To: Governor Tina Kotek and SE Portland Legislators (Representative Rob Nosse, Representative Khanh Pham, Representative Mark Gamba, Representative Janelle Bynum, Representative Hoa Nguyen, Representative Andrea Valderrama, Senator Michael Dembrow, Senator Kayse Jama, Senator Kathleen Taylor)

CC: Governor's Chief of Staff (Chris Warner), Senior Health Advisor (Kristina Narayan), Natural Resources and Climate Policy Advisor (Karin Power)

CC: Multnomah County Board of Commissioners, Portland City Council, Members of the Oregon Public Utility Commission

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Subj: Take Immediate Action to Halt and Investigate NW Natural's Portland Hydrogen Blending Project

Governor Kotek and Members of the Legislature,

We, the undersigned building professionals and public health, environmental and social justice organizations are writing to voice our extreme concern that NW Natural (NWN) has begun blending "turquoise hydrogen"[1] into the natural gas system in Southeast Portland. We are alarmed that NWN is already distributing this new blended product to its consumers without forewarning.[2] NWN appears to be acting without any oversight, accountability, or transparency around the amount of hydrogen being blended or the health and safety impacts that blending could have on customers. These actions seem to fall between the cracks of Oregon's existing regulatory system, and action by state leaders is necessary to ensure that appropriate health and safety checks are in place *before* this blending continues.

There is a growing body of literature about the significant increases in health and safety risks associated with blending hydrogen into natural gas, and local opposition to these projects is growing. In Eugene, NWN withdrew a similar project in 2022 after public

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[1] "Turqoise hydrogen" refers to the use of a process, methane pyrolysis, to separate hydrogen molecules from methane, while capturing or storing the Co2 byproduct in order to reduce emissions. Thomas Koch Blank et al, "Clean Energy 101: the colors of hydrogen," RMI, April 13, 2022, https://rmi.org/clean-energy-101-hydrogen/?utm_source=google&utm_campaign=18654046274&utm_content=160572158147&utm_term=what%20is%20hydrogen&utm_medium=687071802123&gad_source=1&gclid=CjwKCAjwnei0BhB-EiwAA2xuBmwyafrkRGtjsvPN5CBDwv1HnRrDzOem0DV3lnIiPTB2cd7KCiCcQxoCsVQQAvD_BwE

[2] NW Natural, "NW Natural and Modern Hydrogen Unveil Clean Hydrogen Production, Carbon Capture Project in Portland" (May 16, 2024), https://ir.nwnaturalholdings.com/news/news-details/2024/NW-Natural-and-Modern-Hydrogen-Unveil-Clean-Hydrogen-Production-Carbon-Capture-Project-in-Portland/default.aspx.

opposition from a local neighborhood association,[3] in large part due to the potential health and safety risks associated with even low levels of blending. In response to local opposition in Eugene, the utility appears to have pivoted its blending efforts to another city and foregone any kind of regulatory oversight or public notice.

Lack of Public Engagement and Oversight

According to recent reporting, NWN has installed new equipment for hydrogen blending at the site of its headquarters in central Portland without any advance notice to local residents and gas customers.[4] Despite the utility's recognition of the importance of "stakeholder outreach and engagement" in its formal filing to the PUC withdrawing the Eugene hydrogen blending project, NWN did little or nothing to engage local residents or neighborhood associations in the impacted area.[5] The community in Portland impacted by the utility's new hydrogen blending project has a higher percentage of renters compared to other parts of the city. NWN should not have moved forward with this dangerous process without public notice or regulatory oversight, and in doing so, the company has jeopardized the safety and wellbeing of our communities.

NWN's lack of community engagement regarding this project is in stark contrast to the efforts it has made to promote this project to elected officials and city staff in local governments outside of Portland, as well as the local media. Specifically, information from public records requests has shown that NWN's government affairs staff have conducted extensive outreach to cities such as Albany and Eugene to visit the methane pyrolysis facility.[6] No such invitations have been extended to residents within the Portland communities that are receiving this blended gas/hydrogen mix. This further indicates that the project will endanger residents and not result in any customer benefits. It appears that NWN's rushed blending decision is instead intended to bolster the company's reputation on climate action.

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[3] Alex Baumhardt, "NW Natural scraps plans for blended hydrogen and natural gas project in Eugene" (Oregon Capital Chronicle, Nov. 2, 2022), https://oregoncapitalchronicle.com/briefs/nw-natural-scraps-plans-for-blended-hydrogen-and-natural-gas-project-in-eugene/.

