

# Resource Adequacy Fundamentals

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OREGON  
DEPARTMENT OF  
ENERGY



# 2020 ENERGY REPORT

## Goal of the Report

Pursuant to ORS 469.059, provide a comprehensive review of energy resources, policies, trends, and forecasts, and what they mean for Oregon.

## Scoping the Report

Shaped by a data-driven process, equity considerations, and input from stakeholders and the public.

## Designing the Report

Shorter briefs on a wider variety of energy topics, tear-away style. Themes cross sections for general 101 or technology reviews and deeper-dive policy briefs.



<https://energyinfo.oregon.gov/ber>

# WHAT IS RESOURCE ADEQUACY?

**Table 1: Power System Reliability Over Different Timescales**

<b>Short-term</b> <i>(&lt; 1 minute)</i>	<b>System Stability</b>	Short-term reliability (e.g., frequency response) focused on grid stability over very short time intervals
<b>Medium-term</b> <i>(Hourly or Daily)</i>	<b>System Balancing</b>	Medium-term reliability focused on managing imbalances on the system like those that occur between a day-ahead forecast and real-time conditions
<b>Long-term</b> <i>(1 to 5 years)</i>	<b>Resource Adequacy</b>	Long-term reliability focused on seasonal or year-to-year mismatches between supply-and-demand

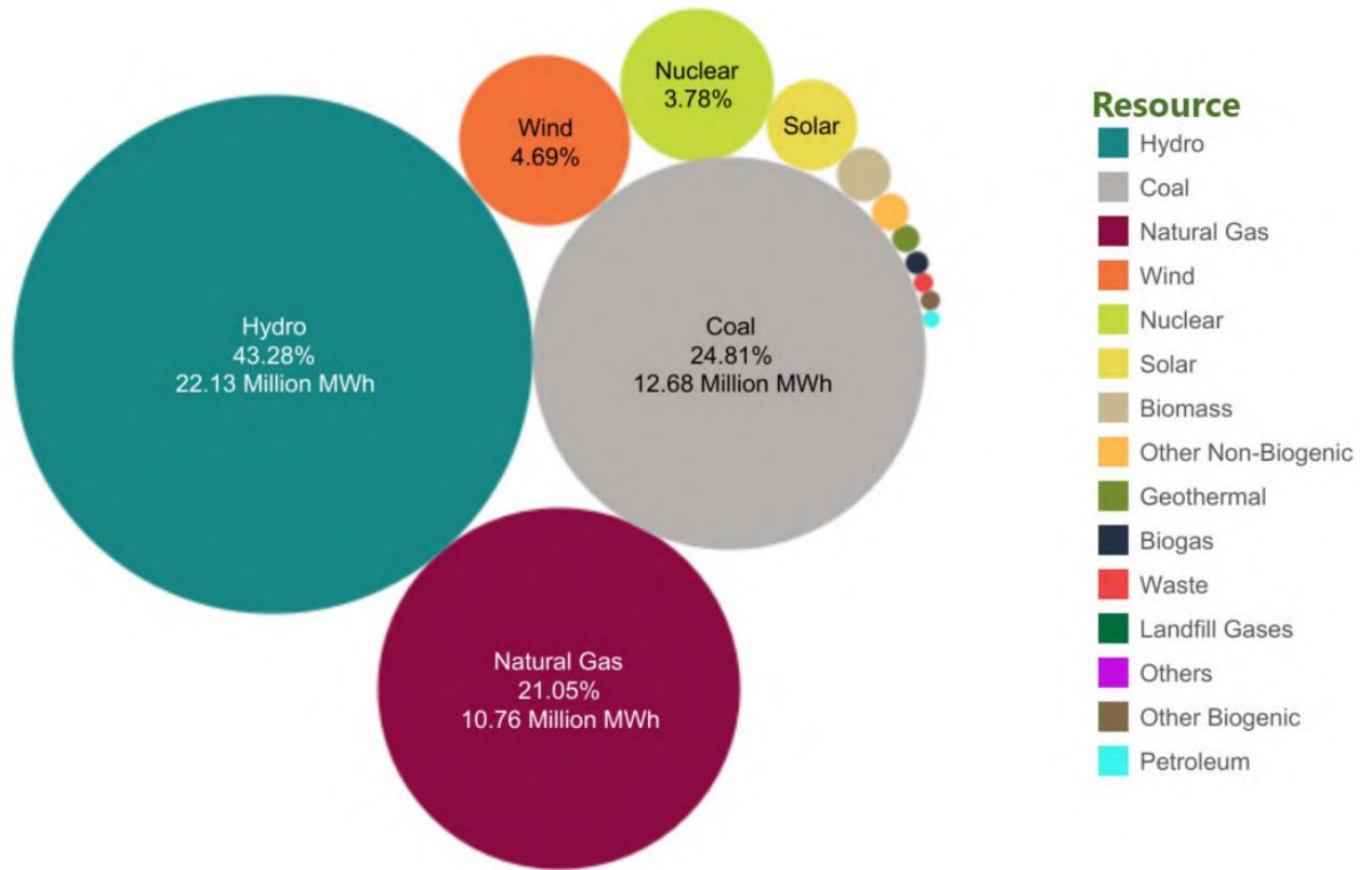
How much **demand**?

How much **supply**?

