Background Brief on …

Oregon Renewable Energy Resources

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Overview of Renewable Energy

Renewable energy is defined as an energy source that is replenished continuously in nature or that is replaced after use through natural means. Oregon has a wide variety of renewable resources that can be used to generate electricity including biomass, geothermal, hydropower, solar, wave, and wind. Oregon's primary renewable energy generation source is conventional hydropower.

According to the Oregon Department of Energy, 52 percent of electricity consumed in Oregon in 2012 came from renewable resources, mainly conventional hydropower. Generation from other renewable resources is increasing, most notably wind power, which in 2012 supplied more than five percent of Oregon's electricity consumption (Figure 1).

The National Renewable Energy Laboratory (NREL) 2012 Renewable Energy Data Book and the U.S. Department of Energy's Energy Information Administration (EIA) report the following statistics for 2012:

- The installed capacity of renewable energy facilities in the U.S. was 163 gigawatts, representing 14 percent of total U.S. electrical generating capacity.
- Renewable resources supplied over 12 percent of the electricity consumed in the U.S.
- Wind energy was about 75 percent of new renewable electricity capacity installed in the U.S.
- While electrical generation from landfill gas is also increasing, generation rates from geothermal, hydropower, and other forms of biomass have remained relatively stable since 2000.

The increases in renewable energy development are attributable to federal and state mandates and incentives, federal production and investment tax credits, and concerns over growing fossil fuel emissions. A substantial portion of the United States' renewable energy capacity is located on the West Coast, with California, Oregon, and Washington generating 40 percent of the renewable electricity in the country. Even excluding hydropower, the West Coast produces 24 percent of its electricity from renewable sources, more than any other region. Oregon is ranked within the top five states in installed renewable energy capacity both including and excluding hydropower, and on a total and per capita basis (Figure 2). In order of net generation, Oregon's current renewable sources are: conventional hydropower, wind, and woody biomass. Oregon also has operating facilities fueled by solar, geothermal, landfill gas, and other biomass sources.

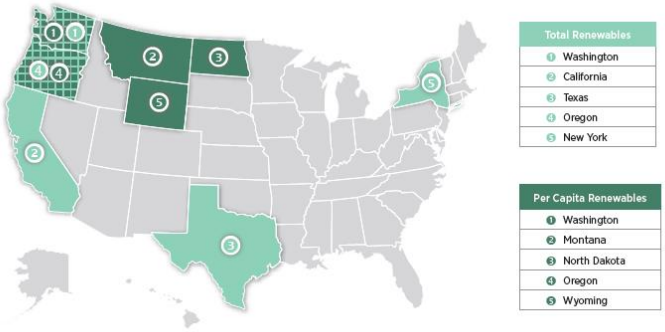

Figure 2: Renewable Energy Installed Nameplate Capacity in the U.S. (2012, NREL)

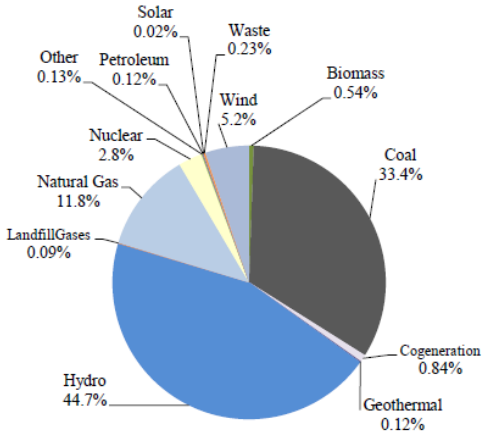

Figure 1: Oregon's Electricity Resource Mix 2010-2012

Renewable Portfolio Standard

The Oregon Renewable Portfolio Standard **(RPS)** was enacted in 2007 through Senate Bill 838 (ORS 469A). The bill directs Oregon utilities to meet a percentage of their retail electricity needs with qualified renewable resources. For Oregon's three largest utilities (Portland General Electric, PacifiCorp, and the Eugene Water and Electric Board), the standard starts at 5 percent in 2011, increases to 15 percent in 2015, 20 percent in 2020, and 25 percent in 2025. Other electric utilities in the state, depending on size, have standards of 5% or 10 percent in 2025 (Figure 1).

As of July 2014, 29 other states, two territories, and the District of Columbia have mandatory policies in place. Eight states and two territories have established voluntary goals, rather than

Utility	Standard	Year	Qualifying Sources
Large (> 3% total OR electricity sales)	5 %	2011	▪ Geothermal, wave, wind, solar, biomass (some restrictions), hydropower (some restrictions), and hydrogen if generated from above sources. ▪ ODOE cannot allow sources from petroleum, natural gas, coal, or nuclear fission. ▪ Facility must have become operational or had capacity/efficiency upgrades after January 1, 1995. ▪ Facility must be located in the Western regional grid. ▪ Eligible generation starts in January 2007.
	15 %	2015	
	20 %	2020	
	25 %	2025	
Medium (1.5% - 3% total OR electricity sales)	10 %	2025	
Small (< 1.5% total OR electricity sales)	5 %	2025	

Table 1 Oregon's Renewable Portfolio Standard

mandates, for percentages of power generation from renewable resources.

Energy Facility Siting

The Energy Facility Siting Council **(EFSC)** is responsible for overseeing development of large energy facilities, high voltage transmission lines, gas pipelines, and radioactive waste disposal sites in Oregon. The EFSC is made up of seven members appointed by the Governor and confirmed by the Senate. The Oregon Department of Energy **(ODOE)** provides technical expertise and staffing to the EFSC.

