PUGET SOUND ENERGY

Wind Power

PSE: a leader in delivering clean, renewable energy

Puget Sound Energy is the Pacific Northwest's largest utility owner of wind power. We own and operate three large wind farms in Washington state: the Wild Horse Wind and Solar Facility in Kittitas County; the Hopkins Ridge Wind Facility in Columbia County; and our third and largest wind operation, the Lower Snake River Wind Facility, in Garfield County.

Our three current wind facilities produce up to 773 megawatts (MW) of electricity, enough to meet the power demands of nearly 200,000 homes, making us the second-largest utility owner of wind power in the U.S.

In some cases, PSE sells the excess green-energy attributes generated by our wind facilities to other entities across the nation. The revenue from these sales helps to reduce our customers' power costs and allows other utilities to take advantage of the benefits of renewable energy.

Wild Horse Wind and Solar Facility

Location

The Wild Horse Wind and Solar Facility is located in Central Washington near Interstate 90, approximately 2.5 hours east of Seattle.

Facility Profile

The 273 MW Wild Horse Wind and Solar Facility came on-line in December 2006 and was expanded three years later. Situated at 3,500 feet of elevation on Whiskey Dick Mountain, Wild Horse is a place of extreme weather. Temperatures can range from 0 to 100 degrees Fahrenheit, while wind gusts exceeding 115 miles per hour have been recorded. The 149 wind turbines and solar array are capable of operating in a wide range of weather conditions, with the turbines producing energy at wind speeds ranging from 9 to 56 mph.

Public Accommodations

The facility's Renewable Energy Center, free and open to the public from April through November, offers visitors a first-hand look at how electricity can be made from the wind and sun. The center also provides information on Central Washington's natural and cultural history. For directions and information on daily tours and available conference facilities, please call **509-964-7815**.

Benefits to Public

Wild Horse is a source of clean, renewable energy that also provides 25 family wage jobs and significant tax revenues for Kittitas County and Washington state. Since opening, more than 125,000 local and worldwide visitors to Wild Horse have boosted the area's tourism. In constructing Wild Horse, PSE voluntarily created a conservation easement safeguarding 7,000 acres of threatened shrub-steppe habitat and planted 6,000 sagebrush plugs. The Renewable Energy Center allows visitors to explore the latest technologies in wind and solar power, and learn about the Kittitas Valley.

Wild Horse Wind & Solar Facility Renewable Energy Center

Hopkins Ridge Wind Facility

Location

The 157 MW Hopkins Ridge Wind Facility is located in Southeast Washington, centered about 15 miles northeast of Dayton, Columbia County — or approximately 285 miles southeast of Seattle. The site covers 11,000 acres, nearly all private, locally owned crop and range lands. The facility's wind turbines, support structures and access roads cover only about 100 acres — less than 1 percent of the wind farm's total acreage. The rest remains available for farming and livestock grazing.

Facility Profile

The Hopkins Ridge Wind Facility, built in 2005 and expanded three years later, is the first of three large Puget Sound Energy wind farms now in operation. The site contains 87 turbines manufactured by Vestas, a substation, 34 miles of underground power lines that collect the project's power output, and 6.9 miles of overhead, high-voltage transmission lines that move the turbines' power onto the Bonneville Power Administration's regional transmission grid.

Economic Benefits

Wind power provides a substantial economic boost to the communities that host wind farms. The Hopkins Ridge Wind Facility created about 20 permanent, family-wage jobs in the Dayton area for the maintenance and operation of the facility. During the project's construction, as many as 175 workers were on site building the facility. As with PSE's Wild Horse and Lower Snake River facilities, the Hopkins Ridge wind farm also produces a notable increase in commerce for local retailers and service businesses.

In addition, with the second-largest property-tax assessment in Columbia County, the Hopkins Ridge facility is a major source of tax revenue for the fire district and other public services.

Hopkins Ridge Wind Facility

Lower Snake River Wind Facility

The 343 MW Lower Snake River Wind Facility is Puget Sound Energy's newest and largest wind-power operation. Completed in early 2012, the facility is the largest wind farm, to date, in Washington.

