



OREGON
DEPARTMENT OF
ENERGY

2020 Biennial Energy Report

Energy Advisory Work Group
January 14, 2021

2020 BIENNIAL 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.

Energy 101: Energy Jobs in Oregon
In 2019, Oregon's energy industry employed 96,727 Oregonians.¹
Figure 1: Energy Jobs in Oregon (2019)

Category	Jobs
Electric Power Generation	10,053
Fuels	2,662
Transmission, Distribution, and Storage	13,948
Energy Efficiency	42,935
Motor Vehicle	26,129

Traditional Energy Jobs
Electric Power Generation | Fuels | Transmission | Distribution | Storage
Oregon Traditional Energy Jobs: 27,663

Energy 101: Bill Basics
Energy is part of everyone's household budget. Lighting, heating, cooling, and refrigeration all require energy in the form of electricity and direct use fuels like natural gas, propane, fuel oil, and even wood. Water and wastewater have a big energy component because of the energy needed to obtain, distribute, and treat water. Transportation has an energy bill too, every time you buy gasoline or plug in your electric car. Telecommunications, from internet to TV to cell phones, all require electricity to operate and provide the services used a part of our daily lives.⁴

Energy Bill Basics
The key to deciphering charges on an energy bill is understanding the terminology used to describe each charge. Following are some general energy terms and types of charges that apply to most energy bills:
Meter: Meters measure how much energy is consumed. Some electric utilities are updating their meters to "smart meters," which help track when energy is used in addition to how much.
Rate Schedule: Rates vary between residential, commercial, and industrial customers, based on the type of service and the maximum demand. More than one rate can be used for the energy a building or facility uses. Schedules can be created for specific uses, like traffic signals, streetlights, irrigation and drainage pumping, or for time of day service or special pilot programs like demand response.
Every Utility Bill has certain things in common:
Basic Charge or Service Charge: A minimum cost of service, regardless of the amount of energy used. This funds some of the utility provider's costs like maintenance and customer support.
Use Charge: Utilities charge for how much energy is used, measured in kilowatt hours for electricity, and therms for natural gas. There are additional types of use charges that are explained later in this section.

Figure 1: Typical Share of Household Expenses

Resource Review: Wind Power

- Total MW Capacity in Oregon: 3,415 MW
- Facilities in Oregon (1.65 to 290 MW): 46 (3 under construction)
- Total Generation (2018): 7,447,442 MWh
- Total Consumption (2018): 2,396,878 MWh
- Total Exports (2016): 5,050,564 MWh

Figure 1: Horizontal-axis Wind Turbine

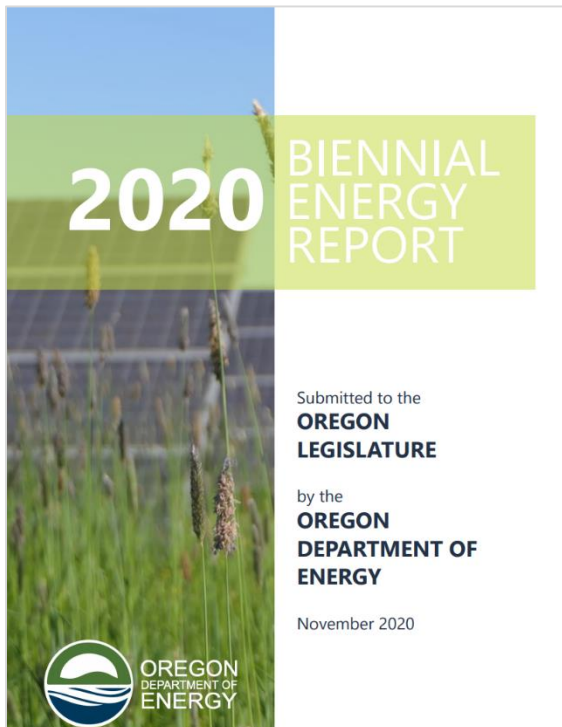
Wind turbine blades capture the wind's motion and transform that mechanical energy into electricity.¹ The average individual utility-scale wind turbine in Oregon has a capacity of 1.75 MW, with the largest at 3.6 MW.² While there are currently none in Oregon, offshore wind turbines use the same principle, but are sited off the coast where wind resources tend to be stronger and more constant.³ Most offshore wind farms are in shallow waters where turbines are directly fixed to the seabed (fixed-bottom turbines).⁴ Floating wind turbine farms that can take advantage of better wind resources in deeper waters are producing electricity in places like Portugal and Scotland.⁵

Labels in diagram: Blades catch the wind and spin, Generator converts mechanical energy into electricity, Cable carries electricity to transmission line, Control system controls direction of the blades.

Figure 1: Typical Share of Household Expenses

zero carbon emitting to hydropower. Wind Oregon's electricity by has grown substantially since construction of the state's first 14 U.S. states in the Western Electricity Coordinating Council,¹² but wind generation projects are large, utility-scale projects MW.¹³ existing wind farms and four state jurisdictional facilities under additional 894 MW, with an additional 550 MW of wind projects is also upgrading turbines at many older facilities, a process slow, full or partial upgrades that can either increase maximum use efficiency allowing turbines to generate more electricity per MW.¹⁴ Oregon has approved repowering of four facilities to date.¹⁵ The components to increase turbine generation efficiency, but do not increase capacity.¹⁶

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Conclusion

About the Report



Energy by the Numbers

Oregon's overall and sector-based energy use, energy production and generation, and energy expenditures.

