

*South Dakota*

WIND ENERGY



South Dakota  
Public Utilities Commission

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[www.PUC.SD.gov](http://www.PUC.SD.gov)

The South Dakota Public Utilities Commission's role in wind energy development is regulation and education. The PUC has siting authority for wind farms with a capacity of 100 megawatts or more. The PUC provides information on its website, [www.PUC.SD.gov](http://www.PUC.SD.gov), and through other sources to help South Dakotans understand the opportunities and obstacles regarding wind energy use and development.

## Wind Energy

South Dakota ranks in the top five states for wind energy potential in the United States. Recent data from the U.S. Department of Energy finds that South Dakota could produce enough wind energy by 2030 to power the equivalent of 895,000 average American homes. With the potential to power nearly three times the number of households in South Dakota, wind energy development will be an important part of the energy equation moving forward.

## Wind Quality

What factors make certain areas score higher in wind energy potential than others?

While it's true that South Dakota has plenty of wind to go around, the difference is really in the quality of the wind. South Dakota wind farms have reported higher than industry standard capacity factors, which means the quality of South Dakota wind is high. For more information on how wind is classified throughout South Dakota and the importance of wind quality, see the wind resources map on the PUC's website. Go to [www.PUC.SD.gov](http://www.PUC.SD.gov), and follow the links to "Energy," "Wind Energy," then "Potential."

## Wind Energy Benefits

**Sustainable** - Though supplies of fossil-fuel resources like coal and natural gas are finite, as far as we know, the wind will always blow.

**Environmentally-friendly** - Wind power does not emit carbon dioxide, sulfur dioxide, nitrogen oxides or mercury.

**Economic** - Although wind projects do not create many jobs, wind-related businesses, like turbine manufacturers and maintenance companies, often can and are likely to be located in areas with significant existing or possible wind development. Wind projects can also be a significant source of tax revenue for state and local governments.

## Wind Energy Limitations

**Cost** - Many utilities in our region, particularly rural municipal and electric providers, have low-cost power, primarily generated from a combination of hydropower and coal, in their portfolio. Wind power is often more expensive. However, wind power is often considered cost competitive with existing natural gas generation and new nuclear.

**Intermittency** - It is difficult to predict how hard the wind will blow at a given time during a week, a day or even an hour. This creates some integration and reliability challenges for load-serving entities.

**Generation profile vs. load needs** - The wind often blows most when we least need the electricity. Highest wind speeds are often recorded in the nighttime and early morning when energy needs are relatively low. In July, August and September, when electricity is most needed to cool our homes and businesses, the wind blows less than other times.

**Lack of (cost-effective) storage mechanisms** - Electricity must be used when it is produced. No cost-effective, large-scale storage or battery technology currently exists, but research is being conducted and costs continue to fall.

## South Dakota Wind Projects

South Dakota has operating wind farms capable of producing nearly 980 MW of wind energy.

Project	Developer	Power Purchaser	Size	Began Operation
<b>South Dakota Wind Energy Center</b> Hyde County	NextEra Energy Resources	Basin Electric Power Cooperative	40.5 MW 27 turbines	2003
<b>MinnDakota Wind Farm</b> Brookings County	Iberdrola Renewables	Xcel Energy	54 MW 36 turbines	January 2008
<b>Tatanka Wind Farm</b> McPherson County	Acciona Energy	MISO market	88.5 MW 59 turbines	March 2008
<b>Wessington Springs Wind Project</b> Jerauld County	Babcock & Brown	Heartland Consumers Power District	51 MW 34 turbines	February 2009
<b>Buffalo Ridge I</b> Brookings County	Iberdrola Renewables	Northern Indiana Public Service Co.	50.4 MW 24 turbines	April 2009
<b>Titan Wind Project</b> Hand County	BP Alternative Energy	NorthWestern Energy	25 MW 10 turbines	November 2009
<b>Day County Wind Farm</b>	NextEra Energy Resources	Basin Electric Power Cooperative	99 MW 66 turbines	April 2010
<b>Buffalo Ridge II</b> Brookings and Deuel counties	Iberdrola Renewables	MISO customers	210 MW 105 turbines	December 2010
<b>PrairieWinds SD1</b> Jerauld, Aurora and Brule counties	Basin Electric Power Cooperative	Basin Electric Power Cooperative	151.5 MW 101 turbines	February 2011
<b>South Dakota Wind Partners</b> Jerauld County	Basin Electric Power Cooperative	Basin Electric Power Cooperative	10.5 MW 7 turbines	February 2011
<b>Oak Tree Wind Farm</b> Clark County	Consolidated Edison Development	NorthWestern Energy	19.5 MW 11 turbines	December 2014
<b>Beethoven Wind Farm</b> Bon Homme, Hutchinson and Charles Mix counties	BayWa r.e. Wind	NorthWestern Energy	80 MW 43 turbines	May 2015
<b>Campbell County Wind Farm</b>	Consolidated Edison Development	Basin Electric Power Cooperative	94.3 MW 55 turbines	December 2015

Smaller projects are in operation around Chamberlain, Howard, Gary, Canova, Carthage, Oaklane Colony and Rosebud.

