APPENDIX B

SITE SELECTION STUDY

BASIN ELECTRIC
POWER COOPERATIVE

Your Touchstone Energy® Cooperative

PrairieWinds – SD 1
Alternative Evaluation Analysis and Site Selection Study

(January, 2009)

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1. Introduction

Basin Electric Power Cooperative (Basin Electric) is a consumer-owned, regional cooperative headquartered in Bismarck, North Dakota which services 126 member rural electric systems in nine states: Colorado, Iowa, Minnesota, Montana, Nebraska, New Mexico, North Dakota, South Dakota, and Wyoming. These member systems, in turn, distribute electricity to more than 2.6 million customers.

Public policy regarding the electric industry has increasingly focused on the carbon intensity of the resources commonly used to generate electricity. As a result, incentives and regulations to encourage or require the generation of power from renewable or low environmental impact resources are being actively considered and/or implemented within the Basin Electric member service areas. At the same time, a number of proposals for national Renewable Portfolio Standards (RPS) are pending in Congress. With members in nine states, Basin Electric recognizes the need for additional renewable energy capacity to service forecasted member load growth demands and to meet state mandated RPS. A wind project of up to 150 Megawatts (MW) was determined to be the least-cost renewable resource option to satisfy future load and RPS requirements.

Basin Electric membership passed a resolution at their 2005 annual meeting that established a goal for Basin Electric to "obtain renewable or environmentally benign resources equal to 10% of the MW capacity needed to meet its member demand by 2010". This project would also provide opportunity for Basin Electric to meet that goal.

An Environmental Impact Statement (EIS) is being prepared under the direction of the U.S. Department of Agriculture, Rural Utilities Service (RUS) for the proposed project. Basin Electric Power Cooperative has submitted a loan application to RUS for the proposal. Thus the EIS will be developed in accordance with National Environmental Policy Act (NEPA) requirements and RUS NEPA implementing regulations.

The purpose of this report is to describe the proposal, and the technological and siting alternatives that were evaluated in its development. The report is prepared in accordance with RUS requirements at 7 CFR 1794.51(c). The material presented here forms in large part the basis for a more detailed assessment required for federal agency compliance with NEPA.

2. Project Overview

Basin Electric is proposing to construct a 151.5 megawatt (MW) (nameplate rating) wind project in central South Dakota. The PrairieWinds – SD 1 Project (Project) includes approximately 101 wind turbine generators. The wind resource assessment study conducted in the area projects a net capacity factor in the upper thirty percentile range. Power from the facility would be supplied to Basin Electric's customers through an interconnection with the IS, of which Western Area Power Administration (Western) is the control area operator.

Two alternative sites are being evaluated, as depicted in Figure 1. The proposed project areas encompass roughly 37,000 acres of leased private land at the Crow Lake Site Alternative or roughly 49,000 acres of leased private land at the Winner Site Alternative.

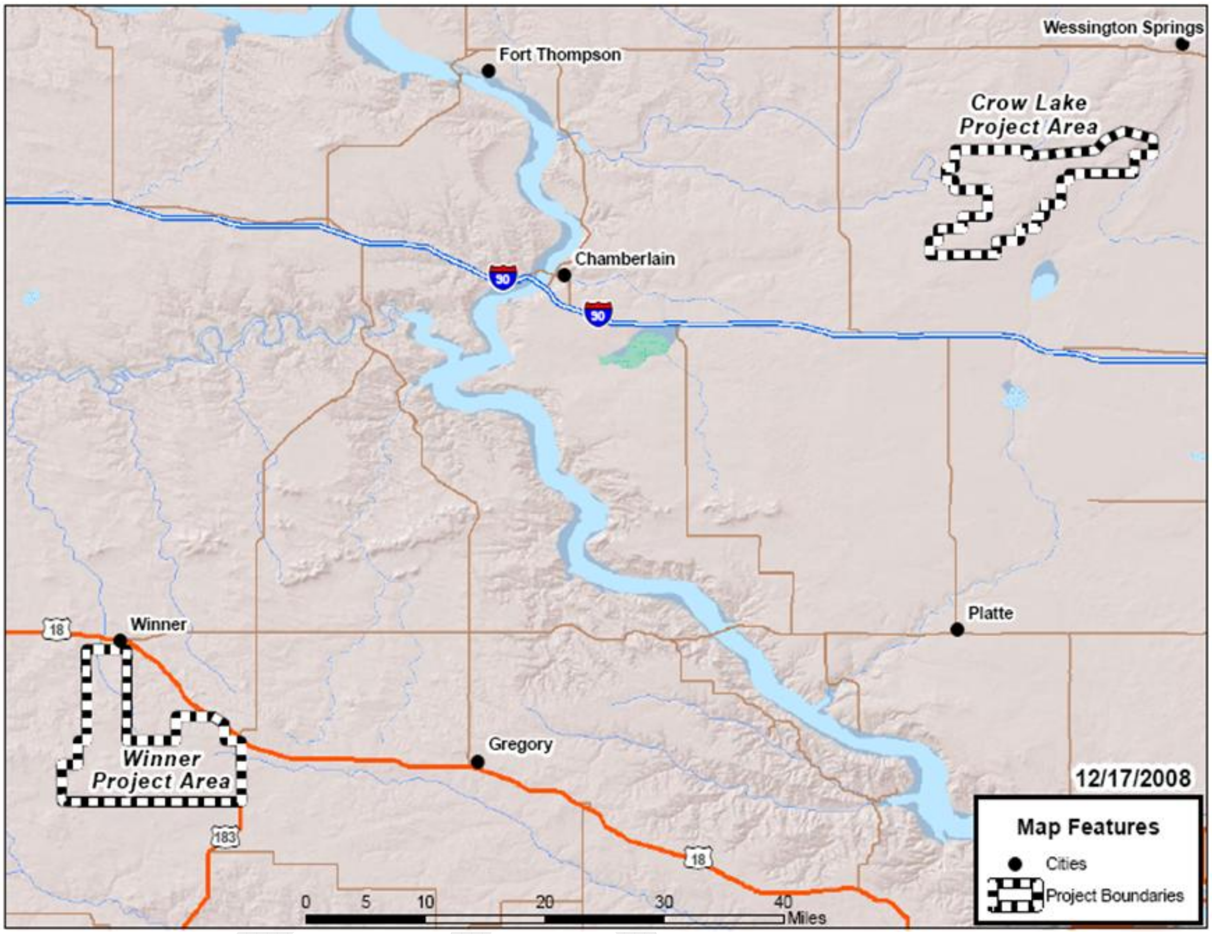

Figure 1. Project Site Alternatives

The PrairieWinds – SD 1 Project will consist of four main facilities:

- Turbines: Basin plans to install approximately one hundred one (101) General Electric 1.5sle model wind turbines for a South Dakota wind project. Each generator will have a nameplate capacity output of 1.5 MW of power. Each generator will have a hub height of 80 meters (262 feet) and a turbine rotor diameter of 77 meters (252 feet). The total height of each wind turbine would be 118.5 meters (389 feet) with a blade in the vertical position. The towers will be constructed of tubular steel, approximately 15 feet in diameter at the base, with internal joint flanges. The color of the towers and rotors will be standard white or off-white. During construction, a work/staging area at each turbine would include the crane pad and rotor assembly area. This area would measure 190 feet by 210 feet. The turbine foundations would typically be mat foundations (inverted T-foundations) or a concentric ring shell foundation. The area excavated for the turbine foundations would typically be no more than 70 feet by 70 feet. Pad mounted transformers would be placed next to the each turbine. In some cases, for step-and-touch voltage compliance, an area around a turbine may be covered in 4 inches of gravel, river rock or crushed stone.

- Collector System: Each wind turbine would be interconnected with underground power and communications cables, called the collector system. This system would be used to route the power from each turbine to a central collector substation where the electrical voltage will stepped up from 34.5 kV to 230 kV. The collector substation would be enclosed in a fence with dimensions of roughly 350 foot by 140 foot. The underground collector system would be placed in one trench or two parallel trenches and connect each of the turbines to a central collector substation. The estimated trench length, including parallel trenches, is 317,000 feet (60 miles) for either alternative site.

  The fiber optic communication lines for the project would be installed in the same trenches as the underground electrical collector cables and connect each turbine to the Operations and Maintenance (O&M) Building and collector substation.

  It is anticipated that a 5,000 square foot (50'x110') O&M building would be built within the vicinity of the collector substation. The final location would be determined in consultation with future operations personnel.

- Roads: New access roads would be built to facilitate both construction and maintenance of the turbines. This road network would be 70 miles of new or upgraded roads. These roads will be designed to minimize length and construction impact. Initially, turbine access roads would be built to approximately twenty-five (25) feet in width, to accommodate the safe operation of construction equipment. Upon completion of construction, the turbine access roads would be reclaimed and narrowed to an extent allowing for the routine maintenance of the facility. Existing roads, state and county roads, and section line roads will also be improved upon to aid in servicing the turbine sites. Approximately 30 to 40 miles of new turbine access roads would be built and 25 to 35 miles of existing roads would be used and where appropriate, improved.

- Transmission: For the Crow Lake Site Alternative, a new 230 kV transmission line would be required to deliver the power from the collector substation to a 230 kV Western interconnection point at the Wessington Springs substation. The Wessington Springs substation is located approximately 9 -12 miles from the collector substation. The proposed line would be built using wood or steel H-frame (two pole) structures or steel single-pole structures. The structures will be about 85-95 feet high and span about 800 feet.

  For the Winner Site Alternative, a new 115 kV transmission line would be required to deliver the power from the collector substation to a 115 kV Western interconnection point at an existing substation near Winner, SD, known as the Winner Substation. Alternatively, a new 115 kV substation tapping the 115 kV Western line that crosses the site might be a potential interconnection if allowed by Western. The Winner substation is located approximately 6-8 miles from the collector substation. The proposed line would be built using wood or steel H-frame (two pole) structures or steel single-pole structures. The structures will be about 75-85 feet high and span about 700 feet.

3. Project Need and Justification

Existing Resources

Basin Electric operates a total of 3,508 megawatts (MW) of electric generating capacity of which 953 MW is dedicated for participants in the Missouri Basin Power Project. The Missouri Basin Power Project is a group of six consumer-owned utilities, including the Missouri River Energy Services and Heartland Consumers Power District. Basin Electric also has 73 MW of ownership rights in two projects which it does not operate, and has a total of 136 MW of wind energy resources in the form of owned projects and power purchase agreements. In addition, Basin Electric has 22 MW of recovered energy generation through power purchase agreements. Basin Electric also manages and maintains 2,424 miles of high-voltage transmission lines, 40 switchyards and substations, and 58 microwave installations used for communications and system protection.

Projected Energy Requirements

Between 1999 and 2006, Basin Electric's system peak demand increased 752 MW, from 1,195 MW to 1,947 MW, which is approximately 107 MW per year. Basin Electric system energy sales increased 5.3 million MWh, from 6.5 million MWh to 11.8 million MWh, or approximately 760,000 MWh per year. Basin Electric forecasts peak demand on its system to grow by 1,834 MW from 2006 through 2021. This will be a growth of approximately 122 MW per year. The load growth is driven mainly by commercial sector growth which includes energy related development in the form of coal, oil and gas development. There are also increased loads in the residential sector mainly located on the outskirts of larger cities within the service territory.

Basin Electric's total system deficit is 275 MW in 2008 and is forecasted to increase steadily over time. The two periods that do not produce additional deficits from one year to the next are when the Dry Fork Station in Wyoming is anticipated to go commercial in 2011 and when a long-term power supply obligation ends in early 2016.

Project Need

Basin Electric has established the need for additional renewable energy capacity to service forecasted member load growth demands, to meet Basin Electric's renewable energy goal set forth in 2005, and to meet state mandated RPS. Wind is the most viable renewable technology based on availability and economics. Solar resources in the region are limited. While solar economics are improving, costs are still not competitive with wind. Geothermal and bio-based resources are in some cases cost effective but are either restricted to limited or distant locations, available in only small quantities, or present other environmental concerns. In contrast, potential wind resources in the Basin Electric member service territory are generally recognized as excellent, and limited mainly by land use and transmission. A 150 Megawatt (MW) wind project was determined to be the best available, least-cost renewable resource option to satisfy future load and RPS requirements.

4. Alternative Evaluation Analysis

Overview

Basin Electric is in the process of completing a detailed power supply analysis. The draft 2007 Power Supply Analysis (PSA) provides an in depth look at Basin Electric's current operating system, future load growth and the framework for future expansion, including both supply-side and demand-side resource expansion. Twelve resource expansion portfolios were created to meet the anticipated needs of Basin Electric. These portfolios were evaluated with respect to cost, performance, and risk. All portfolios included some component of wind energy development.

