

July 2, 2021

VIA ELECTRONIC FILING

Public Utility Commission of Oregon
Attention: Filing Center
201 High Street SE, Suite 100
Salem, Oregon 97301-3398

RE: UM 2178, In the Matter of Oregon Public Utility Commission Staff Natural Gas Fact Finding per Executive Order 20-04 PUC Year One Work Plan - NW Natural's Comments

Northwest Natural Gas Company, dba NW Natural (NW Natural or Company), appreciates the opportunity to provide comments on the May 27th workshop in the above-captioned docket. It looks forward to further participating in this effort to analyze the potential natural gas utility bill impacts that may result from limiting greenhouse gas ("GHG") emissions of regulated natural gas utilities under the Oregon Department of Environmental Quality's ("ODEQ's") Climate Protection Program ("CPP").

NW Natural is eager to engage in an analytical, data-driven process on this important issue. We understand that stakeholders have strongly held views, and we are prepared to have honest and frank discussions in this forum. However, these discussions can only be meaningful if they take place in an environment of mutual respect where stakeholders are prepared to understand (although not necessarily agree with) others' perspectives and points of view. If this cannot occur, it may lead to an incomplete and unproductive process where stakeholders are unable to even agree on a rudimentary set of facts, which would be the antithesis of a fact-finding process. Similarly, it could lead to a chilling effect where stakeholders that may have different perspectives do not feel comfortable expressing their views, as discussed in Avista's and Cascade's joint comments.

To ensure meaningful and productive discussions, NW Natural recommends deactivating the chat forum in the Zoom meeting. The chat forum did not result in productive engagement, was often distracting from the Staff's presentations at the workshop, and rarely remained on topic. In addition, it is not clear how the chat will be used by the Public Utility Commission of Oregon ("OPUC" or "Commission"). Given that NW Natural disputes many of the assertions in the chat, we feel compelled to provide responses to some of those assertions and questions, which we have attached to these comments (Attachment 1). Going forward, we intend to respond to verbal comments made at the fact-finding workshops or comments filed in the docket, but we do not

intend to engage in an unmoderated chat forum. In the event that Commission Staff ("Staff") decide to keep the Zoom chat forum available, we urge Staff to moderate the chat so that participants can only directly chat with Staff to raise a question or let Staff know of the participant's intent to speak at a workshop.

The remainder of NW Natural's comments address: 1) NW Natural's role in the overall energy system, 2) the sources of Oregon's GHG emissions, 3) the utility regulatory framework, 4) how NW Natural has pursued environmental initiatives within that framework, and, where necessary, sought changes to pursue additional initiatives, and 5) the scope and timeline of the fact-finding. NW Natural appreciates all of Staff's work on the fact-finding to date, particularly its May 27th presentation and, the comments above notwithstanding, looks forward to further participating in this process.

NW Natural's Role in Oregon's Energy System

NW Natural's role in Oregon's overall energy system can hardly be overstated. The Company delivers more energy in Oregon than any other utility—electric or gas. It 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.

The natural gas system is essential to mitigating resource adequacy issues that already exist on the electric grid even before any potential building electrification is considered. In Oregon, the gas and electric systems have a concurrent peak in winter. During this concurrent peak, the gas system actually delivers about twice as much energy as the electric system itself—with even more available. In fact, the gas system has the equivalent of about 98 gigawatts of capacity and 6 million MWh of storage. That is equivalent to a \$2 trillion battery, if one assumes current lithium ion technology. Having this amount of 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.