## Successful Development

A successful wind farm needs three basic ingredients:

1. **An excellent wind resource** – South Dakota’s wind resource ranks from fair to excellent.
2. **Transmission** – Capacity on high voltage lines is needed to get the energy to the end user.
3. **A buyer for the electricity** – Wind farm developers typically do not deliver the electricity to consumers. Electric utility companies buy the electricity from the developer. It is preferred the wind farm have a signed, long-term contract with a buyer before making an investment.

## Transmission

Transmission is a key element of a successful wind project and one of the biggest obstacles. The current transmission system in South Dakota is mostly full. Utility companies that own the lines are using the capacity to transmit electricity that’s already being produced to customers. The leftover capacity is limited. Further, that leftover capacity fluctuates depending on energy use. During times of extreme heat or cold, the capacity of the lines may be in complete use. Considering wind energy is not produced at a constant level – it fluctuates based on when and how hard the wind blows – that leftover transmission capacity may not be adequate to carry newly-produced wind energy.

Major transmission lines are generally estimated to cost between \$1 million and \$2 million per mile to construct. That’s a huge investment for a wind developer. South Dakota is far from large energy-use markets like Minneapolis and Chicago so the distance and cost to export wind energy is great.

The good news is that in recent years the PUC has approved several major transmission line projects in South Dakota, many with the purpose of assisting the development of wind power.

## Neighboring States

South Dakotans may see wind farms in Minnesota or hear news reports of California's rebate programs for renewable energy systems and wonder why our state doesn't develop wind energy at the same pace as others. When making comparisons to other states, it's important to consider the differences between South Dakota and its counterparts. For example, both Minnesota and California have larger populations, more energy use and new energy needs, and more state government-collected taxes and funds than South Dakota. Population and growth drive the demand for new energy in those states and taxes fund incentives available to companies and individuals with renewable energy systems.

## Small Wind Systems

South Dakotans who want to install a small wind system to provide power to their homes or other facility should consider these points:

**Need** – Determine the practicality of having a wind system. It may be worth investigating if your property has a good wind resource, is located on at least one acre of land, if your local zoning codes or covenants allow wind turbines, if your average electricity bills are \$150 per month or more, and if you are comfortable with long-term investment.

**Cost** – According to the U.S. Department of Energy, the average installed price for small wind systems (up to 100 kW) in 2015 was \$5,760 per kilowatt. The actual installed price will vary depending on the size and location of the turbine. Other facts affecting cost can include maintenance, connection, payment to a utility provider for when the wind doesn't blow and insurance, among others. While a small wind system is a big investment, the federal government and South Dakota have developed tax credit and incentive programs to encourage small wind development.



## Net Metering

Net metering is a policy in which a utility must purchase power generated by its consumers at the same retail price it sells electricity to the customer. Typically used as an incentive for customers who install renewable energy systems like wind turbines, net metering was first considered as a result of the Public Utility Regulatory Policies Act of 1978. At the time, South Dakota policymakers debated and chose not to implement it. Having considered this on numerous occasions, the state legislature concluded mandatory net metering is not in the public interest.

Net metering hasn't been adopted for several reasons. First, the utility would be forced to pay the generator above market cost of generation. Further, the utility would not be able to schedule the generation of electricity and it would be worth less than electricity they are already buying for a lower price.

Retail electricity rates are based on the cost of generation and the cost of distribution and transmission facilities. If utilities must pay above market rates for substandard power, rates will eventually have to rise to cover increased expenses. Increased rates will have the largest effect on low income customers, who couldn't afford the upfront costs of renewable energy systems in the first place.

Small generators have the opportunity to sell power to a utility without net metering. The purchase price the utility pays must reflect the value of generation and be similar to the utility's wholesale cost of power. It doesn't include costs of transmission, distribution and overhead, as well as other costs of providing electrical service that are included in net-metered rates.

All electric utilities regulated by the PUC are obligated to interconnect with and purchase power from small wind facilities if the generator desires and agrees to the terms. These rates must be filed with the PUC. This transparency allows producers to compare rates and make informed decisions regarding the economics of a small renewable power facility.