The twelve portfolios ranged from emphasizing nearly all baseload development to all peaking development, with various combinations in between. A number of demand-side and supply-side resource alternatives have been considered as a means of meeting the forecasted electrical need for Basin Electric. The alternatives evaluated include:

- Demand Side Management
- Renewable Energy Sources
  - Wind
  - Solar
  - Hydroelectric
  - Geothermal
  - Biomass Power
  - Biogas
  - Municipal Solid Waste
- Fossil Fuel Generation
  - Simple Cycle Combustion Turbines
  - Combined Cycle Combustion Turbines
  - Microturbines
  - Coal Facility
- Nuclear Power
- Repowering/Uprating of Existing Generating Units
- Participation in Another Utility's Generation Project
- Purchased Power / Request for Proposals
- New Transmission Capacity

The most economical means of supplying power to a load that varies every hour on an electric power system is to have three basic types of generating assets available for use. These generation assets are commonly referred to as baseload, intermediate, and peaking capacity.

Baseload capacity runs at its full capacity continuously throughout the day and night, throughout the year. The output of baseload-type plants cannot be rapidly decreased or increased to "follow load." Baseload units are designed to optimize the balance between high capital/installation cost and low fuel cost, resulting in the lowest overall production cost under the assumption that the unit will be heavily loaded for most of its life. Typically, baseload capacity units are operated around 80 percent capacity factor or more. Coal-fired power plants, nuclear plants, and hydroelectric plants are examples of baseload generation capacity. However, hydro plants that follow load are not considered baseload units.

Intermediate capacity units are designed to be "cycled" at low load periods, such as evening and weekends. The units are loaded up and down rapidly to handle the load swings of the system while the unit is online. Typically, intermediate capacity units are operated between a 20 and 80 percent capacity factor, or between baseload and peaking. Technologies for intermediate-load plants include oil or gas-fired steam cycle plants, combined cycle plants, some hydroelectric plants, and internal combustion engine generators. While not an "on call" resource, wind facilities typically have capacity factors ranging from 30 to 40 percent, and may be classified as intermediate resources.

Peaking capacity is only operated during peak load periods and during emergencies. Very low capital/installation costs are important due to the fact these units are typically not operated very often. The production costs are relatively high due to the high cost and volatility in the price of fuel. Types of peaking capacity power plants include combustion turbines, internal combustion engine plants, and pumped-storage hydroelectric facilities. Typically, peaking resources are operated under a 20 percent capacity factor.

Of the twelve resource expansion portfolios analyzed in the PSA, the preferred portfolio included 300 MW of wind, 200 MW of peaking generation, 250 MW of intermediate generation and 600 MW of baseload coal generation. The PrairieWind ND project is proposed to meet a portion of

Basin Electric's projected wind generation requirement. While baseload, intermediate, and peaking capacity units that use conventional (fossil) fuels are being contemplated for inclusion in Basin Electric's resource expansion plan, they are not addressed in this alternative evaluation analysis.

Demand Side Management

Demand Side Management (DSM) is the process of managing the consumption of energy, generally to optimize available and planned generation resources. According to the Department of Energy, DSM refers to "actions taken on the customer's side of the meter to change the amount or timing of energy consumption. Utility DSM programs offer a variety of measures that can reduce energy consumption and consumer energy expenses. Electricity DSM strategies have the goal of maximizing end-use efficiency to avoid or postpone the construction of new generating plants."

DSM programs aim to achieve three broad objectives: energy conservation, energy efficiency and load management. Energy conservation can reduce the overall consumption of electricity by reducing the need for heating, lighting, cooling, cooking energy and other uses. Energy efficiency can encourage consumers to use energy more efficiently, and thereby getting more out of each unit of electricity produced. Load management allows generation companies to better manage the timing of their consumers' energy use. Thus, helping to reduce the large discrepancy between on-peak and off-peak demand.

Approximately half of the Basin Electric members are utilizing load management to manage their power purchases from Basin Electric. Basin Electric has implemented a system-wide load management program on its eastern system. This program enables Basin Electric to target large loads and/or generation that are not included in the members' load management programs to be used during Basin Electric's seasonal peak periods. Basin Electric has approximately 6-10 MW of load management available at this time.

DSM programs are capable of reducing the energy demand and reducing the required capacity of future additional generation facilities. It is apparent, however, that energy savings through DSM are not enough to alleviate the need for the additional generating capacity fulfilled by the current proposal.

Repowering/Uprating of Existing Generating Units

Basin Electric has committed to upgrading the high pressure and intermediate pressure (HP/IP) turbine section of the main turbine at all three units of the Laramie River Station. The Unit 2 upgrade occurred in the spring 2007 maintenance outage. The Unit 3 upgrade occurred in the spring 2008 maintenance outage, and Unit 1 is scheduled to be upgraded during the spring 2009 maintenance outage. The upgrade to the HP/IP turbine is anticipated to increase the net output of each unit by 8-12 MW for a total of 24-36 MW. Basin Electric could see an additional 10-15 MW from the upgrades of these turbines, due to its 42.27% ownership share of the Missouri Basin Power Project (MBPP). The increase in net output is an efficiency increase because there is no increase in the fuel input to the units.

Basin Electric has also evaluated the option of upgrading the HP/IP turbines at the Antelope Valley Station. However, work within the boiler would need to be done to make this a viable project. This work would require full "New Source Review" (NSR) for modification of the boiler. Basin Electric has determined that modifying the Antelope Valley Station to increase generation is not economically justifiable.

While Basin Electric has made progress in upgrading existing facilities, it is apparent that the scale of the improvements does not alleviate the need for the additional generating capacity fulfilled by the current proposal.

Participation in Another Utility's Generation Project

Basin Electric has been having discussions with some neighboring utilities about participating in a third unit at the Milton R. Young Station near Center, North Dakota. Basin Electric is looking at a 100 MW share of a 500 MW unit to be operational in the 2016-2020 time period.

This participation could help meet a portion of Basin Electric's long-term need for increased generating capacity in the region, but would not meet the purpose and need for its renewable energy requirements.

Purchased Power / Request for Proposals

Basin Electric has signed a 25-year contract with the developer of four currently operational Recovered Energy Generation (REG) power plants to purchase the output from four additional REG plants. The plants are fueled by hot exhaust from compressors on the Northern Border Pipeline. There will be one site each in Montana and Minnesota, and two sites in North Dakota. These additional four sites should have a total combined output of 22 MW and are anticipated to be operational in 2009. The generation is environmentally benign, using virtually no additional fuel and producing virtually zero emissions.

Basin Electric hired Power Systems Engineering (PSE) to develop and issue a Request for Proposals (RFP) in early 2007 for short- and long-term power supply on both its eastern and western system. The long-term proposals were used to evaluate against Basin Electric's self-build options. The short-term proposals could be utilized to meet some of Basin Electric's need in the next couple of years. Renewable proposals were also sought.

Short-term Proposals

Basin Electric received short-term proposals from nine different entities for power products located in Basin Electric's eastern and western systems. The short-term proposals were evaluated by PSE.

