

Hydrogen

Joint Committee on Transportation

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About NW Natural

- Celebrating 162 years of service
- Largest stand-alone gas utility in the Pacific Northwest
- Serving 2.5 million people in Oregon and SW Washington through 770,000 meters
- One of the tightest, most modern distribution systems in the country
- Nearly 1,200 employees



Destination Zero:

The pathway to our vision of carbon neutral

A decarbonized network:

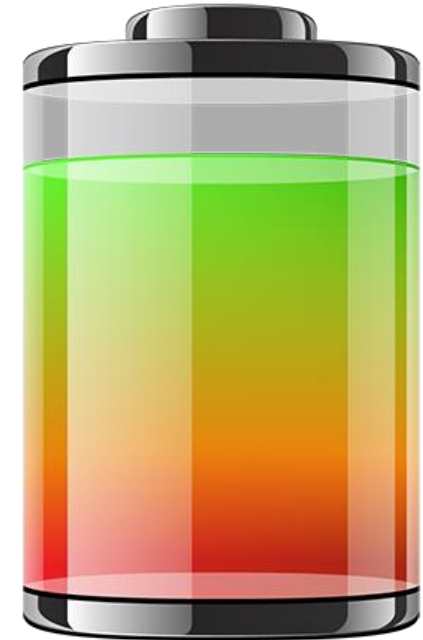
- Deep energy efficiency
- Renewable natural gas
- Renewable hydrogen
- Blended and dedicated hydrogen systems

- Renewable Natural Gas
- - - Dedicated Hydrogen
- - - Waste CO2
- - - Renewable Electricity



Renewable Energy Storage

- NW Natural has ≈ 6 million MWh of energy storage
- Equivalent annual electric energy $\approx 600,000$ average Oregon residential customers
- In terms of lithium-ion batteries: \$2 trillion
- 50,000x larger than the largest battery project in Oregon
- Lowest capital cost storage available:
 - Lithium-Ion $\approx \$375/\text{kWh}$
 - Pumped hydro $\approx \$165/\text{kWh}$
 - Hydrogen (electrolyzer) $< \$1/\text{kWh}$
- Building access to storage creates cost efficiencies



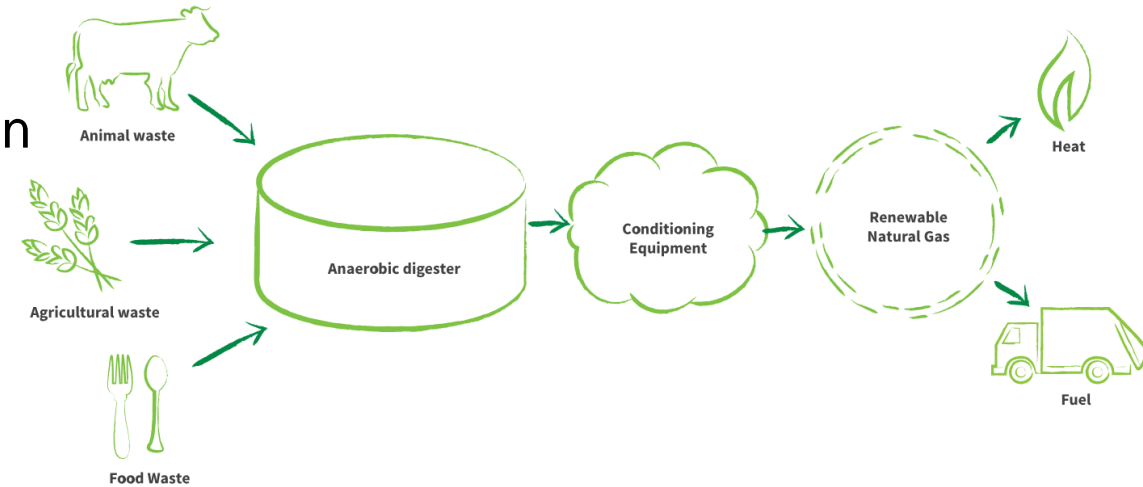
Gas System Hydrogen Pathways

○ Steam methane reforming

- Most popular method for hydrogen production (by far)
- Efficient
- Can use renewable Natural Gas
 - Dairies
 - Woody biomass
 - Waste water treatment plants
 - Negative carbon intensities

○ Multiple pathways increases energy resilience

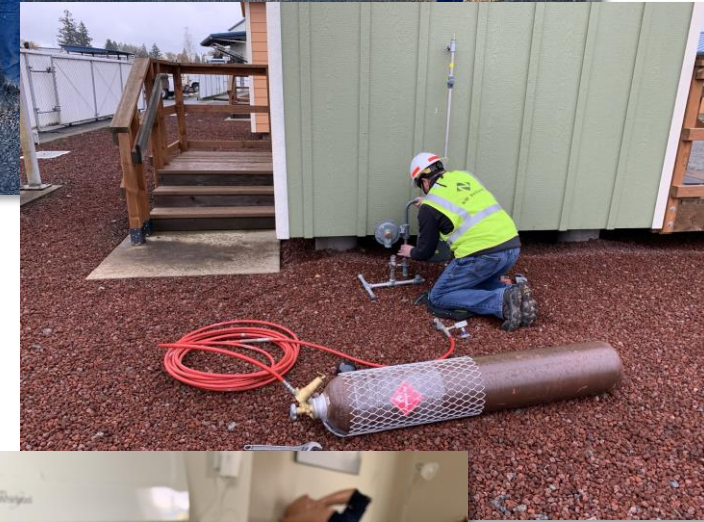
○ Blue hydrogen



Source: ATCO

Next Steps

- Continue preparing for blending
- Hydrogen pilot in Eugene
- Exploring large scale hydrogen



THANK YOU