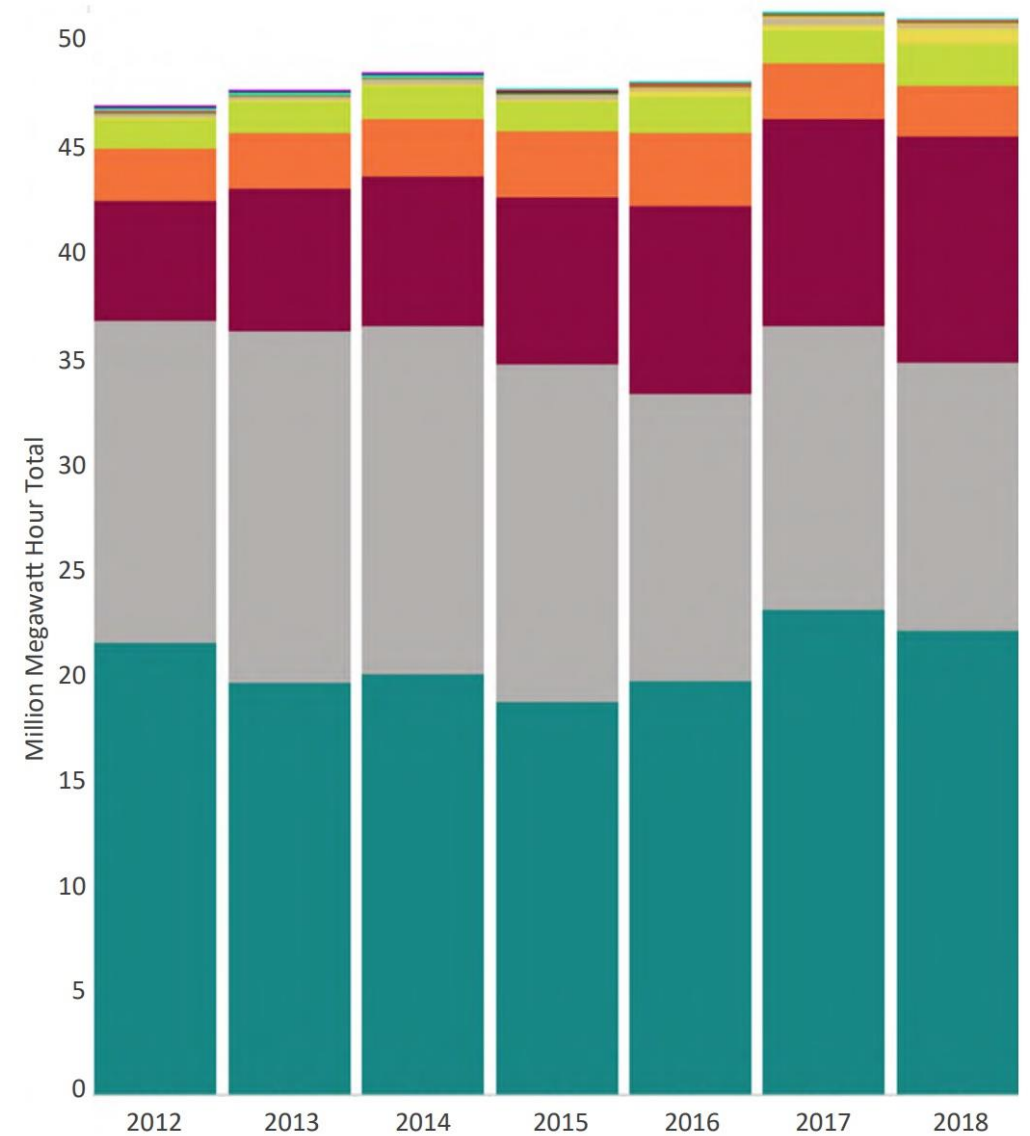
How much **risk**?

## Resources Used to Generate Oregon's Electricity

Based on 2018 data, this chart shows the energy resources used to generate the electricity that is sold to Oregon's utility customers.