The types of energy facilities subject to EFSC review are defined in statute (ORS 469.300). Relevant to renewable energy projects, these facilities include:

- Electric power plants generating 25 MW or more from thermal power or combustion turbines;
- Electric power plants generating an average 35 MW (aMW) or more from geothermal, solar, or wind facilities, at a single-energy facility or within a single-energy generation area;
- Solar collection facilities using more than 100 acres of high-value farmland or land that is predominantly cultivated; for any other land, the threshold is 320 acres;
- Plants that convert biomass to gas, liquid, or solid fuel, provided that at least one of these three is capable of being burned to produce the equivalent of six billion Btu of heat per day;
- High voltage transmission lines 10 miles or longer in length with a minimum capacity of 230,000 volts that are built in more than one city or county (with some exceptions);
- Pipelines six inches or greater in diameter and five or more miles in length that can carry geothermal energy in liquid form; and
- Pipelines 16 inches or greater in diameter and five or more miles in length that can carry geothermal energy in gaseous form (excludes pipelines distributing heat within a geothermal heating district).

Prior to construction or operation, developers of energy facilities are required to obtain a site certificate from the EFSC. A typical siting process has several phases: the notice of intent, the application, contested case, and final order. In the notice of intent, the developer describes the proposed facility, and ODOE uses the notice of intent to gather initial public comments and other relevant state and local agencies use it to identify any applicable laws, regulations, and ordinances. The application contains a more detailed description of the proposed site, the facility, and any anticipated impacts from the facility. It also describes what measures the applicant plans to take in order to comply with all EFSC standards for energy facilities. Those standards are defined in regulation; in general they are designed to ensure that energy facilities will protect Oregon's natural resources and public health and safety, and will minimize any potential adverse environmental impacts. Proposed power plants with an average generating capacity of less than 100 MW can

request an expedited review, which does not include the notice of intent phase.

ODOE reviews all applications to ensure that each project complies with EFSC's standards, any applicable state agency regulations, and applicable local government ordinances. ODOE then makes a recommendation to EFSC. If a proposed facility meets all of EFSC's standards, EFSC is required to issue a site certificate.

A site certificate serves as a consolidated state permit; the decision is binding on all applicable state agencies and local governments, and those entities must issue the necessary permits and licenses to the facility (this excludes federally delegated permits, for instance, for compliance with the Clean Water Act or the Clean Air Act). The statutory time frame for the siting process is six months to two years, depending on the size and nature of the facility.

Facilities that do not require a site certificate must instead go through local processes to get a conditional use permit, as well as permits from applicable state agencies. Applicants for wind energy facilities of less than 35 aMW may elect to be permitted through EFSC's consolidated process.

California, Washington, and Montana also have a consolidated energy facility siting process.

Renewable Energy Legislation

Since 1977, the legislature has passed a number of energy-related bills promoting the development of local renewable resources. The Residential Energy Tax Credit program was specifically created to promote the use of solar, wind, and geothermal energy. ODOE estimates that incentive programs in the state have led to the residential installation of approximately 5,208 solar electric arrays, 19,891 solar water heating systems, and 2,825 ground source heat pumps. Table 2 provides a list of selected renewable energy legislation in Oregon.

Legislation	Year Enacted	Purpose
Residential Energy Tax Credit	1977	Encouraged homeowners to install renewable energy technologies.
Business Energy Tax Credit	1979	Encouraged investments in renewable energy sources, energy conservation, recycling, and less-polluting transportation fuels.
Small-scale Energy Loan Program	1979	Offered low-interest, fixed rate, long-term loans for qualified Oregon projects that invest in renewable energy, energy conservation, alternative fuels, or creates products from recycled materials.
Public Purpose Charge	1999	Funded renewable resources and conservation; weatherization for low-income households; energy efficiency in schools.
Net Metering	1999	House Bill 3219 authorized net metering throughout Oregon to encourage solar energy and fuel cells. Net metering means individuals can sell their energy into the electric grid.
Renewable Portfolio Standard	2007	Required electric utilities to acquire a minimum percentage of their power from renewable sources.
Solar Technology on Public Buildings	2007	Required 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	Exempted small wave energy projects from hydroelectric provisions; define wave energy as a renewable resource. This legislation was renewed in 2011. See House Bill 2748
Renewable Fuel Standard; Biomass	2007	House Bill 2210 established Oregon's Renewable Fuel Standard and biomass producer or collector tax credit as well as the biofuel

Producer or Collector Tax Credit; Biofuel Consumer Tax Credit		consumer tax credit. While this bill was largely about transportation, it also included significant tax credits for electricity production.
Renewable Energy Fund	2009	Financed acquisition and operation of renewable energy electric generation and transmission facilities.
Solar Power Pilot Program	2009	Created 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 **(BETC)** program, capping the incentives available and adding a tiered competitive selection process. House Bill 3672 (2011) sunset the BETC program effective July 1, 2011 and created several separate energy generation and conservation incentive programs. For a full summary see http://www.oregon.gov/ENERGY/CONS/docs/HB3672summary.pdf
Solar Photovoltaic Zoning	2011	House Bill 3516 established 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	Senate Bill 1533 added 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.

Table 2 Selected renewable energy legislation in Oregon

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