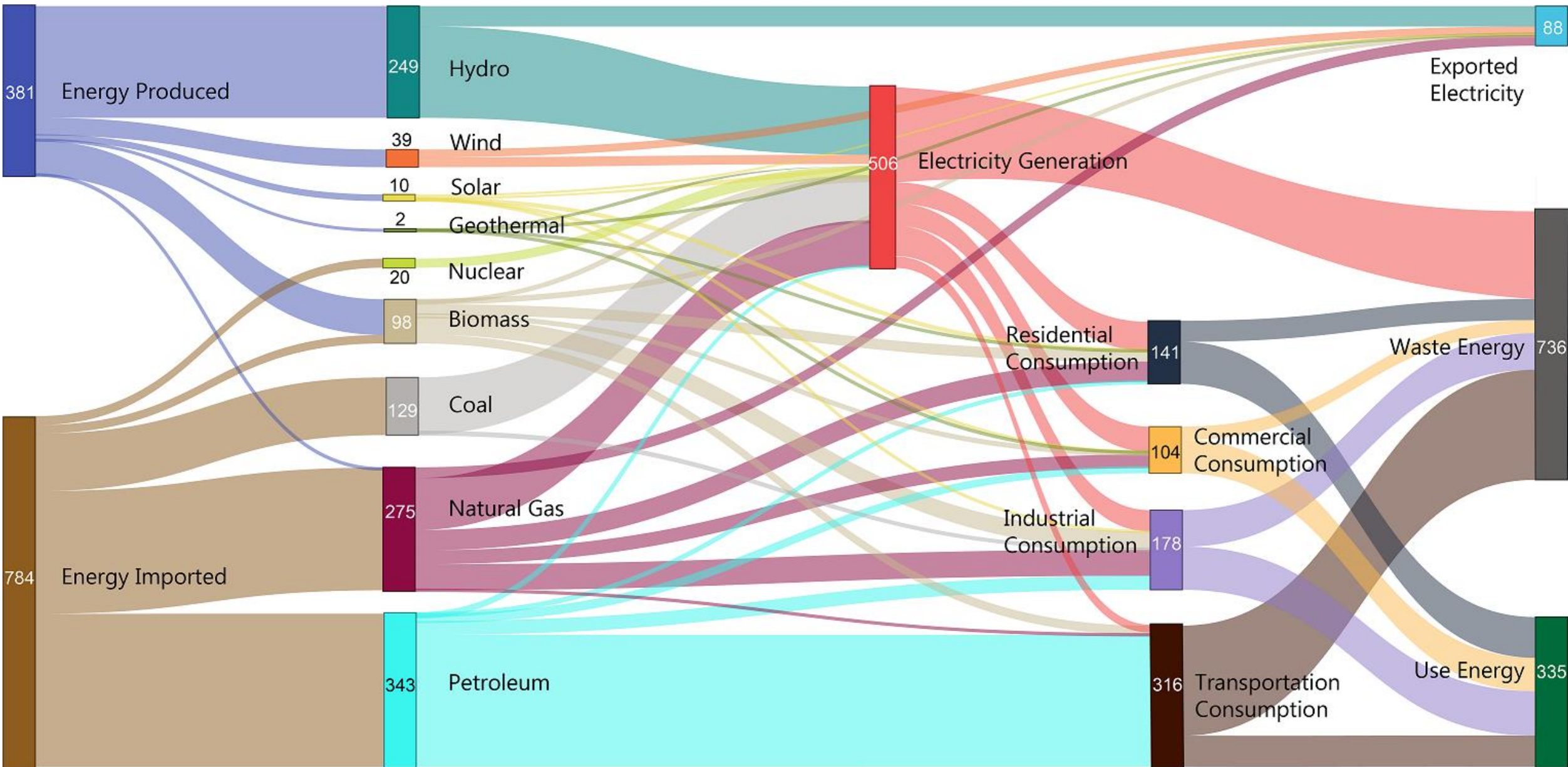
Data and metrics track how Oregon produces, purchases, and uses various types of energy.