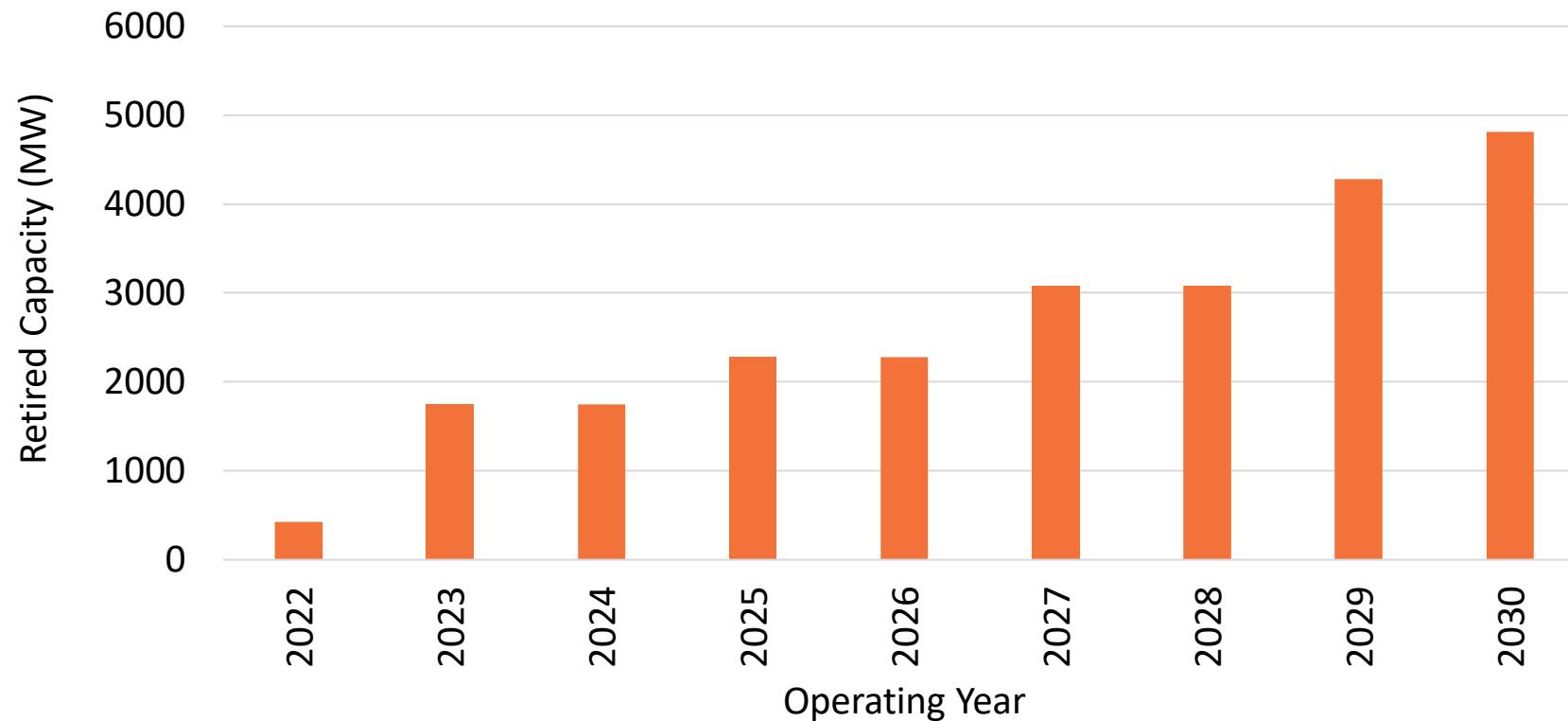


## Oregon's Electricity Mix Over Time

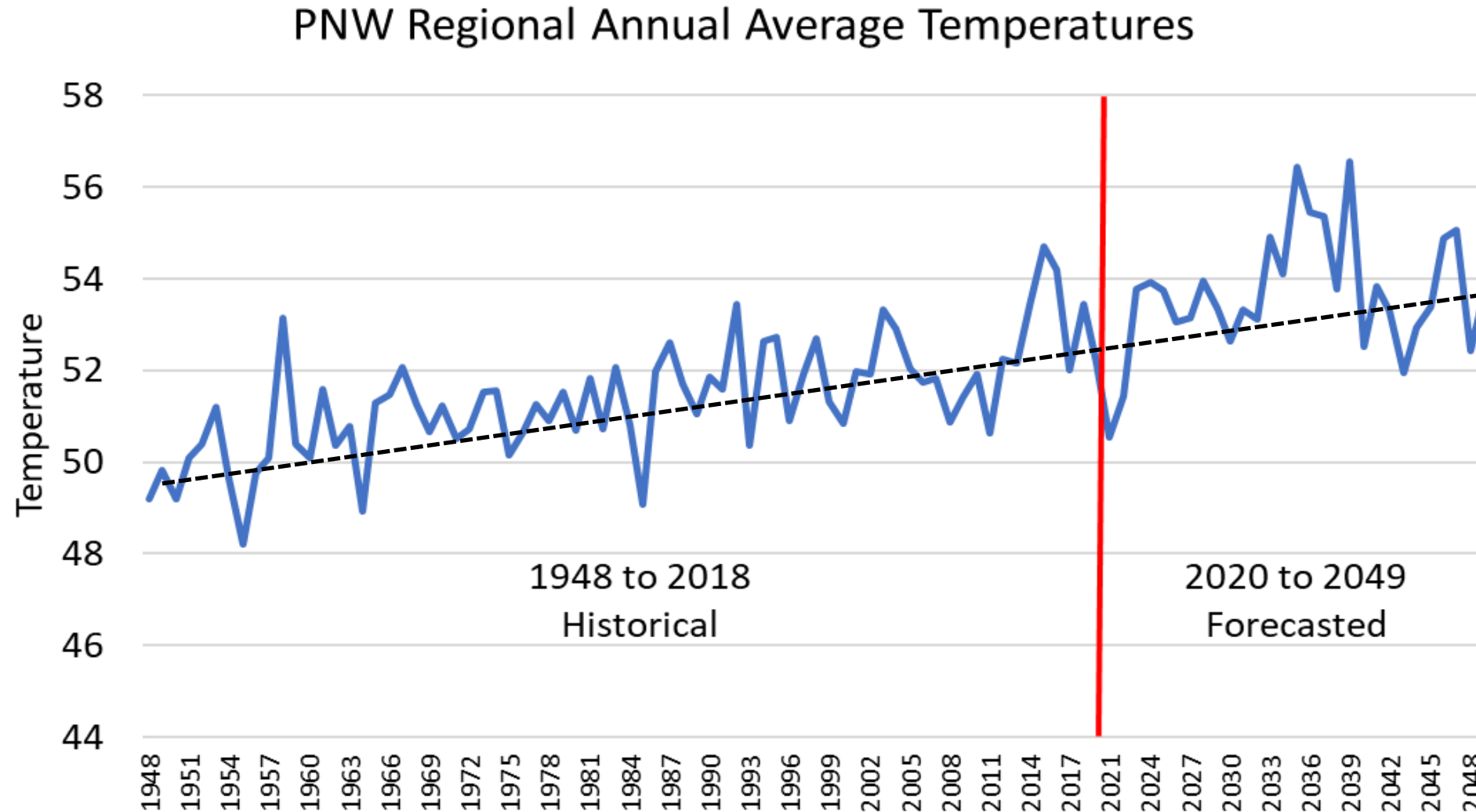


# ANNOUNCED COAL PLANT RETIREMENTS

**Cumulative