



LPRO: Legislative Policy and Research Office

WIND ENERGY

BACKGROUND BRIEF

Wind energy is a rapidly growing source of renewable energy in the United States. According to the 2015 American Wind Energy Association U.S. Wind Industry Market Reportⁱ, total wind power capacity additions in the United States in 2015 for the first time exceeded capacity additions from any other power source (41 percent for wind, 28 percent for the second-place source, natural gas).

From 2006 through 2015, wind power generation in the United States multiplied six times over, with nearly 75 gigawatts of wind-generating capacity now installed.ⁱⁱ At the end of 2015, Texas was ranked number one in the United States for installed wind power capacity at 17,713 MW; Oregon is ranked eighth, with 3,152 MW (Figure 1).

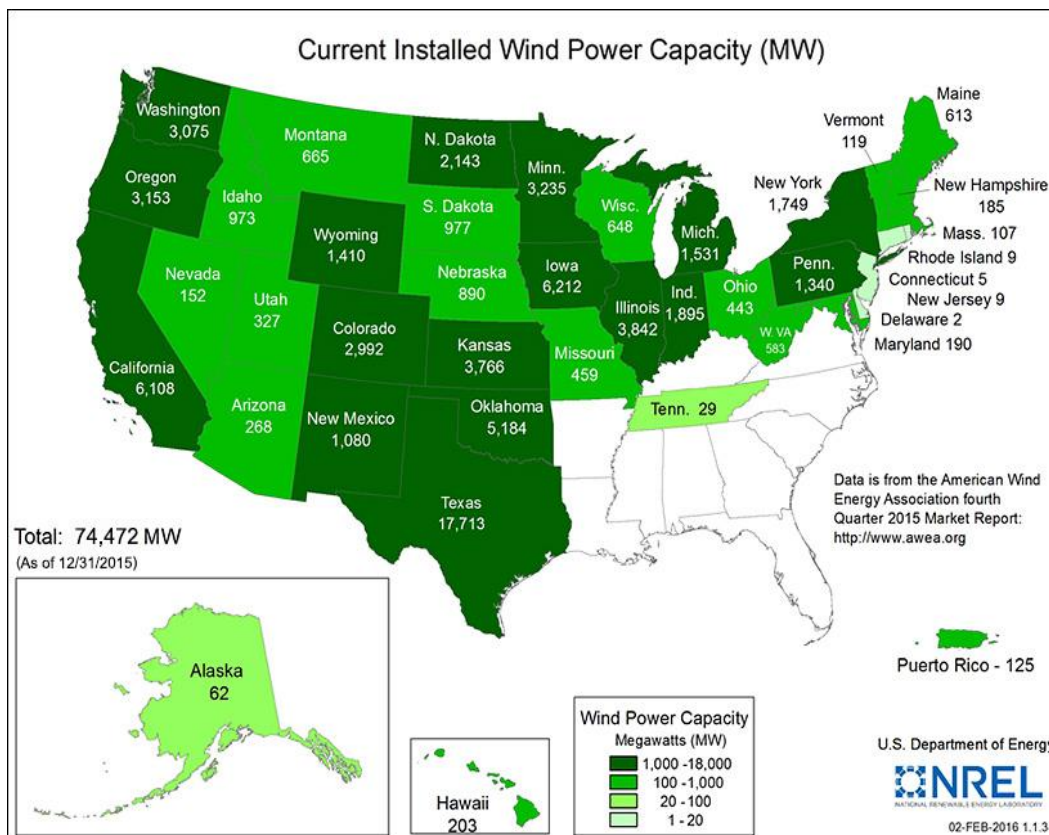


Figure 1. U.S. Installed Wind Capacity 2015, National Renewable Energy Lab



Oregon’s wind energy industry has developed mainly in the central and eastern end of the Columbia River and in northeastern Oregon. Developments have been proposed in other areas with good potential wind resources, including the Cascades, along the Oregon coast, and in southeastern Oregon (see Figure 2).