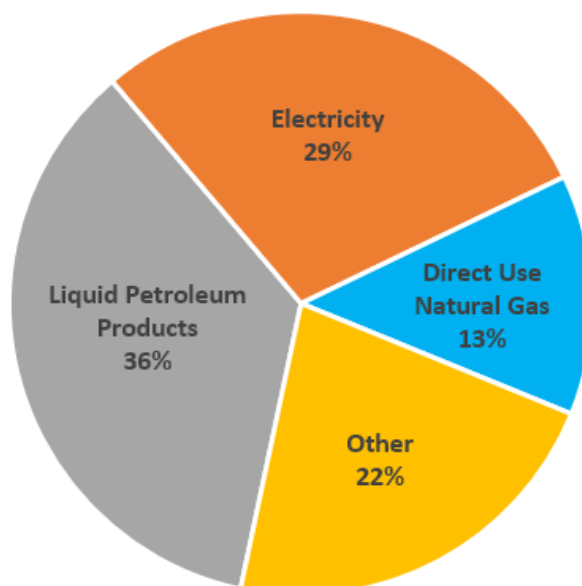
Aside from the amount of energy and capacity it provides, NW Natural also offers resilient and affordable utility service. During extreme weather, wildfires, or other events that can cause power outages, there is great value in having a separate, independent energy grid that NW Natural provides. NW Natural's service is also affordable. The average monthly residential gas bills are at the same level they were 20 years ago. While that is driven, in part, by the commodity cost decreasing over time, NW Natural recognizes that natural gas is a fuel of choice and has an incentive to keep its fixed costs down as well.

NW Natural plays a crucial role in delivering safe, reliable, and affordable energy to its customers that cannot be easily replaced or replicated, particularly in a colder climate such as Oregon's.

Oregon GHG Emissions

Many of the comments and questions during the May 27th workshop understandably focused on the greenhouse gas contribution of natural gas utilities, with a particular focus on emissions associated with direct use natural gas space heating. NW Natural agrees this information is critical to understanding the potential emissions impact of different potential policies, including EO 20-04. As shown in Figure 1 compiled from the ODEQ's GHG inventory, natural gas utility deliveries to uses other than power plants represented 13 percent of Oregon's emissions in 2019, even though roughly two out of three Oregonians use natural gas directly in their homes for space heating, water heating or cooking.¹

Figure 1: Oregon Emissions Breakdown - 2019



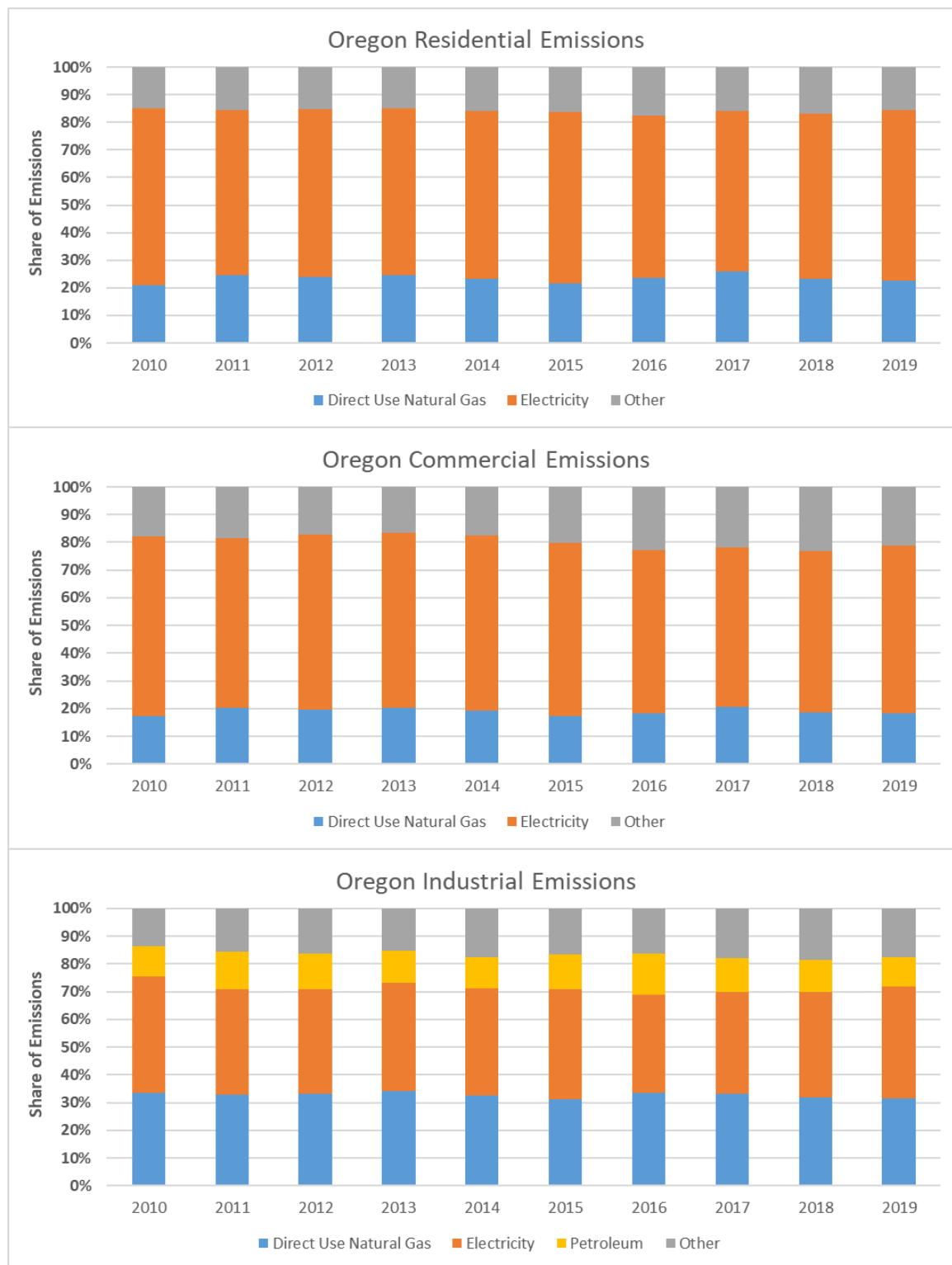
All emissions from residential direct use of natural gas in Oregon make up 4 percent of the state's emissions. Commercial use represents about 3 percent and industrial use about 6 percent. Direct use natural gas space heating—including both residential and commercial heating—accounts for roughly 70 percent of Oregon's space heating needs and about 4.5 percent of Oregon's emissions. The remaining 30 percent of Oregon's heating needs served by electricity, heating oil, propane or wood is more emissions intensive than natural gas and represents about 3 percent of the state's emissions. This is only 1.5 percent less than all the natural gas direct use space heating emissions, even though natural gas meets a substantial majority of the state's space heating's needs (70 percent). Direct use natural gas water heating represents about 1.5 percent of Oregon's emissions.