MW of Retired Nameplate Capacity**  
Retired Capacity Over Full Operating Year (Oct-Sep)

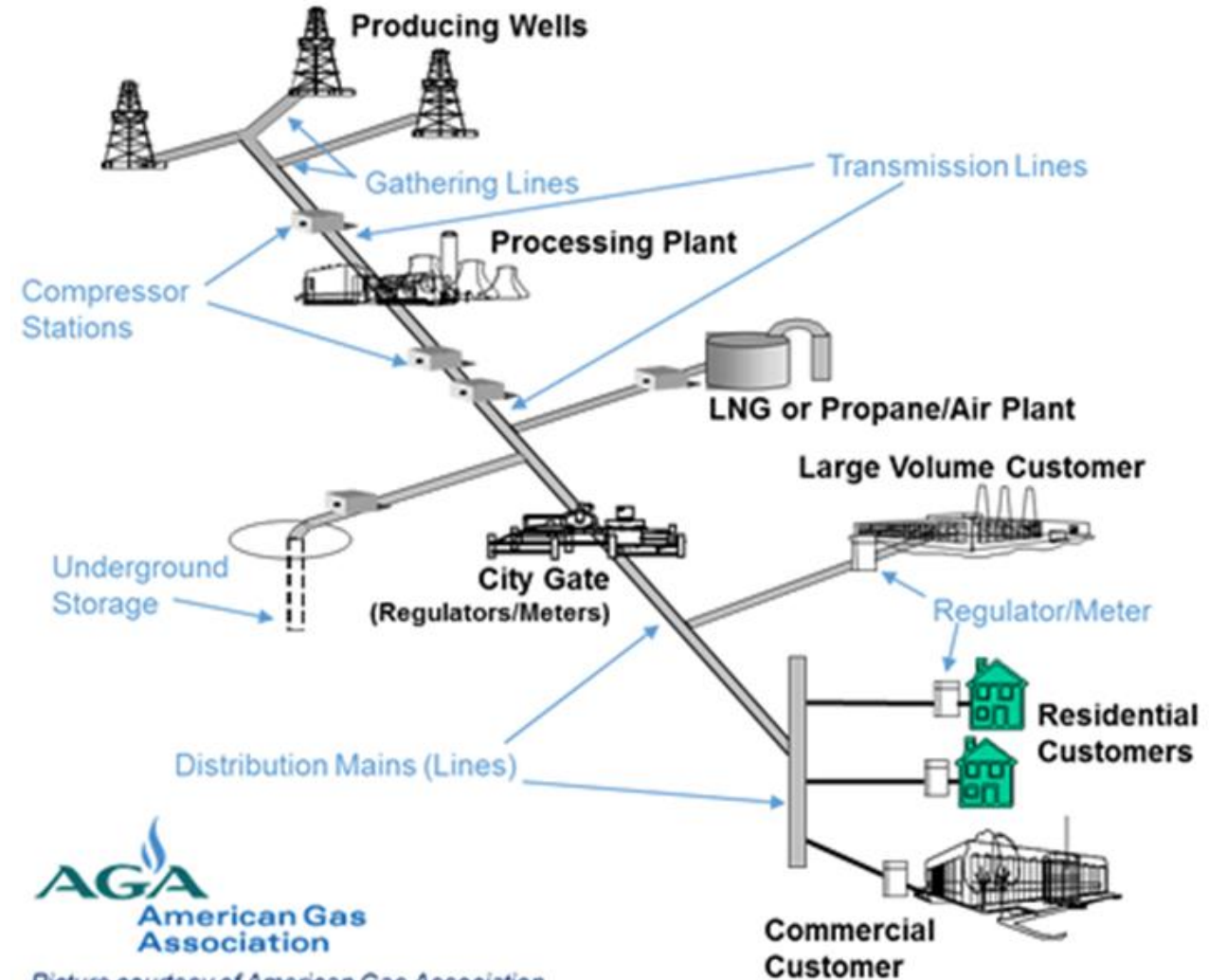
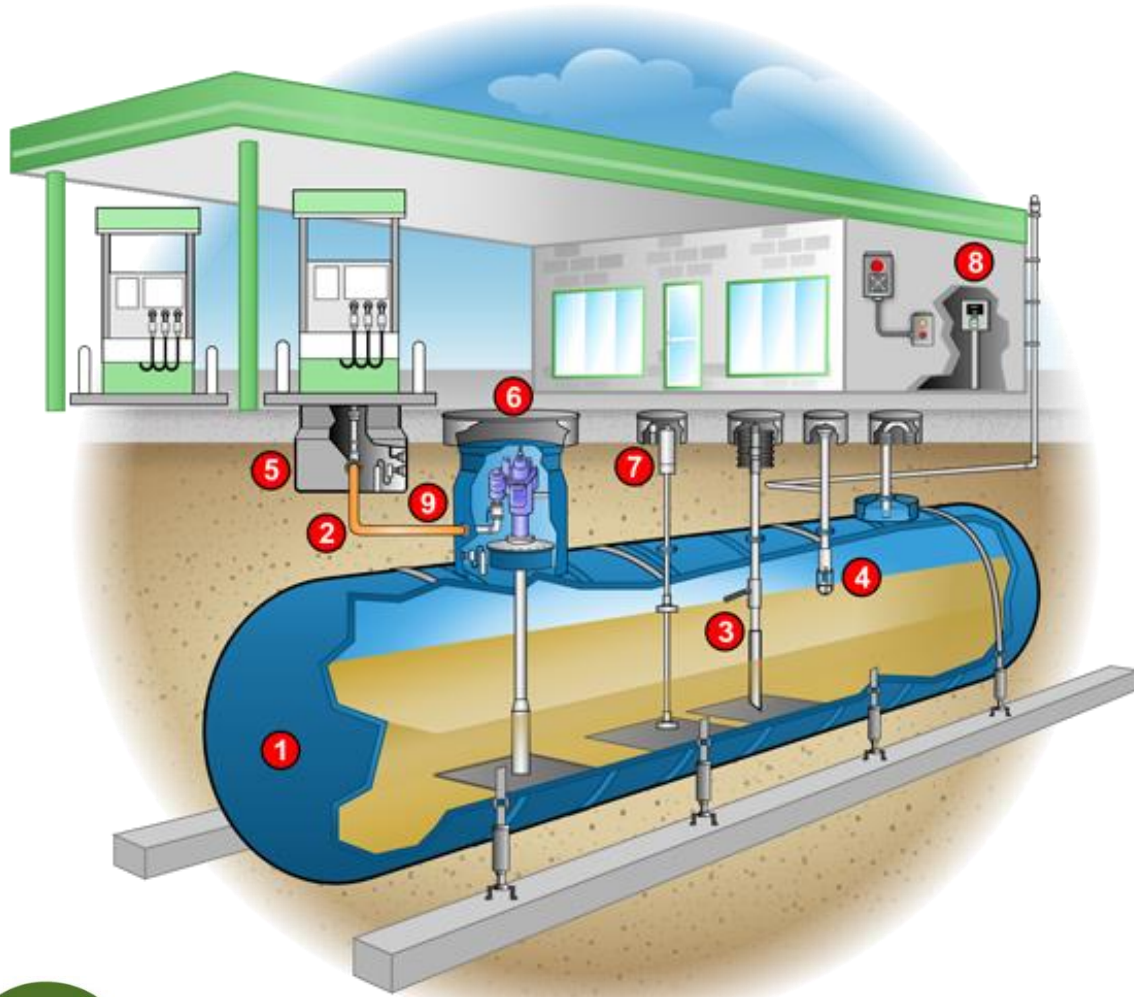


