



- Background and Process
- Energy By the Numbers
- Energy History Timeline
- Energy 101
- Resource and Technology Reviews
- Policy Briefs
- Cross Sectional Topics
- Next Steps
- Q&A







- Chat
- Q&A
- Polling
- End of Webinar Survey

This webinar is being recorded and will be posted to ODOE's website.



OREGON DEPARTMENT OF ENERGY

Leading Oregon to a safe, equitable, clean, and sustainable energy future.



The Oregon Department of Energy helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

What We Do On behalf of Oregonians across the state, the Oregon Department of Energy achieves its mission by providing:

- A Central Repository of Energy Data, Information, and Analysis
- A Venue for Problem-Solving Oregon's Energy Challenges
- Energy Education and Technical Assistance
- Regulation and Oversight
- Energy Programs and Activities

2020 BIENNIAL ENERGY REPORT

Goal of the Report

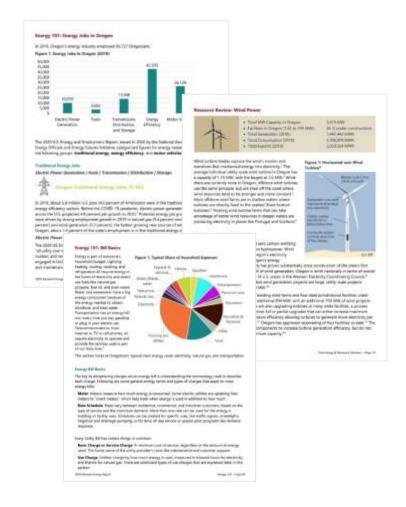
Pursuant to ORS 469.059, provide a comprehensive review of energy resources, policies, trends, and forecasts, and what they mean for Oregon.

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.









Oregon's overall and sectorbased energy use, energy production and generation, and energy expenditures.

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

CONT TABLE

Energy by the Numbers

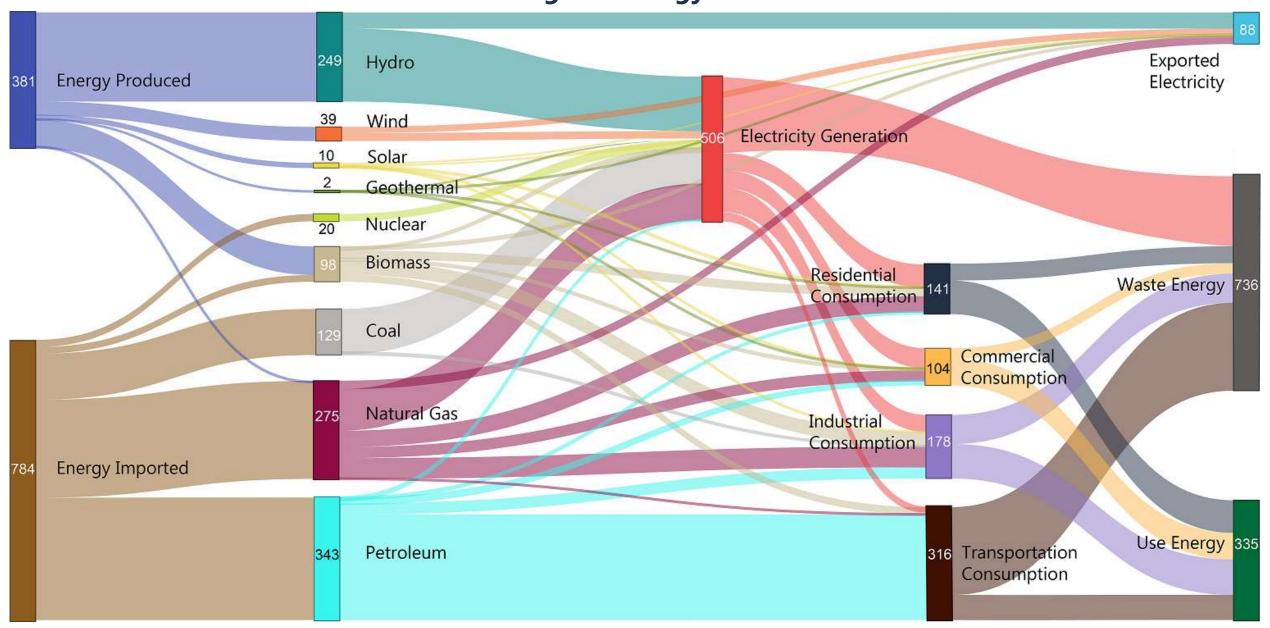
- 1 Understanding Oregon's Energy Story
- 3 Energy Use in Oregon
- 9 Electricity Use
- 15 Direct Use Fuels
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- 49 Sector Profiles: Residential, Commercial, Industrial, Agriculture, & Transportation