¹ Roughly 40 percent of natural gas use associated with Oregon energy consumption is not delivered by gas utilities and used directly, but is used to generate electricity used by Oregonians, and these emissions are accounted for in the emissions of the electricity sector.

This means that if it were possible to replace the heating needs of the roughly 3 million Oregonians who rely upon natural gas to keep their homes warm in the winter with a source of emissions free energy—something that is not currently possible—it would reduce Oregon's emissions by less than 5 percent. 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.

One must also consider whether emissions are increasing or decreasing through time. When accounting for variation in weather from year-to-year, direct use natural gas emissions in Oregon have been increasing by less than ½ percent per year over the last decade and are now expected to begin falling as SB 98 and initiatives related to EO 20-04 are implemented. 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, as shown in Figure 2:

Figure 2: Oregon Sectoral Non-Transportation Emissions Breakdown through time²



² Compiled from ODEQ's GHG Inventory

While NW Natural's emissions are relatively limited considering that it delivers more energy to Oregonians than any other gas or electric utility, it recognizes the need to reduce its emissions. The next two sections discuss how utility regulation is traditionally focused on providing safe, reliable, affordable utility service, not emissions reductions, how NW Natural has pursued efforts to reduce its emissions within that regulatory framework, and how NW Natural has also advocated for changes in Oregon law to change that framework in order to allow it to pursue additional efforts to reduce emissions.

The Utility Regulatory Framework

At the May 27th workshop, Staff provided an excellent overview of the ratemaking process. NW Natural would like to take this opportunity to further expand on this overview, particularly how traditional utility regulation guides a utility's investments.

State-regulated utilities, such as NW Natural, are among the most highly regulated private companies in the country because they provide an essential public service. Natural gas serves a critical public need by providing the majority of the energy that keeps Oregonians warm in the winter. If it were to disappear tomorrow, a significant number of Oregonians would be unable to affordably heat their homes. In recognition of this, utilities are granted exclusive service territories and are required to offer service to all eligible customers.