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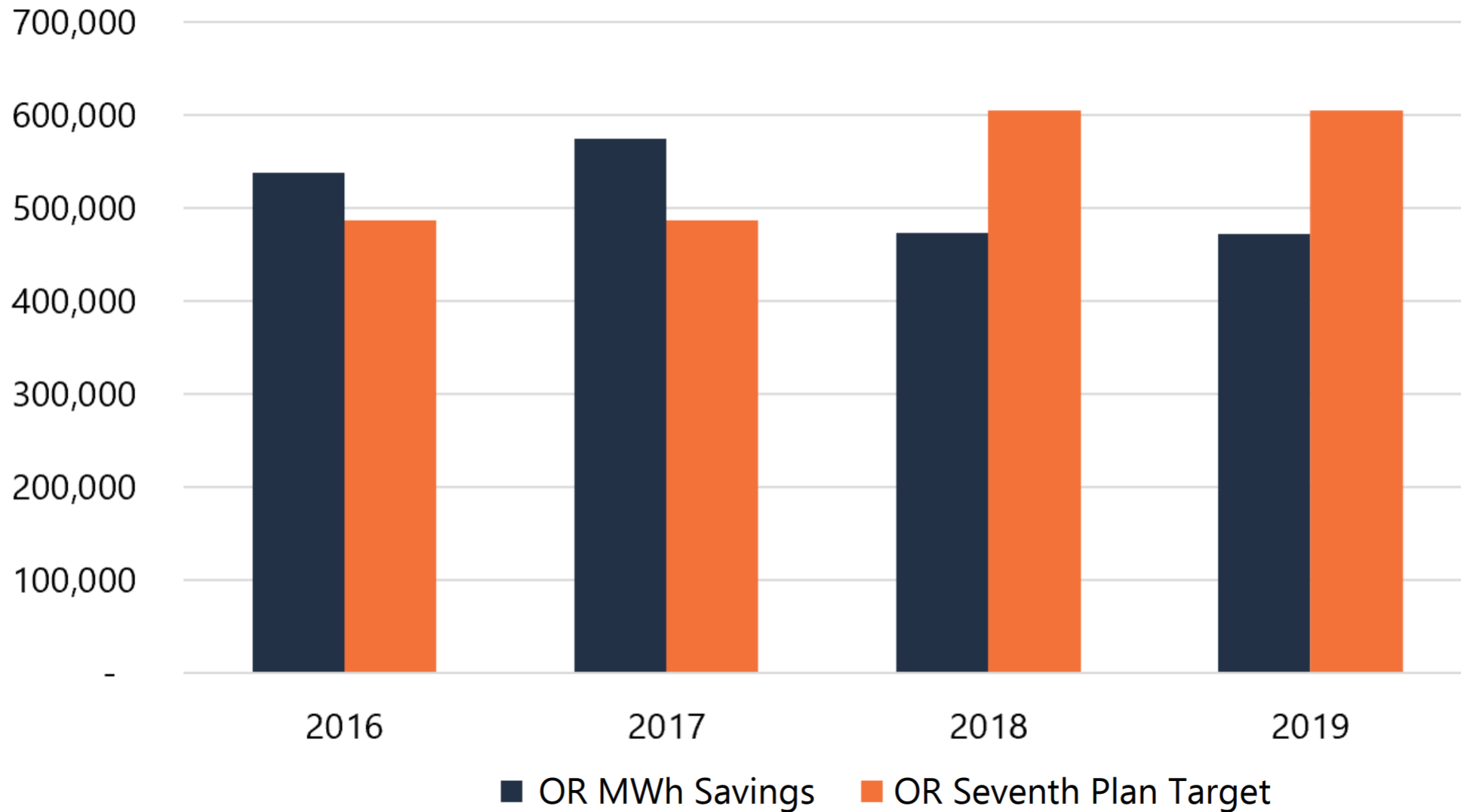
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Oregon's Energy Flow