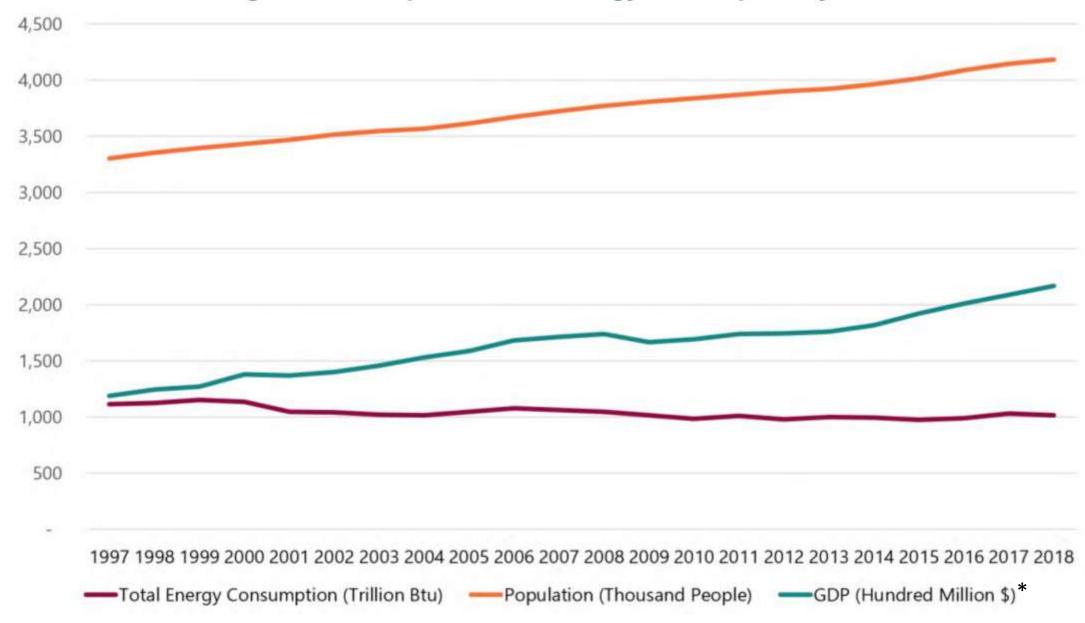
What do you think?