In order to protect customers from a potential abuse of market power, Oregon law authorizes the Commission to be the economic regulator of public utilities, which serves as a proxy for competition in the market. As such, public utility commissions require utilities to make investment decisions based on least-cost, least-risk planning. As part of the ratemaking process, the Commission is required to ensure service is affordable. To do so, it examines all of the ratemaking elements noted by Staff as part of the ratemaking process to ensure that all costs a utility recovers through rates are necessary to serve customers, and that the utility is not over-earning at the expense of customers. In addition, organizations that represent customer interests, such as the Oregon Citizens' Utility Board and the Alliance of Western Energy Consumers, participate in the ratemaking process and provide additional oversight of utility's costs.

Contrary to discussions in the workshop chat, regulated utilities are not guaranteed a profit. Utilities are given the opportunity to earn a limited return, but the purpose of that return is to ensure that utilities are financially healthy enough to attract capital to finance necessary investments in their systems—so that the utilities can ensure the continued provision of safe, reliable service.

Furthermore, as part of its economic regulatory oversight responsibilities, the Commission regulates the types of investments that NW Natural may make. As noted previously, state law requires the Commission to focus on the provision of safe, reliable, affordable utility service. Absent a specific law setting targets or mandates for utility

investments, the Commission lacked the authority to allow NW Natural to invest in lower carbon resources to serve customers if there are lower cost options available.

NW Natural's Role in the State's GHG Reduction Efforts

As described above, traditional utility regulation limits the investments NW Natural can make to decarbonize. Nonetheless, as further described below, the Company has been able to: 1) pursue a number of initiatives under traditional utility regulation, and 2) when that proved insufficient, it sought changes to Oregon law to go beyond least-cost utility regulation to allow it to acquire renewable natural gas and pursue programs to reduce GHG emissions. This section also briefly touches upon future initiatives that NW Natural will pursue to further decarbonize.

Initiatives Using Traditional Utility Regulation

NW Natural understands it needs to decarbonize and has pursued initiatives under the traditional regulatory model that have resulted in environmental benefits.

In 2003, NW Natural became one of the first natural gas utilities in the country to establish a decoupling mechanism. Decoupling breaks the link between a utility's earnings and the quantity of gas consumed by customers, removing any financial incentive to discourage customers from conserving energy. This fully aligns the interests of NW Natural and our customers in reducing energy use 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. The Company has over 67,000 customers enrolled in the program, who have funded over one million metric tons of emissions reductions.

The Company worked closely with the Commission and its stakeholders to develop constructive regulatory mechanisms that allowed it to accelerate the replacement of approximately one hundred miles of older bare steel pipe that could cause safety issues and potential increased leakage of methane in the atmosphere. Through this accelerated replacement, the Company now has one of the tightest pipeline distribution systems in the country.

In 2019, NW Natural incorporated the greenhouse gas emissions of its natural gas suppliers into its gas purchasing practices by using publicly available Environmental Protection Agency data. NW Natural prioritizes purchasing from suppliers that report lower greenhouse gas emissions from production. These actions reduce the lifecycle carbon intensity of the gas the Company provides to customers.

The Company also works across the natural gas value chain with other like-minded industry members and trade groups to encourage producers to adopt best practices and reduce methane emissions. NW Natural is a founding member of the Natural Gas

Supply Collective, the U.S. EPA Methane Challenge, and a member of ONE Future. The Natural Gas Supply Collective is a group of natural gas purchasers promoting safe and responsible practices for natural gas supply. The U.S. EPA Methane Challenge focuses on adopting advanced practices to further reduce methane emissions, such as alternative blowdown methods in pipeline construction and maintenance. One Future is a coalition representing the entire natural gas value supply chain and is committed to reducing methane emissions through science-based standards and deploying best practices.