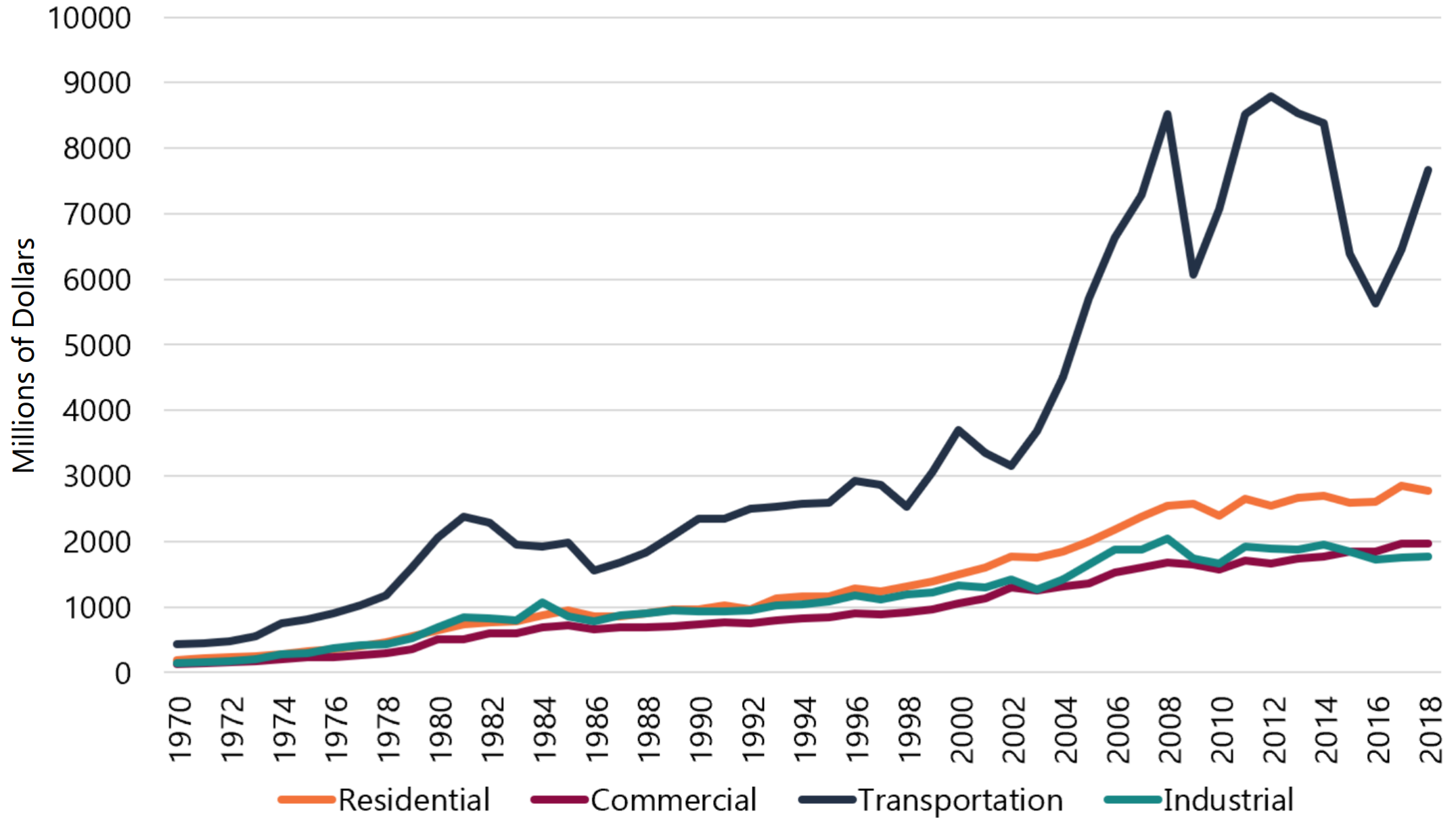


Numbers are in trillions of British thermal units (Btus)

Oregon Electricity Savings and Estimated Share of the Seventh Power Plan Goal



Oregon's Total Energy Expenditures by Sector Over Time



History Timeline

The timeline of Oregon's energy history is meant to serve as a useful reference for readers as they review sections of the Energy Report, especially for energy data over time.



Portland during the early morning hours of pumping when gas was limited to five gallons per car on a first-come, first served basis, courtesy of David Falconer/EPA/US National Archives. (1973)



This section is intended to help the reader understand the first part of the energy story: how energy is produced, used, and transformed.

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Codes & Standards

Codes and standards deliver energy efficiency at low cost. In 2019, 30 percent of the cumulative energy savings in the Pacific Northwest came from codes and standards. Additionally, from 2000-2018, 11 percent of regional savings came from market transformation efforts by the Northwest Energy Efficiency Alliance (NEEA) – work that directly leads to updates of codes and standards.

Figure 1: Status of State Energy Code Adoption for Residential Buildings¹⁰

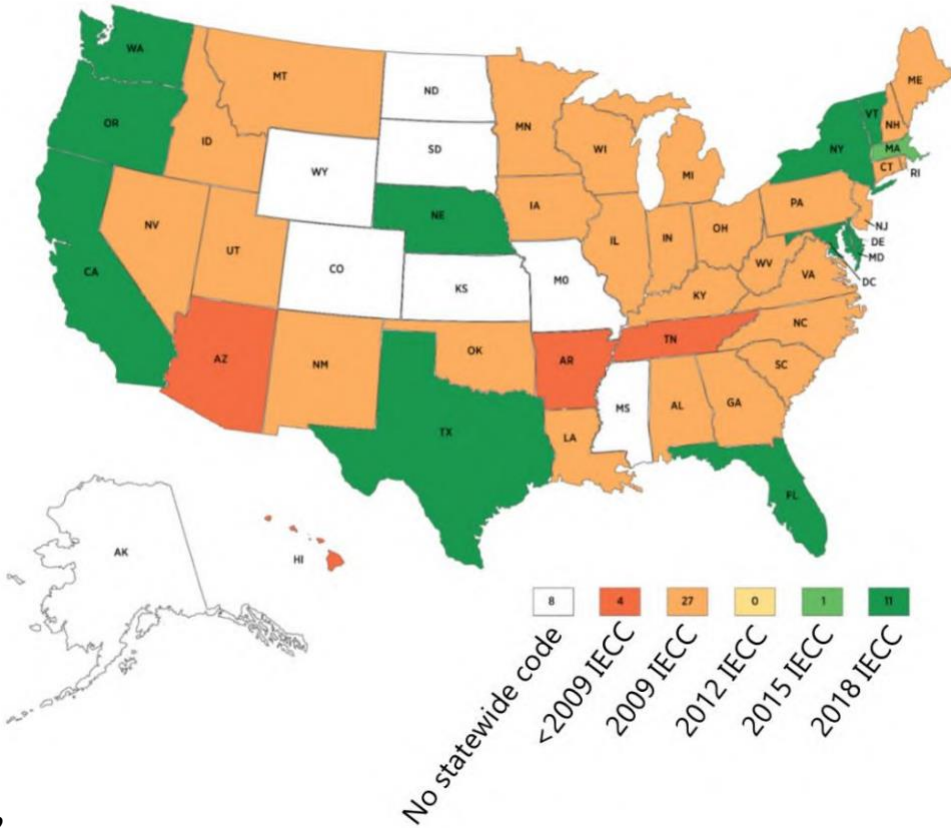
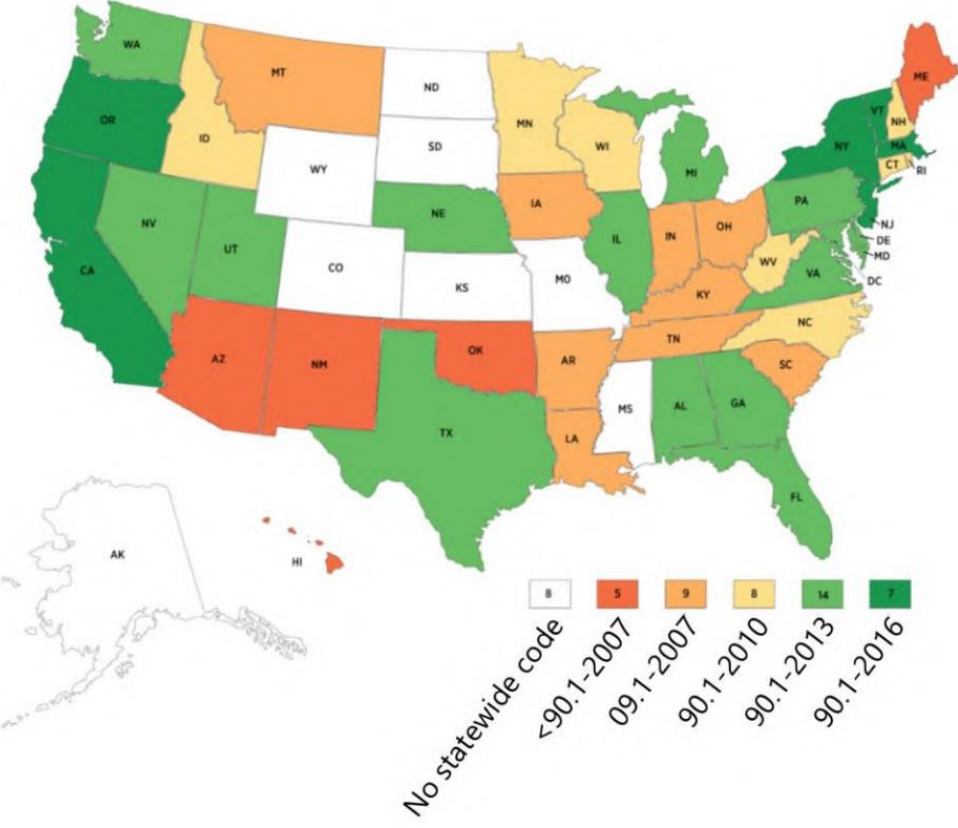