Location

The Lower Snake River Wind Facility is located in Southeast Washington, centered about 12 miles west of Pomeroy, Garfield County — or nearly 300 miles southeast of Seattle. The site covers 21,610 acres, nearly all private, locally owned crop and range lands. The facility's wind turbines, support structures and access roads cover only about 200 acres — less than 1 percent of the wind farm's total acreage. The rest remains available for agriculture or conservation reserve.

Facility Profile

Lower Snake River contains 149 wind turbines, manufactured by Siemens Energy. The site also contains two large substations, 64 miles of underground power lines that collect the project's power output, and 8 miles of overhead, high-voltage transmission lines that move the turbines' power onto the Bonneville Power Administration's regional transmission grid. Wind energy brings temporary and permanent jobs to the local community, as well as a new source of income for landowners.

Economic Benefits

Wind power provides a substantial economic boost to the communities that host wind farms. The Lower Snake River Wind Facility created about 25 permanent, family-wage jobs in the Pomeroy area for the employees who maintain and operate the facility. During the project's two-year construction, as many as 250 workers were on site building the facility. As with PSE's Hopkins Ridge and Wild Horse facilities, the new wind farm also produces a notable increase in commerce for local retailers and service businesses. In addition, with the largest property-tax assessment in Garfield County, the Lower Snake River facility is a major source of tax revenue for local schools and public services.


Lower Snake River Wind Facility

Wind facility facts and figures

	Wild Horse	Hopkins Ridge	Lower Snake River
Capacity	273 MW	157 MW	343 MW
Approximate number of households served by output *	63,000	41,000	82,000
Total number of turbines	149	87	149
Turbine manufacturer & model	Vestas V80-1.8/2.0	Vestas V80-1.8	Siemens Energy SWT 101-2.3
Turbine height (from ground to tip of vertical rotor blade)	351 feet		415 feet
Total turbine weight	223 tons		300 tons
Tower dimensions	221 feet at the rotor's hub, 13.2 feet wide at the base and 7.6 feet wide at the top		262 feet at the rotor's hub, 13 feet wide at the base and 7.6 feet wide at the top
Blade dimensions	129 feet long, 11.6 feet wide near the hub and 1.6 feet wide at the tip		161 feet long, 11.6 feet wide near the hub and 1.6 feet wide at the tip
Weight of each blade	More than 7 tons		11 tons
Tower foundations	Pier P & H Design — A design that relies on resistance. Buried 25 to 32 feet (depending on bedrock depth) in up to 260 cubic yards of concrete; 120 anchor bolts extend from ground level to the bottom of the 14-foot-diameter foundation (a single 28-foot-long anchor bolt weighs 150 pounds)		Gravity Design — A design that relies on weight. Buried 8.6 feet in up to 305 cubic yards of concrete; 160 anchor bolts extend from ground level to the bottom of the foundation
Generators	Each V80-model generator produces up to 1.8 MW of power; housed inside a fiberglass "nacelle," the generators produce power at 690 volts, which is stepped up by a transformer inside the nacelle to 34.5 kilovolts; a power-collection system connects strings of turbines to the substation, where power is stepped up again to transmission voltage		The SWT 101-model generator produces up to 2.3 MW of power, housed inside a steel "nacelle," the generator produces power at 690 volts, which is stepped up by a transformer outside of the tower base to 34.5 kilovolts; a power-collection system connects strings of turbines to the substation, where power is stepped up again to transmission voltage
Rotor/wind speed	The rotor spins clockwise at 16.5 revolutions per minute; the turbines generate electricity at wind speeds as low as 9 mph, reach peak generation at 31 mph, and shut down at constant wind speeds of 56 mph		The rotor spins clockwise at 6-16 rpm; the turbines generate electricity at wind speeds as low as 9 mph, reach peak generation at 28 mph, and shut down at constant wind speeds of 56 mph

* PSE's wind projects generate electricity about two-thirds of the time, with the spin of their turbine rotors varying slightly according to local wind speeds.