NW Natural's Initiatives to Reduce its Emissions Going Beyond Traditional Utility Regulation

NW Natural has not only pursued decarbonization under traditional utility regulation, but it has sought changes to law that would facilitate decarbonization. It supported the passage of SB 844,³ which allows natural gas utilities—contrary to traditional utility regulation—to invest in a limited set of above-market solutions for decarbonization. NW Natural was also instrumental in the passage of SB 98,⁴ which allows natural gas utilities to acquire renewable natural gas. Further, NW Natural supported the recently proposed cap-and-invest legislation, HB 2020 and SB 1530, which, ultimately, were not enacted into law.

While NW Natural is disappointed that cap-and-invest was not passed, these changes to the regulatory framework, especially SB 98, which removes the barriers that were preventing NW Natural from acquiring renewable natural gas and hydrogen, are crucial to NW Natural's ability to decarbonize.

In short, NW Natural has had some success at not only pushing the limits of traditional utility regulation, but also modifying it to allow the Company to pursue more investments to decarbonize through SB 98 and SB 844. While more needs to be done, assertions in the May 27th workshop chat that NW Natural is somehow “greenwashing” its customers are manifestly incorrect. NW Natural has long been pushing the boundaries of what is possible within the limits of state law (and when that is not enough, working to change state law) to decarbonize its system.

Future Initiatives

NW Natural recognizes that there is much more to be done. Deep energy efficiency is the fastest and cheapest way to reduce emissions. Through the Energy Trust of Oregon, 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. That is equivalent to removing greenhouse

³ ORS 757.539.

⁴ ORS 757.390 – ORS 757.398.

gas emissions from over 6,000 cars for one year. NW Natural is also working with nonprofit organizations like the Gas Technology Institute and Northwest Energy Efficiency Alliance 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.

As stated above, NW Natural strongly supports developing renewable natural gas from waste streams, such as agriculture, landfills, food waste, human waste, and wood waste. Utilities can capture the gasses from those waste streams, clean it to pipeline quality, and inject it into a pipeline with benefits similar to wind and solar. This turns a waste problem that is currently contributing to atmospheric methane release into a powerful climate solution using the existing pipeline network. The Oregon Department of Energy conducted a study in 2019 that found there was nearly 50 billion cubic feet of technical potential, equivalent to the total amount of natural gas used by all Oregon residential customers today. An ICF national study shows up to 14 trillion cubic feet nationally of technical potential (88 percent of current natural gas direct use throughput).

NW Natural is also pursuing hydrogen. This includes hydrogen blending into the existing system directly, some dedicated hydrogen networks —initially for large industrial customers, and methanated hydrogen, which uses waste CO₂ to create synthetic gas. All of these energy sources have carbon intensities similar to electric renewables, and ensures there are no limitations to the number of molecules available to completely decarbonize the gas system in the future.

Hydrogen can also provide significant benefits to the electric grid. It enables significantly lower costs of wind and solar investments through power-to-gas-to-power (PGP), which works through generating hydrogen with electrolyzers with curtailed power, and storing that power in the gas system. This energy can be used for power generation months in the future, or delivered to natural gas customers using the gas grid. PGP is orders of magnitude less expensive than batteries and pumped hydrogen for long-term storage. In addition, these electrolyzers provide large-scale demand response solutions and voltage stabilization services. In short, coupling the electric and gas grids through hydrogen increases reliability and resilience for energy in the region, and helps decarbonize both grids much more quickly, and at a much lower cost.

When thinking about how to decarbonize the electric system, the solution was not to cut down the wires. Instead it was to change what was flowing through them. The same is true for the gas system. These are assets worth billions of dollars, which are already in place with massive seasonal storage capability, and specifically designed to serve heating. NW Natural is dedicated to decarbonizing its system and expects to be held accountable for meaningful results.

Scope of the Fact-Finding

Due to the limits of traditional utility regulation, one may question the purpose of these workshops. However, as Staff explained, the purpose of this docket is to "[g]ain a better

understanding of the natural gas customer dimensions and impacts of different decarbonization scenarios to help inform future decision making." From NW Natural's perspective, this means the Commission is looking at the regulatory tools available to limit the harm to customers should NW Natural's decarbonization pathway end up more expensive than its traditional service model. The Commission is required to care about this because its statutory mandate is to ensure that utilities provide safe, reliable, and affordable utility service. In light of its statutory duties, NW Natural views this docket as an opportunity to examine regulatory tools available for the Commission to ensure that Oregonians continue to have access to such service as we move forward into a decarbonized future. NW Natural does not view this as a forum for pre-deciding Oregon's decarbonization pathway. Establishing decarbonization mandates or pre-deciding what tools the state should use to achieve its climate action goals are not within the Commission's statutory purview.