# LONG-TERM TRENDS IN TEMPERATURE 1949-2049





# GASOLINE AND NATURAL GAS: ROLE OF STORAGE



# ELECTRICITY: GENERATED FOR YOU IN **REAL-TIME**

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## **Average Residential Electricity Usage:**

10,000 kWh / year

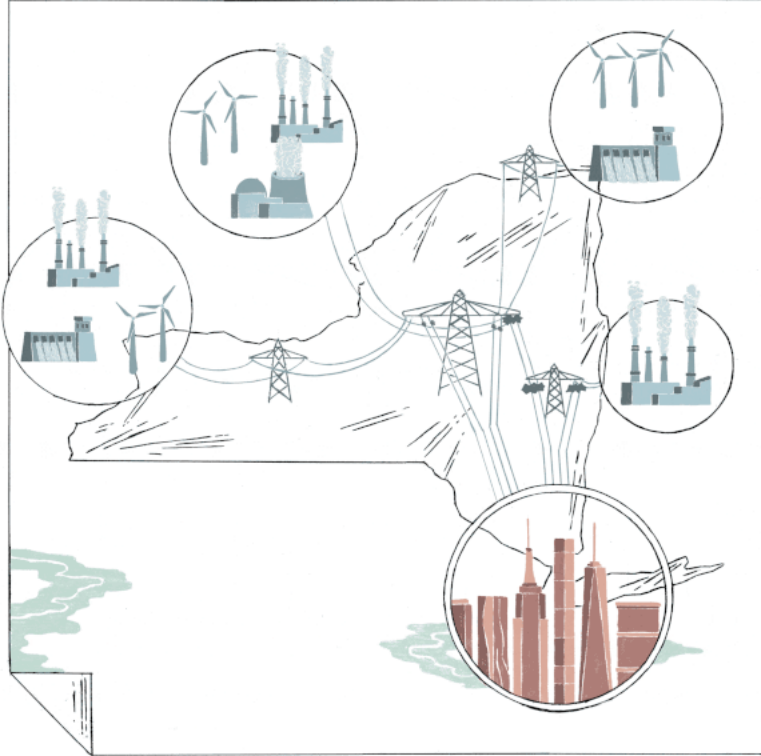
or