Figure 2: Status of State Energy Code Adoption for Commercial Buildings¹⁰



Resource & Technology Reviews

The reviews in this section cover the spectrum of traditional to innovative – and demonstrate the breadth of technology that is integral to the production and management of our energy system.

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Power-to-Gas



- Established technology in Europe; emerging in the U.S.
- NW Natural and Eugene Water & Electric Board are evaluating an 8.5 MW project opportunity in Oregon.
- Douglas County PUD in Washington is planning a 5 MW facility
- Utah's ACES project expects to have 10 GWh of H2 storage capacity

Figure 2: Green, Blue, and Grey Hydrogen Explained⁹

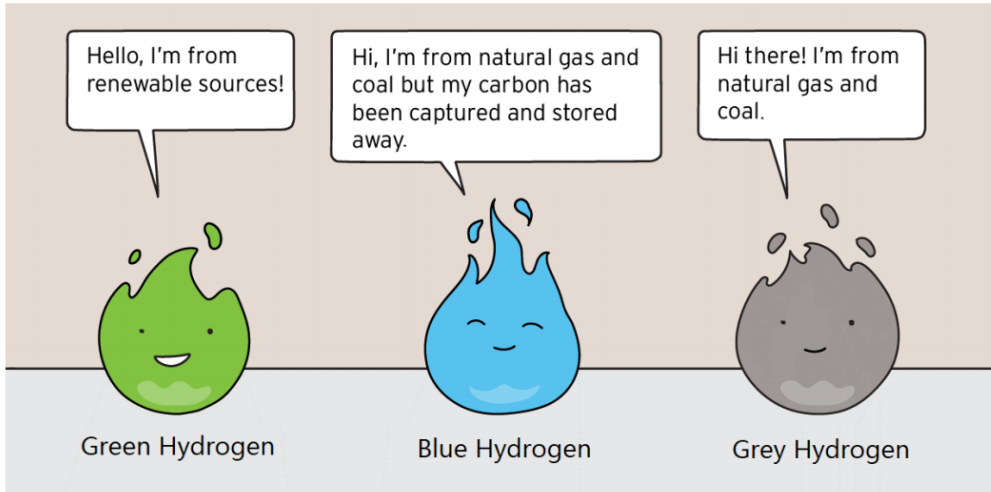
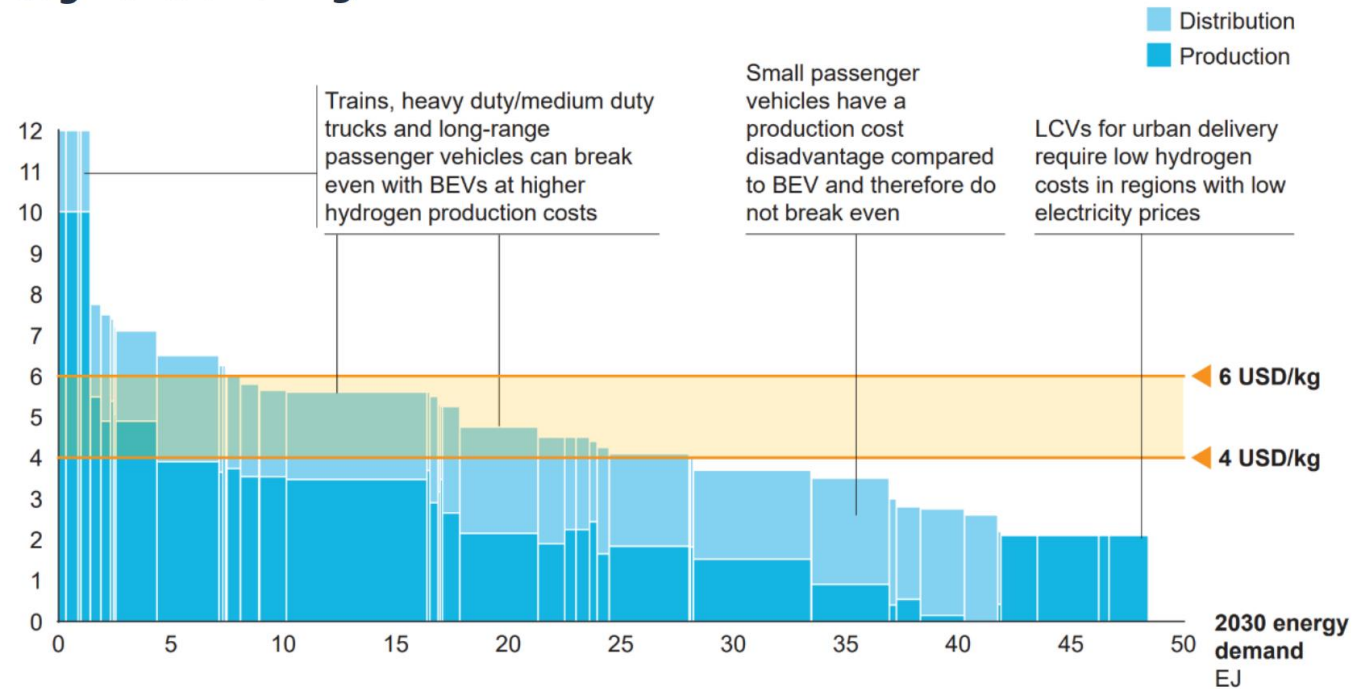