To the extent stakeholders wish to look beyond the scope of this fact-finding, the analysis should be performed pursuant to the Commission's statutory mandates—ensuring the provision of safe, reliable, affordable utility service. There are a broad array of implications of an expanded scope that impact the Commission's ability to discharge its duties, and thus that the Commission would have to consider. In the event that stakeholders sought to model electrification of space heating, for example, the Commission would have to consider the potential impacts to Oregonians of the state's electric demand increasing when electric capacity in the region is becoming more constrained, the impact to electric rates, the safety of the system, and the regulatory tools needed to mitigate these impacts on electric customers.

The Commission would also have to consider what types of resources will meet this increase in demand, as flexible non-emitting hydro resources are becoming further and further taxed and renewables are challenged to meet the instantaneous demands of the region, particularly on cold winter mornings. In addition, reliability and resiliency concerns would have to be addressed. Generation capacity concerns already exist due, in part, to retired coal plants, and new electric transmission is inherently difficult to permit and construct. Under any such scenario, the Commission is required to also examine the safety impacts on Oregonians, should the utility system fail to meet demand or if Oregonians lack the means to afford utility service they need for their daily lives.

The Fact-Finding Process Timeline

Like other stakeholders at the May 27th workshop, NW Natural is concerned that the timing of this process does not align well with the planned timeline of ODEQ's CPP rulemaking process. Specifically, it appears to be asking utilities to complete an analysis on a set of rules that are likely to be changing as the CPP rulemaking proceeds. Furthermore, while high level directional analysis of potential compliance options can be put together in this fact-finding process, it appears to take place much too quickly for a detailed analysis to be completed, especially considering all of the ways the CPP is likely to change the methodologies employed by natural gas utilities to

complete IRP work. Perhaps even more important, there are provisions in the draft CPP rules that make it impossible to understand how many Community Climate Investments (CCIs)⁵ will be made available to NW Natural, how they would reduce emissions, and what those investments might cost. Instead NW Natural will likely have to wait until the program is established and third parties qualify under ODEQ rules to offer CCIs before NW Natural can analyze them in comparison to other emissions reduction options to determine the emissions reduction portfolio that represents the best combination of least cost and risk for NW Natural's customers. With this timing mismatch—this process is scheduled to finish before CPP rules are finalized—NW Natural is struggling to understand how this fact-finding process can support policymakers and stakeholders in understanding the implications of EO 20-04.

Meaningful modeling and analysis of rate impacts and compliance options is a significant undertaking, and should be scoped and planned to ensure it yields results that are useful for their intended purpose. For that reason, NW Natural believes that one of the most important next steps in this docket will be for Staff to further define the purpose of the modeling, and explain to participants how the proposed timing of this docket is targeted to allow the Commission to achieve its intended goals.

NW Natural appreciates the opportunity to provide these comments and thanks Staff for all of its work in this docket. We look forward to participating in further workshops and discussions.

Sincerely,

/s/ Zachary Kravitz

Zachary Kravitz
NW Natural
Director, Rates and Regulatory Affairs

⁵ CCIs are a compliance mechanism included in the draft CPP rules.

During the Kick Off meeting a number of participants expressed questions in the zoom chat feature that were not fully answered in the meeting time allotted. We have deduced some common themes across these questions and hope to point those meeting participants and others who may have similar questions to our answers and resources with more information.

What is a Decarbonized Energy System with Natural Gas?

Multiple studies have shown that natural gas and the gas pipeline network will be needed for the Pacific Northwest to achieve its climate goals. In fact, [a study by the premier environmental consultant Energy and Environmental Economics \(E3\)](#) shows how our system—leveraging renewables developed for the pipeline —can be instrumental to helping achieve deep decarbonization in our region affordably and reliably. In April a [report](#) by Columbia University’s SIPA center on global energy policy also points to the value of the role of the natural gas system to support net zero targets.