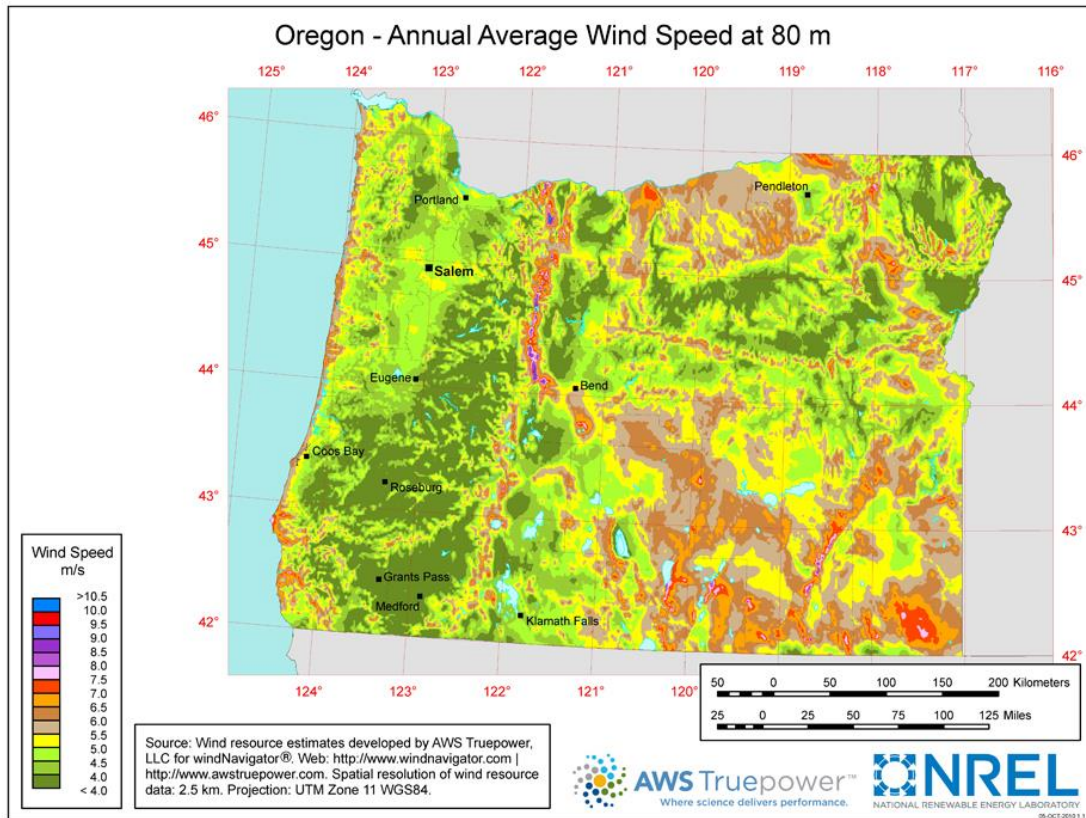


Figure 2: Oregon Annual Wind Speed at 80 meters (262 feet)

Oregon’s wind generation capacity has grown from 25 MW in 1999 to more than 3,153 MW in 2015ⁱⁱⁱ due to development of large-scale wind farms that supply power directly to the electric grid. Oregon has 29 megawatt-scale projects in operation^{iv} (see Figure 3). The state also has smaller-scale wind projects, including several community-owned projects consisting of a few mid-sized or large turbines and numerous installations of small-sized turbines that generate power on-site for homes and businesses. The industry for small-scale turbines is less developed than the large-scale wind industry.

