Destination Zero: a Utility's journey to Carbon Neutrality

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Utility Energy Form
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NW Natural®

Agenda

- NW Natural: Stats and Values
- Policy Context
- Peak realities
- Decarbonizing responsibly
- Vision 2050

NW Natural Overview

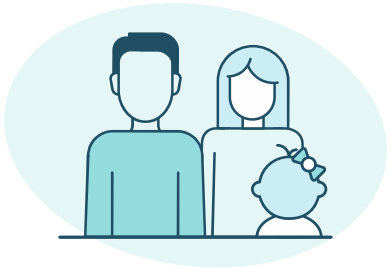
- Celebrating 163 years of service
- Largest stand-alone gas utility in the Pacific Northwest
- Serving 2.5 million people in Oregon and SW Washington
- One of the tightest, most modern distribution systems in the U.S.
- Nearly 1,200 employees
- $1M in corporate giving
- New Structure: All subsidiaries of NW Natural Holdings
  - NW Natural Gas
  - NW Natural Water
  - NW Natural Renewables
- 2022: World's Most Ethical Companies Ethisphere award

Our Shared Values

We must innovate and evolve together, in a way that leaves no one behind.

EQUITY

Provide warmth affordably to the people that depend on us



ENVIRONMENT

Drive down emissions with efficiency, renewables, new technology

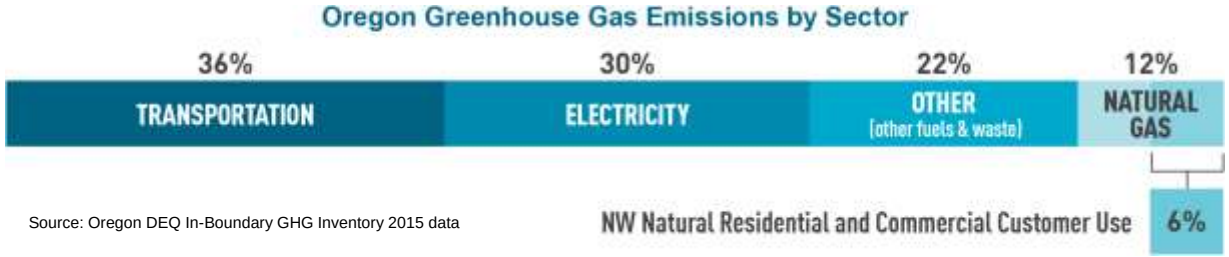
ECONOMY

Use our tightest, modern system to support economic vitality and health

Role of our System Today

NW Natural's System

- Delivers more energy than any other utility in Oregon
- Heats 74% of residential square footage in the areas we serve
- Provides 90% of energy needs for our residential space and water heat customers on the coldest winter days
- One of the tightest, newest systems in the country
- Our residential and commercial customers' emissions account for just 6% of Oregon's total carbon emissions