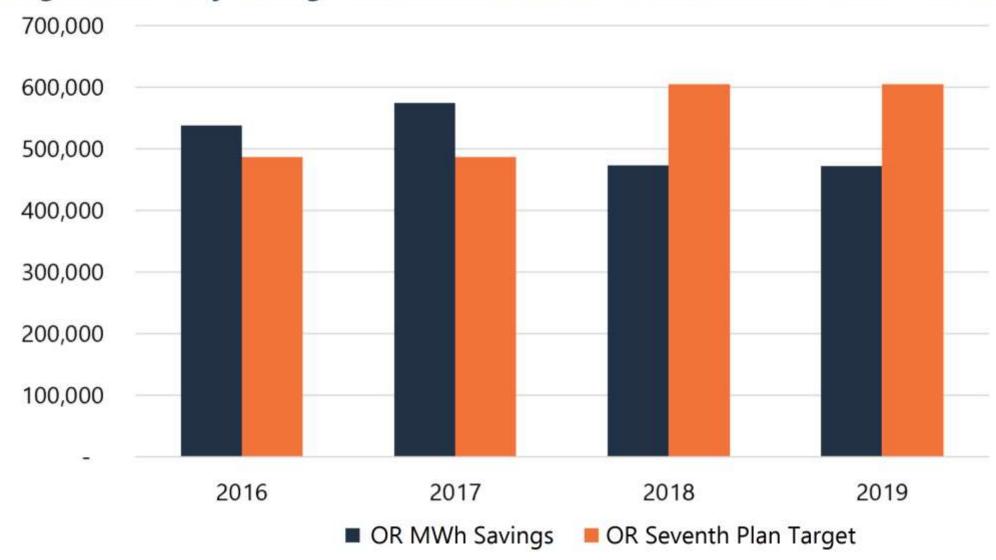
Oregon's Energy Flow



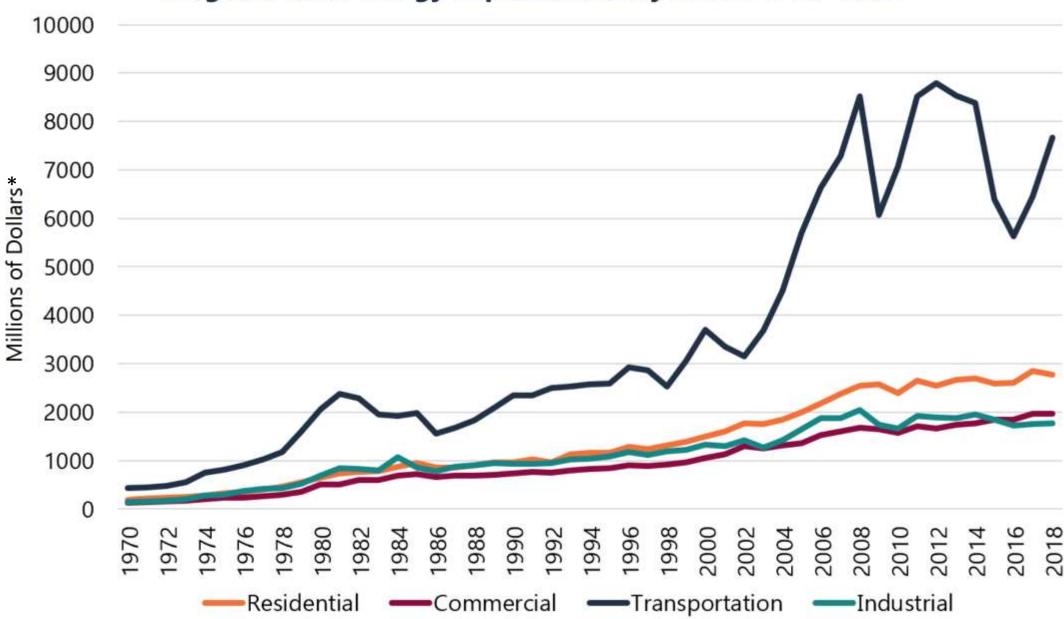
Oregon's GDP, Population, and Energy Consumption by Year



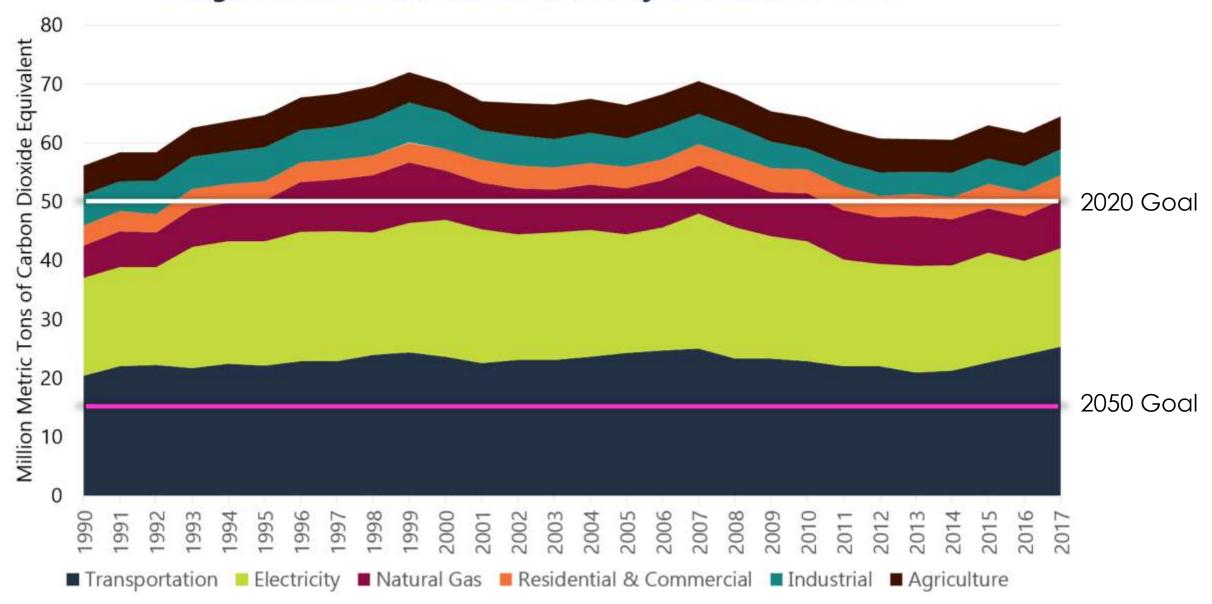
Oregon Electricity Savings and Estimated Share of the Seventh Power Plan Goal



