



LPRO: Legislative Policy and Research Office

# RENEWABLE ENERGY

## BACKGROUND BRIEF

### OVERVIEW OF RENEWABLE GENERATION

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The International Energy Agency defines renewable energy as “energy derived from natural processes (e.g., sunlight and wind) that are replenished at a faster rate than they are consumed.”<sup>1</sup> Solar, wind, geothermal, hydro and biomass are commonly included in definitions of renewable resources.

Oregon has historically relied heavily on conventional hydropower as a major source of renewable electricity generation. The state also has wind resources that have been increasingly developed in recent years, as well as solar and geothermal resources in eastern Oregon, biomass resources in western Oregon, and the potential for off-shore tidal wave development.

Recent growth in electric generation from renewable sources in Oregon parallels national trends. The National Renewable Energy Laboratory’s (NREL) 2014 Renewable Energy Data Book<sup>2</sup> reports the following national statistics for renewable energy in 2014:

- The installed capacity of renewable energy facilities in the United States was 179 gigawatts (GW), representing 15.5 percent of total United States electrical generating capacity.
- Renewable resources supplied over 13.5 percent of domestic electricity consumption in the United States.
- Renewable capacity accounted for more than 50 percent of new electric capacity additions, with 5.5 GW of new solar and 4.8 GW of new wind.
- Generation from geothermal, hydro and biomass remained relatively stable since 2000.
- Wind capacity increased tenfold nationally since 2004, while solar photovoltaic (PV) systems increased by a factor of 114.
- Total installed wind capacity of 65.9 GW.
- Total installed solar PV capacity of 18.3 GW.

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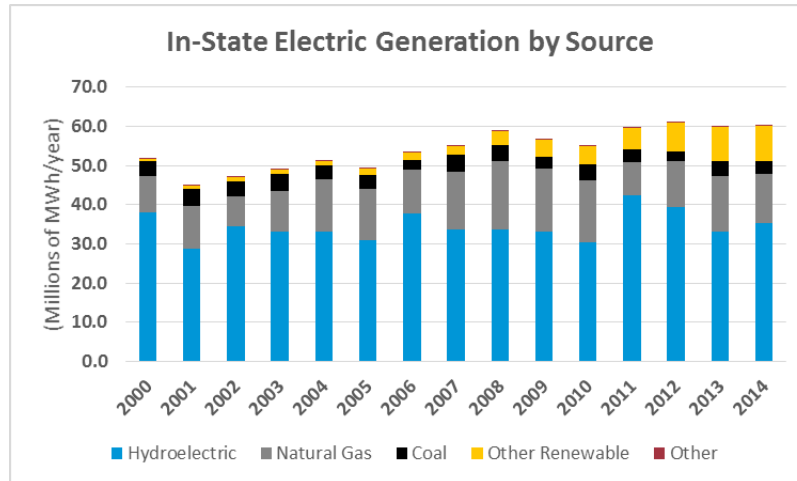
<sup>1</sup> <https://www.iea.org/topics/renewables/>

<sup>2</sup> <http://www.nrel.gov/docs/fy16osti/64720.pdf>



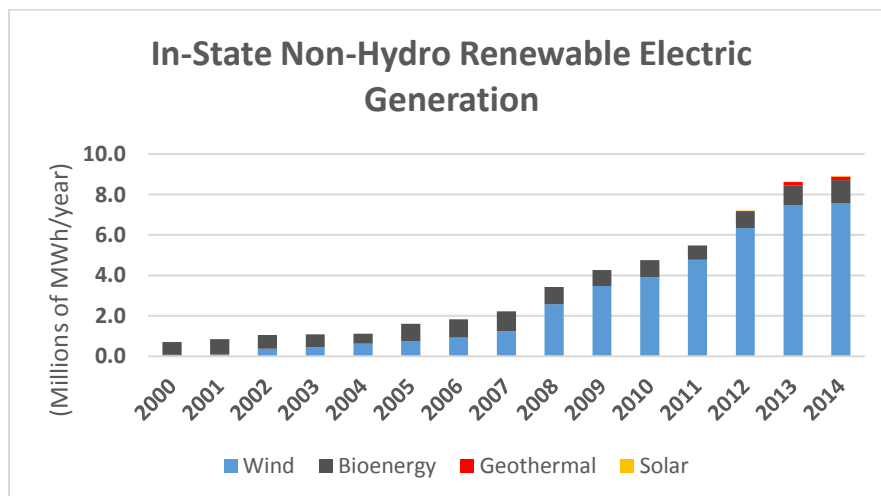
## RENEWABLE GENERATION IN OREGON

According to the U.S. Energy Information Agency (EIA),<sup>3</sup> the majority of Oregon's in-state electric generation comes from renewable resources and is dominated by hydroelectric generation:



Note that this table reflects in-state electric *generation* from facilities located in Oregon and not *consumption* of electricity by Oregonians. Oregon's electric consumption varies from this generation mix due to significant electric imports and exports between Oregon and other western states due to seasonal generation imbalances (e.g., excess hydroelectric generation in winter and spring) and market conditions.