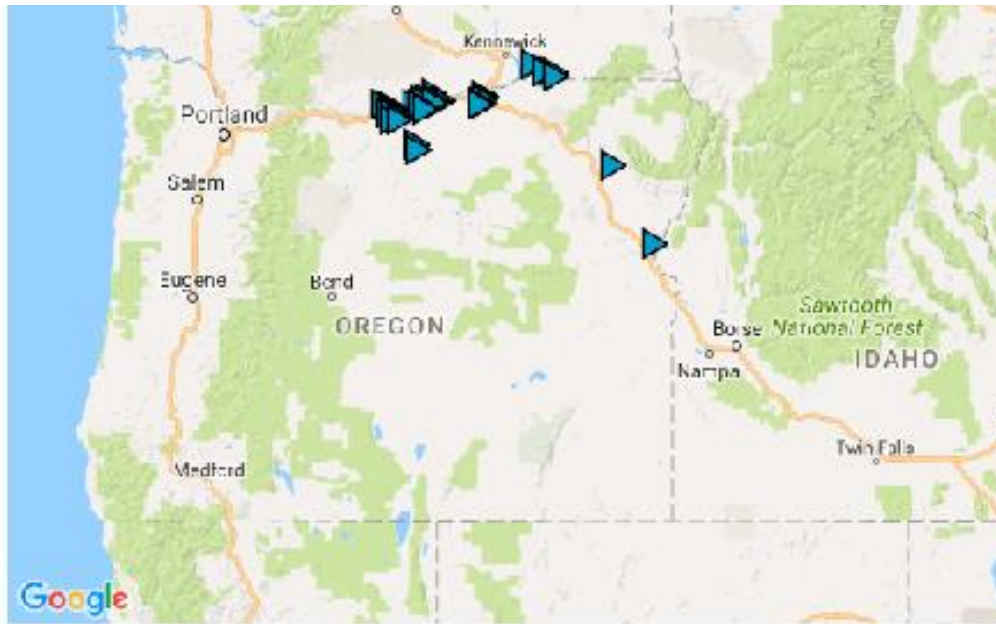


Figure 3. Operating Wind Energy Projects in Oregon⁴

The chart in Figure 4 shows operating wind energy projects, the county in which they are located, installed capacity in MW, and the year projects became operational⁴. The total wind energy investment shown in this chart represents more than \$7 billion dollars for Oregon.^v Sherman County and Umatilla County lead Oregon with 10 major wind projects each, with capacities of 1,057 MW and 384 MW respectively. Gilliam County has the highest buildout of wind project capacity, in part because it has portions of the 845 MW Shepherds Flat Wind Projects. Union County in eastern Oregon has only one facility, yet at just over 100 MW, it is a substantial project.

Although the development of wind energy in Oregon was robust for well over a decade, and the state has areas with high wind potential that are undeveloped, no new wind capacity has been added so far in 2016. The Oregon utilities subject to the Renewable Portfolio Standard have largely met their obligations for renewable energy through the 2020-2025 timeframe. With the increase of the Oregon RPS to 50 percent renewable energy by 2040, new wind projects will likely be built in the state by utilities and independent developers in the coming years.

Developing wind projects is a complex process. Particularly challenging are grid interconnection and transmission access. New large wind projects in Oregon will likely require significant transmission system investment. Small wind projects (<20 MW) have less impact on transmission but require complex system studies that may result in the need for expensive upgrades to the local grid.



