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June 3, 2022

VIA EMAIL

Public Utility Commission of Oregon
Attention: Filing Center
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RE: UM 2178, Natural Gas Fact Finding Per Executive Order 20-04
NW Natural's Comments on Draft Report

NW Natural would like to thank the Oregon Public Utility Commission (Commission), Commission Staff, and stakeholders for the opportunity to comment on Staff's UM 2178 Natural Gas Fact Finding Draft Report (Draft Report). Everyone involved in this proceeding cares deeply about our state's future, and we all want to see it decarbonized. With that in mind, NW Natural responds to the Draft Report by offering thoughts about the context and purpose of this docket, the limitations of the proceeding, and feedback on Staff's recommended next steps. The rapid decarbonization of the state's energy industry is underway, and this docket has provided a valuable opportunity for an early discussion of regulatory next steps for managing that transition appropriately.

I. Introduction and Summary

The Oregon Department of Environmental Quality (DEQ) has recently taken steps to address Greenhouse Gas (GHG) emissions by adopting the Climate Protection Program (CPP), which are administrative rules that set GHG reduction targets.[1] In addition, the legislature recently passed HB 2021, which mandates the reduction of GHG emissions for the electric sector. Under the CPP, entities that account for about half of the state's emissions – including regulated gas utilities – must achieve emission reductions of 50 percent by 2035 and 90 percent by 2050. The Commission opened this docket to evaluate the potential bill impacts of the CPP on gas utility customers and to better understand various gas utility decarbonization scenarios.[2] In the end, Staff recommends 25 near-term actions in its Draft Report and seeks feedback on those recommendations.

When this docket was opened, the goal, as NW Natural understood it, was to provide the Commission with a better understanding of the traditional regulatory tools at the Commission's disposal to monitor and support gas utilities' CPP compliance. Others viewed the docket differently, seeing it instead as an opportunity to advocate for drastic

[1] OAR 340-271-0010 – 9000.
[2] Natural Gas Fact Finding Draft Report at 1 (Apr. 15, 2022) (hereinafter, "Draft Report").

changes to this Commission's regulatory oversight and to seek the imposition of new state policy. NW Natural views this docket as an opportunity to better understand how utilities and this Commission might best effectuate *current* state policy, which requires emissions reductions—not fuel switching—and which explicitly recognizes the value of investment in products like renewable natural gas (RNG). Other stakeholders instead call into question whether the gas utility model has any place in Oregon's decarbonized energy future at all. They argue that the only way to reduce GHG emissions is to electrify building load and to limit customer choice, and they ask the Commission to drive this change in this Fact Finding proceeding.

Recommendations to limit customer choice run counter to the evidence presented in this proceeding, to current state policy, and to this Commission's statutory duties. While electrification[3] is a popular mantra, Oregon's gas utilities have demonstrated through preliminary modeling in this docket the existence of viable and affordable pathways for complying with the CPP.[4] For its part, NW Natural is confident that it can comply with the CPP through a combination of innovative resources—under a wide range potential future market and policy conditions. The Company's preliminary modeling will soon be supplemented by more rigorous IRP modeling, scheduled to be released in August.

Moreover, NW Natural's modeling results are consistent with the most comprehensive, Oregon-specific analysis of building electrification in the context of economy-wide decarbonization that exists, a 2018 study by Environmental+Energy Economics ("E3 Study"). This study analyzed the most efficient and cost-effective approach to decarbonizing the economy in the Pacific Northwest while focusing on the important issue of reliably serving heating loads during cold weather events.[5] That study concluded that natural gas companies serving existing and new customers while decarbonizing "is a cost-effective strategy to meet the region's climate goals while also reliably serving winter peak demands."[6] While the study was completed before the passage of HB 2021 or the establishment of the CPP, and iterative utility IRPs will be critical for understanding decarbonization costs as they change over time, it demonstrates that any rush to judgment on the future of gas is misguided and that rapid, wholesale electrification of building load is neither economical nor necessary for meeting Oregon's decarbonization targets. Moreover, that rush to judgment could potentially increase emissions in the short run and inhibit large-scale emissions reductions in the long run. In short, the facts support investment in natural gas decarbonization measures rather than a retreat from that system.

Likewise, state policy supports investments in the state's gas system, as does Executive Order 20-04 (EO 20-04), which further establishes *fuel-neutral* GHG reduction

[3] When using the term "electrification," NW Natural refers to any action or scenario that limits the option of new customers to choose natural gas or that encourages the defection of customers from the gas system to the electric system.
[4] NW Natural Presentation at slides 42-55 (Sept. 24, 2021).
[5] Energy+Environmental Economic, *Pacific Northwest Pathways to 2050, Achieving an 80% Reduction in Economy-wide Greenhouse Gases by 2050* (Nov. 2018), available at https://www.ethree.com/wp-content/uploads/2018/11/E3_Pacific_Northwest_Pathways_to_2050.pdf (hereinafter, "E3 Study").
[6] E3 Study at 86.

goals and identifies RNG as a benefit to Oregonians.[7] Also, while EO 20-04 explicitly directs transportation electrification as a measure to meet that order's emissions targets, it does not direct any state agency – inclusive of the Commission – to enact policies that would drive or incentivize building electrification. On the legislative side, the Oregon legislature has explicitly promoted the use of RNG for decarbonization with the passage of SB 98, and SB 844 encourages gas utilities to actively invest in decarbonization projects.[8] Encouraging gas utility decarbonization is consistent with these state policy pronouncements; limiting customer choice is contrary to them.

The Commission's own statutory duty to protect customers calls for encouraging gas decarbonization. NW Natural's role in Oregon's overall energy system can hardly be overstated. NW Natural delivers more energy than any other utility in Oregon —electric or gas.[9] In Oregon, the gas and electric systems have a concurrent peak in winter. During this concurrent peak, the gas system delivers about twice as much energy as the electric system. The gas system is thus essential to electric reliability now, and for mitigating projected regional electric capacity deficits.[10] The resilience and reliability benefits provided by natural gas are sorely needed by Oregon's energy system *today*. And gas will be critical to Oregon's energy system in the *future*, as the resilience and reliability benefits provided by the gas system will continue to support electric utilities' own decarbonization pathways under HB 2021. Any Commission action that would minimize the number of customers who help pay for the state's gas infrastructure could inadvertently impact the financial health of gas utilities—either by forcing a smaller base of customers to pay for the system, or by sending market signals that undermine utility's access to capital markets—thus irreversibly damaging the statewide benefits provided by Oregon's gas system. Such actions are *incompatible* with calls for robust investment in new decarbonization technologies and are more likely to spur a crisis than avert one.

While NW Natural appreciates the resource constraints at the Commission, it should also be recognized that low- or no- cost consultants utilized by the Commission as a proxy for in-house resources are not necessarily unbiased in their approach to decarbonization. For example, the Regulatory Assistance Project (RAP), while staffed with professional and competent individuals, explains on its website that two out of its four key priorities are to "[a]ccelerate electrification of buildings and transportation," and to [a]ccelerate the phase-out of gas infrastructure."[11] While NW Natural appreciates the valuable assistance such organizations can bring for moving a docket forward, they are no substitute for true unbiased and independent consultants, nor do they bring to the table

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[7] Office of the Governor State of Oregon, Executive Order No. 20-04 at 2 ("Executive Order"), https://www.oregon.gov/gov/Documents/executive_orders/eo_20-04.pdf.
[8] ORS 757.390 – ORS 757.398; ORS 757.539.
[9] NW Natural serves 70 percent of the space heating needs in its service territory, and, on the coldest days of the year, its residential space and water heating customers are getting 90 percent of their homes' energy needs met by the Company's system.
[10] The direct use gas system has the energy equivalent of about 98 gigawatts of capacity and 6 million MWh of storage. This capacity is crucial in ensuring that the combined gas and electric systems can meet Oregonians' overall energy demand during the coldest days of the year.
[11] *See* https://www.raponline.org/jobs/

expertise in modeling local or regional gas decarbonization scenarios, even if they were tasked with doing so.

Finally, NW Natural looks forward to pursuing a number of meaningful decarbonization efforts at the Commission in the short term, while planning for full CPP compliance in the long term. Successful development and implementation of new gas decarbonization measures by Oregon gas utilities—such as deep energy efficiency, increased use of RNG, and hydrogen gas —is likely to provide a viable and practical decarbonization pathway for gas utilities while providing critical industry leadership and market development for gas utilities across the country, many of whom will eventually be tasked with decarbonizing their own systems. Encouraging a pathway for gas decarbonization also ensures resilience of the state's energy system in the event of extreme weather or market dysfunction, or in the event deep decarbonization of the electric system proves more challenging than anticipated.

II. Discussion of Natural Gas Fact Finding

A. The Timing and Usefulness of the Natural Gas Fact Finding Docket

The Commission opened this proceeding to focus solely on gas utilities in order to examine the possible impacts of the CPP on the gas industry and to better understand "different decarbonization scenarios to help inform future decision making."[12] This goal is laudable, and discussions in this docket prompted meaningful discussions about the types of regulatory oversight and analysis that could, in fact, inform meaningful regulatory oversight of utility decarbonization efforts. At the outset, however, NW Natural would note that the docket suffered from a lack of scope because the docket focused solely on the gas distribution industry.

In doing so, this docket has excluded any meaningful analysis of the impacts of various gas decarbonization scenarios on the state's electric system, despite their distinctly interconnected nature. The investigation thus provided no meaningful cost or reliability information against which to understand the *relative* or holistic costs of gas decarbonization pathways on retail customers or on the cost or reliability of the state's energy system as a whole.

1. The results of the modeling and discussion in this docket are limited and simply reinforce the validity and viability of the Commission's existing regulatory processes: modeling, reporting, and follow-through.

Some of Staff's recommendations seem to suggest that this Commission should take initial steps toward electrification of Oregon's energy industry.[13] Aside from the calamitous market signal this would send, and aside from serious questions about whether such actions are within Commission's statutory authority, no credible "facts"

[12] Oregon Public Utility Commission Staff Natural Gas Fact Finding per Executive Order 20-04 at slide 11 (June 8, 2021) (hereinafter, "Fact Finding").
[13] *See, e.g.*, Draft Report, Appendix C – RMI Building Electrification Policy Pressures.

developed in this proceeding support a Commission decision to take this drastic and unsupportable step. First, the modeling in this docket was insufficiently robust to inform any specific, substantive action, let alone unprecedented regulatory action. And second, to the extent the modeling demonstrated anything, it demonstrated the likelihood of practical, achievable natural gas decarbonization pathways that should be explored over time through robust, meaningful, and iterative planning. Lastly, the modeling completed in this process showed it is likely that electrification would likely result in *larger* bill increases for gas utility customers moving forward than gas decarbonization in the context of CPP compliance. This contradicts the narrative put forth by some stakeholders that the Commission should take action to protect gas customers from the impacts of building electrification *by counterproductively taking action to incentivize or force electrification*.