Oregon's Total Energy Expenditures by Sector Over Time



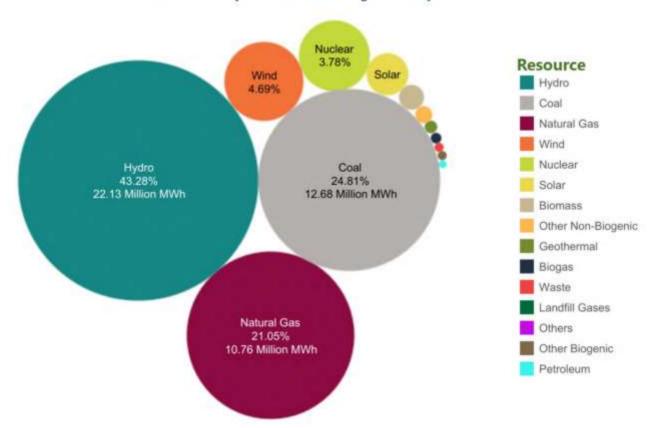
Oregon Greenhouse Gas Emissions by Source Over Time

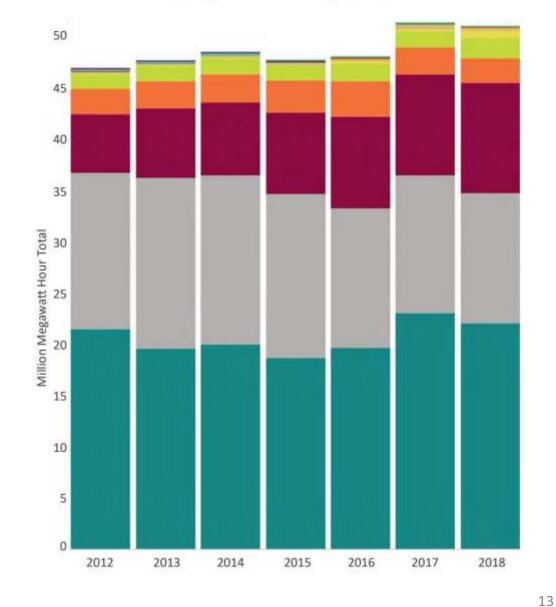


Oregon's Electricity Mix Over Time

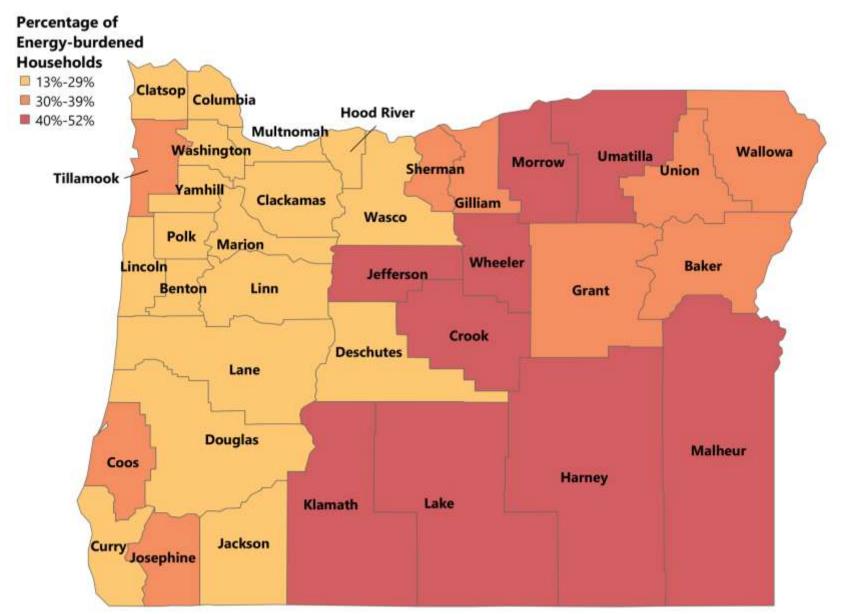
Resources Used to Generate Oregon's Electricity

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





Percentage of Oregon Households Considered Energy Burdened and Earning 200 Percent or Below Federal Poverty Level by County





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)



What do you think?





