

Dear Senator Sollman and members of the Senate Committee on Energy and Environment:

I have been working on climate change issues for decades. We are butting up against critical tipping points. I apologize for missing the meeting yesterday as I'm in the hospital.

There are not a lot of good reasons for using hydrogen for burning in the home with natural gas. In fact, our natural gas companies could change their business model to building ground-sourced heat pumps for new construction and own the local neighborhood mechanics. This is the most efficient form of heat pumps as the subsurface temperature is cool in the summer and warmer than ambient air in the winter. NW Natural has taken part in a test case and no gas is needed at all! Meaning no methane leaks, no in house emissions, etc.

Hydrogen is expensive.

- Hydrogen costs a lot to produce. It's more expensive than methane and will cause rates to go up.¹
- Displacing methane with hydrogen actually requires more fuel because it's not as fuel efficient.
- As the blend increases over 15% by volume, every mile of existing pipeline will need to be retrofitted at a high cost.

Safety Impacts: Oregon needs to have Public Utility Commission Oversight

- Unlike WA and CA, NW Natural was able to blend hydrogen with natural gas without notification to customers.
- Hydrogen makes the pipes more brittle increasing leaks.
- Hydrogen is more explosive than methane, increasing risks of explosions and fire.

Climate & Health Impacts-more emissions

- Burning hydrogen in home stoves and furnaces increases the health harms of gas by increasing emissions of asthma worsening nitrogen dioxide.²

¹ International Energy Agency. The Future of Hydrogen, 2019. <https://www.iea.org/reports/the-future-of-hydrogen>.

² Celtek Mehmet Salih & Ali Pınarbaşı, Investigations on Performance and Emission Characteristics of an Industrial Low Swirl Burner While Burning Natural Gas, Methane, Hydrogen Enriched Natural Gas and

- My former organization Physicians for Social Responsibility and academics have shown health impacts of just natural gas in our homes from inadequate combustion and higher carbon monoxide levels. Along with high Nitrous Oxides while cooking that exceed external limits.
- Leaks from more brittle pipes as the ratio increases of the greenhouse gases methane and hydrogen will make Oregon's greenhouse gas emissions worse.
- Nearly all hydrogen used is made from methane, so we aren't really reducing emissions.

It's important to reserve hydrogen for uses that are hard to electrify.

- Heavy manufacturing of steel, glass and cement requires high heat that hydrogen is good for.
- Transportation-shipping, aviation and long-haul trucking are better uses of hydrogen until these can be electrified with battery technology.
- Energy storage of "green hydrogen" (produced with renewable energy), offers energy security and storage.