Meaningful utility modeling takes time, good parameters, and good data. The modeling exercises and sensitivities mandated by Staff in this factfinding, while interesting for illustrative purposes, were rushed as a matter of necessity given the docket's schedule. The modeling requirements were developed and mandated largely by Staff, rather than developed by consensus, resulting in misunderstandings about how modeling was performed and what, exactly, the results might mean.[14] Finally, because the schedule limited time for model development, the modeling parameters utilities were meant to use were at times unclear and thus developed of necessity on an ad hoc basis. Scenarios and sensitivities were not consistently well developed or clear, and results were therefore inconsistent among utilities and inferior to results obtained as part of a methodologically sound process that allows the appropriate analytical tools to be employed.

NW Natural's work in this docket represents the Company's best efforts to develop meaningful results, but given the substantial results being sought (essentially the results typically provided through integrated resource planning (IRP)) and the very short timeframe allowed, the Company was forced to use less-than-ideal analytical tools to complete the work. Moreover, the analytical work conducted in this process was based upon the draft CPP rules, since the final program rules were not issued until the analytical work in this docket was complete. NW Natural's own, more comprehensive work on compliance pathways will shine more light on the existence of credible, meaningful, cost-effective natural gas decarbonization pathways, as well as the details for NW Natural's initial plans for achieving that compliance. This more robust work, though necessarily preliminary in nature, will appear in NW Natural's IRP, slated to be released in by the end of July.

[14] Staff suggests that utilities and stakeholders collaborated in a meaningful way on the process, modeling proposals, and sensitivities undertaken in this docket. NW Natural would respectfully disagree with this assertion. While NW Natural believes Staff worked in good faith to develop modeling exercises that might provide useful information, there was simply insufficient time to develop modeling parameters or engage in analysis sufficiently robust to inform any substantive Commission action.

2. Natural gas utilities must be given the opportunity to decarbonize their systems.

Many stakeholders have already decided that NW Natural cannot meet the goals of the CPP. Advocates have criticized NW Natural's efforts and modeling as unrealistic, while simultaneously advocating for unsupported alternative pathways, downplaying potential impacts of electrification on electric system cost or reliability, and glossing over the scope of the Commission's statutory duties.[15]

Instead of asking the Commission to implement state policy, some stakeholders instead urge the Commission to act like a legislative body by making broad pronouncements about energy policy, fuel choice, and whether a utility has a right to grow or add customers. The Commission should reject these requests, which find no support in Oregon law. The question for this Commission is not whether vocal stakeholders would prefer that Oregon citizens use electricity rather than gas. The question is whether gas utilities can comply with state law and regulations to reduce GHG emissions.

Natural gas utilities are five months into the first-ever CPP compliance period under rules that were not even adopted until December 2021. This Commission has not yet developed rules or policies for planning and/or regulatory CPP compliance monitoring. As Staff noted, "[a]ll parties agreed that the rigor and analysis that comes with a full IRP would be needed for more definitive modeling conclusions."[16] NW Natural must be given a full and fair opportunity to demonstrate that it can decarbonize its system—something it has been working on for over a decade and for which it has a strong foundation in place. While NW Natural is in the midst of conducting its first iteration of IRP modeling that incudes CPP compliance, preliminary modeling suggests that it will be able to comply with the CPP at a reasonable cost while adding new customers.

III. The Importance of Natural Gas to Oregon's Energy System

Although this proceeding was opened as a venue for the neutral, objective evaluation of GHG emissions compliance pathways and regulatory tools for facilitating them, it also became a venue for advocates seeking to eliminate the gas industry. While NW Natural does not believe that driving the gas industry out of business is the intended scope of this proceeding, recommendations that signal a start to that unprecedented path, if considered or adopted, could send a signal that there is a lack of confidence that NW Natural has a viable future in Oregon. If the Company's future viability is called into question, its financial health could be significantly impaired, which in turn would hamper its ability to ability to decarbonize at a reasonable cost. In addition to its questionable legality, these recommendations would, in any event, be short-sighted, unsupported by

[15] *See, e.g.,* Comments of Green Energy Institute and Electrify Now (July 13, 2021) (stating that natural gas has no role to play in the future and urging the Commission to use this docket to evaluate and make determinations about the future of the natural gas system); Comments of Meredith Connolly, et al. (Sept. 24, 2021) (concluding that electricity from wind and solar are cheaper than decarbonized gas alternatives, with no discussion of infrastructure needs or diminished value of these renewable resources at higher penetrations).
[16] Draft Report at 10.

evidence, harmful to customers, and damaging to the state's decarbonization efforts given the importance of Oregon's gas system.

A. Natural Gas Is a Bedrock of Oregon's Energy System, Yet Is Responsible for Only 13 Percent of Oregon's Emissions

As NW Natural noted previously, NW Natural delivers more energy than any other utility in Oregon —electric or gas. During Oregon's concurrent gas and electric system winter peak, the gas system delivers about twice as much energy as the electric system. The natural gas system is thus essential to electric reliability now, and for mitigating projected regional capacity deficits on the electric side.[17] Natural gas also provides needed resilience to the state's energy system. During extreme events that can cause power outages, natural gas generally remains available to customers to allow them to cook in their kitchens and stay warm in their homes. NW Natural's service is also affordable. The average monthly residential gas bills are at the same level they were 20 years ago.

Roughly two out of three Oregonians use natural gas directly in their homes for space heating, water heating or cooking.[18] Yet natural gas utility deliveries to uses other than power plants represented only 13 percent of Oregon's emissions in 2019. Emissions from residential direct use of natural gas in Oregon make up 4 percent of the state's emissions. Commercial use represents about 3 percent and industrial use about 6 percent. Direct use natural gas space heating—including both residential and commercial—accounts for roughly 70 percent of Oregon's space heating needs and about 4.5 percent of Oregon's emissions.

What do these numbers mean? They mean that direct-use natural gas provides an incredible amount of energy to Oregonians for the emissions it produces. Indeed, replacing the heating needs of the roughly 3 million Oregonians who rely upon natural gas to keep their homes warm in the winter with a reliable source of emissions free energy, even if it were possible, would reduce Oregon's emissions by less than five percent.[19] Furthermore, if every natural-gas heated building in Oregon were converted to electric heat pumps tomorrow and the electric grid could somehow maintain its current emissions intensity, it would reduce Oregon's emissions by less than 1%. It would be

[17] The gas system has the equivalent of about 98 gigawatts of capacity and 6 million MWh of storage. This capacity is crucial in ensuring that the combined gas and electric systems can meet Oregonians' overall energy demand during the coldest days of the year.

[18] NW Natural Comments at 3-4, 7-8 (July 2, 2021).

[19] For comparison, replacing light duty transportation with carbon free energy would be about 5 times as impactful and reduce the state's emissions by more than 20 percent. In terms of emissions reduction opportunities, replacing Oregon's electric resistance heating with high efficiency heat pumps would result in a greater emissions reduction and cut customer heating bills by 70 percent, largely from disadvantaged communities, compared to electrifying all natural gas heating with high efficiency heat pumps, which would decrease Oregon's emissions by less than 1 percent (and may actually increase emissions, at least in the near-term, for certain Oregonians depending on their electricity provider) while also increasing customer heating bills.

reckless to impose the costs associated with this transition on customers if more cost-effective emissions reductions are possible.

These emissions numbers are not going up. The share of residential, commercial, and industrial sector non-transportation emissions that come from direct use natural gas has largely remained constant over the last decade. Direct-use natural gas emissions in Oregon have been increasing by less than one-half of a percent per year over the last decade and are now expected to begin falling as SB 98 and other initiatives are implemented.

NW Natural is well situated to manage the transition of its system. NW Natural has long pursued cutting-edge, meaningful decarbonization efforts that go beyond what is required by law, and is prepared to execute on its decarbonization plans.[20] NW Natural became one of the first gas utilities to establish a decoupling mechanism in 2003 to align the Company's and its customers' incentives to reduce usage and, consequently, emissions. 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.[21] In 2015, the Company was among the first to replace all cast iron and bare steel, positioning the company to safely incorporate renewable gas without additional expenditures.[22] NW Natural was also the first gas utility to analyze in detail natural gas deep decarbonization scenarios as part of its IRP analysis. NW Natural revised its gas purchasing practices in 2019 to incorporate consideration of the GHG emissions of its natural gas suppliers and uses this information to prioritize purchasing from suppliers that report lower GHG emissions from production, actions that reduce the lifecycle carbon intensity of the gas the Company provides to customers.[23]

In addition, through its work with 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. In 2019, NW Natural and its customers provided funding that covered approximately $30 million of expenses and generated nearly 5.5 million therms in energy savings.[24]

NW Natural has not only pursued decarbonization under existing utility regulation, but it has sought changes to law that would facilitate decarbonization. In 2019, NW Natural was instrumental in the drafting and passage of SB 98[25] to facilitate RNG procurement by gas utilities, and we are actively working to rapidly acquire a diverse portfolio of RNG resources. NW Natural also supported the passage of SB 844,[26] which encourages voluntary investment in decarbonization projects.

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[20] NW Natural Comments at 7-8 (July 2, 2021).
[21] *Id.*
[22] *Id.*
[23] *Id.*
[24] *Id.* at 8.
[25] ORS 757.390 – ORS 757.398.
[26] ORS 757.539.

In short, Oregon's gas system delivers an incredible amount of societal value relative to its GHG emissions. NW Natural proactive and on-going decarbonization efforts make the Company well situated to execute a thoughtful, effective CPP compliance plan that retains the societal value of Oregon's gas system while continuing to lower those emissions consistent with Oregon law.

B. NW Natural's Modeling Results

During the course of this proceeding, NW Natural modeled numerous potential CPP compliance scenarios under different assumptions directed by OPUC Staff.[27] NW Natural's initial analysis indicates that the Company can continue serving customers and responsibly grow its system, while also complying with the specific requirements of the CPP.[28] Although the Company's CPP-compliance modeling is preliminary, and more robust modeling is currently underway in NW Natural's IRP, the Company is confident that it can comply with the CPP under a wide range potential future market and policy conditions.

