Company has specific cost allocations for employees that are engaged in lobbying and/or political activity. These allocations (inclusive of salary and overheads) are recorded to non-recoverable expense. In other words, NW Natural has not sought recovery of those costs, and consequently, NW Natural's shareholders have paid for those activities. In response to a Coalition data request, NW Natural demonstrated that all employees in the Government Affairs department had specific allocations of their time recorded to non-recoverable expense.[159] In addition to salary and payroll costs, the Company records any costs of production of materials and communications to a non-recoverable account, and does not seek recovery of those costs either.

[158] *Id.* at 41.

[159] *See* NW Natural/1711, Heiting-Bracken.

**Q. Please describe the Company's engagement with the City of Eugene regarding its climate action plan.**

A. Over the past three years, NW Natural has been in conversation with the City of Eugene regarding their efforts to adopt and implement a climate action plan. As part of the climate action plan discussions, concerns about the environmental impact of gas service were raised, and in particular regarding whether the City should propose a prohibition on the addition of new customers to the gas system and other electrification measures. The City raised these concerns with NW Natural in the context of negotiations between the Company and the City regarding NW Natural's franchise agreement. In the course of these discussions, the City and its staff have asked the Company to provide a significant amount of information that would bear on their decision as to whether or not to move forward with regulating the provision of natural gas as part of their emissions-reduction strategy. The Company has provided the requested information via emails and meetings, has been invited to make presentations to the City, and has expressed many concerns about the negative implications of prohibiting their citizens from receiving natural gas utility service. Furthermore, as part of those discussions, NW Natural and the City engaged in many productive conversations to develop a targeted emissions reduction program for the City, which would be brought forward to the Commission for review and approval. Ultimately, those discussions did not lead to a program proposal, but they were conducted with the specific aim to provide solutions for the City's desire to decrease its emissions.

**Q. Has the Company sought to recover the costs of its engagement with the City of Eugene in this rate case?**

A. Yes, to the extent that the Company is seeking recovery of our standard employee compensation costs from the Base Year, the time working with the City of Eugene would be included in those costs.[160] The Company has not sought any special recovery for any costs associated with its work with the City of Eugene (such as a deferral of incremental costs not previously captured in rates).

**Q. The Coalition's testimony also refers to political advocacy related to the City of Eugene including a "paid survey" and the "paid advertisements in a local newspaper."[161] Has the Company sought recovery of those costs?**

A. No, the "paid survey" and the "paid advertisements in a local newspaper" were recorded as non-recoverable expense and paid for by shareholders. In fact, the survey referenced by the Coalition expressly states: "This communication and research are not paid for by customers." [162] While the Coalition did not provide an exhibit of the local newspaper advertisement, the Company's practice is to record any advocacy advertisement in a newspaper to non-recoverable expense.

[160] The Multi-Party Stipulation entered into by NW Natural, Staff, CUB and the Small Business Utility Advocates reflects a reduction to revenue requirement for salary, wages and benefits of $5.25 million, which reduced the amount for which the Company seeks recovery of the wages of all employees, including those participating in negotiations with the City of Eugene. Docket UG 435, Stipulation at 5 (May 31, 2022).

[161] Coalition/400, Ryan/39.

[162] Coalition/408, Ryan/179.

**Q. The Coalition also references the potential for other cities to regulate the use of natural gas.[163] Can you please provide some background regarding this issue?**

A. Several cities in Oregon are grappling with the question of what they can do to address climate change, and some of them have explored the questions I have addressed in this testimony—whether the gas system should be expanded and to what extent electrification is feasible and/or beneficial. And some stakeholders in those conversations have indeed recommended limiting the growth of the gas system. We are often invited to comment on these ideas and plans as they are being developed not only because our customers could be impacted, but also because our expertise as a local distribution company is needed to fully understand the impacts of these proposals (regardless of the political outcome of any proposal). We have attempted to work with the cities to explain to them the importance and value of the energy we provide and what we plan to do to decarbonize, as well as the implications of a "gas ban". Importantly, no city has advanced a gas ban for new customers. We expect that cities will continue to have these conversations, and that we will need to demonstrate to them the value of our service, the role our infrastructure currently plays, as well as our ability to meet the State's decarbonization goals. We remain optimistic that when in possession of the relevant information, recommendations to limit gas service will be unsuccessful.

[163] Coalition/100, Apter/12-13.

**Q. The Coalition testifies that the Company's costs of participating in the CPP rulemaking should be disallowed as "lobbying" and "political activities."[164] Could you start by describing the Company's participation in the CPP Rulemaking?**

A. Certainly. Throughout 2021, the Company actively participated in the Oregon ODEQ's CPP rulemaking. As a covered entity subject to the then-forthcoming regulation, NW Natural provided the ODEQ with important information regarding NW Natural's service and product, listened and learned from the other participants, and responded to requests for comments for the agency rules. Additionally, NW Natural was invited to have an employee be a member of the Rules Advisory Committee.