[4] Chris McGinness, "Northwest Natural plans to cut carbon emissions through production of 'turquoise hydrogen'" (KGW8, Jun. 5, 2024), https://www.kgw.com/article/news/local/good-energy/turquoise-hydrogen-cutting-carbon-emissions-northwest-natural-modern-hydrogen/283-bd096de2-0454-4f4c-8f5a-b83e6144b20d.

[5] NW Natural, "Re: UM 2251 - NW Natural's Application for Approval of Eugene Hydrogen Project", Public Utility Commission of Oregon, November 1, 2022, https://edocs.puc.state.or.us/efdocs/HNA/um2251hna165033.pdf

[6] See note 1 above; see also example email communications retrieved from public records requests in this folder.

NWN has routinely responded to concerns about its hydrogen blending projects by claiming that it has been testing different percentage blends of hydrogen at its Sherwood Operations and Training Center, since at least 2019. Specifically, NWN has repeatedly claimed that it has been "successfully blending hydrogen… at 5% and now blending 20%."[7] However, despite this apparently extensive testing at relatively high blending levels for several years, to our knowledge NWN has yet to release any concrete data or findings from this testing. This lack of transparency makes it difficult to take NWN's claims about the supposed safety of blending hydrogen into methane gas at face value. Releasing the results of their testing should be required before any consideration is given to approving NWN's hydrogen blending projects.

Health and Safety Risks

Hydrogen is more susceptible to leakage than "natural" methane gas, and can be ignited more easily.[8] A study from the United Kingdom found that if hydrogen were used in homes to replace methane gas, the annual predicted number of explosions would more than quadruple.[9] Burning blends of hydrogen and methane can increase the emission of nitrogen oxides (NOx) compared to burning methane alone by up to six times.[10] NOx exposure can cause serious health effects, including asthma and increased chance of respiratory infections; NOx is also a precursor to particulate matter and ozone, which harm the respiratory system.[11]

These increased impacts will disproportionately fall on people from historically marginalized backgrounds, who are more likely to live in rental housing with older and inadequately ventilated gas stoves that result in higher levels of indoor air pollution. Studies show that the use of methane gas-powered appliances already greatly impacts indoor and outdoor air quality: Children that grow up in a home with a gas stove have a 42% greater risk of developing asthmatic symptoms and nearly 13% of childhood

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[7] See also NW Natural, "Hydrogen", https://www.nwnatural.com/about-us/environment/hydrogen ("We have been successfully blending hydrogen at our largest facility for more than two years, starting out at 5% and now blending 20% hydrogen directly into our pipes to test our distribution system materials, leak detection equipment and to ensure normal operations of end uses, including furnaces, water heaters, fireplaces, and cooktops.").

[8] United States Office of Energy Efficiency and Renewable Energy, "Safe Use of Hydrogen," https://www.energy.gov/eere/fuelcells/safe-use-hydrogen.

[9] Leigh Collins, "'Hydrogen in the home would be four times more dangerous than natural gas': government report" (Recharge News, Aug. 2, 202)1, https://www.rechargenews.com/energy-transition/hydrogen-in-the-home-would-be-four-times-more-dangerous-than-natural-gas-government-report/2-1-1047218.

[10] Mehmet Salih Cellek and Ali Pınarbaşi, "Investigations on Performance and Emission Characteristics of an Industrial Low Swirl Burner While Burning Natural Gas, Methane, Hydrogen-Enriched Natural Gas and Hydrogen as Fuels," 43(2) *International Journal of Hydrogen Energy* 1194 (2018), https://doi.org/10.1016/j.ijhydene.2017.05.107.

[11] United States Environmental Protection Agency, "Nitrogen Dioxide (NO_2) Pollution," https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects.

asthma cases in the United States can be linked to having a gas stove in the home.[12] Hydrogen blending is expected to drastically increase these impacts. Portland's Southeast neighborhoods already breathe some of the worst air quality in the entire state of Oregon.