Using these findings as guideposts we’ve set the goal of a carbon neutral by 2050. More about the role of the energy delivery system can be found here in our explanation of what we call [Destination Zero](#).

[E3 Pacific Northwest Pathways to 2050.pdf \(ethree.com\)](#)

[Vision 2050 - Destination Zero \(nwndestinationzero.com\)](#)

[Columbia | SIPA Center on Global Energy Policy | Investing in the US Natural Gas Pipeline System to Support Net-Zero Targets](#)

We are certainly not the first to think about decarbonizing a pipeline delivery system. Our peers in the EU have worked to increase significant volumes of RNG and Hydrogen onto systems to serve the needs of customers while also achieving targets from Paris Climate goals. <https://gasforclimate2050.eu/>

What is Renewable Natural Gas?

Renewable natural gas (RNG) is the name used to describe biogas that has been cleaned and upgraded for use in place of fossil natural gas. The biogas used to produce RNG comes from a variety of waste sources, including municipal solid waste landfills, digesters at water resource recovery facilities (wastewater treatment plants), livestock farms, food production facilities and organic waste management operations.

Use of RNG can provide benefits in terms of fuel security, economic revenues or savings, local air quality and greenhouse gas emission reductions. RNG combines low- to negative life-cycle carbon emissions with the high-energy density, storage capability and transportability of natural gas. Thus, RNG is highly valued in the transportation sector, but its attributes are equally valued for direct use in the residential, commercial and industrial sectors to serve heating needs. More information on this energy source can be found on these sites:

<https://www.epa.gov/lmop/renewable-natural-gas>

https://www.epa.gov/sites/production/files/2020-07/documents/lmop_rng_document.pdf

<https://www.aga.org/natural-gas/renewable/>

What is the availability of renewable natural gas?

The report on renewable natural gas availability published by Oregon Department of Energy is an important and valuable resource in assessing potential supply from within the state. There are 49 biogas production facilities in Oregon currently producing or have produced biogas and electricity. The gross potential for RNG production when using anaerobic digestion technology is around 10 billion cubic feet of methane per year, which is about 4.6 percent of Oregon's total yearly use of natural gas- including the use of natural gas to produce electricity.

The gross potential for RNG production when using thermal gasification technology is nearly 40 billion cubic feet of methane per year, which is about 17.5 percent of Oregon's total yearly use of natural gas, but roughly equivalent to the amount used by our residential sales customers. When assessing the current use of natural gas against projected need for renewable gas to serve our customers this is an important designation. We anticipate that together Renewable Natural Gas and Renewable Hydrogen are able to meet significant demand for direct use by our customers as we see our peers transition to increasingly renewable electricity that decreasingly relies on combustion based generation.

RNG is generated from existing waste streams. This process captures gases and other point pollution that, would otherwise be released to atmosphere directly or flared. Development of RNG for direct use displaces use of fossil gas and serves to reduce waste related methane emissions.

<https://digital.osl.state.or.us/islandora/object/osl:501770>

What resources do vulnerable customers have today to reduce bills or receive assistance?

In partnership with community action agencies and other nonprofit partners NW natural is able to help customers reduce energy bills through energy efficiency upgrades and with bill assistance programs. More information of both programs can be found here.

<https://www.nwnatural.com/account/payment-assistance>
<https://www.nwnatural.com/ways-to-save/savings-programs>

As we work to transition toward decreasingly carbon intensive energy across our entire region, ensuring cost controls and thoughtful use of resources, like leveraging the system in place, serves to manage cost impacts to customers.

What is the role of renewable hydrogen in the energy delivery system?

Renewable or green hydrogen (also referred to as power to gas) can be produced using renewable electricity, such as wind or solar power. The electricity is used to power an electrolyzer, which splits water into hydrogen and oxygen. Hydrogen can be captured, stored and used, or combined with a source of carbon to produce renewable methane:

Hydrogen has a secondary but very important benefit in that it also offers a long-term energy storage solution for renewable electricity. On the electric side, hydrogen reduces costs and enables reliability. To smooth the transition to a greener energy system we need long duration storage to enable more intermittent sources like wind and solar to provide reliability – fossil gas is performing this role today.