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

Energy 101

- 1 Production
- 3 Electricity Transmission
- 16 Natural Gas
- 34 Where Our Transportation Fuels Come From
- 50 Facility Siting and Permitting
- 60 Electricity System Distribution Planning
- 68 Resource Adequacy
- 77 Clean and Renewable Standards
- 84 Energy Bill Basics
- 92 Energy Burden
- 109 Net Metering
- 113 Energy Jobs
- 125 Energy Efficiency
- 130 Codes and Standards
- 135 Net-Zero Buildings



What do you think?



Energy
Facility Siting
& Permitting

New energy projects in Oregon are typically proposed and developed by utilities or independent developers. The federal government also owns and operates large scale energy projects in Oregon. For example, the Bonneville Power Administration, a federal government agency, owns and operates much of the high-voltage electric transmission system in Oregon and other neighboring states; and the U.S. Army Corps of Engineers and U.S. Bureau of Reclamation own and operate hydroelectric dams on the Columbia River. The state of Oregon regulates the siting of certain energy projects, but does not own or operate energy projects.

Siting vs. Permitting

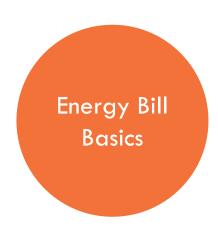
Siting: refers to the location, or site, of proposed energy facilities, and typically refers to the process by which those locations are selected.

Permitting: refers to the process for a facility to obtain permits that demonstrate compliance with laws and regulations to construct and operate an energy facility.



Renewable energy project primary permitting jurisdictional thresholds

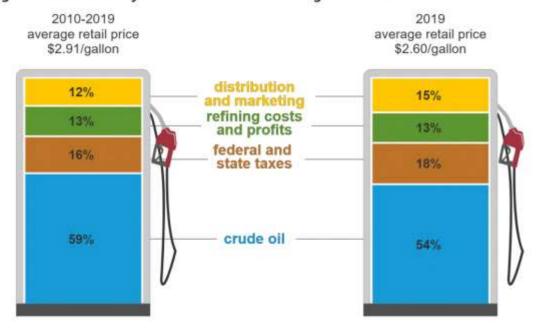
Renewable Energy Project Type	Primary Permitting Authority					
	County	County with HB 2329	EFSC ¹⁹	Oregon Water Resources Commission	Oregon Department of State Lands	Federal Government
Solar Photovoltaic ²⁰ High Value Farmland	< = 100 acres	> 100 acres & < = 160 acres	> 160 acres	N/A	N/A	N/A
Arable Farmland	< = 100 acres	> 100 acres & < = 1,280 acres	> 1,280 acres (2 sq. miles)	N/A	N/A	N/A
Other Land	< = 320 acres	> 320 acres & < = 1,920 acres	> 1,920 acres (3 sq. miles)	N/A	N/A	N/A
Onshore Wind	N/A	< = 150 MW	> 150 MW	N/A	N/A	N/A
Geothermal	N/A	< = 55.5 MW	> 55.5 MW	N/A	N/A	N/A
Biomass	< 6 BBTU/day	N/A	> 6 BBTU/day	N/A	N/A	N/A
Offshore (wind and wave)	N/A	N/A	N/A	N/A	< = 3 Miles Offshore ²¹	> 3 Miles & < = 200 Offshore (Bureau of Ocean Energy Management)
Battery Storage	All projects	N/A	N/A ²²	N/A	N/A	N/A
Hydroelectric	N/A	N/A	N/A	Projects in waters of the state ²³	N/A	Projects in waters of the US (FERC)
Pumped Hydroelectric	N/A	N/A	N/A	Certain projects	N/A	All projects (FERC)

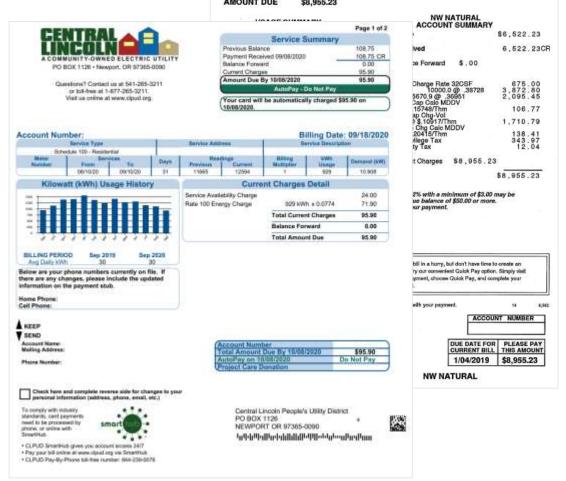


Includes definitions, sample bills, and more.