28 kWh / day

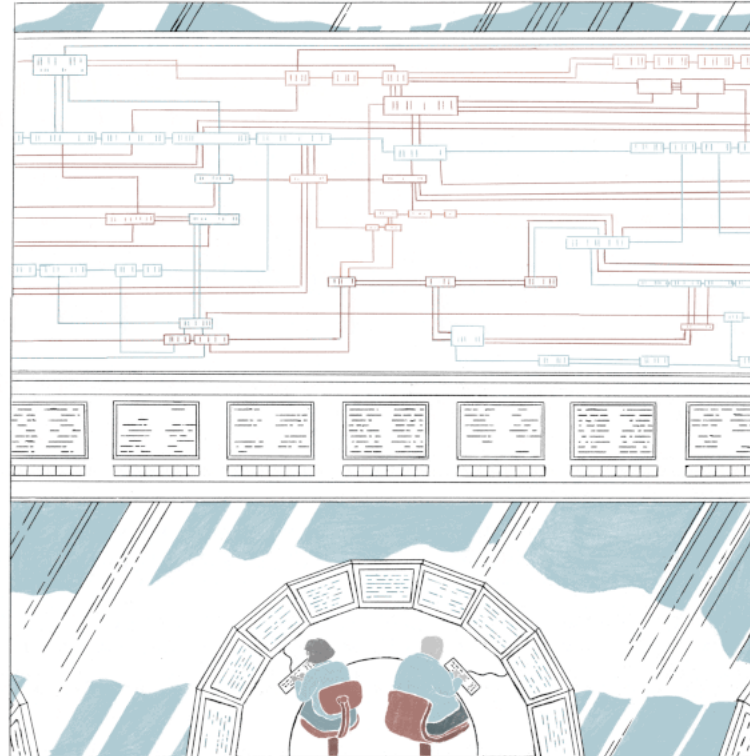


# ELECTRICITY: GENERATED FOR YOU IN **REAL-TIME**

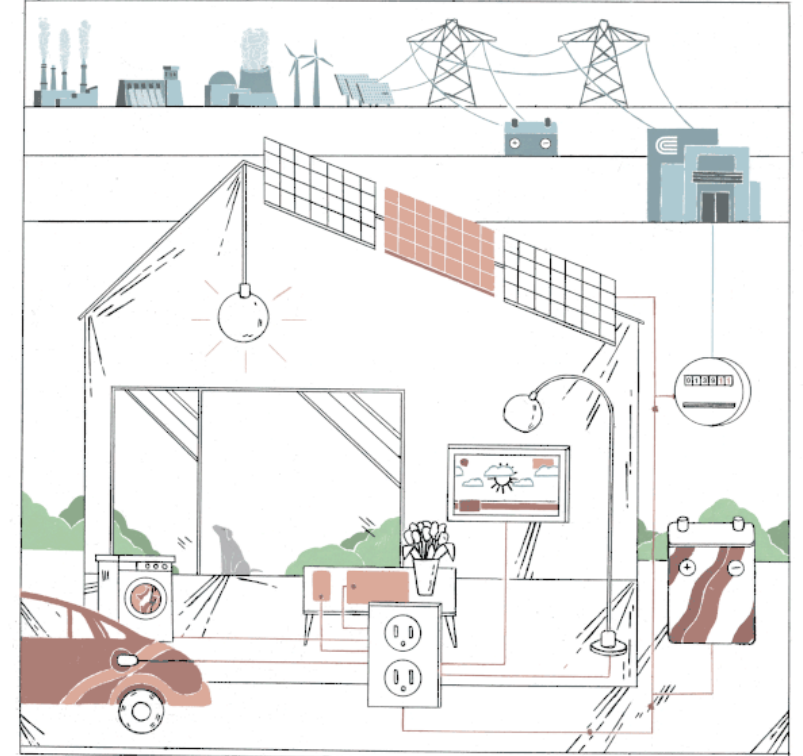
Generated by power plants



Balanced in real-time



And delivered into your home



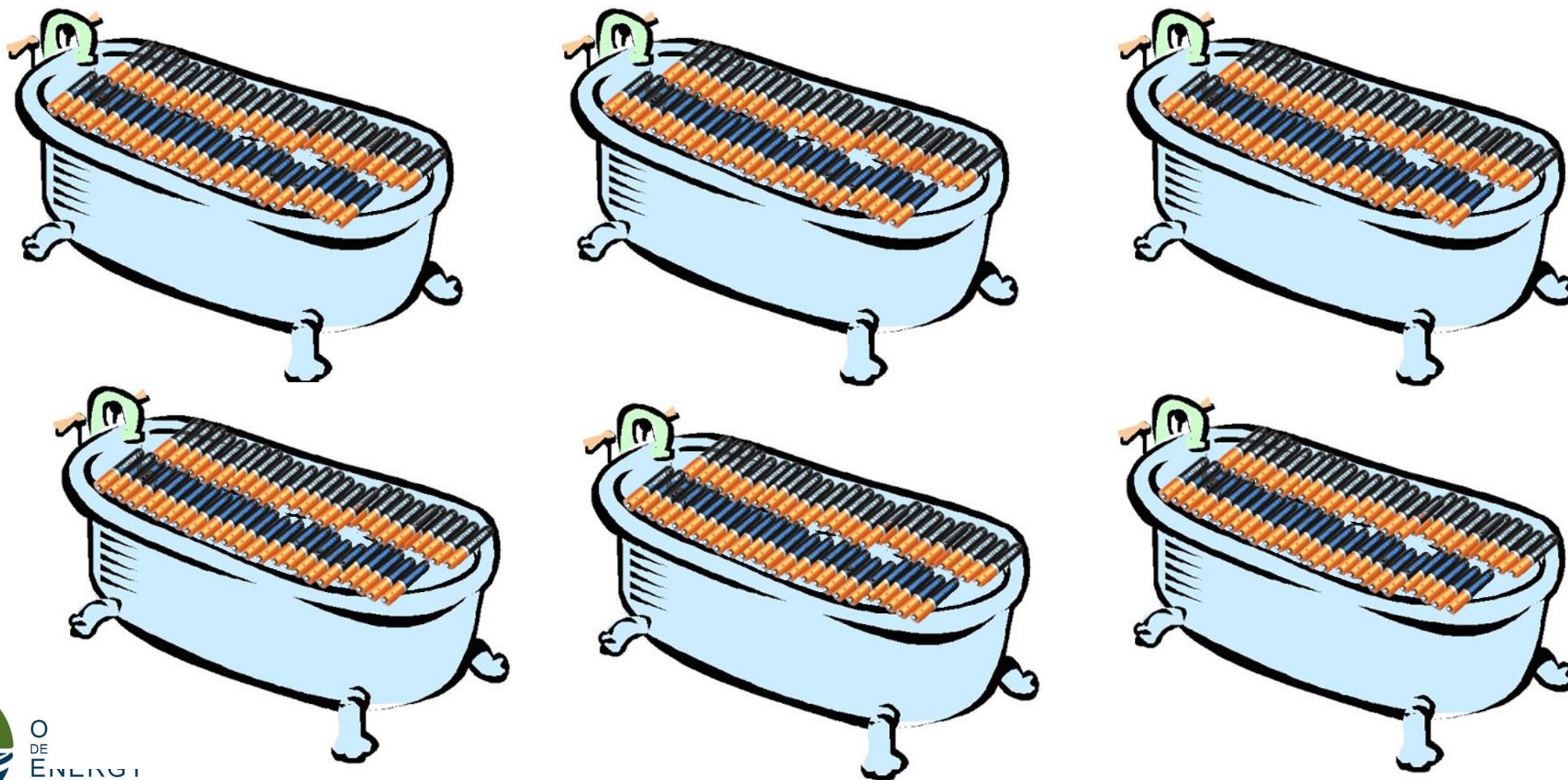
# ELECTRICITY: POWER UP FROM STORAGE?