Figure 2 compares Basin Electric's eastern system needed generation capacity to the magnitude of proposals received. From this information it was determined that Basin Electric could purchase the needed power from the market through 2009 but would need to develop additional resources to meet the needed obligations beyond 2009. Basin Electric elected to short-list one proposal from the proposals received for delivery into Basin Electric's eastern system. However, since the proposals do not include renewable energy resources, they do not meet the purpose and need fulfilled by the current project.

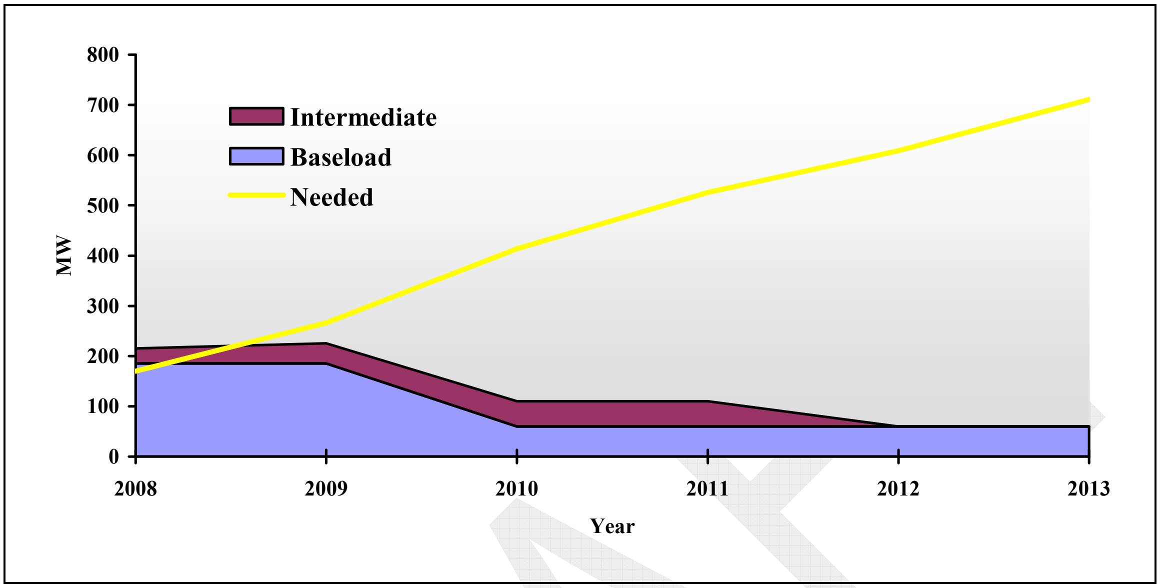

Figure 2. East System Short-Term RFP Proposals

Long-term Proposals

Basin Electric received four conventional long-term power purchase proposals from two different entities for either coal generation or a combination combined cycle and simple cycle generation. It was believed that the four long-term proposals were more costly than Basin Electric's self build options. Furthermore, they did not include renewable energy sources. As such, they do not meet the purpose and need fulfilled by the currently proposed project.

Renewable Proposals

Basin Electric received 12 proposals from nine different entities for wind generation. These 12 wind proposals were located in North Dakota, South Dakota, Montana and Wyoming. Figure 3 shows the anticipated first-year bus bar of each proposal. Bus bar cost is the cost of producing one MWh of electricity, typically including the cost of capital, debt service, operation and maintenance, and fuel. The renewable proposals were evaluated by Basin Electric staff.

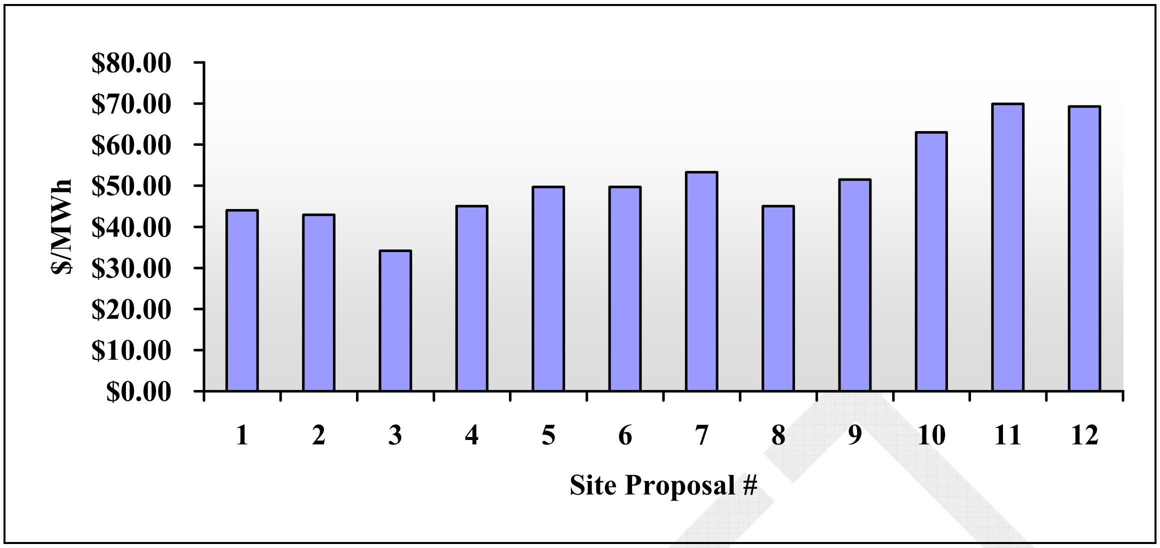

Figure 3. Renewable Proposals First-Year Bus Bar Costs

Based on the anticipated capacity factors, installation locations, bus bar costs, price escalation terms and durations of the proposed agreements, Basin Electric determined the self-build option for wind generation was the most economical.

New Transmission Capacity

There is limited available transmission capacity (ATC) on the transmission system to move power into the Integrated System (IS) from Nebraska Public Power District (NPPD), Mid-American Energy Company (MEC), Midwest Independent Transmission System Operator (MISO) or Saskatchewan. In order to bring in enough power to cover Basin Electric's total need, additional transmission would need to be built and there would probably be upgrades needed to third-party transmission.

Another concern is the availability of existing generation capacity outside the region to meet Basin Electric's need. The Request for Proposals provided few responses for power from outside the IS area during the short term; one proposal within MISO, one proposal within MEC and one proposal within NPPD. One proposal for a long-term output of a new coal plant was received that would result in either additional transmission to be built or additional wheeling expense to move the power into the IS or both. Because of these anticipated higher costs, Basin Electric feels it would be a better economic decision to build the new generation within the IS and therefore avoid some unnecessary transmission costs to provide power to the membership at the lowest reasonable cost.