Figure 7: What We Pay for Per Gallon of Retail Regular Grade Gasoline⁶







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

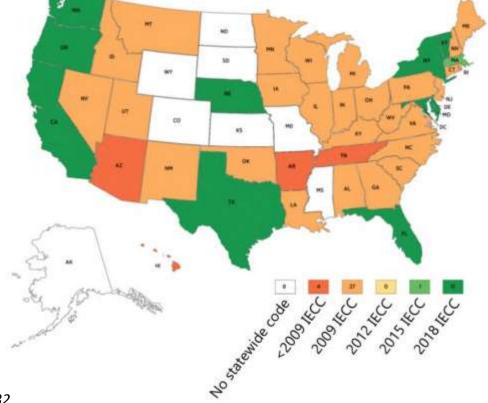
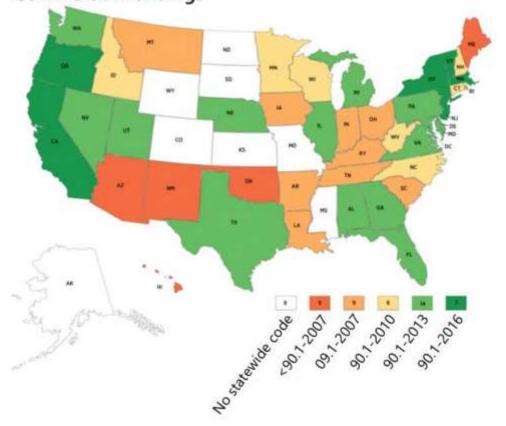


Figure 2: Status of State Energy Code Adoption for Commercial Buildings¹⁰



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.

Resource and Technology Reviews

- 1 Hydropower
- 5 Conduit Hydropower
- 11 Natural Gas
- 15 Wind
- 20 Coal
- 25 Solar
- 29 Biomass
- 33 Biogas and Renewable Natural Gas
- 37 Geothermal
- 41 Utility-Scale Energy Storage
- 46 Residential Energy Storage
- 50 Nuclear
- 54 Small Modular Reactors
- 58 Demand Response
- 69 Advanced Meter Infrastructure
- 73 Combined Heat and Power
- 76 Electric Vehicle Chargers
- 82 Electric Vehicles
- 87 Hydrogen Fuel Cell Vehicles
- 90 Resilient Microgrids
- 95 Marine
- 99 Carbon Capture and Storage
- 102 Power-to-Gas



What do you think?



Residential Energy Storage



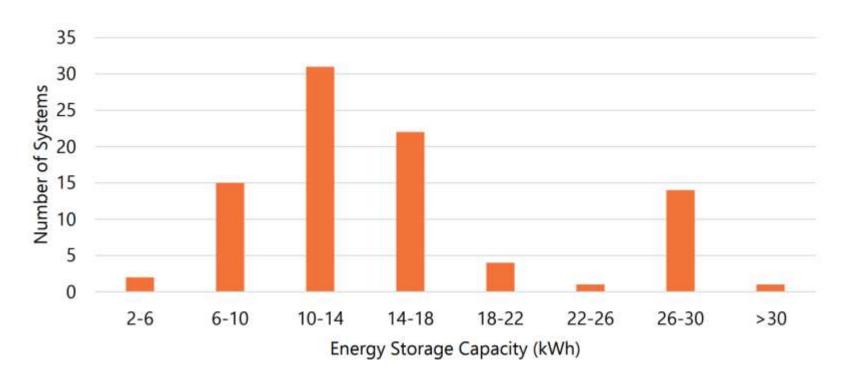
Peak Power Capacity in Oregon: 670 kW

• Facilities in Oregon: 291

Maximum Stored Energy in Oregon: 1,440 kWh

Range of Sizes:
 2.4 to 46 kWh

Figure 1: Range of Residential Battery Sizes in Oregon (2018-2020)



As of September 2020, the Oregon Department of Energy's Oregon Solar + Storage Rebate Program has provided rebates for 11 residential battery systems paired with solar.