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**Storage in one AA battery:**  
3 watt-hours (or 0.003 kWh)

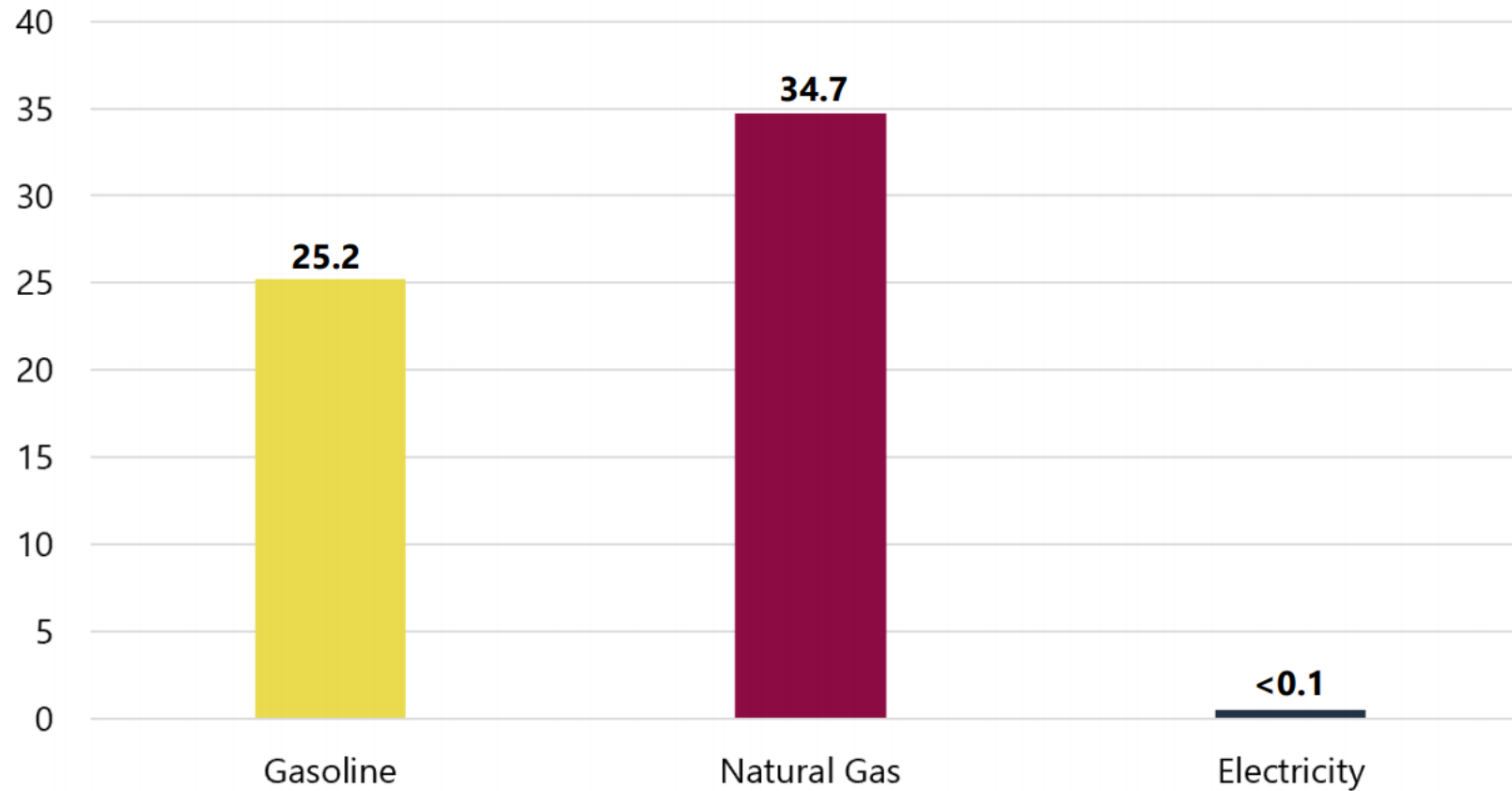
# ELECTRICITY: POWER UP FROM STORAGE?