Renewable Energy Resources

Overview

Renewable energy comes from sources that are essentially inexhaustible in duration but limited in the amount of energy that is available per unit of time. These energy supplies can be endless resources such as the sun, the wind, and the heat of the Earth, or they can be replaceable fuels such as biomass, i.e. combustible plants or plant extracts, such as ethanol. The renewable energy sources evaluated include wind, solar, hydroelectric, geothermal, biomass, biogas and municipal solid waste.

In 1850, about 90 percent of energy consumed in the United States was from renewable energy resources. Now the United States is heavily reliant on non-renewable fossil fuels: coal, natural gas, and oil. Figure 4 shows that 9 percent of total electricity production was contributed from renewable energy in 2004. Non-hydro renewables made up only 2.3 percent of the total generation in the United States in 2004.

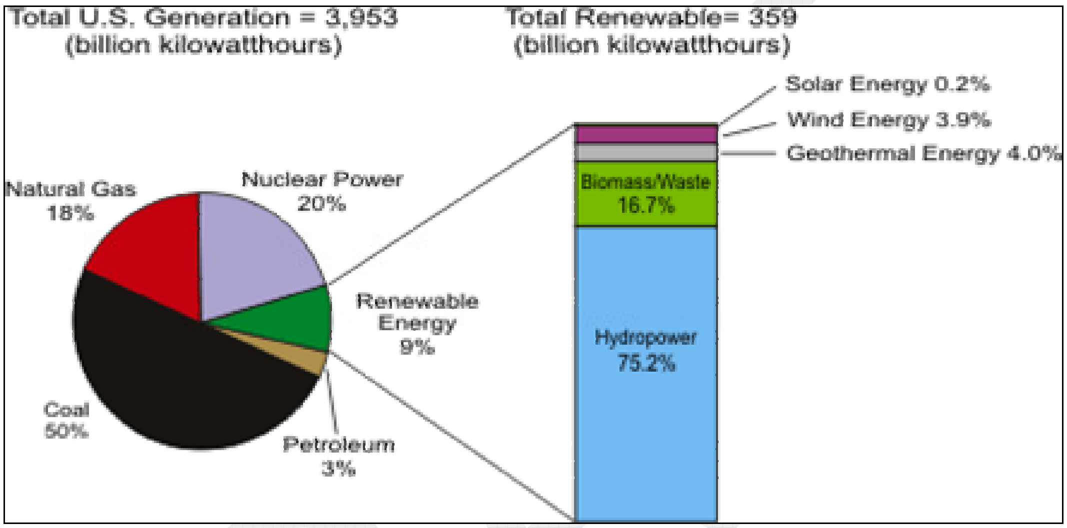

Figure 4. U.S. Electricity Generation by Energy Source, 2004[1]

Solar

The sun's energy can be converted to electricity directly through photovoltaic cells (solar cells) or through thermal systems. In a thermal system, a heat transfer fluid heated in the receiver is used to generate steam. In turn, that steam is used in a conventional turbine-generator to produce electricity. Thermal systems appear practical only in the southwestern United States. Solar energy varies by location and by the time of year. Solar resources are expressed in watt-hours per square meter per day ($Wh/m^2/day$). This measurement quantifies how much energy falls on a square meter over the course of an average day.

There are two types of solar collectors, flat-plate and concentrator. Flat-plate collectors are generally fixed in a single position, but can be mounted on structures that maximize their exposure to the sun on a daily or seasonal basis. Concentrator collectors focus direct sunlight onto solar cells for conversion to electricity. These collectors are on a tracker so they always face the sun directly. Since these collectors focus the sun's direct rays, they cannot utilize indirect sunlight.

[1] Source: U.S. DOE Energy Information Administration: *Renewable Energy Sources: A Consumer's Guide* (Ref. 16)

Figure 5 shows a map of the United States and the amount of solar resource capability for a flat-plate collector. Moderately useful solar resources are located throughout the Basin Electric service area.

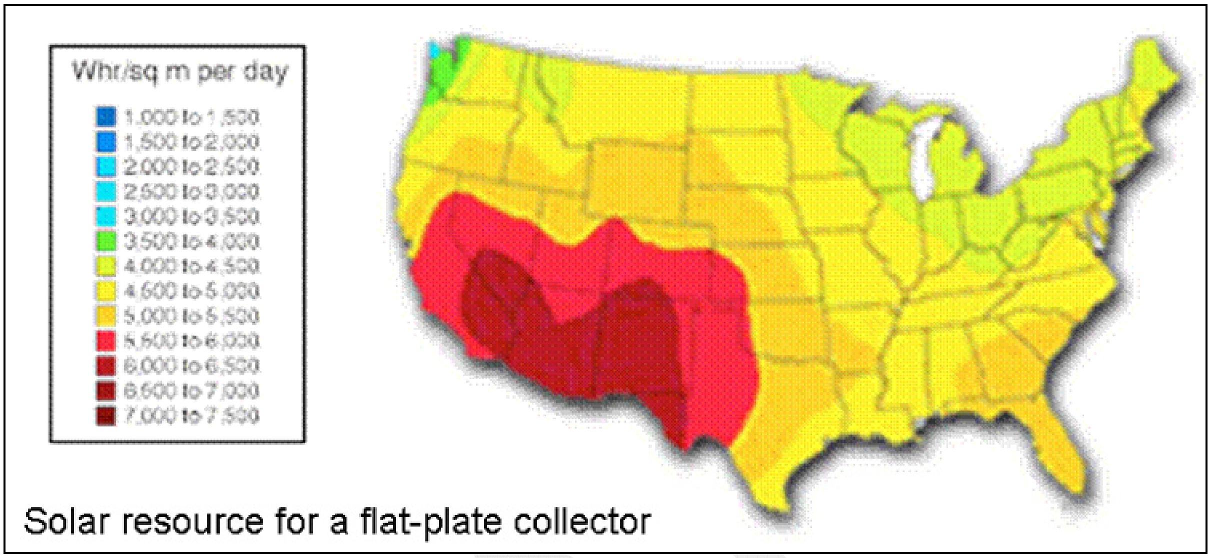

Figure 5. Solar Resources for a Flat-Plate Collector in the United States[2]

Figure 6 shows a map of the United States and the amount of solar resource capability for a concentrator collector.