Small Modular Reactors



Total Capacity and Facilities in Oregon:

Range of Potential Sizes:

60 - 250 MW per module

0

Containment Vessel

Oregon-based NuScale developed the first modular reactor to receive design approval by the U.S. Nuclear Regulatory Commission.

While there are small, traditional nuclear reactors operating in the world, there are no new-generation SMRs yet in operation. The International Atomic Energy Agency reports that of the 50 or more designs being pursued, there are "four SMRs in advanced stages of construction in Argentina, China and Russia, and several existing and newcomer nuclear energy countries are conducting SMR research and development."

Oregon has statutory barriers to siting nuclear power plants in the state. One barrier: Oregon voters would have to approve any nuclear facility.

Design Illustration of NuScale Power Modular Reactor







- 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

Most of the hydrogen produced in the world today is derived from steam reformation of fossil-based natural gas. Not only is PtG is an emerging alternative to the reformation of natural gas to produce hydrogen, but numerous potential end uses for hydrogen are emerging in the power and transportation sectors.

Figure 2: Green, Blue, and Grey Hydrogen Explained9

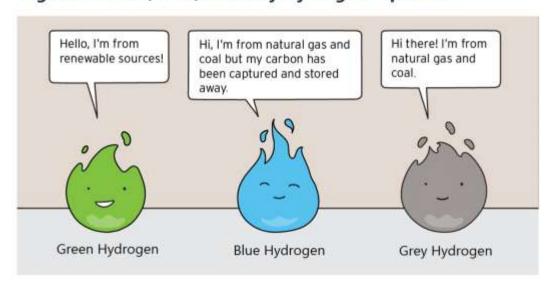
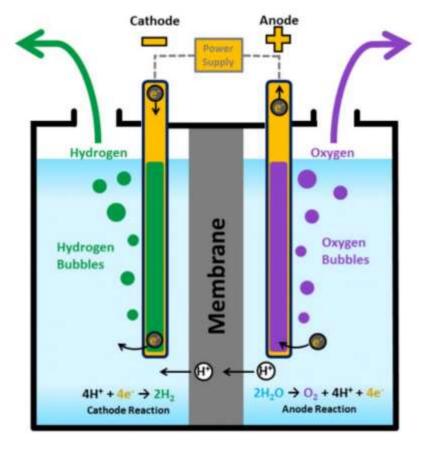


Figure 1: Electrolyzer Illustration





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

TABL

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- 27 Climate Vulnerability Assessment
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- Agricultural Energy Use and Associated Greenhouse Gas Emissions
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- 114 Advanced Meter Infrastructure
- 120 Assessing and Managing Effects of Electric Vehicles on the Grid
- 128 Evolving Wholesale Electricity Markets
- 136 Offshore Wind
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- 166 Using Truck Efficiency to Reduce Fuel Consumption and Emissions
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What do you think?





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.



Oregon is well-known for its agricultural diversity – and this diversity of crops, livestock, soils, climates, and production methods is reflected in how Oregon farms use energy. Oregon farmers and ranchers use energy for many purposes: to power tractors and other farm equipment in the field, to chill milk and freshly-picked produce, to provide heat and light for greenhouses, to mechanically control weeds, to pump water, and to run equipment like hop dryers, seed cleaners, and mint oil distilleries.

Table 1: Oregon Farm Bureau Survey

Top 5 Uses of Electricity	Top 3 Uses of Natural Gas	Top 3 Uses of Propane
Irrigation	Greenhouses	Forklifts
Seed Cleaning	Dryers (hops, onions)	Greenhouses
Greenhouses	Shop/Farm	Shop/Farm
Shop/Farm		
Cold Storage		

For several rural consumerowned utilities, farms are the primary customer base – and the seasonal dynamics of supplying energy to farms drives utility operations.





Oregon has been a leader in development of renewable energy for many years. Customer-owned or on-site renewables can provide individual financial benefits, societal benefits associated with clean energy production, and economic development associated with jobs to install systems. However, access and benefits of on-site renewable energy systems have not been enjoyed by all Oregonians.