While non-hydroelectric renewable generation (e.g., wind, bioenergy, geothermal and solar) comprises a relatively small portion of overall in-state generation, EIA data shows that its share is growing rapidly over the past several years, which is consistent with national trends:



<sup>3</sup> Table 5. Electric power industry generation by primary energy source, 1990 through 2014, "Oregon Electricity Profile 2014," U.S. Energy Information Agency. March 24, 2016. (Available online: <http://www.eia.gov/electricity/state/Oregon/>)



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In terms of electricity consumption by Oregonians, the Oregon Department of Energy reported<sup>4</sup> that for 2012-2014, hydroelectric power provided 42.88 percent of the state's generation, followed by 33.65 percent from coal (mostly from out-of-state imports), 13.55 percent from natural gas and a growing percentage from non-hydro renewables (led by wind at 5.62 percent).

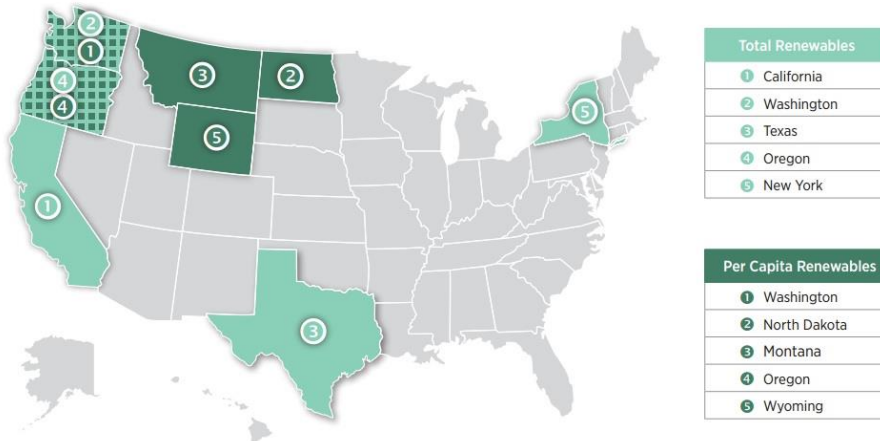
Nationally, Oregon is consistently ranked<sup>5</sup> as one of the top states in terms of cumulative installed renewable generation capacity (both when including and excluding hydroelectric power) and on a per capita basis.

### 2012-2014 Electricity Resource Mix

|             |        |
|-------------|--------|
| Hydro       | 42.88% |
| Coal        | 33.65% |
| Natural Gas | 13.55% |
| Wind        | 5.62%  |
| Nuclear     | 3.21%  |
| Biomass     | 0.35%  |
| Other*      | 0.74%  |

\* < 0.2% from each of the following: Waste, Landfill, Geothermal, Petroleum, Solar, and Cogeneration

### Top States for Cumulative Renewable Electricity Installed Capacity (2014)



## RENEWABLE PORTFOLIO STANDARD

The Oregon Renewable Portfolio Standard (RPS) directs Oregon utilities to source a defined percentage of their retail electricity sales with generation from qualified renewable resources by specific dates. In 2007, [Senate Bill 838 \(ORS 469A\)](#) adopted a 25 percent RPS by 2025 for large utilities. In March 2016, [Senate Bill 1547](#) increased the RPS to 50 percent by 2040 while mandating the elimination of coal generation from Oregon rates by 2030.

The RPS is set higher for Oregon's three largest utilities (Portland General Electric, PacifiCorp and the Eugene Water and Electric Board) and is less stringent for smaller consumer-owned utilities. Utilities are not required to comply with the RPS if compliance costs exceed four percent of a utility's annual revenue requirement in any given compliance year.

<sup>4</sup> [https://www.oregon.gov/energy/pages/oregons\\_electric\\_power\\_mix.aspx](https://www.oregon.gov/energy/pages/oregons_electric_power_mix.aspx)

<sup>5</sup> <http://www.nrel.gov/docs/fy16osti/64720.pdf>



## SUMMARY OF OREGON'S 50 PERCENT RPS (SB 1547, 2016)

| Utility  | RPS Standard | Compliance Period | Qualifying Sources   |
|--|--------------|-------------------|--|
| <b>Large</b><br>(> 3% total electricity sales)       | 5 %          | 2011-2014         | <ul style="list-style-type: none"><li>▪ Geothermal, wave, wind, solar, biomass (some restrictions), hydropower (some restrictions), and hydrogen if generated from above sources.</li><li>▪ Facility must have become operational or had capacity/efficiency upgrades after January 1, 1995.</li><li>▪ Facility must be located in the Western Electric Coordinating Council (WECC).</li><li>▪ RPS eligibility certified by Oregon Department of Energy.</li></ul> |
|  | 15 %         | 2015-2019         |  |
|  | 20 %         | 2020-2024         |  |
|  | 27 %         | 2025-2029         |  |
|  | 35 %         | 2030-2034         |  |
|  | 45 %         | 2035-2039         |  |
|  | 50 %         | 2040+             |  |
| <b>Medium</b><br>(1.5% - 3% total electricity sales) | 10 %         | 2025+             |  |
| <b>Small</b><br>(< 1.5% total electricity sales)     | 5 %          | 2025+             |  |