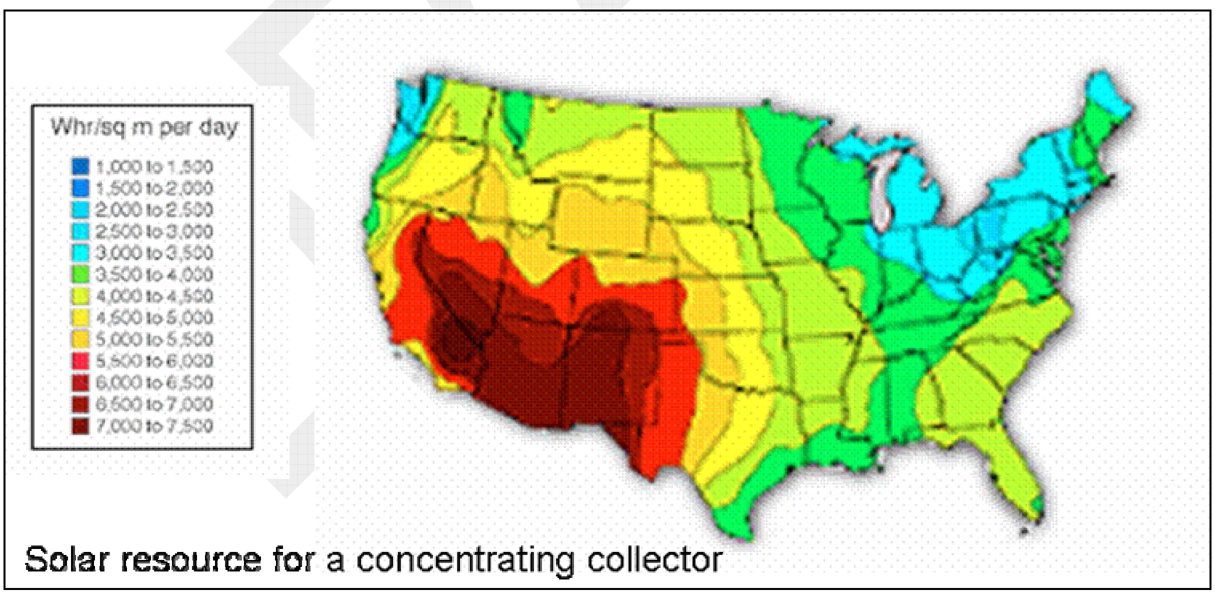

Figure 6. Solar Resources for a Concentrating Collector in the United States[3]

[2] Source: U.S. DOE EERE State Energy Alternatives website (Ref. 13)
[3] Source: U.S. DOE EERE State Energy Alternatives website (Ref. 13)

Photovoltaic (PV) systems are expected to be used in the United States for residential and commercial buildings, distributed utility systems for grid support, peak power shaving, and intermediate daytime load following. With improvements in electrical storage and transmission, PV systems may be used for dispatchable electricity and for hydrogen gas (H_2) fuel production.

The main advantages of PV systems are their modularity, portability, high reliability, and low environmental impact. These systems have no (or few) moving parts, which means operating and maintenance costs are low. Another obvious benefit of PV systems is that the sun provides abundant and free fuel. Solar power, however, can be very unpredictable due to weather and other factors. It is not dispatchable in a traditional sense, meaning its output cannot be controlled and scheduled to respond to variable consumer demand for electricity. It does, however, have the advantage of providing output that has considerable coincidence with natural demand for electricity. The demand is driven largely by daytime activities – particularly in the summer when a large amount of electricity is used for air conditioning.

Fixed, investment-related charges are the largest component of solar-based electricity costs. Capital costs for PV systems range from $5,000 to $12,000 per kilowatt and are offset by low operating costs (no fuel). The 20-year lifecycle cost ranges from $200/MWh to $500/MWh.

Solar power could help fulfill the need for intermediate generation as it generally has an annual capacity factor of 20-35%. However, estimated bus bar costs are very high compared to other resources. Due to its intermittency, solar power could be integrated with on-call natural gas generation to provide a more stable product. Basin Electric, however, believes wind generation to be a better alternative than solar, especially when factoring in the relatively high bus bar cost of PV electricity, the wind potential within the Dakotas, and the limited availability of solar power resources within Basin Electric's eastern system.

Hydroelectric Power

Hydroelectric power (hydropower) uses the kinetic energy of flowing water. Hydropower is captured and used to power machinery or converted to electricity. Hydropower plants will typically dam a river or stream to store water in a reservoir. The water is released from the reservoir and it flows through a turbine causing it to spin and activates a generator to produce electricity. A pumped-storage hydroelectric plant has the ability to store energy by moving water from lower to higher potential energy. Energy (off-peak) is sent from the power grid to the electric generators. The generators then turn the turbines in reverse, which causes the turbines to pump water from a lower reservoir to an upper reservoir. When energy is needed, water is released from the upper reservoir back down to the lower reservoir, turning the turbines forward and generating electricity. Hydropower is the nation's leading renewable energy source, accounting for 75% of the nation's total renewable electricity generation.

Hydropower is the least expensive source of electricity in the United States, with typical efficiencies of 85% - 92% during production. The DOE's Idaho National Laboratory (INL)[4] reports hydropower capital costs to be $1,700 to $2,300/kW. Operating and maintenance costs

[4] Source: Idaho National Laboratory (Ref. 18).

are relatively low at about $6 to $7/MWh. The total levelized cost of hydropower is projected to be about $24/MWh. A hydropower facility will most likely operate longer than 50 years.

Hydroelectric power production is seasonal and depends greatly on year-to-year rainfall levels. With an average annual capacity factor of 40 to 50 percent, it could meet Basin's intermediate capacity need. However, there have been several years of drought in the Upper Midwest and water is currently very limited. Further, environmental impacts associated with flooding a valley to create a reservoir may be significant, and permitting would likely be complex and time-consuming. Based on these factors, hydroelectric was removed from further consideration.

Geothermal

Geothermal energy is thermal energy from the Earth's interior where temperatures reach greater than 7,000°F. The heat is brought to the surface as steam or hot water and may be used to produce electricity or for space heating and industrial processes. Currently, about 8,000 MWs of geothermal electricity have been developed around the world, with approximately 2,800 MWs in the United States.

There are three types of geothermal energy. The first is power generation (or electric), which employs turbines using natural steam or hot water flashed to steam to produce mechanical power that is converted to electricity. The second is a direct use application where a well brings heated water to the surface and a mechanical system delivers the heat to the space or process. The third and most rapidly growing use for geothermal energy is geothermal heat pumps, which use the earth or groundwater as a heat source in winter and a heat sink in summer. A heat pump transfers heat from the soil to the house in winter and from the house to the soil in summer. Figure 7 shows geothermal resources throughout the United States.