Source: Oregon DEQ In-Boundary GHG Inventory 2015 data

Serving 2.5 Million people in 140 Communities

Policy Context

Emissions reduction in Oregon

Natural Gas

Executive Order 20-04

50% reduction by 2035

90% reduction by 2050

Senate Bill 98

Enables RNG investment

Electricity Generation

House Bill 2021

80% clean by 2030

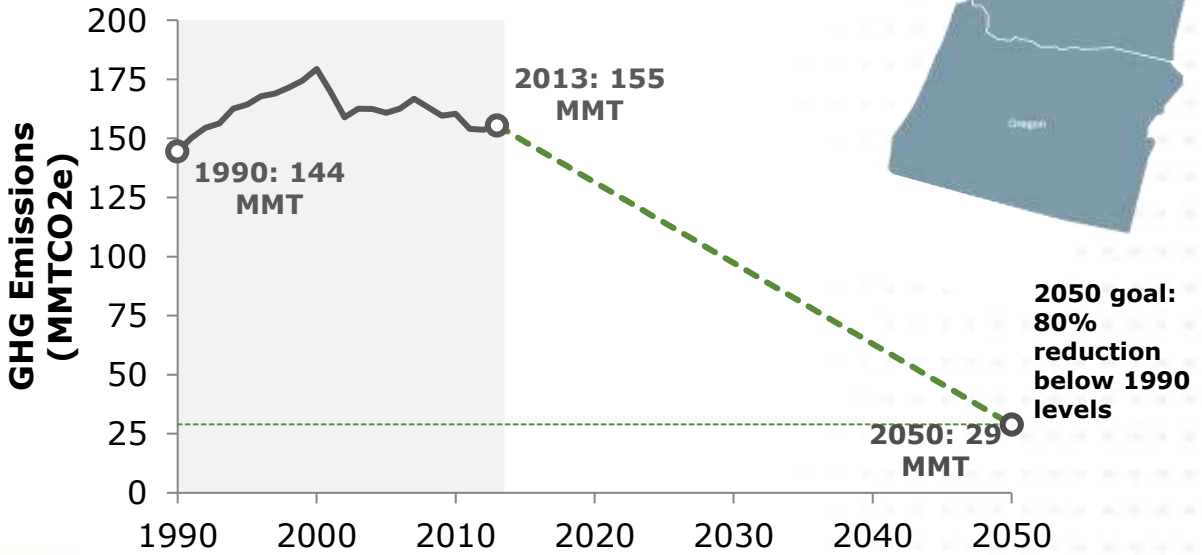
90% clean by 2035

100% clean by 2040

NW Natural asked E3 to evaluate scenarios to achieve deep decarbonization in PNW

- **Oregon and Washington are taking steps reduce emissions, but exactly how deep decarbonization will be achieved remains uncertain. This study evaluates different strategies to achieve an 80% reduction in greenhouse gases (GHGs), aka deep decarbonization by 2050.**

Oregon and Washington Deep Decarbonization Trajectory



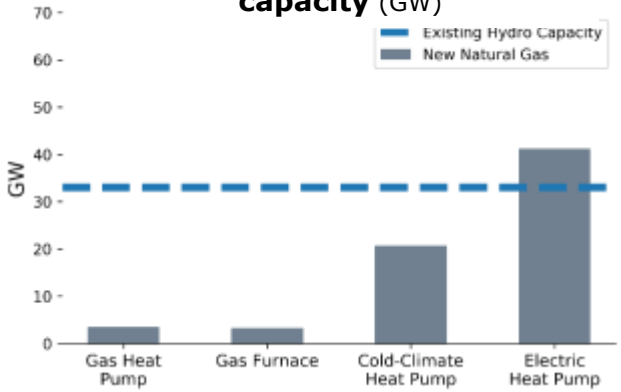
Scenarios vary based on level of electrification, low-carbon fuels & renewable electricity

2050 metrics	Gas in Buildings Scenarios: Gas Furnaces Scenario	Gas in Buildings Scenarios: Natural Gas Heat Pumps Scenario	Electrification in Buildings Scenarios: Electric Heat Pumps Scenario	Electrification in Buildings Scenarios: Cold Climate Heat Pumps Scenario
Share of natural gas space- and water heating electrified	0%	0%	96%	96%
Industry electrification (fuel-switching % of total industrial energy)	30%	30%	5%	5%
Zero-carbon electricity	97%	97%	95%	95%
Share of available biofuels used	100%	97%	73%	73%
Hydrogen mix in pipeline	7%	0%	0%	0%

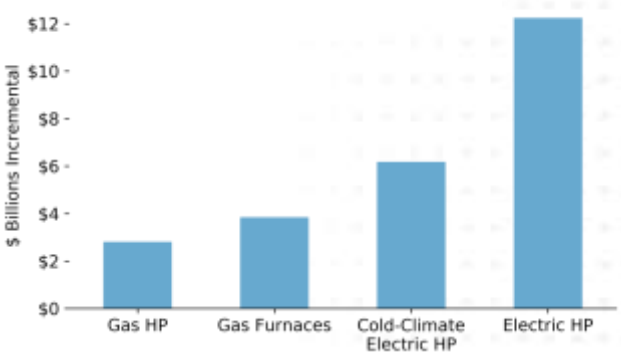
By 2050, incremental gas capacity is 5-10 times higher in electric heat pump scenarios compared to gas scenarios

- Electric scenarios include 17 – 37 GW of new gas capacity by 2050 to serve winter space heating peaks (at 1-in-10 winter temperatures)
- Additional electric sector costs are $3B - $9.5B in 2050 in electric heat pump scenarios, relative to gas heat pump scenario
- Energy storage could displace some of this new gas capacity, but more detailed reliability analysis of storage as a winter peak solution is needed