NW Natural's modeling indicates that our compliance with CPP carbon reduction targets is achievable through a combination of reduced demand, reduced intensity of our gas supply, and judicious use of CCIs to facilitate a transition to renewables for the gas industry versus electrification. Although the final CPP rules are more aggressive than the scenarios modeled in this docket, NW Natural's IRP analysis conducted to-date indicates that that the same strategies identified by NW Natural in this proceeding will enable CPP compliance.

NW Natural anticipates making additional investments in energy efficiency and to further reduce demand in the future by encouraging the adoption of both existing technologies and new technologies that are on the horizon, including dual-fuel "hybrid" heating systems and high-efficiency natural gas heat pumps.[29] Indeed, Staff specifically recommends 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.[30]

In a "dual fuel" or "hybrid" heating system, a natural gas furnace serves as the backup to an electric heat pump.[31] In most cases, a dual fuel system has lower annual operating costs and is more efficient than a using a standard heat pump backed up by electric resistance heating, and can reduce gas usage within a home in our climate by 80 percent. Hybrid heating helps address resource adequacy issues on the regional power grid by having gas utilities meet space heating demand during peak periods while electricity provides space heating during off-peak hours. Natural gas heat pumps are a

[27] Draft Report at 8-9 & App. A.
[28] Draft Report at 10.
[29] NW Natural Presentation, Sept. 24, 2021, at slide 22.
[30] Draft Report at 27.
[31] *See* NW Natural Presentation, September 24, 2021, at slides 21-22 (discussion of dual fuel heat pumps).

promising technology on the horizon that are very efficient and, unlike standard electric heat pumps, do not require a back-up heat source at low temperatures.

In addition to using the above measures to reduce natural gas usage, NW Natural expects to decarbonize supply by adding RNG, hydrogen, and synthetic gas. In NW Natural's modeling, renewable gas supply serves about 72 percent of deliveries by 2050.[32] Specifically, preliminary models show that RNG from biofuels is the cheapest option until about 2030, and that biofuels can serve up to 14 percent of current deliveries in any given year. Around 2030, hydrogen becomes cheaper, and hydrogen blending reaches the 20 percent targeted amount around 2035. After 2040, synthetic gas derived from hydrogen becomes least cost.

With respect to RNG, NW Natural has moved rapidly since the passage of SB 98 to study and acquire RNG developed from animal, agricultural and human waste streams as a substitute for conventional natural gas. SB 98 includes RNG portfolio targets up to 30 percent RNG, including renewable hydrogen. Currently, NW Natural's gas portfolio is approximately 1.6 percent RNG, and NW Natural has already signed agreements to develop 3 percent of its supply as RNG. Consistent with SB 98, NW Natural aims to increase the amount of RNG to five percent by 2025 and to 10 percent over the next several years. NW Natural's modeling envision supplementing biofuel RNG with increasing amounts of hydrogen and synthetic gas as those products become more cost-effective[33], with the majority of deliveries expected to be from hydrogen-derived fuels by 2050. In the meantime, however, NW Natural's modeling used an assumption based upon the population weighted-share of the most recent and comprehensive study of national biofuel availability,[34] which shows biofuel RNG being sufficient and lower cost over the next few years before renewable hydrogen costs are expected to become less costly.

NW Natural is also working to develop hydrogen gas supplies to incorporate into its system. The term "hydrogen gas" refers to the hydrogen molecule (H2) in a gaseous state, which can be blended with natural gas to produce heat for homes and businesses and for certain industrial applications. Hydrogen gas has been successfully delivered to customers through gas distribution systems for over half a century, and numerous pilot projects NW Natural is following have not found safety or reliability issues. NW Natural has one of the most modern systems in the country and is well prepared to safely distribute natural gas blended with hydrogen.[35]

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[32] NW Natural Presentation, Sept. 24, 2021, at slide 46
[33] Based upon independent 3rd party projections of renewable hydrogen production costs moving forward.
[34] "Renewable Sources of Natural Gas: Supply and Emissions Reduction Assessment," prepared by ICF, 2019 (see https://gasfoundation.org/wp-content/uploads/2019/12/AGF-2019-RNG-Study-Full-Report-FINAL-12-18-19.pdf) was used to define resource availability for the base case scenario in the analysis in this proceeding. ICF updated the RNG availability assessment since the analysis in this process and it can be found here: https://www.aga.org/globalassets/research--insights/reports/aga-net-zero-emissions-opportunities-for-gas-utilities.pdf
[35] According to S&P Global, NW Natural had the lowest ratio of leak repairs per mile of pipe among natural gas utilities in the United States in 2018.

C. In short, NW Natural sees a reasonable path forward to responsibly serve new customers while also reducing GHG emissions consistent with the CPP.NW Natural's Proposed Decarbonization Pathway Is Credible and Supported by Facts

Unlike state utility commissions in some jurisdictions, this Commission has not been tasked by the legislature with reviewing state-sponsored analyses of decarbonization pathways or with making major policy decisions based on those analyses. Nevertheless, NW Natural does feel it is appropriate to respond to some of the assertions and recommendations made by stakeholders in this proceeding. Throughout this proceeding, several commenters asserted that replacing natural gas appliances with electric alternatives is the only viable decarbonization pathway. NW Natural's initial modeling in this factfinding instead demonstrates that affordable compliance is feasible,[36] a conclusion that comports with the findings of the E3 Study. As noted previously, more work will appear in NW Natural's IRP, slated to be released by the end of July.

Generally, the commenters raise three arguments in support of electrification: the best and most cost-effective path to decarbonization is through full electrification of end uses;[37] the gas utilities' decarbonization models are overly reliant on alternatives like RNG and hydrogen;[38] and that investment in gas infrastructure will result in stranded assets as demand for gas decreases, and the cost for these stranded assets will fall mainly to lower-income households that cannot afford to electrify.[39] However, many of the commenters' assertions are not supported by any evidence,[40] and are in many instances no more than unsubstantiated opinions regarding the viability of the gas utilities' decarbonization pathways.

Many of the articles or studies that commenters cited were based on generalized data from across the country or were specific to another state.[41] For example, commenters cited a study from the Rocky Mountain Institute relating to the retrofit costs

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[36] *See* Draft Report at 11.
[37] *See, e.g.*, 350 Eugene, *et al.*, Comments Re: Natural Gas Fact Finding – Alternative Scenario Modeling at 1 (Dec. 3, 2021) ("[E]lectrification is a growing trend and can provide significant decarbonization and savings benefits to communities and the state.").
[38] *See, e.g.*, CUB Comments on Modeling and Alternative Scenarios at 3 (Sept. 24, 2021) ("The RNG and hydrogen forecasts which all three utilities rely on is technology that is not currently commercialized.")
[39] *See, e.g.*, 350 Eugene, *et al.*, Comments Re: Natural Gas Fact Finding Workshop 4 at 5 ("Simultaneous trends of electrification and falling demand for methane gas pose a significant stranded–asset risk to utilities, as well as a cost burden on ratepayers if a gas utility overbuilds its distribution system for future demand that never materializes. If the OPUC does not manage the energy transition well, vulnerable and lower–income customers are at risk of being stranded on an increasingly unaffordable gas system.").
[40] *See, e.g.*, Sierra Club, Comments on Natural Gas Scenario Analysis at 2 (Dec. 3, 2021) ("While NW Natural did not provide anticipated peak load under the alternative electrification models, the peak loads would undoubtedly be significantly lower.").
[41] *See, e.g.*, Megan Anderson *et al*, REGULATORY ASSISTANCE PROJECT, *Under Pressure: Gas Utility Regulation for a Time of Transition* at 27 May 2021 (relying on a California study relating to stranded assets).

of electrifying space and water heating.[42] However, that study assessed costs in four cities—none of which are located in Oregon or even in the Pacific Northwest.[43] Location, resource mix, and other local details and constraints matter. A California study by E3 found that electrification in buildings could be cost effective for reducing GHG emissions from California's buildings, but noted that "***this finding is influenced, in part, by California's relatively mild winter climate***"[44] and cited the Pacific Northwest E3 study as one of interest as it cautioned readers against projecting the California specific results of the study to other climates and situations.

Similarly, commenters cited a 2019 study from California to support the assertion that electrification would result in "direct local job creation for hundreds of contractors and thousands of installers throughout" Oregon to retrofit homes for electric and install electric appliances.[45] First, it should be noted that the Commission is tasked with regulating utility service, not creating jobs. But in any event, most of the jobs identified in the California report involved retrofitting existing housing stock to install electric appliances.[46] NW Natural's proposed decarbonization pathway would create similar jobs involving installation of deep energy efficiency measures and for the installation of dual-fuel or natural gas heat pumps.

In other instances, commenters relied on studies regarding the cost-effectiveness of electrification to support the position that the Commission should pursue electrification instead of the other decarbonization pathways.[47] However, some of these studies demonstrated only that electrification is *one possible* means of accomplishing the GHG-reduction goals, but did not compare other potential decarbonization pathways or indicate that the Commission should pursue electrification as the only means of achieving the GHG-reduction goals.[48] For example, one study from the National Renewable Energy Laboratory specifically stated that it focused on the potential for and impacts of a high

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[42] 350 Eugene, *et al.*, Comments Re: Natural Gas Fact Finding – Alternative Scenario Modeling at 5 (Dec. 3, 2021) (citing Sherri Billimoria, *et al.*, ROCKY MOUNTAIN INST., *The Economics of Electrifying Buildings* (2018)).

[43] *The Economics of Electrifying Buildings* at 29 ("We assessed results in four cities: Oakland, California; Houston, Texas; Providence, Rhode Island; and Chicago, Illinois."). Importantly, although the four cities analyzed in that study were geographically diverse, the study found natural gas customers in those cities would "face higher upfront costs to retrofit to electric space and water heating compared with new gas devices" and would not recoup those costs in energy savings over the life of the space and water heaters. *Id.* at 6

[44] 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.

[45] 350 Eugene, *et al.*, Comments Re: Natural Gas Fact Finding Workshop 4 at 4 (citing Betony Jones, *et al.*, *California Building Decarbonization: Workforce Needs and Recommendations*, UCLA LUSKIN CTR. FOR INNOVATION (Nov. 2019)).

[46] *California Building Decarbonization: Workforce Needs and Recommendations* at 13.