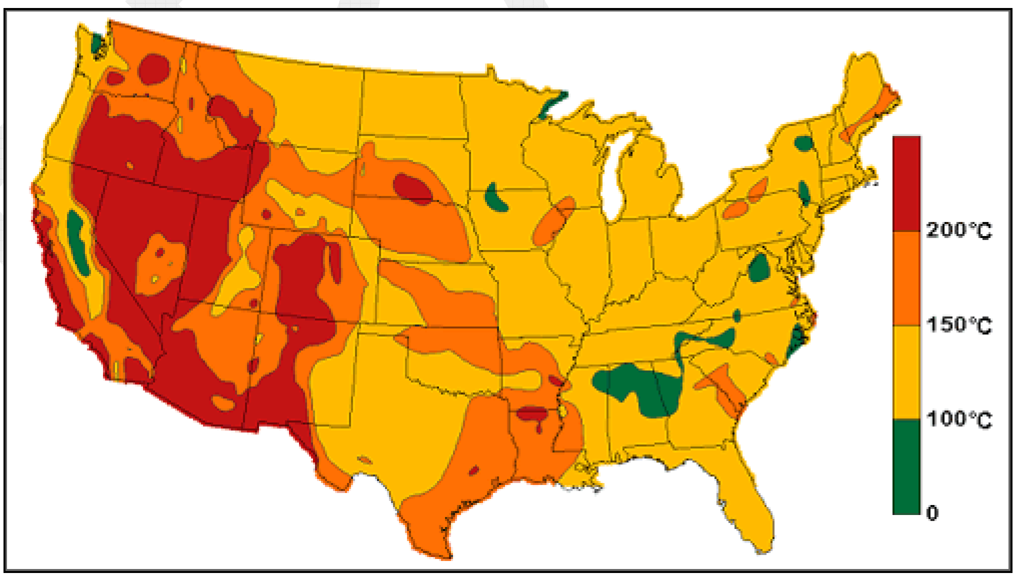

Figure 7. Geothermal Temperatures for Resources in the United States[5]

[5] Source: U.S. DOE EERE State Energy Alternatives website (Ref. 13)

In general, geothermal resources used for electric generation should be 200ºC or greater. Those utilized for direct use should be between 150ºC and 200ºC, and those used for heat pumps should be between 100ºC and 150ºC. Based on Figure 7, South Dakota has moderate to good temperature resources that can be tapped for direct heat or for geothermal heat pumps. Electricity generation is not possible with these resources. However, South Dakota, has high-temperature resources that may be suitable for electricity generation, as well as direct use and heat pump applications if that resource can be accessed and developed. Consultations with geothermal companies were unable to determine any feasible geothermal potential at this time, due to a lack of actual information. Obtaining geothermal data in South Dakota would require lengthy and costly exploration, and Basin Electric was not able to locate sufficient research data to pursue geothermal generation at this time. Montana also has high-temperature resources that are suitable for electricity generation as well as direct use and heat pump applications. Similar to North Dakota, Minnesota has vast low-temperature resources suitable for geothermal heat pumps but does not have sufficient resources to use the other geothermal technologies.

Geothermal power plants are very reliable when compared to conventional power plants. Geothermal power plants will typically have an availability factor of 95 percent or more and their capacity factor is highest among all types of power plants. Geothermal electric power typically ranges from $40 to $80/MWh, and technology improvements are lowering that range steadily.

Due to the limited geothermal resources available within Basin Electric's service territory for power generation, this alternative will not be pursued further.

Biomass Power

Biomass power (biopower) is the generation of electric power from biomass resources. These resources include urban waste wood, crop and forest residues and in the future, crops grown specifically for energy production. Biomass reduces most emissions compared with fossil fuel-based electricity. Biomass results in very low carbon dioxide (CO_2) emissions due to the absorption of CO_2 during the biomass growing cycle.

There are four primary types of biomass power systems: direct-fired, co-fired, gasification, and modular systems. Nearly all current biomass generation is based on direct-fired combustion in small, biomass-only plants with relatively low electric efficiency. Most biomass direct-fired combustion generation facilities utilize the basic Rankine cycle for electric power generation, which burns biomass fuel in a boiler to produce steam that is expanded in a Rankine Cycle turbine to produce power. Currently, co-firing is the most cost-effective technology for biomass. Co-firing substitutes biomass for coal or other fossil fuel in existing boilers.

The price of electricity depends on the type of technology used, the size of the power plant and the cost of the biomass fuel supply. Currently, the most economically attractive technology for biomass is co-firing. These projects require small capital investments per unit of power generation capacity. Co-firing systems range in size from 1 MW to 30 MW capacities. When low-cost biomass fuels are used, co-firing systems can result in payback periods as low as 2 years.

For biomass to be economical as a fuel for electricity, the source must be located near the generation site to reduce transportation costs. The most economical conditions exist when the biomass fuel is located at the generating site. This condition, however, does not exist in the Basin Electric service area. Using inexpensive biomass fuels, co-firing produces power for about $60/MWh while direct-fired generation costs are about $90/MWh. Based on the estimated costs, it appears other renewable energy resources (such as wind) are more economical.

Biogas

Biogas power plants produce electricity through a combination of anaerobic digestion systems and associated electricity generators such as gas turbines or gas engines. The feedstock must be biodegradable in order to produce methane. Suitable feedstocks include (but are not limited to):

- Sewage treatment sludge (primary or raw sludge and/or secondary sludge)
- Slaughterhouse waste
- Food waste
- Farm waste
- Organic component of mixed municipal waste
- Biomass like maize

An anaerobic digester is an industrial system that harnesses the natural process of anaerobic decomposition to treat waste and produce biogas that can be used to power electricity generators, provide heat and produce soil improving material. There are three stages of anaerobic digestion: hydrolysis, acidogenesis, and methanogenesis. These stages can occur in the same digestion tank or can be controlled independently and optimized according to the requirements of different bacterial processes.

Biogas is one of the principal by-products of anaerobic digestion and is a gaseous mixture predominantly composed of methane and carbon dioxide. Biogas may also contain small amounts of hydrogen and occasionally trace levels of hydrogen sulfide. Biogas can be burned to produce electricity, usually in a reciprocating engine or a microturbine. The gas is often used in a cogeneration arrangement, to generate electricity and use waste heat to warm the digesters or to heat buildings. Since the gas is not released directly into the atmosphere and the carbon dioxide comes from an organic source with a short carbon cycle, biogas does not add significantly to atmospheric carbon dioxide concentrations.

The DOE Energy Information Administration[6] projects the capital cost component of the levelized cost of biogas power to be approximately $37/MWh in 2009. The total levelized cost of biogas power is projected to be approximately $46/MWh.

Basin Electric is open to this technology, and currently purchases power from the Midwest Dairy project (375kW) in Milbank, South Dakota. The number of cattle required to support a large project is significant, with typical estimates ranging from 1,500 to 3,000 head of cattle per MW of electricity generated. As such, Basin Electric has elected not to pursue the biogas option due to the limited opportunities for a large development in its service area.