Resource	Project Name	Status	State	County	Capacity	Capacity Unit	Developers	Partners	Year	# of Turbines
Wind	Lime Wind	Operating	OR	Baker	3	MW	Joseph Millworks	Idaho Power, BEF	2011	6
Wind	Condon (Phase I)	Operating	OR	Gilliam	24.6	MW	SeaWest	BPA	2001	41
Wind	Condon (Phase II)	Operating	OR	Gilliam	25.2	MW	SeaWest	BPA	2002	42
Wind	Leaning Juniper	Operating	OR	Gilliam	100.5	MW	Iberdrola	PacifiCorp, enXco	2006	67
Wind	Leaning Juniper II	Operating	OR	Gilliam	201.6	MW	Iberdrola		2011	117
Wind	Pebble Springs Wind	Operating	OR	Gilliam	98.7	MW	Iberdrola	Southern California Public Power Authority (SCPPA)	2009	47
Wind	Rattlesnake Rd Wind Phase I	Operating	OR	Gilliam	102.9	MW	Horizon Wind	PG&E, CEP, Confed. Tribes of the Umatilla	2008	49
Wind	Shepherds Flat North - N. Hurlburt	Operating	OR	Gilliam	265	MW	Caithness Energy	Southern California Edison, North Hurlburt Wind LLC	2012	106
Wind	Wheat Field Wind Farm	Operating	OR	Gilliam	96.6	MW	Horizon	Snohomish PUD	2009	46
Wind	Shepherds Flat Central - S. Hurlburt	Operating	OR	Gilliam & Morrow	290	MW	Caithness Energy	Southern California Edison, South Hurlburt Wind LLC	2012	116
Wind	Shepherds Flat South - Horseshoe Bend	Operating	OR	Gilliam & Morrow	290	MW	Caithness Energy	Southern California Edison, Horseshoe Bend Wind LLC	2012	116
Wind	Willow Creek	Operating	OR	Gilliam & Morrow	72	MW	Invenergy	LADWP	2009	48
Wind	Echo - Four Mile Canyon Windfarm	Operating	OR	Morrow	10	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	5
Wind	Echo - Pacific Canyon Windfarm	Operating	OR	Morrow	8.25	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	5
Wind	Echo - Sand Ranch Windfarm	Operating	OR	Morrow	9.9	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	6
Wind	Echo - Wagon Trail	Operating	OR	Morrow	3.3	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	2
Wind	Threemile Canyon Wind	Operating	OR	Morrow	9.9	MW	Exelon, Momentum RE	John Deere, PacifiCorp	2009	6
Wind	Biglow Canyon - Phase 2	Operating	OR	Sherman	149.5	MW	PGE		2009	65
Wind	Biglow Canyon - Phase 3	Operating	OR	Sherman	174.8	MW	PGE		2010	76
Wind	Biglow Canyon - Phase I	Operating	OR	Sherman	125.4	MW	PGE, Orion		2007	76
Wind	Hay Canyon	Operating	OR	Sherman	100.8	MW	Iberdrola	SnoPUD	2009	48
Wind	Klondike I	Operating	OR	Sherman	24	MW	Northwestern Wind	BPA, PPM Energy	2001	16
Wind	Klondike II	Operating	OR	Sherman	75	MW	Iberdrola	PGE	2005	50
Wind	Klondike III	Operating	OR	Sherman	223.6	MW	Iberdrola	PG&E, PSE, EWEB, & BPA	2007	125
Wind	Klondike IIIa	Operating	OR	Sherman	76.5	MW	Iberdrola	PG&E	2008	51
Wind	PāiTu Wind Farm	Operating	OR	Sherman	9	MW	Oregon Trail Wind Farm	PGE, Iberdrola, MMA Renewable Ventures	2010	6
Wind	Star Point	Operating	OR	Sherman	98.7	MW	Iberdrola		2010	47
Wind	Combine Hills	Operating	OR	Umatilla	41	MW	Eurus	PacifiCorp, ETO	2003	41
Wind	Combine Hills - Phase II	Operating	OR	Umatilla	63	MW	Eurus		2009	63
Wind	Echo - Big Top	Operating	OR	Umatilla	1.65	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	1
Wind	Echo - Butter Creek Power	Operating	OR	Umatilla	4.95	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	3
Wind	Echo - Four Corners Windfarm	Operating	OR	Umatilla	10	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	5
Wind	Echo - Oregon Trail Windfarm	Operating	OR	Umatilla	9.9	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	6
Wind	Echo - Ward Butte Windfarm	Operating	OR	Umatilla	6.6	MW	Exelon, Oregon Windfarms	PacifiCorp, John Deere	2009	4
Wind	Stateline (OR side)	Operating	OR	Umatilla	122.8	MW	NextEra	Iberdrola	2001	
Wind	Vansycle II (Stateline III)	Operating	OR	Umatilla	98.9	MW	NextEra		2009	
Wind	Vansycle Windplant	Operating	OR	Umatilla	25.1	MW	NextEra	PGE	1998	
Wind	Elkhorn Wind Power Project	Operating	OR	Union	100.7	MW	Horizon	Idaho Power	2007	61

Figure 4. Details on Operating Wind Farms in Oregon⁵

ⁱ www.awea.org/amr2015, American Wind Energy Association

ⁱⁱ http://apps2.eere.energy.gov/wind/windexchange/wind_installed_capacity.asp, US Department of Energy, Energy Efficiency and Renewable Energy

ⁱⁱⁱ http://www.rnp.org/sites/default/files/pdfs/OR_Fact_Sheet_2015Oct1.pdf, Renewable Northwest

^{iv} http://www.rnp.org/project_map, Renewable Northwest

^v Renewable Northwest: Investment data for currently operating renewables was either sourced directly from project reports and news feeds, or based on estimates from the U.S. Energy Information Administration's April 2013 report, Updated Capital Cost Estimates for Utility Scale Electricity Generating Plants (http://www.eia.gov/forecasts/capitalcost/pdf/updated_capcost.pdf) and NREL's November 2010 report Cost and Performance Assumptions for Modeling Electricity Generation Technologies (<http://www.nrel.gov/docs/fy11osti/48595.pdf>). Estimations are based on wind at \$2.0 mil/MW.