



WIND ENERGY

Introduction

Harnessing wind energy is certainly not a new concept. Years ago windmills were widespread in rural South Dakota and were used to pump water. Many are still in use today. Converting wind energy to electricity is also not a new concept; however, it is becoming increasingly popular because wind energy is a clean, cost effective, renewable source of energy. This issue memo will discuss the wind resource in South Dakota, highlight some technical and non-technical issues related to developing South Dakota's wind resource, and review some legislative issues.

South Dakota's Wind Resource

While wind-generated electricity has its roots in California, there are sixteen states that have greater wind energy potential than California. According to an assessment of wind energy conducted in 1991 by the Pacific Northwest Laboratory, South Dakota ranks fourth in the nation for wind energy potential.

As a renewable resource, wind is categorized according to wind power classes based on typical wind speeds. The classes range from class 1 (the lowest) to class 7 (the highest) as detailed in the following table:

Wind Power Class	Resource Potential	Wind Speed in mph
Class 1		0 to 12.5
Class 2	Marginal	12.5 to 14.3
Class 3	Fair	14.3 to 15.7
Class 4	Good	15.7 to 16.8
Class 5	Excellent	16.8 to 17.9
Class 6	Outstanding	17.9 to 19.7
Class 7	Superb	19.7 to 24.8

In general, class 3 or higher wind power can be useful for generating electricity with large, utility scale wind turbines. Small wind turbines may be used with any wind speed.

According to a map published by the United States Department of Energy's National Renewable Energy Laboratory, nearly the entire state of South Dakota has a class 3 or

higher wind classification. There are even several areas in South Dakota that have a class 6 rating. In a nutshell, South Dakota has a tremendous wind resource.

Technical Issues

Environmental - Wind-generated electricity is a clean and renewable form of energy. It does not create pollution or toxic waste, nor does it consume scarce resources. In spite of these advantages over conventional power plants, there are some environmental concerns with wind energy. These concerns include noise generated by the wind turbine, aesthetic concerns by nearby residents over the highly visible towers, ecological concerns about constructing roads that access wind turbines, and wildlife concerns primarily related to birds. Most environmental issues can be resolved through proper research and siting of the wind turbines.

Transmission - Transmission lines are the vehicles that move electricity from point A to point B. These transmission lines are subject to constraints that limit the amount of electricity that can be transmitted safely and reliably. A critical issue for wind energy development in South Dakota is whether transmission capacity is available to bring large amounts of wind energy to market without upgrade or expansion of the existing transmission and distribution systems. The Federal Energy Regulatory Commission regulates pricing and access for transmission of electricity.

Metering - Metering or billing policies are important to the development of individual small-scale wind energy systems. Electric power produced by an individual consumer's wind turbine reduces the amount of electricity that the individual purchases from the electric utility. If the wind turbine produces more electricity than the individual is using, electricity flows back into the utility grid. Normally, the electric utility would be required to purchase every kilowatt-hour of electricity that flowed back into the utility grid.

With net metering (net billing), the direction of flow of electricity is irrelevant. The meter may slow down or spin backwards depending on how much electricity the individual's wind turbine is producing. However, at the end of the billing period, the net amount of electricity supplied by the electric utility or by the individual is recorded. If the customer received more electricity from the utility than the customer supplied, the customer pays the utility for the difference.

Approximately thirty states have some form of net metering laws. The South Dakota Legislature debated this issue in House Bill 1232 during the 2000 Legislative Session. The bill did not pass. It is likely that this issue will be debated again.

Non-technical Issues

Economic Effects - Wind-generated electricity has become cost competitive with conventional fossil fuel-generated electricity due to improvements in wind energy technology. There are also several direct economic effects from wind energy projects. These include additional revenue to landowners, job creation, demand for local goods and services, and additional tax revenue for state and local governments.

Rural landowners can reap economic rewards from wind energy development. A wind developer pays a landowner for the right to place a wind turbine on private land. Once the wind turbine is constructed, the landowner receives a payment from the utility company based on the amount of electricity generated. Landowners in Minnesota and Iowa have received payments of \$2,000 per wind turbine per year. The wind turbines and access roads occupy a very small portion of the land. In most cases, farming and ranching operations are virtually undisturbed.

A large-scale wind energy project can benefit a local community by providing full-time jobs during the construction period. The construction workers will create a demand for local goods and services. Skilled workers will also be required for operation and maintenance of the wind energy facility once construction is complete.

Wind energy projects result in increased tax revenue. Local governments receive additional property tax revenue from the construction of turbines, access roads, and sub-stations.

Easements - One of the first steps in a large-scale wind energy project is for the utility company or wind developer to obtain easements on private land. These easements give the developer the right to use all or a portion of private land to construct and maintain a wind energy facility. A wind energy easement is a legally binding agreement and should be carefully reviewed and understood before execution. Wind energy easements generally cover twenty to thirty years. It is important for the landowner to get every detail in writing.

Legislative Issues

There have been a variety of policy options used by state legislatures to encourage wind energy projects. These include net metering laws, tax incentives, utility bill fuel source disclosure statements, and mandating that utility companies provide a specific amount of renewable energy (commonly five to seven percent of total power produced).

Current South Dakota law gives a property tax credit for renewable resource energy systems used in residential and commercial applications (South Dakota Codified Laws chapter 10-6). However, the tax credit does not apply to systems that produce energy for sale. County commissioners may also adopt a discretionary formula for reduced taxation of property.

Minnesota and Iowa are two states where large-scale wind energy projects have recently been constructed. Both of these states have some form of property tax and sales tax incentive for renewable energy.

Summary

In conclusion, South Dakota has a tremendous wind resource. Wind-generated electricity is becoming a cost effective alternative as the technology continues to improve. There are several technical and non-technical issues that need to be

considered when developing wind energy. Legislatures have several policy options that may be used to encourage wind energy development.

Additional Resources

The following Internet addresses provide additional detailed information on wind energy.

www.awea.org

American Wind Energy Association

www.nrel.gov

National Renewable Energy Laboratory

www.nationalwind.org

National Wind Coordinating Committee

www.eren.doe.gov/wind/

US Department of Energy

www.windustry.org

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This issue memorandum was written by David Becker, Senior Fiscal Analyst for the Legislative Research Council. It is designed to supply background information on the subject and is not a policy statement made by the Legislative Research Council.