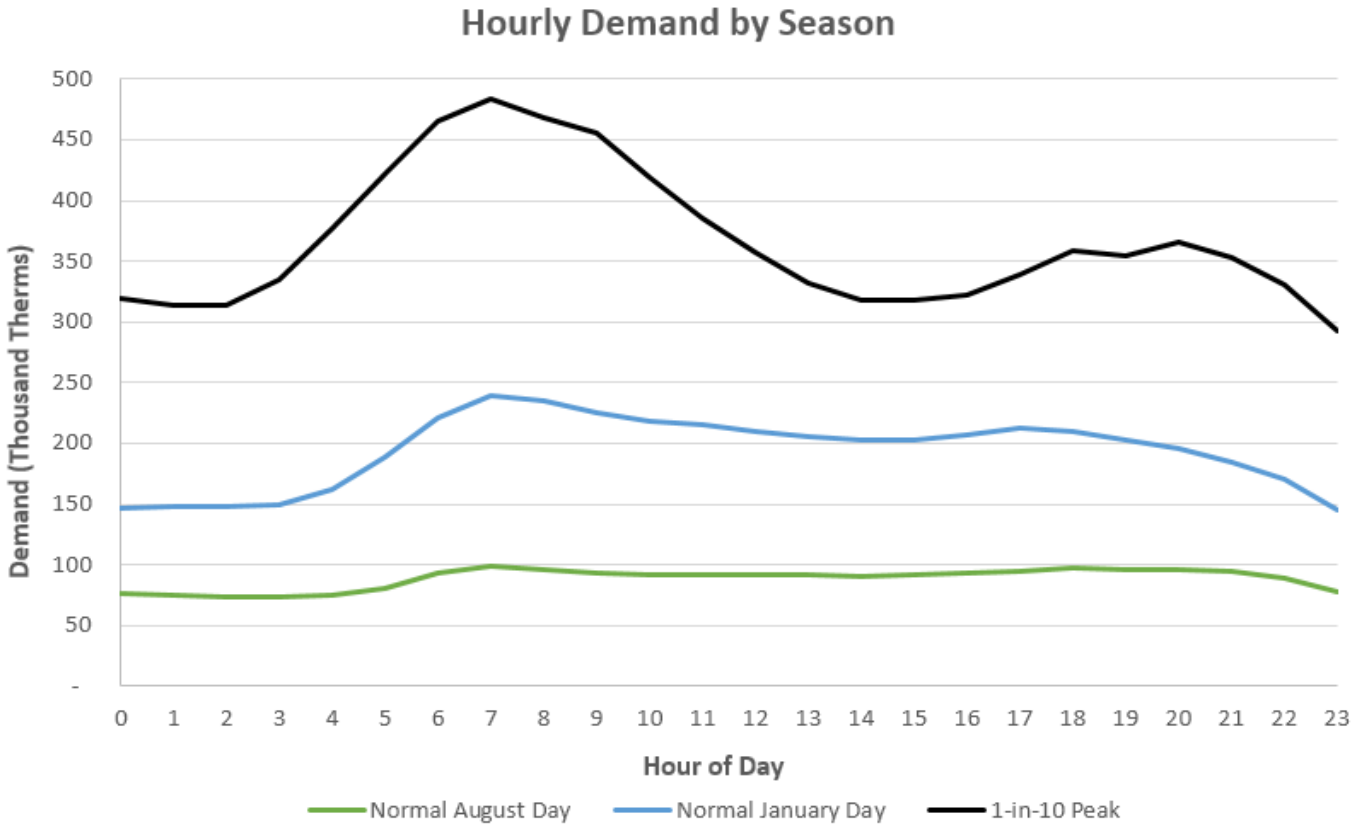
2050 incremental gas capacity (GW)



2050 electricity sector cost relative to Reference ($ Billions)



Understanding Peak – Gas Delivery



Understanding Peak:

Electric relative to Gas

Extreme Weather Example 7am January morning in 2017

- Electric System: experienced the largest peak in recent years with a load of less than **30 gigawatts**
- Natural Gas System: delivered ~1.8 million therms; equal to **53 gigawatts**
- **The natural gas system in the Northwest can deliver 98 gigawatts of energy on peak**
  - 3 times the current electric generating fleet that serves the region
  - Roughly 100x the delivery capability of utility scale battery storage in the United States

We Must Evolve Energy Sources

Instead of wires, NW Natural delivers energy through pipes. What goes through them is the opportunity for de-carbonization.