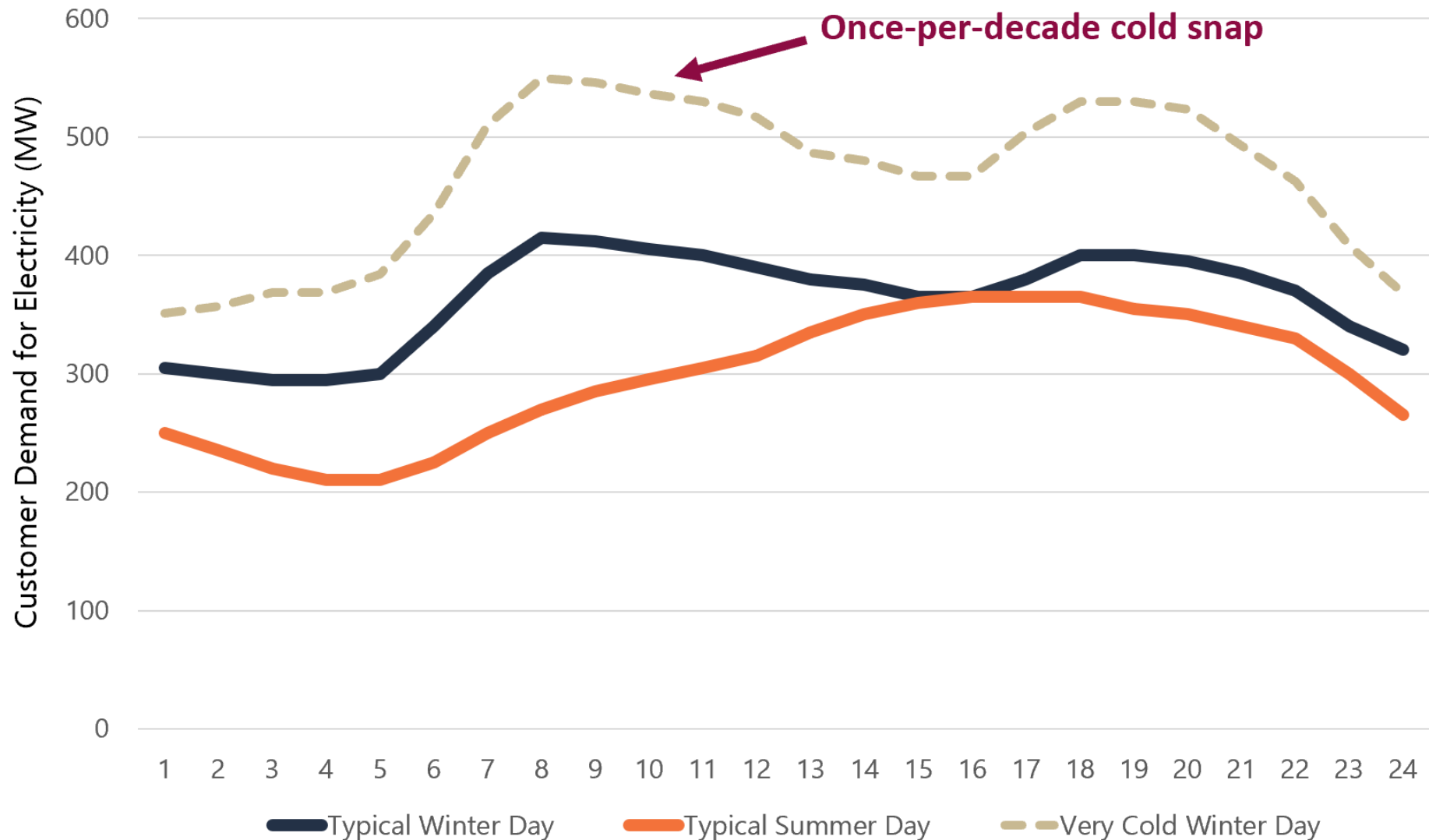
# WHY DOES STORAGE MATTER?

**Figure 1: Days of End-Use Fuel Storage in the U.S. Based on Average Daily U.S. Consumption by Fuel Type<sup>2</sup>**



*Derived from U.S. EIA data comparing average volumes of stored energy to average daily consumption for total gasoline (barrels consumed vs. weekly stocks); natural gas (mcf consumed vs. working natural gas in storage); and electricity (MWh of daily consumption vs. MWh of stored electricity).*

# HYPOTHETICAL UTILITY DEMAND PROFILE



# PARTING THOUGHTS

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- **Resource Adequacy:** Keeping the lights on by ensuring that adequate resources are available at all hours in the years ahead
- **New Challenges:** Changing resource mix (renewables coming, coal retiring) + climate change impacting historic patterns of usage
- **Evolving Process:** Individual utilities (with their regulators) in Oregon have long been responsible for evaluating and ensuring an adequate power system, but increasing interest in more coordinated state/regional efforts





# Questions/Comments?

Biennial Energy Report online:  
[energyinfo.oregon.gov/ber](http://energyinfo.oregon.gov/ber)

ODOE's website: [www.oregon.gov/energy](http://www.oregon.gov/energy)

Contact us: [Adam.Schultz@oregon.gov](mailto:Adam.Schultz@oregon.gov)