Figure 1: Annual Count and Average Cost of PV installations in the Residential Energy Tax Credit Program

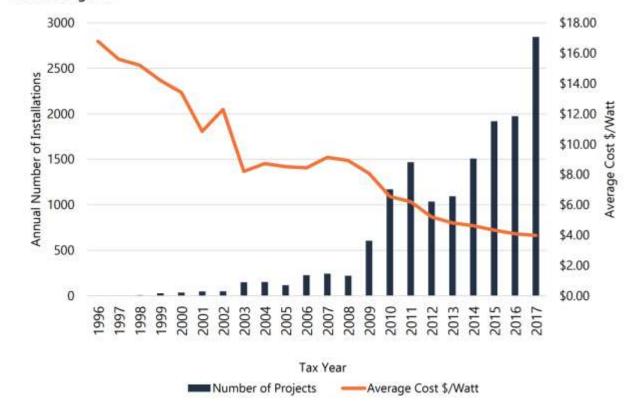


Table 2: Race Distribution of 2010 RETC Census Blocks

2010 Oregon Population Race Distribution	2010 RETC Block Group Race Distribution	
78.46%	84.76%	
11.75%	6.40%	
3.64%	3.29%	
2.87%	2.76%	
1.70%	1.61%	
1.14%	0.81%	
0.33%	0.22%	
0.14%	0.16%	
	Distribution 78.46% 11.75% 3.64% 2.87% 1.70% 1.14%	

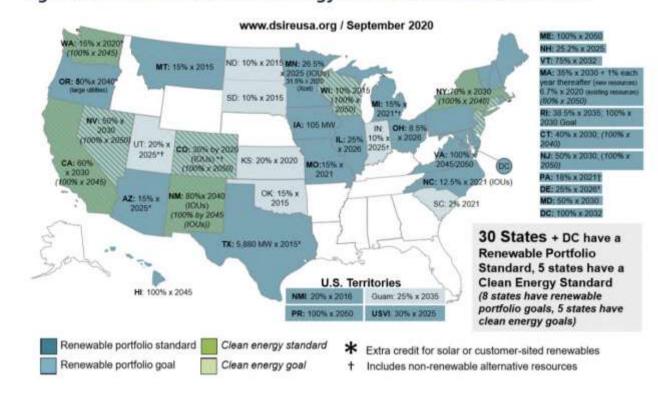
CROSS-SECTIONAL TOPICS

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

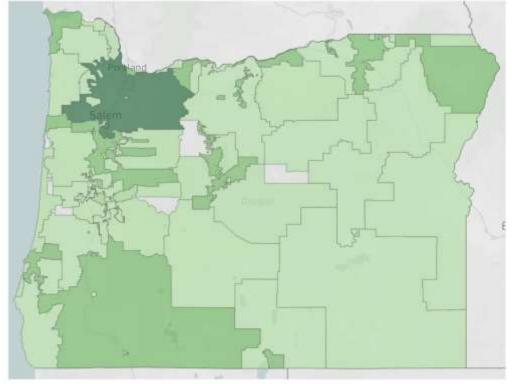
Figure 1: Renewable and Clean Energy Standards in the United States





CROSS-SECTIONAL TOPICS

Figure 2: Registered EVs by Oregon Utility Service Territory⁴



Darker shades of green = more registered EVs

OREGON DEPARTMENT OF ENERGY

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

COMING SOON

Web-Friendly Version

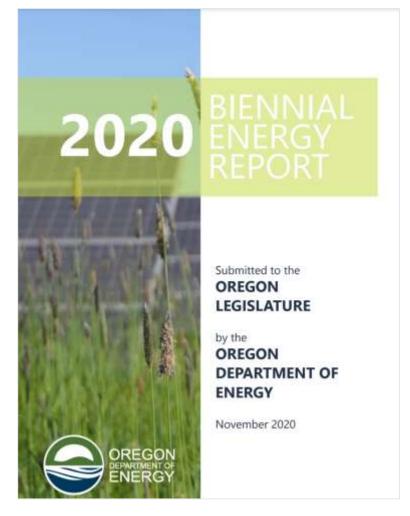
In addition to PDFs of the report, ODOE will have a web-friendly version with report highlights.

2021 Road Show

We'll kick off a virtual "road show" in 2021 with a series of ODOE-hosted webinars that offer deeper-dives into the report. ODOE staff are also available to attend community and organization meetings to present.

Convening Conversations

The report will serve as a starting point to hear from Oregonians about what they want the state's energy future to look like – and how we'll get there.





https://energyinfo.oregon.gov/ber



Questions/Comments?

RESOURCES:

Report online: energyinfo.oregon.gov

ODOE's website: www.oregon.gov/energy

Contact us/request a presentation: odoe.powerappsportals.us/ber-comment/