Senate Bill 1547 also directs Portland General Electric and PacifiCorp to source, by 2025, at least eight percent of their sales from projects that have a generating capacity of 20 megawatts (**MW**) or less, or from facilities that generate electricity using biomass that also generate thermal energy for a secondary purpose.

As of June 2016, a total of 29 states, Washington, D.C., and three United States territories have adopted renewable portfolio standards. Only Hawaii (100 percent by 2045), Vermont (75 percent by 2032), and California (50 percent by 2030) have adopted RPS standards more stringent than Oregon's.<sup>6</sup>

<sup>6</sup> <http://www.dsireusa.org/resources/detailed-summary-maps/>



## HISTORY OF RENEWABLE ENERGY LEGISLATION

The legislature has taken significant steps towards the deployment of renewable energy resources in the state. Since 1977, the legislature has passed a number of energy-related bills promoting the development of local renewable resources. The following table provides a list of selected legislative initiatives that have supported the development of renewable energy in Oregon:

| Legislation                          | Year Enacted | Purpose  |
|--------------------------------------|--------------|--|
| Residential Energy Tax Credit        | 1977         | Encourage homeowners to install renewable energy technologies.   |
| Business Energy Tax Credit           | 1979         | Encourage investments in renewable energy sources, energy conservation, recycling, and less-polluting transportation fuels.  |
| Small-scale Energy Loan Program      | 1979         | Offer low-interest, fixed rate, long-term loans for qualified Oregon projects that invest in renewable energy, energy conservation or alternative fuels, or create products from recycled materials. |
| Public Purpose Charge                | 1999         | Authorize charge for Portland General Electric and PacifiCorp consumers to fund renewables and conservation, weatherization for low-income households and energy efficiency in schools.              |
| Net Metering                         | 1999         | Authorize net metering throughout Oregon to encourage the use of solar energy and fuel cells. Net metering means individuals can sell their energy into the electric grid.                           |
| Renewable Portfolio Standard         | 2007         | Require electric utilities to acquire a minimum percentage of their power from renewable sources, increasing to 25 percent by 2025.  |
| Solar Technology on Public Buildings | 2007         | Require new public buildings or major renovations of existing public buildings to include at least 1.5 percent of total contract price for solar technology.   |
| Encourage Wave Energy Development    | 2007         | Exempt small wave energy projects from hydroelectric provisions; define wave energy as a renewable resource.<br>This legislation was renewed with House Bill 2748 (2011).                            |



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|  |           |   |
|--|-----------|---|
| Renewable Fuel Standard; Biomass Producer or Collector Tax Credit; Biofuel Consumer Tax Credit | 2007      | Establish Oregon's Renewable Fuel Standard and biomass producer or collector tax credit as well as the biofuel consumer tax credit. While this bill was largely about transportation, it also included significant tax credits for electricity production.  |
| Renewable Energy Fund  | 2009      | Finance acquisition and operation of renewable energy electric generation and transmission facilities.  |
| Solar Power Pilot Program  | 2009      | Create program to establish volumetric incentives for 25 MW of new solar development. Establish solar photovoltaic capacity standard for additional 20 MW of larger facilities.   |
| Tax Credits and Other Incentives for Energy Generation and Conservation                        | 2010-2011 | House Bill 3680 (2010) made significant changes to the Business Energy Tax Credit ( <b>BETC</b> ) program, capping the incentives available and adding a tiered competitive selection process.<br><br>House Bill 3672 (2011) sunset the BETC program effective July 1, 2011 and created several separate energy generation and conservation incentive programs. |
| Solar Photovoltaic Zoning  | 2011      | Establish that installation and use of solar photovoltaic energy systems or solar thermal energy systems on residential or commercial buildings is an outright permitted use in any zone where such structures are an allowed use.  |
| Geothermal Energy in Construction or Renovation of Public Buildings                            | 2012      | Add electricity generation or direct use of geothermal energy to satisfy the existing statutory requirement that contracting agencies allocate at least 1.5 percent of the total contract price for the inclusion of solar technologies in the construction or renovation of public buildings.  |
| Oregon Clean Electricity and Coal Transition Plan  | 2016      | Increase the state's RPS to 50 percent by 2040, in addition to requiring an elimination of coal generation from Oregon rates by 2030.   |



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