[47] *See, e.g.*, Renewable Northwest Comments on Oregon DEQ Draft Rules at 6 (filed in UM 2178 on Oct. 27, 2021) ("The call to 'electrify everything' -- or at least as much as possible -- is the conclusion of most deep decarbonization studies that we are aware of.") (citing Steinberg, *et al.*, *Electrification & Decarbonization: Exploring U.S. Energy Use and Greenhouse Gas Emissions in Scenarios with Widespread Electrification and Power Sector Decarbonization*, Technical Report, NAT'L RENEWABLE ENERGY LABORATORY (July 2017)).

[48] *See Electrification & Decarbonization: Exploring U.S. Energy Use and Greenhouse Gas Emissions in Scenarios with Widespread Electrification and Power Sector Decarbonization* at 2.

electrification pathway but "d[id] not compare these scenarios to alternative GHG abatement pathways," and "d[id] not judge or evaluate the likelihood of [electrification] pathways or their merit relative to other strategies."[49]

Other examples exist, but NW Natural will simply note that the most relevant, comprehensive Oregon-specific decarbonization analysis of which NW Natural is aware is the Oregon E3 Study. In 2018, NW Natural contracted with E3 to perform an independent analysis evaluating the technology implications and potential costs of different strategies for NW Natural to achieve 80% reduction of GHG emissions below 1990 levels by 2050.[50] E3 concluded that maintaining natural gas heat in buildings is a feasible strategy to achieve 80 percent GHG reduction by 2050, 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."[51] Given that the most comprehensive analysis conducted to date concludes that both approaches appear to be feasible methods of meeting the state's climate goals, there is no basis for assertions that Oregon must move rapidly toward building electrification to meet its climate goals.

IV. NW Natural Recommended Next Steps and Response to Staff's 25 Recommendations

A. Appropriate Next Steps.

As detailed above, Oregon's gas system is a critical element of the state's energy system. NW Natural's initial modeling shows a credible pathway for meeting its CPP goals without limiting or damaging that system. The Commission should not take steps to prejudge that process or impede viable pathways toward the true goal of this exercise: reductions in GHG emissions. NW Natural makes the following recommendations for immediate next steps at the conclusion of the Fact Finding:

First, prioritize near-term natural gas decarbonization measures. The initial compliance period for the CPP began on January 1, 2022. The gas utilities subject to the CPP will need to immediately begin pursuing emissions reductions to meet the CPP's mandates.

Second, prioritize the following regulatory efforts to effectuate CPP compliance:

- *Low-income rate mitigation. HB 2475 provides an opportunity to mitigate energy burdens on low-income residential customers, which would include potential cost burdens driven by compliance with the CPP. NW Natural is currently seeking approval of an interim low-income bill discount program, undertaking a low-*

[49] *Id.*
[50] As far as NW Natural is aware, this is the most comprehensive deep decarbonization study performed that is specific to Oregon.
[51] The study also found that switching to electric heat for buildings was a feasible strategy.

income needs assessment specific for its service territory, and engaging in ongoing HB 2475 activities at the Commission.

- *Energy efficiency programs for transportation customers: Currently, no energy efficiency programs exist for transportation customers. The CPP designates gas utilities as the point of regulation for these customers, and therefore, gas utilities must reduce emissions associated with the throughput of these customers. The Commission should explore the policy considerations associated with expanding energy efficiency programs and the costs and benefits of various approaches.*

- *Cost recovery for CPP compliance: Gas utilities will need methods or mechanisms for recovering the costs of complying with CPP mandates. While some tools already exist, additional tools will be needed to recover other compliance mechanisms such as increased energy efficiency beyond what is currently authorized for NW Natural. The Commission should ensure such tools are available.*

- *Rate spread and rate design: The Commission should immediately take steps that would allow utilities and their customers to understand rate spread and rate design issues for CPP compliance, especially as they pertain to gas transport customers. These customers deserve to understand, as soon as possible, the impacts of the CPP on their near-term costs, so they can begin planning for them.*

- *CPP compliance reporting: The Commission will require compliance reporting for meeting the CPP mandates. Interested stakeholders should discuss how often these reports should be presented, in what form, and the information that should be required in the reports and the Commission should issue rules or guidelines.*

- *IRP guidelines: The Commission should open a proceeding to address proposed changes to its IRP guidelines, which pertain to both **gas and electric IRPs**. Staff's proposal to modify the IRP guidelines through a "waiver" process for only gas IRPs is problematic given the extensive time, effort, and clear parameters required for meaningful IRP modeling. Without some sort of review process, Staff's proposed IRP modifications to gas IRPs could inadvertently undermine the validity of the Commission's guidelines, which NW Natural understands to be the primary source for utilities and stakeholders to understand the scope and requirements of IRPs. Additionally, the precedent of creating*

guidelines from suggested lists without a public process of discussion is harmful to all parties.

Third, prioritize joint system planning to evaluate potential benefits of combined electric and natural gas decarbonization efforts, as building decarbonization naturally touches both gas and electric grids, which are also directly intertwined upstream of energy usage at the building level. The Commission should explore opportunities for joint system planning between electric utilities and gas utilities. This may include planning for hydrogen that could be produced from excess renewables on the electric system and stored in existing underground storage on the gas system. This would create long-term seasonal renewable capacity for both the gas and electric systems. Additionally, further joint study of hybrid heating, which NW Natural modeled in its CPP compliance, would be beneficial. Hybrid heating helps address resource adequacy issues on the regional power grid by having gas utilities meet space heating demand during peak periods with electricity serving much of the heating need during off-peak hours.

Finally, the Commission should sponsor an Oregon-specific, economy-wide decarbonization study that includes the gas, electric, transportation, agriculture, and waste sectors and explicitly models the capacity needed to maintain reliable service during extreme weather events when service interruptions are most dangerous to Oregonians. While NW Natural appreciates the Commission's resource constraints and recognizes that such a study may not be possible in the near-term, a study of this type by a neutral, expert third-party will be necessary at some point for Commission visibility into the interaction of the electric and gas systems. The Commission and stakeholders should discuss possible models for funding such a study and the consultant selection process.

V. Response to Staff's Recommendations

In its report, Staff notes that it is "particularly interested" in responses to its recommendations. NW Natural's responses to specific Staff recommendations are below.

A. Protecting Customers with Limited Options (5.1.1)

In its discussion on protecting customers with limited resources or options, Staff notes that the burden from increased bills will likely fall to those already experiencing high energy burdens. Electrification costs are likely to spill over and impact electricity customers.[52] As Staff notes, rate pressure risks can include the cost of compliance, the cost of penalties, and the risk of customer migration to the electric system. A shrinking customer count can accelerate more motivated and affluent customers to leave the gas system.[53] Staff concludes that proper balance of investments will need to be struck to achieve CPP compliance and decarbonize the Oregon gas sector.

NW Natural agrees that decarbonization strategies will have customer impacts, something true for both the electric and gas sectors. The appropriate balance should be

[52] Draft Report at 20.
[53] Draft Report at 20.

based on facts, the law, and appropriate regulatory actions, rather than political expediency. Moreover, the energy systems and the technologies and investments available for decarbonization are changing rapidly, and thus the correct "balance" is likely to change as the energy landscape changes. The Commission should not take premature actions that limit optionality or development of nascent technologies that may drive effective decarbonization strategies but should use its regulatory oversight over utility planning and rates to ensure thoughtful decarbonization strategies are being pursued.

Staff Recommendations:

1. Estimated Bill impact (Protection) (Planning) 5.1.1(1)

Staff Recommendation: Include estimated customer bill impact analysis in IRPs to ensure transparency of trends and implications of compliance pathways as represented in portfolios.

NW Natural response: NW Natural supports this recommendation, but with some caveats. First, IRPs are not rate cases, and thus utilities will need to adopt a non-rate case methodology to convert planned IRP investments into estimated bill impacts. There are a number of ways to accomplish this, as demonstrated by the disparate but reasonable modeling methodologies utilized by utilities in this proceeding. Consequently, some additional regulatory process should be undertaken to develop a uniform methodology for converting IRP investments into bill estimated impacts. The Commission should formally update its IRP guidelines to effectuate this change.

Second, this modification to IRP guidelines should apply to both electric and gas utilities. Both industries are facing transformational climate policies that require significant emissions reductions. As such, both gas and electric utility stakeholders should have access to information about estimated bill impacts.

2. Direct ETO to target programs to low-income and environmental justice communities (Protection) (Programs) 5.1.1(2)

Staff Recommendation: Direct ETO and Community Action agencies to work with utilities to expand and target energy efficiency programs to low income and environmental justice communities to reduce energy burden and minimize anticipated bill impacts. This would include conducting outreach with targeted customers to receive input on program designs to maximize effectiveness.

NW Natural response: NW Natural supports the expansion of energy efficiency programs that are cost-effective under the new paradigm of the CPP, particularly programs for low income and environmental justice communities. NW Natural has been proactively taking steps in this direction. NW Natural currently partners with community action groups to deliver low-income weatherization and energy efficiency to qualifying customers.

The ETO could potentially be an effective partner for delivery of such services, but the Commission will need to do more than "direct" the ETO to implement this

recommendation. The Commission and utilities will first need to address ETO budget development, as well as funding and delivery mechanisms for program expansion, for example, and ETO may need to develop additional expertise to effectively deliver these programs. Additionally, the Commission should reiterate the importance of using all available cost-effective energy efficiency tools to decarbonize Oregon's energy system, including programs to promote high efficiency gas furnaces. Eliminating the use of such an important tool to promote an agenda of building electrification undermines the effectiveness of the programs designed to help to these communities, as well as EO 20-04 and the Commission's own fuel neutrality policies.

3. EE measures that allow for customer hook-ups (Protection) (Programs) 5.1.1(3)

Staff Recommendation: Prioritization of incremental energy efficiency for CPP compliance that lowers natural gas usage but allows for customer growth to continue at some level so as to avoid near-term outcomes that place upward rate pressures on those customers unable to exit the gas system and would therefore be forced to cover an increasing proportion of fixed costs.

NW Natural response: NW Natural's initial CPP compliance modeling shows that higher customer bill increases are expected under scenarios that assume electrification. As the assumptions for electrification increase, the anticipated bill impact also increases for the fewer and fewer customers that remain on the system.[54] Given the importance of the customer base to affordability, the importance of the gas system to the overall reliability of Oregon's energy system, and the vital choice natural gas provides to many Oregon customers, any Commission action that cuts off system growth, let alone prompts its contraction, could unnecessarily create a number of issues. Most importantly, action to curtail customer additions or incentivize electrification would create the customer bill pressures that many state policies hope to prevent.