Figure 3: Cost Curve for Hydrogen for Transportation Sector Across Segments and Regions²¹





Policy Briefs

This section provides deeper-dive insights on emerging energy trends, opportunities, and barriers in the energy sector.

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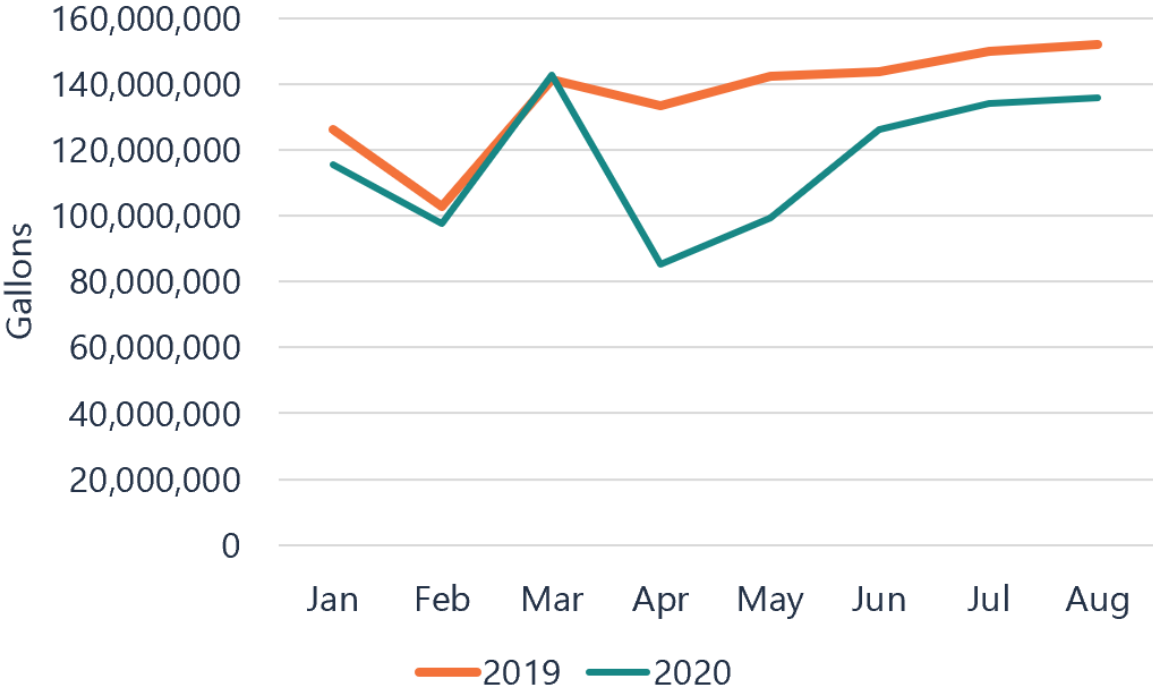
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COVID-19 and Energy

The COVID-19 pandemic has affected the energy sector in many ways, both around the world and in Oregon. Because of COVID-19 we saw energy consumption behavior change quickly. For example, the U.S. Energy Information Administration (EIA) reported that total national energy consumption in April 2020 was 14 percent lower than in April 2019, the lowest monthly energy consumption since 1989 and the largest year-over-year decrease since EIA began tracking this data in 1973.