We have a gas distribution system that stores billions of MWh of energy. Our system alone stores over 6 million MWh – equivalent of a \$2 trillion battery, or enough energy to supply 600,000 homes. It can be leveraged to reduce the cost and the lead time to achieve the energy transition. Developing hydrogen resources is a high priority nationally and beyond. Some additional information is linked below:

[Hydrogen- Scientific American](#)

[H2@Scale | Department of Energy](#)

[Hydrogen Storage | Department of Energy](#)

How much does natural gas contribute to carbon emissions?

The use of natural gas accounts for roughly 12% of the state of Oregon's emissions today. This includes all the natural gas delivered by the three natural gas utilities serving the state. Information about the inventory can be found ON the state's Inventory page here: [State of Oregon: AQ Programs - Oregon Greenhouse Gas Sector-Based Inventory Data](#). With continued work to reduce use through energy efficiency as well as integration of renewables the carbon emissions associated with serving our customers will be reduced.

Do gas appliances impact indoor air quality?

Indoor air quality is impacted by a number of household activities. From furniture, paint and flooring ingredients to appliance performance it is important that every house has good ventilation. This is especially true for cooking. No matter the heat source building codes encourage installation of hood vents to remove food and cooking related particulates from the indoor environment. In specific, a 2013 peer-reviewed study of 513,000 children in 47 countries found no association between gas cooking and lifetime asthma or current asthma in children, when compared to kids in homes where electric stoves were used. <https://www.nwnatural.com/safety/home-safety/indoor-air-quality>

Where can you find more information about system age and planning?

Today, we operate one of the most modern and tightest natural gas systems in the nation. In 2018, NW Natural had the lowest ratio of leak repairs per mile of pipe among natural gas utilities in the United States, according to S&P Global. Completing our pipeline replacement program created a tighter system with fewer leaks, which furthers our efforts to distribute natural gas in an environmentally responsible manner. More information about our system integrity program can be found here: [Modern pipelines, integrity programs help deliver natural gas safely - NW Natural](#)

Additionally, our system planning is executed through an Integrated Resource Plan which includes a stakeholder process and partnership with regulators. More information about the past and current plans as well as the process can be found on our website. [Strategic Planning – NW Natural](#)

Our annual Environmental Social Governance (ESG) report is another way to get up to speed on progress towards the company's carbon goals and commitments [Business practices - NW Natural](#)

What information do customers receive on their bills about the breakdown of rates?

Our website provides information about costs to customers and how rates are assigned and governed. The current rate information can be found on the website here.

<https://www.nwnatural.com/about-us/rates-and-regulations/billing-rates>

Additionally, there is a guide on interpreting customer bills that can be found on our website.

[Understanding My Bill - NW Natural](#)

Where does natural gas delivered in Oregon come from?

Natural gas in OR is sourced from Western Canada and the US Rockies. NW Natural has been actively involved in advocating for responsible and transparent practices for more than ten years and is an active member of multiple north American coalitions working to ensure that even as we decarbonize the product delivered to customers is decreasingly carbon intensive. This has resulted in using environmental reported data as an input in purchasing decisions. More information about this work can be found here: [Responsible gas production - NW Natural](#)

What is NW Natural's Commitment to decarbonization?

Our commitment to decarbonize is a top priority. Like other industries, we have made voluntary decarbonization goals above and beyond what is required by regulation. We see our goals as the path forward, not aspirational but possible with the technology that exists today. We intend to lower the carbon intensity of the product we deliver using a mix of technologies and renewable energy sources while we continue to pursue energy efficiency and offset projects. Looking beyond the confines of our own system there are also opportunities to leverage the pipeline delivery system to replace dirtier fuels with lower carbon pipeline options including renewable gas and hydrogen. By leveraging the modern system in place we will be better able to keep the energy transition affordable by using our existing system in new and innovative ways.

See more about our commitments and action: <http://lesswecan.com/> & [Vision 2050 - Destination Zero \(nwndestinationzero.com\)](#)