**Q. Please explain whether the Company views its participation in the CPP rulemaking as lobbying and whether it seeks to recover such costs in customer rates.**

A. First, while I am not a lawyer, my understanding is that, by definition, the Company's activity in the rulemaking was not "lobbying" because the Company was not attempting to influence a legislative action. Rather, as noted above, NW Natural participated in an administrative rulemaking because the Company was expected to be a covered entity subject to emissions compliance.

As a covered entity, the GHG reduction proposals considered and ultimately adopted by the ODEQ would have very significant impacts on our customers.

[164] Coalition/400, Ryan/39-43.

Therefore, it was critical that the Company participate in the development of the rules. It is undoubtedly true that the Coalition may disagree with some of the Company's views expressed in the course of that rulemaking—however that fact does not suggest that the Company was not required to participate as a regulated entity, or that its customers are not benefited from that participation. If the Coalition is truly suggesting that NW Natural should not be permitted recovery for the costs of engaging with state and local governments or regulatory agencies that affect its business, that is a radical and unprecedented position that would have significant and far-reaching consequences for all utilities.

To the extent that the Company is seeking recovery of the costs of our participation in the rulemaking, the Company is only seeking recovery of our standard employee compensation costs from the Base Year and escalated to the Test Year. The Company has not sought any special recovery for any costs associated with the rulemaking (such as a deferral of incremental costs not previously captured in rates).

**Q. The Coalition lists several examples of the Company's communications to customers related to the CPP and its public comment process.[165] Did the Company seek recovery of any of these communications?**

A. No. Each of the communications identified by the Coalition were recorded as non-recoverable expense and paid for by shareholders. In other words, the costs of the communications were not included in the Base Year for recovery in this case.

[165] Coalition/400, Ryan/40; Coalition/408, Ryan/56-61, 63.

**Q. Ms. Ryan also refers to the Company's involvement in general statewide legislative advocacy, presumably out of concern that the costs of these efforts were included in rates.[166] Does the Company seek recovery of its lobbying expense?**

A. No, it does not. Specifically, the Company does not seek recovery of 50 percent of the employee compensation for our State and Federal Government Affairs manager. This allocation was established to reflect this employee's time spent lobbying.

***2. Dues and Memberships***

**Q. What expenses are included in the Company's expense category for dues and memberships?**

A. The expense category for dues and memberships includes dues paid to organizations where membership is necessary for the Company and its employees for perform their job functions (e.g., the Oregon State Bar and Oregon Board of Accountancy). In addition, these expenses include dues and memberships paid to organizations that:

- provide educational opportunities for NW Natural employees (e.g., American Institute of Certified Public Accountants and the Practicing Law Institute);

[166] Coalition/400, Ryan/41.

- certify NW Natural employees for specialized job functions (e.g., the American Board of Industrial Hygiene and the Institute of Internal Auditors); and
- provide opportunities to build and maintain relationships with other entities operating in the natural gas industry, such as the American Gas Association ("AGA"), Northwest Gas Association ("NWGA"), Western Energy Institute and the Better Business Bureau.

**Q. Has the Coalition objected to the Company's request to recover expenses related to dues and memberships?**

A. Yes. The Coalition's witness, Ms. Ryan, points out that the Company seeks to recover expenses related to dues and memberships in organizations that are involved in lobbying or other political activities, and therefore she argues that these expenses should not be recoverable.[167] In particular, Ms. Ryan asserts that the AGA and NWGA "engage in various lobbying and other political activities, including seeking to influence legislation or other government agency action and other political activities" that are not in customers' interests.[168] Ms. Ryan notes that the Company seeks to recover approximately $506 thousand in dues for these two organizations.[169] Ms. Ryan also points out that the Company has made payments to various Chambers of Commerce, the Oregon Truckers Association and other

[167] Coalition/400, Ryan/42-47.

[168] Coalition/400, Ryan/5, 43.

[169] Coalition/400, Ryan/42.

membership groups involved in political advocacy.[170] Ms. Ryan states that it is not clear how much the Company seeks to recover for payments recorded in accounts other than Account 930.2, but that she is concerned that the Company the Company is including these expenses as "above the line."[171]

**Q. What adjustment does the Coalition propose to the Company's dues and membership expenses?**

A. The Coalition requests that the Commission "disallow recovery of dues and payments to these trade associations as well as any other membership dues to third-party groups engaged in political activities."[172] However, other than noting the amount included in the Test Year for the AGA and NWGA (approximately $506 thousand),[173] the Coalition does not propose a total amount for its proposed adjustment.