The Commission has accurately identified the significant problems that can come with declining customer counts. In order for utilities to serve customers safely and reliably, and to ensure they are able to make thoughtful investments in decarbonization technologies, utilities need a customer base over which to fairly share system costs and a healthy investment profile. NW Natural is not seeing signs of meaningful customer defection compared to long term historical trends, nor is it seeing a reduced share of newly constructed buildings that are choosing to connect to NW Natural's system. Additionally, NW Natural is unaware of any state policy proclamation that calls for driving customer defection. To the contrary, current state policy is fuel-neutral, and calls for support and encouragement of fuel-neutral decarbonization pathways.

The biggest risk to triggering the complex issues that come with declining customer counts, therefore, are the proposals that would intentionally drive gas customer defections or limit the addition of new customers. Any such proposal would be inconsistent with the Commission's mandate to ensure the provision of safe, reliable utility service.

[54] *See, e.g.,* NW Natural Presentation, Staff Alternative Scenarios Addendum at 12-13 (Nov. 17, 2021).

Consequently, the Commission should focus its efforts on emissions reductions, rather than any limitations on customer counts.

4. EE programs to include transport (Protection) (Programs) 5.1.1(4)

Staff Recommendation: Ensure the gas utilities either fold transport gas customers into existing efficiency programs or into new programs, paying their fair share relative to what other ratepayers pay for energy efficiency programs.

NW Natural response: NW Natural supports including transport customers in energy efficiency programs. Transport customers tend to be a diverse but sophisticated set of customers, and a one-size-fits-all solution may not be optimal for this class of customers. Consequently, NW Natural recommends the Commission engage with NW Natural and its transport customers to determine how best to optimize the use of energy efficiency. This should be an immediate action coming out of this fact-finding.

In addition, the Commission will need to examine the scope of its authority for directing various actions related to transport customers. The phrasing of this recommendation suggests that gas utilities have intentionally chosen not to "fold transport gas customers" into existing programs, but gas utilities have never had authority to do so. Prior to the adoption of the CPP, transport customers were not subject to any regulation that would permit gas utilities to consider this issue. Moreover, the majority of energy efficiency programs in the state are not run by the utilities at all, but by ETO, a third-party. Now that gas utilities have become a point of compliance for transport customers under the CPP, the Commission should address how best to effectuate this compliance regime under its own existing authority.

5. Continue development of HB 2475 (Protection) (Rates) 5.1.1(5)

Staff Recommendation: Develop and adopt a HB 2475 bill discount and implementation regime that will mitigate rate increases for energy burdened customers.

NW Natural response: NW Natural supports this recommendation. On April 18, 2022, NW Natural filed its request to offer an income-qualified bill discount program for residential customers and soon expects to be able to provide meaningful relief to low-income customers.

6. Align near-term investments with CPP compliance (Protection) (Rates) 5.1.1(6)

Staff Recommendation: Align near-term investment levels with annual progress in CPP compliance in order to limit uncertainty around accumulation of long-term capital assets.

NW Natural response: NW Natural does not support or understand the recommendation. The recommendation is extremely unclear, but it appears that it could represent a monumental change to the regulation of cost recovery of natural gas utility investments. If Staff means that prudent investments in the distribution system would

only be recoverable so long as utilities were in compliance with the CPP,[55] the recommendation would establish a radical policy change for utility ratemaking that would fundamentally change the risk profile of gas utilities. If something else was intended by this recommendation, Staff should offer a clarification, and include in that clarification an explanation of any intended departure from the prudency standard or least-cost, least-risk planning practices. Staff or the Commission should also ensure there is meaningful public process available to allow parties to respond to Staff's clarifications before any public meeting addressing the Draft Report.

B. Full Cost of Aggressive Demand Reduction (5.1.2)

In this section of the Draft Report, Staff suggests that tools could be used to facilitate coordination between gas and electric utilities to enable analysis of customer costs, grid management, and emission impacts of load reduction associated with aggressive gas demand reduction. NW Natural has consistently noted the value of conducting a system decarbonization study that thoughtfully considers Oregon's highly interrelated gas and electric system. Moreover, NW Natural has also expressed an openness to joint system planning. In short, NW Natural supports meaningful, practical tools that could be used to understand joint system impacts associated with building electrification and regional capacity constraints. Some of Staff's recommendations would be helpful for achieving these goals; others would not.

Staff Recommendations:

1. Develop marginal abatement cost curve (Full Cost of Reducing Demand) (Planning) 5.2.1(1)

Staff Recommendation: Develop marginal abatement cost curves for IRPs that identify all resources potentially used by utilities in CPP compliance.

NW Natural response: NW Natural does not support this recommendation. While marginal abatement cost curves are helpful for higher level summaries of work or extremely basic analysis and the goal of being able to compare the relative costs of different decarbonization actions is important, marginal abatement cost curves are not usually sufficiently detailed to make accurate determinations about the relative cost effectiveness of specific investments or actions or account for variation within broader activity groupings. Furthermore, if cost estimates from different sources are used for a comparison across energy systems (for example estimates from a marginal abatement cost curve from a utility specific electric IRP compared with estimates from a cost curve from a utility specific gas IRP) differences in assumptions and baselines for comparison would likely make estimates apples-to-oranges and would likely lead to unintended incentives. For example, some marginal cost abatement curves have a single category for "electric heat pumps" that does not account for the potential that the cost of a small amount of electric heat pump installations would have a much different per ton of carbon saved cost than many heat pumps being installed. A similar problem arises when trying to make an estimate of the cost of RNG, as different amounts of RNG will have different

[55] Noting that NW Natural fully expects to be able to comply with the CPP.

costs, and costs are expected to change through time.

Given that there is a high likelihood that the curves could lead to misunderstanding rather than enhanced knowledge and sound decisions, this recommendation should not be adopted. The most relevant analytical issue discussed in this proceeding – comparing the societal cost of gas decarbonization with the cost of building electrification specific to Oregon – is better addressed by the other expected activities that have been proposed in this process; namely joint system planning exercises.

As with other IRP issues, this recommendation should be discussed further in the context of a proceeding opened to formally review and adopt changes to the Commission's IRP guidelines. Moreover, any vetted and approved changes to the IRP guidelines intended to increase transparency of utility decision-making, such as this one, should apply equally to gas and electric utilities.

2. Transport customer cost of compliance in rate cases (Full Cost of Reducing Demand) (Ratemaking) 5.2.1(2)

Staff Recommendation: Explore rate spread and rate design issues for transport customers in general rate cases.

NW Natural response: NW Natural agrees the Commission should explore rate spread and rate design issues for transport customers given their key role in CPP compliance. Moreover, it should do so quickly so that transport customers can better understand the potential impacts of the CPP on their businesses. It is not clear to NW Natural, however, that the timing of a general rate case will give the Commission an appropriate opportunity to explore new policy issues or concerns associated with adopting appropriate rate spread and rate design for this customer class. Moreover, the Commission's policy decisions related to transport customers—a new class of customers for purposes of state regulation—may be more appropriately addressed in an industry-wide proceeding than in a case-by-case manner.

Consequently, NW Natural recommends the Commission immediately open a docket to address CPP compliance and cost allocation issues. These are hugely important issues for transport customers, who represent a small percentage of NW Natural's customer base but are responsible for the greatest amount of throughput. While the Commission may assume rate spread and rate design issues are relatively straightforward for this class, the application of traditional rate spread considerations to transport customers may have unintended consequences given the potential impacts on these customers, and thus, the broader economy. Whether the Commission decides to simply spread costs on an equal cent per therm basis, or whether the balance of policy considerations calls for some other outcome, it is critical to decide this issue with specificity so that NW Natural's transport customers can understand potential impacts on their businesses.

In short, NW Natural believes it is critical for the Commission to evaluate rate spread and rate design issues for all gas utility customers, including transport customers and to make decisions quickly. This issue will have significant near-term impacts on

Oregon transport customers and may impact the viability of their businesses. The Commission should make durable policy decisions about general rate spread and rate design considerations for these customers as soon as possible, so that NW Natural can share this information with its customers.

C. Coordinated Communication and Stakeholder Access (5.2)

In the Draft Report, Staff notes that the nature of Oregon's utilities (single fuel utilities) and existing planning processes (single company IRPs) make it difficult to evaluate risk, outcomes, and impacts of compliance strategies, and make it challenging for some impacted stakeholders to engage in the process. Consequently, Staff offers recommendations for coordinated communications and facilitation of stakeholder access to information.[56]

NW Natural agrees that the technical and analytical nature of utility regulation, combined with the multiplicity of proceedings required to ensure regulatory compliance, makes participation in all natural gas utility proceedings challenging. NW Natural agrees it is appropriate for regulated utilities to provide some reporting that may provide information without the need to search across dockets.

Staff Recommendations:

1. Quarterly stakeholder updates in UM 2178 (Access) (Planning) 5.2.1(1)

Staff Recommendation: Staff should post quarterly updates and any annual CPP compliance reports in UM 2178 and on the PUC website for stakeholders that track gas docket activities and note how and when stakeholders could get involved.

NW Natural response: NW Natural is generally supportive of this recommendation, but recommends that the Commission open a proceeding, as described above, addressing the content, timing, and other expectations for reporting requirements for the CPP. Additionally, NW Natural recommends that updates be required for both gas utilities (CPP) and electric utilities (HB 2021).

2. Maps in next IRPs (Access) (Planning) 5.2.1 (2)

Staff Recommendation: Require the gas utilities to develop in their next IRPs, publicly available maps of their system overlaying depreciation data and including lists of infrastructure and associated depreciation schedules.

NW Natural response: NW Natural does not support this recommendation. NW Natural has a responsibility to protect its assets from threat of physical damage and terrorist/cyber attacks, and as well as a responsibility to protect customer privacy. As a

[56] Draft Report at 22-23.

matter of sound policy, the Company does not make the locations of our assets publicly available in the requested level of detail.

Additionally, the data being requested does not exist in the form that Staff recommends. Utilities utilize group method accounting and depreciation. Utilities do not track every asset or the specific depreciable life of each asset. There is simply no means for utilities to provide this information.

Finally, Staff should better explain the goals of this recommendation and how those goals apply to gas utilities. This will enable a constructive discussion about how to reach the goals intended by this recommendation, if appropriate.

Like other recommendations, NW Natural believes consistency in expectations for all utility IRPs in Oregon is important, so any requirements about geographic locations of infrastructure included in IRPs should apply to both electric and gas utilities.