Figure 2: Oregon Gasoline Consumption (2019 Compared to 2020 January – August)¹⁴

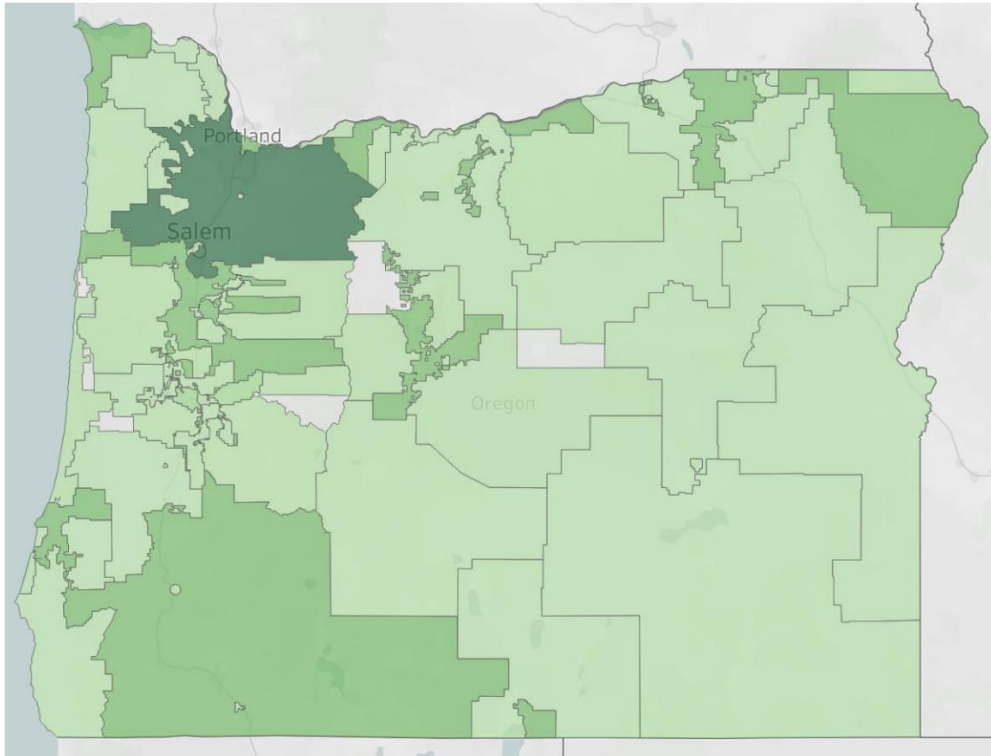


Some Oregon utilities have taken action in the wake of the COVID-19 outbreak:

- Waiving fees for disconnections and reconnections.
- Waiving the accrual and collection of late payment fees, interest, and penalties.
- Increasing the duration and flexibility for payment arrangements to pay off past due balances.
- Creating new relief funds offering bill credits to customers who have lost income due to the pandemic.
- Assisting business customers in applying for federal COVID-19 aid.
- Relaxing eligibility conditions for equal payment plans.
- Refunding security deposits or applying them to utility bills.
- Easing paperwork requirements to qualify for energy assistance programs and medical certification.

CROSS-SECTIONAL TOPICS

Figure 2: Registered EVs by Oregon Utility Service Territory⁴



Darker shades of green = more registered EVs

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Alternative Fuels and Electric Vehicles

Transportation is the largest contributor of greenhouse gas emissions in Oregon, so increasing low- and zero-emission vehicle options can help address climate change. Sections discuss the technologies, how increased adoption can affect utilities and the electric grid, and more.

- ➔ Energy 101: Where Transportation Fuels Come From
- ➔ Technology Reviews: Electric Vehicles, Charging, & Hydrogen Cars
- ➔ Policy Brief: Assessing & Managing Effects of EVs on the Grid
- ➔ Policy Brief: Using Truck Efficiency to Reduce Fuel Consumption and Emissions
- ➔ Policy Brief: Alternative Fuels Assessment for Medium- & Heavy-Duty Fleets