Climate Impacts

Hydrogen blending in homes and buildings not only poses real health and safety risks to communities, but does little or nothing to reduce the climate pollution associated with the gas system. Instead, gas companies facing declining business revenues promote hydrogen blending as a way to maintain dependence on the gas system and delay electrification. A recent study found that, even when using "green" hydrogen, which is produced with 100% renewable electricity and water, a mix of up to 20% hydrogen (estimated to reduce gas system emissions by 7% due to lower volumetric energy density) ended up leading to zero net reduction in emissions because of significant increases in leakage from the system.[13] In the case of "turquoise" hydrogen blends, in which hydrogen is generated through methane pyrolysis, with the resulting carbon theoretically stored in concrete or bricks, the emissions reductions would be similarly negligible, and when considering the upstream emissions of the extraction and transportation of methane gas, the emissions reductions are eliminated.[14]

Simply put, blending hydrogen into gas for home heating and cooking is not a climate solution. It is concerning that NWN is making significant investments into hydrogen, which has been found to be dangerous and ineffective at reducing climate pollution, when there is an affordable, efficient, and widely-available alternative for decarbonizing homes and buildings: electrification with high efficiency heat pump technology. Instead of moving forward with hydrogen blending and the risk it poses to the public, NWN must instead invest in targeted efforts to transition homes and buildings off of methane gas altogether in order to meet local, county, and state climate goals and policies.

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[12] Weiwei Lin et al. "Meta-analysis of the effects of indoor nitrogen dioxide and gas cooking on asthma and wheeze in children," 42(6) *International Journal of Epidemiology* 1724 (2013), https://doi.org/10.1093/ije/dyt150; Talor Gruenwald et al. "Population Attributable Fraction of Gas Stoves and Childhood Asthma in the United States," 20(1 *International journal of environmental research and public health* 75 (2022), https://pubmed.ncbi.nlm.nih.gov/36612391/.

[13] Rachel Parkes, "'No place in our homes' Hydrogen blends leak twice as much in household cookers compared to gas: report" (HydrogenInsight, Apr. 17, 2024), https://www.hydrogeninsight.com/policy/no-place-in-our-homes-hydrogen-blends-leak-twice-as-much-in-household-cookers-compared-to-gas-report/2-1-1628681.

[14] Lorenzo Sani, *Kind of Blue: The real climate impact of blue hydrogen and gas-CCS* (Carbon Tracker, Jun. 20, 2024), https://carbontracker.org/reports/kind-of-blue/. See also Tianyi Sun et al, "Climate Impacts of Hydrogen and Methane Emissions Can Considerably Reduce the Climate Benefits across Key Hydrogen Use Cases and Time Scales," 58 *Environmental Science and Technology* 5299 (2024), https://pubs.acs.org/doi/10.1021/acs.est.3c09030 (finding that the climate benefit of hydrogen is highly dependant on upstream emissions, and, for green hydrogen, whether the renewable electricity used to produce it could instead be used to decarbonize the electricity system.).

A Bad Investment

All current evidence points to hydrogen blending being cost-prohibitive, especially for regular gas utility customers. For example, a recent study found heating buildings by burning green hydrogen in a gas furnace would be three times more expensive than using electricity. Experts say that "blue" or "turquoise" hydrogen generation is even more costly.[15]

In addition, at more than a 5% blend, replacing home appliances and shoring up pipelines against hydrogen embrittlement becomes a significant expense: NWN has pointed to Hawaii Gas as an example of where hydrogen is working, but Hawaii has the highest gas utility rates in the entire country.[16] Well-founded hydrogen safety concerns add to that cost: Hawaii Gas's website reads, "While our 15% hydrogen natural gas blend supports greater decarbonization, it puts infrastructure at risk for hydrogen embrittlement."[17] To combat embrittlement and leaks, the company says it lines its pipes with Oceanit's HydroPel, which costs $239,000 per mile of pipe.[18] That cost would be passed on to everyday consumers: the ratepayers.

Building new hydrogen infrastructure for home heating is likely to create stranded assets and delay the transition to heat pumps, which provide not only more efficient and affordable heating, but also life-saving cooling as Oregon communities face increasingly frequent and deadly heat waves. Heat pumps both heat and cool buildings at a fraction of the price of any available alternative. Trying to "fix" home heating with another expensive, polluting combustion fuel (blended hydrogen) is, to put it simply, a bad investment. To the extent that these technologies should be explored at all, it should be in the context of direct use for the most difficult-to-electrify industrial processes (such as making fertilizers or steel manufacturing), not for everyday residential and commercial customers.