3. RFA docket outreach through DEI Director (Access) 5.2.1(3)

Staff Recommendation: Ensure full stakeholder engagement in dockets considering rate basing of RNG, Automatic Adjustment Clauses, and Affiliate Interest applications through outreach led by the DEI Director.

NW Natural response: NW Natural does not object to the DEI Director providing notice to stakeholders that is additive to the utilities' and Commission's required notices. This notice should be provided for both gas and electric utilities as they seek to decarbonize their systems and the utilities should be included on the notifications.

D. Decarbonization Policies as Key Determinants to Planning and Cost Recovery (5.3)

The Draft Report concludes that HB 2021 and the CPP reshaped Oregon's energy policy landscape, "especially for utility resource planning."[57] Staff notes that for resource plans to be consistent with the long-run public interest and Oregon energy policy, a "least-cost, least-risk" IRP must now also demonstrate how a utility will achieve state-set, utility-specific emission reduction targets and at what cost. Finally, Staff notes that resource planning will increasingly require systems thinking. As Staff accurately notes, Oregon's carbon reduction goals cement the interrelatedness of gas and electric utility operations decisions more than ever before.[58]

While both gas and electric utilities are facing a time of transformation, the Commission's existing statutory authority, its planning tools, and its regulatory processes are well suited to handle the change. As noted previously, the energy industry has always been in a state of change, whether due to market issues, technological advancements, increased environmental awareness, or advances in safety regulations. Changes give rise to new regulatory requirements, and this Commission's basic question remains:

[57] Draft Report at 23.
[58] Draft Report at 23.

Even with an additional regulatory burden, how can a utility continue to provide safe, reliable utility service to customers? While emissions reduction requirements can impose a significant compliance burden on gas utilities, NW Natural would argue that such measures simply introduce new complexities to the existing process, which itself remains fundamentally sound.

One new complexity is the need to understand with some specificity the interrelatedness of gas and electric utility operations. Again, however, the need to add complexities to the utility planning process is not unusual. Electric utility planning, in particular, has become far more complex over the last 10 years. The fact that IRP planning continues to evolve in complex ways, and that it can do so, is a testament to the ability of the Commission's utility regulation to evolve to meet new circumstances.

Staff Recommendations*:*

4. Utilities articulate electrification assumption in IRPs (Systems Approach) (Planning) 5.3(1)

Staff Recommendation: Request gas and electric utilities to develop and articulate individual electrification assumptions in future gas and electric IRPs that others can reference.

NW Natural response: NW Natural does not object to this recommendation, but the assumptions should be consistent and reasonable. NW Natural provides some proposed study parameters relevant to a meaningful assessment of the impacts of electrification in the attached Exhibit A.

5. Electrification Information and Data from DSP (Systems Approach) (Planning) 5.3(2)

Staff Recommendation: Given that electrification, as a potential compliance pathway, involves costs at the distribution level of the electric system, Staff will work with electric utilities to include in either their August 2022 Phase 2 DSP filings or other future DSP filings, the cost elements, costing methodology, and estimated average distribution cost to electrify existing gas customers.

NW Natural response: NW Natural strongly disagrees that electrification is a "compliance pathway" for gas utilities. The CPP requires gas utilities to meet GHG emissions targets, it does not require them to stop serving customers. If an Oregon customer wishes to use gas rather than electricity, and NW Natural is fully compliant with the CPP, there is no reason this Commission should force that customer to use electricity rather than gas.

That said, NW Natural *does* support Commission action to obtain greater visibility into the interactions of Oregon's electric and gas systems, given their interdependence and important for monitoring CPP compliance and energy reliability issues going forward. Understood in that light, it is critical that this recommendation extend beyond DSP into typical capacity planning in IRPs as well. Deliberate peak planning around the issue of

building electrification is critical to understanding this issue. NW Natural would note, however, that DSP costs are but one element of potential costs to electric customers. Transmission upgrades and additional system investments are also potential costs of electrification. Moreover, procurement issues may prove challenging and expensive if regional capacity shortages emerge and Oregon utilities are short.

6. Independent 3rd party analysis of key tech and market assumptions used by all 3 utilities (Systems Approach) (Planning) 5.3(3)

Staff Recommendation: The Commission should contract with an independent third party (e.g., consulting firm or regional non-profit like NEEA) to evaluate market trends around alternative fuel and low-carbon technology cost and availability and to analyze Pacific Northwest market adoption of decarbonization technologies that are central to any utilities' CPP compliance pathway on a regular basis to inform utility planning

NW Natural response: NW Natural is unsure how Staff intends to implement this recommendation. Some interpretations are concerning. First, NW Natural already uses third-party experts to evaluate market trends to inform NW Natural's planned investments. Staff has always evaluated the use of these third-parties when evaluating the assumptions in IRPs, which raises the question of the additive value that would be provided by another third-party. Third-party market trend analysis may provide the Commission with some general information about market trends, costs, and availability, but that information only has so much value. Utilities like NW Natural do not only respond to market trends; they drive them.

Thus, NW Natural's second concern is that an intent to constrain utility plans or investments based on a generic survey of market trends can undermine a technology's pathway to success. For example, the price of solar energy has declined far more quickly than analysts projected a decade ago. Had state commissions limited investments in solar based on third-party analysis, price declines—and the decarbonization pathway for the electric industry—could have been stifled by overly pessimistic projections. New technologies become feasible and affordable with research, investment, and adoption. This recommendation should not be used as a cudgel for blocking progress or for stifling meaningful, appropriate investments in the future.

Utilities like NW Natural are actively developing the RNG market by developing RNG projects. NW Natural is pursuing cutting edge hydrogen projects. And, as noted above, NW Natural is working with nonprofit organizations to encourage innovation through new products like gas heat pumps, zero-net energy homes, fuel cells and microgrids, solar thermal heating systems and other progressive technologies that use less energy.[59] The Commission should encourage reasonable investments in nascent

[59] Regarding the NEEA example cited by Staff, it is pertinent to note that much of the natural gas heat pump assumptions about performance and cost used by NW Natural in this process and in its ongoing IRP process are from NEEA- an example of how utilities generally rely upon independent third parties for assumption development.

technologies so that Oregon can help move these technologies forward.

Finally, any consultants chosen for this role must be independent, unbiased, and experts in the appropriate fields to have credibility and be chosen through a transparent process. "Non-profit" does not always mean independent. It is important that a consultant used for this purpose is able to provide unbiased, rigorous analysis within the appropriate area of expertise. If the goal of this Staff recommendation is to give the Commission some insight into markets and emerging technologies—both what is available at a given time and what may be available using reasonable projections—the value of the recommendation will depend in large part on the consultant selection process.

7. CPP as an acknowledgeable item in IRPs (Systems Approach) (Planning) 5.3(4)

Staff Recommendation: Staff to treat CPP compliance as an acknowledgeable element of any future gas IRP or IRP update.

NW Natural response: NW Natural interprets the current IRP guidelines as requiring actions to achieve CPP compliance be included as action items in its IRPs and IRP updates, as the Company has made clear throughout its current IRP process. Consequently, NW Natural does not object to this recommendation.

8. Exploring IRP guidance from UM 2178 (Systems Approach) (Planning) 5.3(5)

Staff Recommendation: Staff recommends exploring in the future the use of the IRP guidance found in Appendix B. Staff states that it will seek a waiver to adopt this new guidance where it conflicts with existing IRP guidance in Order Nos. 07-002 and 07-047 or existing GHG planning guidance in Order No. 08-339.[60]

NW Natural response: NW Natural agrees in principle with some of Staff's proposed IRP guideline modifications and disagrees with others. Importantly, however, NW Natural has *significant* concerns about the Commission's implementation of Staff's proposed IRP modifications through an informal or interim "waiver" process, which is what NW Natural understands Staff to be recommending. The Commission has historically been a leader in IRP development, and its guidelines were reviewed and adopted with care. IRPs are extremely time-consuming, labor-intensive exercises—as they should be—and the potential for ad hoc additions of multiple new, unvetted guidelines through a waiver process runs the risk of turning the Commission's understood and well-respected IRP process into an inefficient proceeding marked by unclear and potentially unknown requirements and too little time to do them, driving to modeling sensitivities with significant flaws which will produce unreliable results.

NW Natural strongly supports the Commission's IRP process and its thoughtful evolution. Indeed, NW Natural agrees that a number of Staff's proposals have merit. But modifying IRP guidelines through a blanket waiver process, without meaningful

[60] Draft Report at 24.

discussion with utility IRP analysts about the impact, value, timing, and expectations around specific proposals will only devalue the IRP process and risk overburdening the process.

This concern is not unfounded. NW Natural is in the process of developing its current IRP and Staff recently asked NW Natural to modify its IRP process *now* to incorporate some of its proposed recommendations. The recommendations have not been approved, let alone reasonably vetted. Just as importantly, Staff is asking NW Natural to implement these recommendations when it is too late in the development cycle to actually include them. This underscores NW Natural's concern that Staff and stakeholders underestimate the magnitude and scheduling requirements for IRP development work, and that establishing a precedent of significantly modifying the IRP process through a blanket waiver will only lead to a free-for-all.

Nor should the Commission turn a list of unvetted suggestions into formal or permanent guidelines without a thorough public process. Given the magnitude of the transformation taking place, now is the time to be thoughtful about additional recommendations.

If a waiver is necessary to implement any of Staff's recommendations, the Commission should open a proceeding to discuss Staff's recommendations and update or modify the Commission's IRP Guidelines accordingly. NW Natural believes a number of the modifications will be consensus items that simply need clarity, and thus can be adopted quickly.

9. Line extension policy exploration (Systems Approach) (Rates) 5.3(6)

Staff Recommendation: PUC Rates, Finance, and Audit (RFA) staff and Oregon Department of Justice are to explore with gas and electric utilities an interim, easily implemented approach to line extension allowance policy in future upcoming gas and electric rate case dockets that reflects the benefits, costs, and risks associated with system growth or improvements relative to the state's policies on decarbonization.

NW Natural response: Northwest Natural is uncertain what is intended by this recommendation. Staff should clarify this recommendation, and the Commission should ensure there is sufficient time and process available for parties to respond to Staff's clarifications before any public meeting addressing the Draft Report. Moreover, the Commission should refrain from making "interim" changes of any kind that have the potential to fundamentally alter the utility regulatory model. Doing so can have unintended upstream impacts to NW Natural and its customers. Labeling a significant policy shift an "interim" shift neither negates its potential harm, nor justifies its imposition before appropriate work has been done.