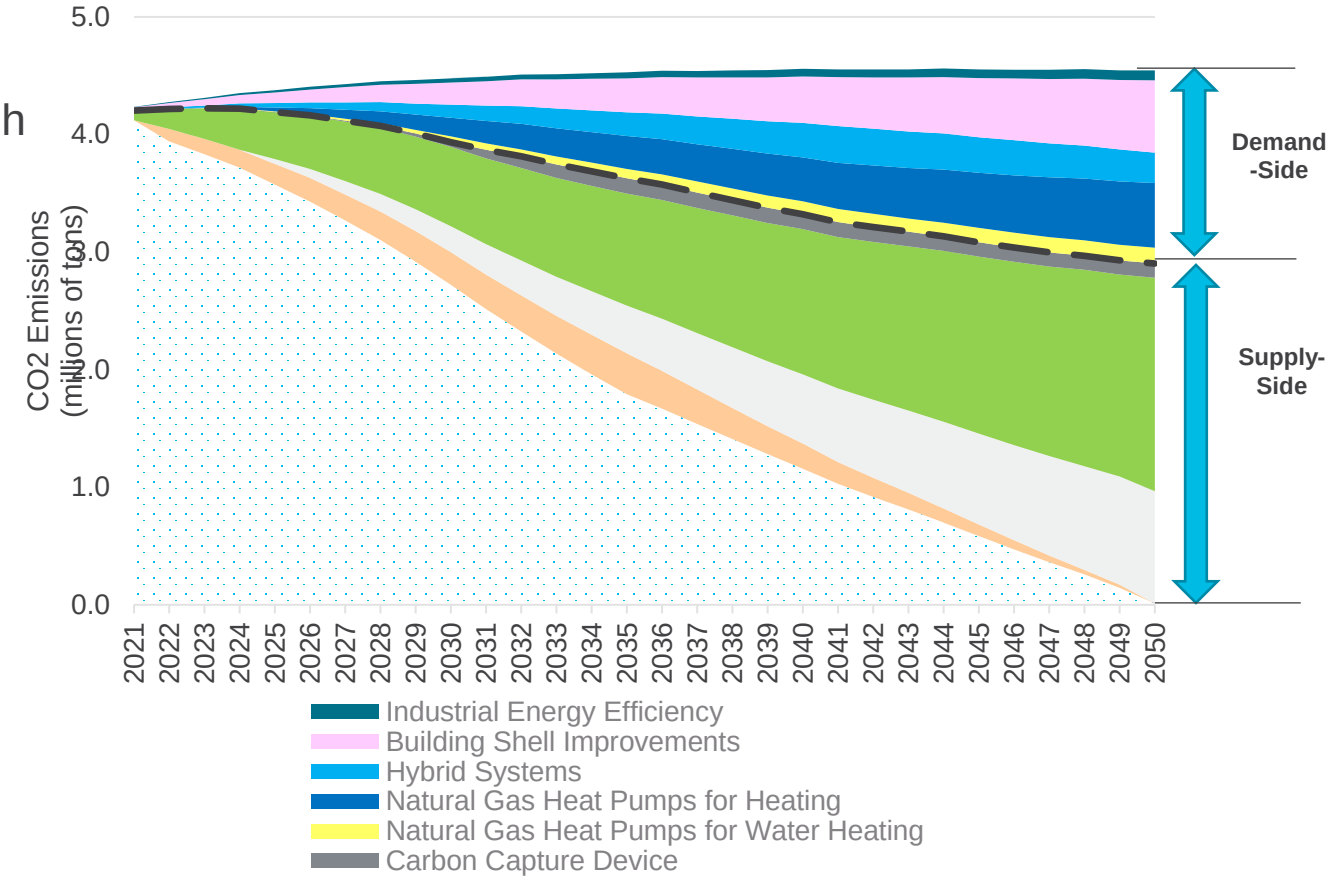
Destination Zero:

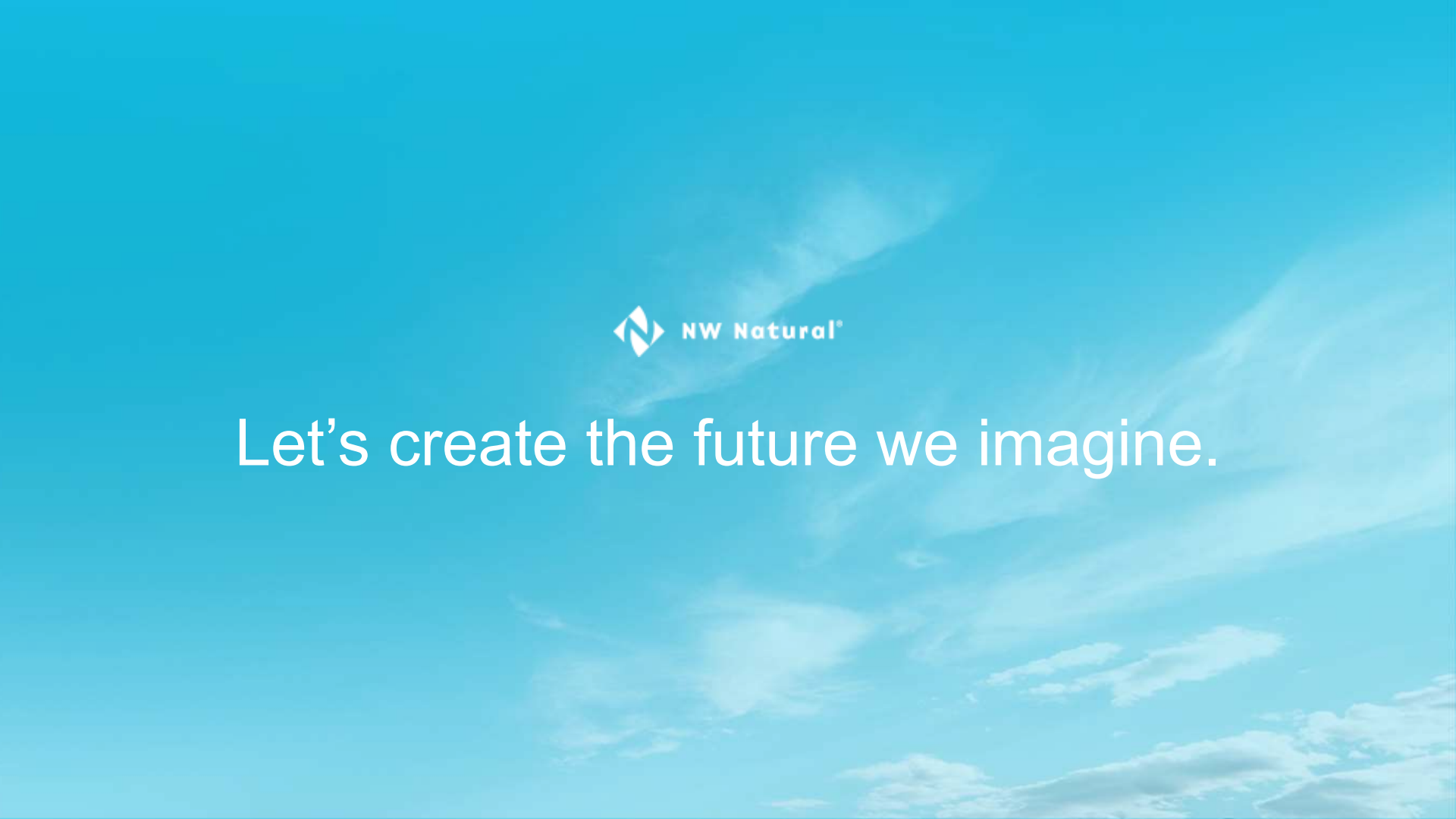
The pathway to our carbon-neutral vision

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

Demand-Focused Scenario

- Reliance on increased energy efficiency through improvements in space and water heating
  - Gas Heat Pumps
  - Hybrid Systems
  - Building Shell Efficiency
- Less reliance on renewable therms and offsets




NW Natural
Let’s create the future we imagine.