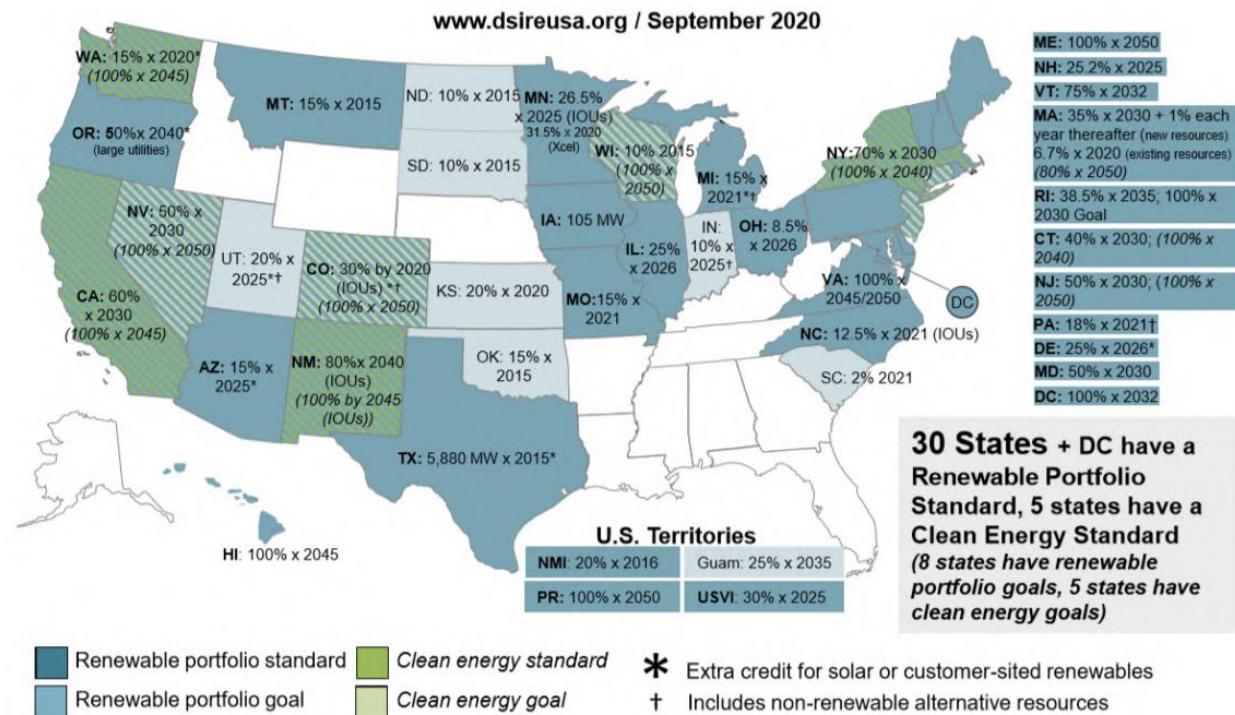
CROSS-SECTIONAL TOPICS

Resource Adequacy & Clean Energy Standards

Resource adequacy ensures there are sufficient resources available to meet electricity needs. As more coal plants head toward retirement and renewable energy facilities come online, addressing resource adequacy will become even more important.

- ➔ Energy 101: Clean & Renewable Standards
- ➔ Policy Brief: Renewable & Zero Emission Standards
- ➔ Technology Reviews: Storage, Solar, Wind, Coal
- ➔ Energy 101: Resource Adequacy
- ➔ Policy Brief: Resource Adequacy

Figure 1: Renewable and Clean Energy Standards in the United States



CROSS-SECTIONAL TOPICS

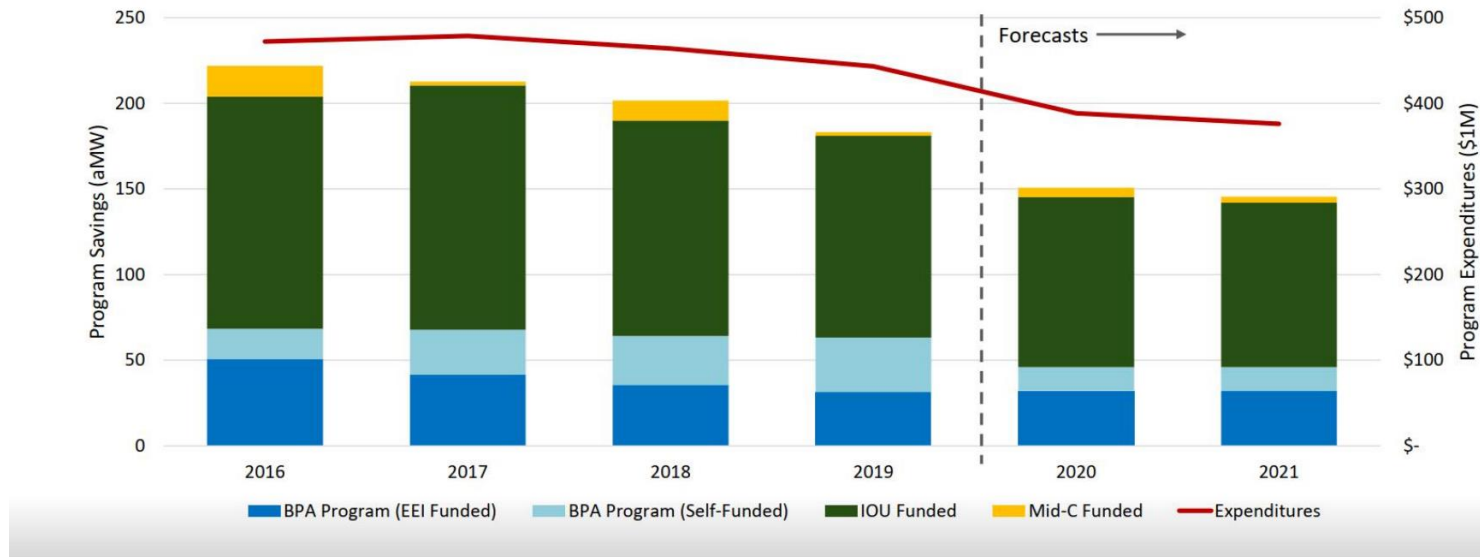
Energy Efficiency

Energy Efficiency is Oregon's second-largest electricity resource behind hydro and continues to cost less than new generation. In 2020, energy efficiency is at a policy and cost-effectiveness crossroads with resource acquisition, equity and climate.

- ➔ Energy by the Numbers - Metrics
- ➔ Energy 101 - Background
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- Acquisition Trends
- Evolution of EE Programs
- EE as Cornerstone to Climate Executive Orders
- Incorporating Equity & Environmental Justice

Figure 1: Annual Program Savings and Expenditures, Including Forecasts (NWPCC)





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Questions/Comments?

RESOURCES:

Report online: energyinfo.oregon.gov/ber

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