E. Monitoring, Tracking, and Reporting of Utility Compliance and Broader Market Trends (5.4)

In its comments, Staff notes that CPP penalties are likely to pose potentially sizeable, near-term, financial risk to the gas utilities.[61] Staff believes that, for the first compliance window (2022 through 2024) the two biggest near-term challenges are reliance on RNG and building the compliance-related infrastructure for the 2025-2027 time period. Relatedly, Staff accurately notes that NW Natural is actively pursuing RNG projects. Staff also states that the GHG reductions required by the end of the second compliance window (2025 through 2027) are substantially larger than the first compliance window, and expresses concerns about ensuring gas utilities are moving quickly to meet these emission reduction goals.[62] To that end, Staff recommends the Commission take steps to proactively and regularly assess and validate performance of the utilities' preferred compliance strategies "so course corrections can be made quickly, if necessary."[63] In general, NW Natural supports reasonable and well-designed measures to monitor utility compliance.

At the same time, compliance monitoring should go hand in hand with clear regulatory requirements for cost recovery that *enable* that compliance. If Oregon's utilities—gas or electric—are required to make significant investments in Oregon's future, and the Commission is skittish about articulating clear standards for cost recovery for those investments, compliance will be more challenging. Much-needed investors in Oregon's energy future may leave, though utility compliance obligations may not.

Staff Recommendations:

1. Annual PUC report based on DEQ compliance filings (Systems Approach) (Planning) 5.4(1)

Staff Recommendation: Develop an annual PUC report to Commissioners, linked to the DEQ's annual GHG reporting used for CPP compliance, that monitors, tracks, and reports on gas utility CPP performance comparing forecasted versus actual emission reductions and CPP costs.

NW Natural response: NW Natural supports this recommendation, but recommends the reporting be coordinated with any DEQ reporting requirements in order to increase administrative efficiency. The requirements of this reporting should be addressed urgently.

2. Annual utility report on CPP compliance costs (Access) (Rates) 5.4(2)

Staff Recommendation: Utilities submit annual report on full CPP compliance

[61] Staff notes the penalty at the CCI price on a per metric ton basis (estimated at $108/metric ton). Draft Report at 24.
[62] Draft Report at 25.
[63] Draft Report at 26.

costs, including alternative supply options such as RNG for all customers, including transport customers, as part of purchased gas adjustment or some other annual filing for tracking and planning activities.

NW Natural response: NW Natural supports this recommendation.

3. Enhance tracking of alternative supply of actual costs and report to planning (Access) (Rates)

NW Natural response: NW Natural does not object to additional, reasonable tracking and planning requirements.

4. Explore linking CPP amortization to CPP performance (Protection) (Rates) 5.4(3)

Staff Recommendation: Explore linking the amortization of CPP compliance costs from deferrals to actual CPP performance

NW Natural response: NW Natural is unclear about the meaning and purpose of this recommendation and seeks Staff clarification of this recommendation. If the Commission decides to explore performance-based ratemaking mechanisms, this recommendation would constitute a significant change to the Commission's regulatory rate recovery model, so the practical impacts of any such mechanism would need to be thoroughly explored. To the extent this recommendation is related to the amortization of deferral balances, it is unclear to NW Natural why the Commission would seek to delay cost recovery. In short, this recommendation appears to raise cost recovery issues with potentially significant impacts on utilities and customers, particularly if the recommendation is intended to be applied without regard to whether a utility acted reasonably. As with other requested clarifications, Staff should clarify this recommendation, and the Commission should ensure there is sufficient time and process available for parties to respond to Staff's clarifications before any public meeting addressing the Draft Report.

F. Actively Incentivize or Facilitate GHG Emissions Reduction Pathways (5.5)

Staff notes in the Draft Report that the base case long-term compliance strategies of gas utilities rely on growing amounts of RNG, green hydrogen, synthetic biofuels, and new energy efficient gas equipment technologies. A number of stakeholders advocated for elimination of new gas hook-ups as an action to reduce gas system emissions. Staff feels it is important for the Commission to place a near-term premium on flexibility in exploring a range of carbon reduction strategies

Stakeholder recommendations that the Commission limit or prohibit new gas hookups are problematic. The Commission's statutory duty is to provide for safe, reliable, utility service, not to limit customer choice. As discussed previously, there is no evidence of significant customer defection to the electric system, yet customers of all utilities come and go and are typically replaced. By prohibiting new hooks ups, the Commission would

be affirmatively creating the problems caused by declining customer counts. Even if this action were consistent with the Commission's statutory duties, it would be inappropriate in any event when alternative pathways for cost-effective compliance are possible.

NW Natural agrees with Staff's assertion that now is the time for urgent natural gas action, and NW Natural is prepared to take such action. Utility regulation has long limited the investments NW Natural can make to decarbonize. Nonetheless, the Company has a history of activism on this front. NW Natural has: 1) pursued a number of initiatives under traditional utility regulation, and 2) when the possibilities proved insufficient, it sought changes to Oregon law to allow it to acquire renewable natural gas and pursue programs to reduce GHG emissions. The Commission should strongly encourage near-term investment in promising new decarbonization strategies.

Staff Recommendations:

1. Encourage use of SB 844 for Pilots (Urgent Action) (Planning) 5.5(1)

Staff Recommendation: Encourage and support the use of SB 844 to encourage actions to reduce GHGs that may not currently be cost-effective, but that advance the piloting and deployment of new technologies.

NW Natural response: NW Natural supports Staff's recommendation to encourage and support pilot projects under SB 844. SB 844 is a unique regulatory tool that enables Oregon gas utilities to gain experience with emerging technologies at a relatively small scale, such as producing hydrogen from excess renewable power. This experience better positions utilities to take advantage of these emerging technologies as they mature. For instance, NW Natural is currently pursuing a power-to-gas project in Eugene. The project would use approximately 1 MW of low carbon power to create hydrogen gas from water. NW Natural would then inject the hydrogen gas into its existing pipeline system to serve its customers in the local Eugene area at a 5% blend. This project, which is small in scale, will give NW Natural firsthand experience in utilizing hydrogen in its distribution system, better preparing it for increasing hydrogen blends in the future.

2. Compliance costs into EE AC (Urgent Action) (Programs) 5.5(2)

Staff Recommendation: Adopt a compliance cost of carbon into gas energy efficiency avoided costs that reflects CPP-related risks in order to accurately value and support energy efficiency opportunities and investments.

NW Natural response: NW Natural has already done this and believes the current rules for energy efficiency cost-effectiveness and expectations for avoided cost calculations require it.[64] Also, in coordination with IRP Guideline 1, which requires that "all resources be treated on a fair and consistent basis," NW Natural believes the current guidelines require utilities to include this information in the avoided costs calculations of all resources, and as such NW Natural has been including this information in its avoided

[64] *See In re NW Natural Gas Co., dba NW Natural's 2014 Integrated Resource Plan,* Docket No. LC 60, NW Natural's 2014 IRP at Appendix 1, 1A-7 (August 9, 2014) (incorporating cost of carbon).

costs.[65] The avoided cost figures NW Natural plans to use in its current IRP as well as in avoided costs filings going forward will be based upon CPP-based GHG costs.

3. Joint pilot for Green Hydrogen by 2025 (Urgent Action) (Programs) 5.5(3)

Staff Recommendation: Request the gas and electric utilities explore studying the development of a joint pilot for Green Hydrogen production and present their findings to the Commission before January 2025.

NW Natural response: NW Natural supports the recommendation for Green Hydrogen pilots, whether undertaken by utilities jointly or individually. If the pilot is a joint pilot, the Commission should first provide clarity on the goals of the pilot to ensure that potential benefits to both gas and electric utilities are properly explored and developed.

4. ETO Expand vendor training for all heat pump tech (Urgent Action) (Programs) 5.5(4)

Staff Recommendation: Direct ETO to expand training vendors on electric and gas heat pump technology through education and pilots and increase the marketing of heat pump technology on its website. This includes dual-fuel and gas-powered heat pump technology

NW Natural response: NW Natural supports this recommendation.

VI. Additional Comments

A. Resource Constraints / Near-Term Recommendations

NW Natural recognizes the Commission's resource constraints, and yet a credible, regional decarbonization study remains critical for understanding the impact of policies, market changes, and trends impacting Oregon's energy system. The Commission currently lacks factual information to understand how impacts on the gas system will affect affordability or reliability of Oregon's interrelated electric and gas system. A regional decarbonization study should include the gas, electric, and transportation sectors and explicitly model the capacity needed to maintain reliable service during extreme weather events when service interruptions are most dangerous to Oregonians. While NW Natural appreciates that such a study may not be possible in the near-term, a study of this type by a neutral, expert third-party will be necessary at some point for Commission visibility into the interaction of the electric and gas systems. As noted previously, the Commission and stakeholders should discuss possible models for funding such a study and an appropriate consultant selection process.

[65] Through the ETO, NW Natural has supported 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. In 2019, NW Natural and its customers provided funding that covered approximately $30 million of expenses and generated nearly 5.5 million therms in energy savings. That is equivalent to removing greenhouse gas emissions from over 6,000 cars for one year.

B. Other Comments

The Final Report in this proceeding is expected to be posted on August 12, 2022. NW Natural recommends the Commission add another date for comments after June 3, 2022, perhaps after the early July public meeting. The current schedule allows parties to respond to the draft recommendations in Staff's report but does not permit stakeholders to respond to one another's comments. NW Natural believes another comment date allowing stakeholders to close the loop by engaging with one another's comments will provide the Commission with a more complete record on which to make its decisions.

Additionally, NW Natural must file its IRP on or before July 28, per Commission Order No. 21-013. Given that NW Natural's IRP will provide a more meaningful, comprehensive, and rigorous evaluation of NW Natural's near-term CPP compliance efforts that the preliminary modeling in this docket, it would be premature to take any action in this docket that could undermine NW Natural's more comprehensive IRP action plan. Moreover, given the current stage of NW Natural's IRP, in would be inappropriate and unworkable from a timing perspective for Staff or stakeholders to ask NW Natural to implement meaningful new IRP requirements proposed in this docket.