**Q. Did Staff also propose an adjustment regarding the Company's dues and memberships expenses?**

A. Yes, however, Staff has entered into a multi-party stipulation with CUB, AWEC, SBUA (the "Stipulation"), and the Company addressing revenue requirement, rate spread and certain other issues. The Stipulation expressly resolves the adjustment that Staff proposed in its Opening Testimony regarding dues and

[170] Coalition/400, Ryan/42.

[171] Coalition/400, Ryan 43. From Ms. Ryan's testimony, it appears that she mistakenly believes that dues paid to the AGA and NWGA are booked to FERC Account No. 930.2. While dues and membership expenses are booked to several FERC accounts, including Account No. 930.2, AGA and NWGA dues are booked to Account No. 921.

[172] Coalition/400, Ryan/5.

[173] Coalition/400, Ryan/42.

memberships by reflecting a reduction to expense of $443,000 that results in a reduction to revenue requirement of $456,000.[174]

**Q. Please explain the Company's justification for recovering dues and memberships expenses in this rate case.**

A. NW Natural believes that these organizations provide a benefit to NW Natural's customers and are a reasonable business expense that should be recoverable. These organizations keep employees informed and trained, provide opportunities to build and maintain relationships with other entities operating in the natural gas industry, and also, in many cases, directly take on issues that benefit customers (e.g., the AGA engaging in federal tax reform). They directly benefit employees' work performance, and in some cases are simply *necessary* for the Company's employees to perform their jobs and for the Company to operate.

**Q. Please provide some examples of memberships that are essential for the Company's operation.**

A. As noted above, the Company pays dues to the Oregon Bar Association on behalf of its lawyers and to the Board of Accountancy on behalf of its accountants. These dues are required for these employees to practice their professions. Another expense in this category is our subscription to the WebICE service. WebICE is an energy trading system that allows its members to see real-time natural gas pricing information at the various hubs where the Company purchases gas. This system

[174] Docket UG 435, Stipulation at 4.

allows the Company to track real-time pricing and ensure that its deals align with the market.

**Q. Please describe the role of the AGA.**

A. AGA's mission is to represent companies delivering natural gas, and to promote the safe, reliable, and efficient delivery of natural gas to homes and businesses across the nation. The AGA's activities include initiatives to improve the safety, efficiency and productivity of member companies' engineering and operating functions, such as:

- Technical Committees and Taskforces, addressing topics such as construction operations, cybersecurity strategy, enterprise risk management, gas control, and natural gas security.
- Technical Discussion Groups covering issues such as asset management, corrosion control, emergency management and public safety, emissions reduction and field worker assault prevention.
- Mutual Assistance Program and Emergency Planning Resource Center, which facilitates response, recovery, and restoration of services following a natural or other disaster.
- Technical Publications, regarding specific equipment, pipelines, gas measurement, leaks, etc.

A fuller summary of the AGA's key operational activities is provided in the Company's response to UG 435 Coalition DR 73, which is attached to this Reply Testimony as NW Natural/1711, Heiting-Bracken.

**Q. Please describe the role of the NWGA.**

A. The NWGA's mission is to advance the safe, dependable, and responsible use of natural gas, to foster greater understanding and informed decision-making among industry participants, opinion leaders, and governing officials in the Pacific Northwest on issues related to natural gas. The NWGA's activities include:

- Convening industry CEOs to share information about the industry.
- Public information through publications through speeches, seminars and conferences on important topics such as safety, alternative fuels for vehicle fleets and new alternative fuel technologies.
- Educational blogs and newsletters on industry developments.
- Developing collective industry perspectives on key regulatory issues, such as RNG gas quality.

**Q. Does the AGA or NWGA engage in lobbying and other political activities?**

A. Yes, both organizations engage in lobbying and political advocacy. However, as can be seen from the above, political work is just one area of activity among many others. For this reason, expenses related to dues and memberships are not booked to the FERC accounts reserved for lobbying and political activities.[175]

[175] Moreover, it is worth noting that while the Coalition may object to specific political activities undertaken by these organizations, there are others that they undoubtedly would support. For example, the AGA has been very active in seeking more energy assistance during COVID.

**Q. Does the Company seek to recover expenses booked to FERC Account No. 426 as lobbying or political activity expenses?**

A. No. As I stated earlier, consistent with Commission policy, the Company does not seek to recover such expenses.

**Q. Please explain the function local Chambers of Commerce serve and the benefits the Company and its customers receive from membership.**

A. Chambers of Commerce support local businesses, providing education and programs for members that address local challenges and opportunities including business recovery efforts, staffing and workforce development needs, and member education and local leadership programs. Utilities, both investor-owned and public, have traditionally participated in Chambers of Commerce; they are viewed as critical local infrastructure and economic partners for the communities and businesses we serve. As an example, PGE, PacifiCorp, and many electric Public Utility Districts also belong to Chambers of Commerce in our overlapping service areas.