Conclusion

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[15] Josh Gabbatiss, "Heating Households and Buildings: Heat Pumps will be up to three times cheaper than Green Hydrogen" (Energy Post, Mar. 3, 2023), https://energypost.eu/heating-households-and-buildings-heat-pumps-will-be-up-to-three-times-cheaper-than-green-hydrogen/; Emma Penrod, "Hydrogen could compete with natural gas by 2030, but there's a catch: report" (Utility Dive, Mar. 15, 2024), https://www.utilitydive.com/news/blue-green-hydrogen-natural-gas-brattle-edf/710397/.

[16] California Public Utilities Commission, "CPUC Issues Independent Study on Injecting Hydrogen into Natural Gas Systems," (Jul. 21, 2022), https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M496/K285/496285890.PDF; Choose Energy, "Natural Gas Rates by State," (Jun. 6, 2024), https://www.chooseenergy.com/data-center/natural-gas-rates-by-state/.

[17] Hawai'i Gas, "Hydrogen," https://www.hawaiigas.com/sustainability/hydrogen.

[18] Hydropel, "Hydropel," https://h2pel.com/.

In light of these concerns, we are asking regulators and elected officials to take immediate action to halt NWN's blending operation until an appropriate safety and regulatory process is established and until robust community engagement can take place. We also encourage members of the Oregon Public Utility Commission to launch an investigation into this project and any related violations of state rules and regulations.

Thank you for your consideration,

Myong O, Board Representative, Brooklyn Climate Action Team - Subcommittee of Brooklyn Action Corps

Cheyenne Holliday, Advocacy Manager, Verde

Siraat Younas, Climate Justice Associate, Community Energy Project

Anne Pernick, Senior Advisor, SAFE Cities at Stand.earth

Samantha Hernandez, Healthy Climate Program Director, Oregon Physicians for Social Responsibility

Nikita Daryanani, Climate and Energy Policy Manager, Coalition of Communities of Color

Dave Cobar, Program Coordinator, Earth Advantage

Eli Spevak, Founder & Director, ElectrifyPDX

Damon Motz-Storey, Oregon Chapter Director, Sierra Club

Lindsey Scholten, Executive Director, Oregon League of Conservation Voters (OLCV)

Dineen O'Rourke, Campaign Manager, 350PDX

Claire Prihoda, Buildings Policy Manager, Climate Solutions

Audrey Leonard, Staff Attorney, Columbia Riverkeeper

Kraig Buesch, Chapter Chair, The Climate Reality Project Portland Chapter

Kat Plimpton, Outreach & Operations Director, NW Energy Coalition

Noelle Studer-Spevak, Founding Boardmember, Families for Climate

Brian Stewart, Co-Founder, Electrify Now

Dave Cobar, Program Coordinator, ZERO Coalition

Danny Noonan, Climate and Energy Strategist, Breach Collective

David Delk, President, Oregon Alliance for Democracy

Sue Craig, President, Oregon Unitarian Universalist Voices for Justice

Neil Baunsguard, Climate Policy Manager, The Environmental Center

Lisa Arkin, Executive Director, Beyond Toxics

Lenny Dee, President, Onward Oregon

Diane Hodiak, Executive Director, 350 Deschutes

Jess Grady-Benson, Organizing Director, Rogue Climate

Patricia Hine, President, 350 Eugene

Wendy Woods, President, Electrify Corvallis

Alan Journet Ph.D., Co-Facilitator, Southern Oregon Climate Action Now

Clark Brockman, Founder-Principal, Brockman Climate Strategies

Jake Lewis, Project Architect, Salazar Architect Inc.

Callie Bailey, Principal, Assemblage Works Inc.

Josh Salinger, Founder and CEO, Birdsmouth

Corey Squire, Sustainability Director, Bora Architecture & Interiors

Mike Ardeljan, Builder/Designer, Dream Home Building and Design

Stephen Aiguier, Founder and President, Green Hammer

Sadie Leigh, Associate Communications Manager, GreenSavers

Patrick Donaldson, Principal Architect, Harka Architecture

Linda Ganzini, Co-President & Board Member, Lake Oswego Sustainability Network

Kate Kearney, Marketing Manager, MWA Architects Inc.

Geneva Strauss-Wise, Regional Operations Manager, NorthWest AeroBarrier

Erica Dunn, Senior Associate, Opsis Architecture

Ruwan Jayaweera, Senior Principle, PAE

Josh Salinger, Founder and CEO, Passive House Northwest

Dirk Larson, Principal, Resilient Retrofits

Jackie Keogh, Executive Director, Rooted Homes

Juliette Grummon-Beale, Sustainability Lead, Scott Edwards Architecture