VII. Conclusion

NW Natural would like to thank the Commission, Staff, and stakeholders for the hard work in this proceeding. This docket has provided a valuable opportunity for an early discussion of regulatory next steps for responsible management of the state's energy transition. NW Natural's preliminary modeling demonstrates a pathway forward for CPP compliance that will retain the resilience and reliability benefits of Oregon's gas system while lowering the company's GHG emissions consistent with the CPP and the state's decarbonization goals. NW Natural strongly recommends the Commission move forward rapidly with regulatory actions that enable this transition and that increase the transparency and visibility into gas and electric system decarbonization efforts as they evolve. The Commission should refrain from taking actions that would limit customer access and contributions to the gas system. No credible evidence supports Commission action that would undermine the financial health of gas utilities and their ability to contribute meaningfully to the state's energy transition. Such actions would damage the ability of gas utilities to decarbonize their systems in a safe, reliable, affordable manner.

We look forward to the ongoing discussion on these important topics. Please address correspondence on this matter to me with copies to the following:

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Sincerely,

NW Natural

/s/ Zachary Kravitz

Zachary Kravitz
Senior Director, Rates and Regulatory Affairs

EXHIBIT A
NW Natural's Proposed Modeling Parameters

To the extent that the Commission intends to model additional electrification scenarios in IRPs, NW Natural urges the Commission to undertake a comprehensive decarbonization study that includes the costs of new capacity resources and corresponding transmission and distribution infrastructure.

The study should be specifically tailored to the energy system in Oregon. A decarbonization strategy that may be appropriate in one region may be ill-suited when applied to another region. The Pacific Northwest, and Oregon in particular, is unique and the study should reflect the region's energy requirements. For example, the study should, at a minimum, account for differences in weather across the state, as well as regional resource adequacy and reliability issues. Similarly, the study should accurately model the natural gas and electric systems and how various decarbonization scenarios will affect those systems using actual data whenever possible, not estimates or theoretical data. Having a deep understanding of all these issues is crucial in order to have a complete study that models the impact of different decarbonization pathways on the gas and electric systems.

With respect to technological issues, many decarbonization studies either have a limited understanding of accounting for heat pump efficiencies under extreme weather or assume very aggressive improvements in heat pump efficiency at cold temperatures (and some do not recognize the importance of the assumption at all). This is a critical piece of the study that should not be overlooked. Heat pump efficiency translates directly into the expected costs of electrification because it is the primary driver in the study's results for the expected peak load on the electric system under electrification. For example, some decarbonization studies completed for the Pacific Northwest assume i) all heat pumps that would be installed under electrification in the Pacific Northwest are 470% efficient, and ii) this efficiency rate is not dependent upon temperature (making the modeling simpler, but far less realistic). In combination with the assumption that supplemental heat source is not used (i.e. back-up resistance heating), the studies ultimately show there is very limited peak impact from electrifying space heating load. These assumptions create unrealistic results, understating winter peak energy requirements, and are a very large contributor to a common misconception that electrification of space heating is a cost-effective undertaking, because the real costs have been artificially depressed.

Even in more recent decarbonization work that is meant to address the deficiency in modeling related to heat pumps, it is typically assumed that "cold climate" heat pumps are the only type of heat pump installed, even though they are far more expensive than more standard heat pumps. The assumptions for "cold climate" heat pumps can also greatly understate the contributions to peak electric loads of heating with heat pumps as it is not uncommon that this work assumes the heap pumps are roughly 300% efficient at peak and that they do not require supplemental heat under peak conditions by using load profiles informed by building science simulations rather than actual usage during peak weather. These assumptions deviate from the specifications of the actual cold-climate heat pump (CCHP) specification from Northeast Energy Efficiency Partnerships (NEEP) where a heat pump can be classified in the CCHP directory if the unit is self-reported as

being at least 175% efficient at 5°F. This specification applies only to the efficiency of the heat pump itself and not the combined efficiency of the entire HVAC system, which usually also relies upon supplemental heating under peak conditions.

This distinction – between total space heating loads and loads from the heat pump itself – is critical, and it requires a close examination of the heat pump sizing and back-up heating technology. It is not efficient, from a building science perspective, to install a heat pump that is sufficiently large to serve all the heating needs of a single-family home under peak conditions, and therefore, a supplemental heat source is almost always installed to reduce wear on the heat pump system. Heat pumps lose not only efficiency, but also heating capacity in colder temperatures. This is why *it is standard* for ducted heat pump installations to include a supplemental heat source in the Pacific Northwest, with the most common option being an electric furnace that is only 100% efficient. With a typical installation, the supplemental heat source becomes the only source used under peak conditions for comfort and to minimize wear and tear on the HVAC system. Installations without designed supplemental heat are possible in some applications, but current installation practices do not typically size the system in this way. Furthermore, for comfort of the occupant, it is not uncommon for residents to use supplemental heat sources (e.g., space heaters or natural gas fireplaces) not connected to the HVAC system that make large contributions to energy use in the home during peak times.

With this, it is likely that homes with heat pumps that are more efficient than code are still using much more electricity during peak times than most decarbonization studies suggest they do. While there have been numerous studies in the energy efficiency world analyzing electric heat pump loads over an entire heating season, there has not been a detailed study of actual usage data in Oregon or the Pacific Northwest on how much energy all-electric homes heated by heat pumps use during peak conditions. This study cannot be done properly using monthly billing data alone, but can be done in a straightforward manner with data currently available to utilities with smart meters and other high frequency meters.

The Commission can develop a very informative data set from the utilities regulated by the Commission to study this issue by compiling usage information of homes that have received an incentive to install a high efficiency electric heat pump (by definition, these systems are more efficient than code) over the last few years during peak times.

NW Natural proposes that the Commission request data from the utilities it regulates to populate the following data for each building that has received a high efficiency heat pump incentive from the Energy Trust of Oregon:

- Square Footage
- Year Built
- Whether a heat pump incentive was received in 2013 or a more recent year
    - If a heat pump incentive was received, date of incentive
- Maximum hourly electric usage of the home for each year since 2013 for each year the system was installed

    - Hour of max usage
- Electric usage for the 7am hour for December 7th 2013, January 5th 2017, and January 14th 2020
- Electric usage for the 7am hour for July 15th of 2013, 2016, and 2019
- Gas usage in December 2013, January 2017, and January 2020 (if possible daily usage for 12/7/2013, 1/5/2017, and 1/14/2020)
- Gas usage in July 2013, 2016, and 2019 (if possible daily usage for July 15th of each year)
- Annual electric usage for each year starting in 2013
- Natural gas usage for each year starting in 2013

Analysis of this data would provide a real-world estimate of what it might mean if it were possible to employ the best available electric heat pumps at scale throughout Oregon. This work could then inform a broader study of the impacts of building electrification to Oregon utility customers, where the following assumptions should also be reviewed by stakeholders and be informed by the space heating discussion above:

1. **Space Heating Equipment Efficiencies and Costs**
    - Equipment options for the residential and commercial sectors
    - Efficiencies of equipment options (and how these efficiencies change with temperature and the equipment's size if the technology's efficiency is a function of temperature where a minimum of two separate efficiencies is required: annual average efficiency and winter peak hour efficiency at 12°F) for the climate in Portland, Newport, and Bend.
        i. Equipment efficiencies, both annual average and winter peak hour, should be based upon sizing recommendations from Air Conditioning Contractors of America (ACCA) *Manual S*
    - How efficiencies, both annual average efficiency and winter peak hour efficiency, are assumed to progress through time
    - Complete install costs – both new construction and retrofit – and how they are assumed to change through time inclusive of line itemed costs of equipment (including required accessory equipment such as line sets and refrigerant) and labor and conversion costs if current equipment type is being converted (with separate conversion costs for heat pumps in homes/businesses that currently have central air conditioning and homes/businesses that do not)
    - Assumed average efficiency of existing space heating equipment by fuel input
2. **Water Heating Equipment Efficiencies and Costs**
    - Equipment options for the residential and commercial sectors

- Efficiencies of equipment options (and how these efficiencies change with temperature and the equipment's size if the technology's efficiency is a function of temperature where a minimum of two separate efficiencies is required: annual average efficiency and winter peak hour efficiency at 12°F) for the climate in Portland, Newport, and Bend.
- How efficiencies, both annual average efficiency and peak hour efficiency, are assumed to progress through time
- Install costs – both new construction and retrofit – and how they are assumed to change through time inclusive of line itemed conversion costs of equipment based upon location of water heater in retrofit applications if current equipment type is being converted
- Assumed average efficiency of existing water heating equipment by fuel input

3. Transportation Vehicle Efficiencies and Costs

- Vehicle options for passenger vehicles, medium-duty vehicles, and heavy-duty vehicles inclusive of compressed natural gas vehicles
- Efficiencies of vehicle options
- How efficiencies are assumed to progress through time
- Capital costs and how they are assumed to change through time

4. Energy Supply Options

- Assigned carbon intensity of all energy supply options
- For electricity generation options: (1) install costs and how they change through time, (2) expected efficiencies, (3) annual capacity factor, (4) monthly capacity factors, (5) winter and summer peak hour firm capacity factors (peak capacity contribution), (6) O&M costs, (7) carbon intensity and (8) assumptions about siting
- For biomass: (1) price and availability of different feedstock, (2) equipment install costs for renewable natural gas for pipeline injection and how they change through time, and (3) assumptions about siting
- Energy Storage options: (1) install costs and how they change through time, (2) expected efficiency of storage process (out of and into useable form) as a function of time, and (3) capacity factor as a function of time energy is stored
    i. For power to gas: (1) install costs for electrolysis and how they change through time, (2) install costs for methanation and how they change through time, (3) costs of storing hydrogen or methane for later use, and (4) capacity factor

5. Transmission and Distribution Costs

- For electricity transmission and distribution: cost per additional unit of

peak hour load and how it changes with additional peak load

- For natural gas transmission and distribution: cost per additional unit of peak load and how it changes with additional peak load

6. Baseline Energy Load and Supply Profiles

- Daily and monthly load profiles by end use based upon temperature and calibrated against actual natural gas and electric intraday and seasonal loads in NW Natural's service territory
- Current mix of generating resources that serve the electric load in NW Natural's service territory

7. Energy Efficiency and Demand Response

- Technical and achievable energy efficiency potentials and the cost of measures to reduce energy use for the residential, commercial, industrial, and transportation sectors

8. Fuel Prices

NW Natural understands that a complete study that addresses all these issues will take considerable time and effort to complete, but it is necessary to fully understand the impacts of building electrification. A study that does not take these factors into account will likely have inaccurate results, and lead to regulatory tools that are ill-suited to the task of decarbonizing Oregon's energy supply while maintaining reliability and affordability.