Our membership in local Chambers of Commerce enable the company to stay involved with and create deeper relationships in the communities we serve, and they allow us to keep abreast of concerns, opportunities and challenges in our service areas, in an efficient manner including:

- Providing an efficient and effective way to engage, monitor, and interact with a large number of customers from across our service areas.

- Providing information and data we can use to assess our company program offerings (e.g., incentives, equipment preferences, energy efficiency needs, ability to respond to local policy aims)
- Communicating timely customer information including natural gas safety, free inspection reminders and maintenance tips, and billing assistance (e.g., communications around COVID-related customer arrearage management).

**Q. Ms. Ryan raises the concern that the Eugene Chamber of Commerce opposed the City of Eugene's "electrification ordinances.[176] Does that fact suggest that there is anything improper about the Company's request to recover membership dues in that organization?**

A. No. As I mentioned with respect to the AGA and NWGA, the fact that a Chamber of Commerce engages in political activity does not render the Company's membership an act of "lobbying"; nor does it suggest that the primary purpose of membership is political in nature. The Company views its membership in local Chambers of Commerce as a form of civic engagement, which is beneficial to the Company's customers.

[176] Coalition/400, Ryan/47.

**Q. Please explain why the Company maintains a membership in the Truckers Association and the benefits to NW Natural and its customers associated with that membership.**

A. As a critical component of its business, NW Natural maintains a fleet of vehicles that are used to provide utility service. Membership in the Truckers Association provides the Company with the following:

- Department of Transportation (DOT) Federal Motor Carrier Safety/ Administration (FMCSA) Regulatory Updates;
- DOT – FMCSA alerts for Emergency Declarations;
- Security updates for the Trucking and CDL regulated vehicles;
- Continuing Education, Training, and Safety Conferences to make sure we are in compliance with the FMCSA regulations;
- Networking with others in trucking and CDL-regulated vehicles, mainly to share best practices around Fleet Safety and Maintenance for trucks;
- DOT-FMCSA compliance audits to make sure NW Natural is in compliance with the regulations; and
- Experts for legal issues.

These are important benefits to help our employees perform their jobs safely and within all applicable regulations.

**Q. Has the Coalition explained the specific political activity engaged in by the Truckers Association to which it objects?**

A. No. However, to be clear, NW Natural's membership in the Truckers Association is not based on any political position that organization may take.

**Q. How do you respond to Ms. Ryan's concern that the groups to which NW Natural pays dues and expenses are "inherently counter to the best interests of Oregon ratepayers and our climate"?[177]**

A. I have two responses to this claim. First, I disagree that the policy recommendations of these organizations run counter to Oregonians' interests. I acknowledge that there are policy disagreements among the various stakeholders as to the best approach to decarbonizing this country's energy sector—and that the Coalition's recommendations may differ sharply from those made by the AGA, the NWGA's or the various Chambers of Commerce. However, that disagreement does not imply that these organizations are incorrect, or, more importantly, that the policies they espouse are counter to the interests of NW Natural's customers—who we believe benefit from these memberships.

Second, I disagree with the underlying premise of Ms. Ryan's argument, which is that customers do not benefit from NW Natural's membership in an industry if a stakeholder, or even NW Natural, disagree with one or more of the organization's policy recommendations. The membership of these organizations is extremely broad, and their policy recommendations generally represent the

[177] Coalition/400, Ryan/43.

majority opinion—so it is important that NW Natural participate and make its own voice heard. The bottom line is that AGA and NWGA are the primary industry organizations representing the interests of gas distribution companies, and as noted above, NW Natural's membership in these organizations is critical to keeping the Company's employees informed on industry trends, developments, and research.

**Q. In addition, does the Stipulation already address the Coalition's concerns about lobbying and political activity expenses?**

A. Yes. In its Opening Testimony, Staff proposed to disallow 25 percent of dues and memberships expenses for national and regional industry trade organizations, such as AGA and NWGA, "on the basis that certain activities are promotional or lobbying in nature or otherwise do not benefit customers"[178] and to disallow all memberships or dues paid to organizations that are neither industry research organizations nor such trade organizations.[179] Staff's total adjustment for dues and memberships expenses in its Opening Testimony was $443,905,[180] which is nearly identical to the $443,000 expense adjustment that the Company, Staff, CUB and AWEC agreed to in the Stipulation.[181] In offering this comparison, I am not presenting a position on Staff's adjustment in its Opening Testimony but rather am demonstrating that the Coalition's concern is resolved by the Stipulation.

[178] Staff/1200, Rossow/4, 6.

[179] Staff/1200, Rossow/6.

[180] Staff/1200, Rossow/6.

[181] Stipulation at 4.

**Q. Does this conclude your Reply Testimony?**

A. Yes.