[6] Source: U.S. DOE EIA (Ref. 14)

Municipal Solid Waste

The municipal solid waste (MSW) industry includes four components: recycling, composting, landfilling and waste-to-energy via incineration. As defined by the U.S. EPA, MSW includes durable goods, non-durable goods, containers and packaging, food wastes, yard wastes, and miscellaneous inorganic wastes from residential, commercial, institutional, and industrial sources. Burning MSW can generate energy while reducing the volume of waste by up to 90 percent and the weight of the waste by up to 75 percent.

MSW can be directly combusted in waste-to-energy facilities to generate electricity after the separation of recyclables. Although MSW consists mainly of renewable resources such as food, paper, and wood products, it also includes nonrenewable materials derived from fossil fuels, such as tires and plastics. There are currently 90 waste-to-energy plants in the United States, producing approximately 2,500 MW or about 0.3 percent of total national power generation. The U.S. EPA and some state governments classify MSW as renewable energy source because it is abundant and contains significant amounts of biomass.

Waste-to-energy plants work very much like coal-fired power plants but use garbage – not coal – to fire an industrial boiler. The same steps are used to make electricity in a waste-to-energy plant as in a coal-fired power plant.

1. The fuel is burned, releasing heat.
2. The heat turns water into steam.
3. The high-pressure steam turns the blades of a turbine generator to produce electricity.

Waste-to-energy plants produce air emissions when the fuel is burned, releasing chemicals and other substances found in the waste. Some chemicals can be dangerous to humans and/or the environment. The EPA requires waste-to-energy plants to use pollution control devices including scrubbers, fabric filters, and electrostatic precipitators.

Landfill disposal is generally the lowest cost method of MSW management. However, when landfills are not available near the collection area and hauling costs become excessive, waste-to-energy plants become an economical method of MSW management. The capital cost of an MSW power project is approximately $3,500 to $4,000/kW. The total levelized cost of MSW power is projected to be approximately $85/MWh.

Ash disposal and air emissions are the primary environmental issues with MSW-fired plants. MSW power cannot fulfill the need for a long-term, cost-effective generation capacity due to the rural nature of Basin Electric's service territory and the lack of nearby MSW supplies.

Wind

Wind turbines convert the power in wind into electricity by utilizing a turbine to extract the kinetic energy of moving air and to produce the mechanical power used to turn an electrical generator. As a renewable resource, wind is classified according to wind power classes, which are based on typical wind speeds. These classes range from Class 1 (the lowest) to Class 7 (the highest). In general, wind power Class 4 or higher can be useful for generating wind power with large (utility-scale) turbines. Figure 8 is a map of the United States showing the general wind power classes. It indicates that the Upper Midwest has primarily a wind power Class 4 with small areas of Class 5.

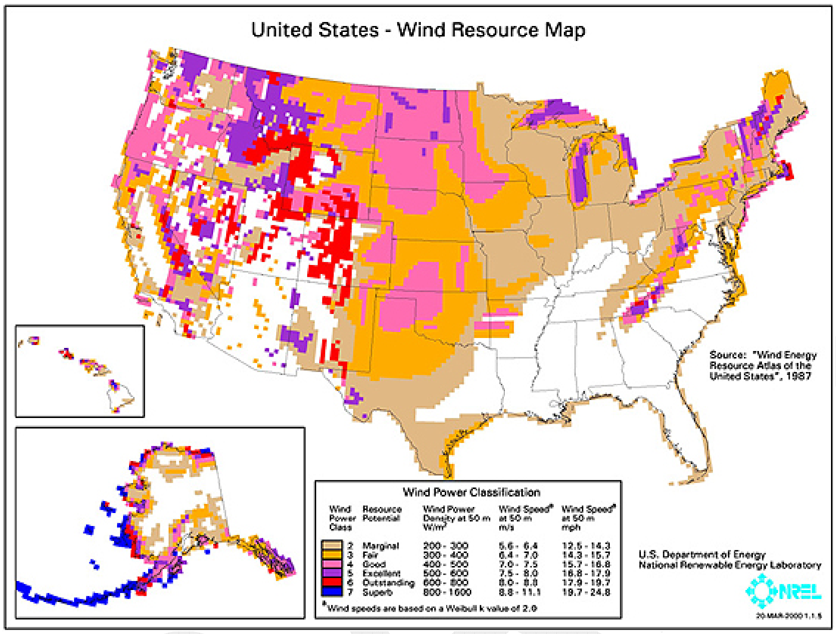

Figure 8. Classes of Wind Power in the United States[7]

Fixed, investment-related costs are the largest component of wind-based electricity costs. Improved designs with greater capacity per turbine have reduced investment costs. Wind power installations incur no fuel costs and their maintenance costs have also declined with improved designs. The U.S. Department of Energy (DOE) National Renewable Energy Laboratory[8] projects the levelized cost of wind power to be between $40 and $60/MWh. However, with the rise in demand for wind generation, the capital cost of installing a wind turbine is increasing. Therefore, the levelized cost of wind power will also increase.

Wind is considered a fuel displacer and it can be integrated with natural gas fueled facilities to provide the energy shape required in most areas. The greatest advantage of wind power is electricity generation without emissions of any kind. Another advantage of wind power is once a wind project is built, the cost of the electricity generated remains stable because there are no fuel price increases or volatility. Acquiring wind power allows utilities to lock in a stable price for electricity for as long as 20 years or more.

Turbine Considerations

Consideration was given to the size and type of turbines to be utilized for the proposed wind installation. While larger capacity units equate to fewer towers and less disturbance for a total

[7] Source: U.S. DOE NREL website (Ref. 20)
[8] Source: Power Technologies Energy Data Book 4th edition, US DOE NREL (Ref. 19)

MW output, larger machines typically do not have the efficiencies found in some 1.5 MW turbines. Turbine selection rationale will be addressed in greater detail in the EIS. Considering reliability, efficiency, constructability, and cost, Basin Electric proposes to use 1.5 MW turbines for the project.

Conclusion

Basin Electric has established the need for additional renewable energy capacity to service forecasted member load growth demands, to meet Basin Electric's renewable energy goal set forth in 2005, and to meet state mandated RPS. Wind is the most viable renewable technology based on availability and economics. Solar resources in the region are limited. While solar economics are improving, costs are still not competitive with wind. Geothermal and bio-based resources are in some cases cost effective but are either restricted to limited or distant locations, available in only small quantities, or present other environmental concerns. In contrast, potential wind resources in the Basin Electric member service territory are generally recognized as excellent, and limited mainly by land use and transmission. A 151.5 MW wind project was determined to be the best available, least-cost renewable resource option to satisfy future load and RPS requirements.

5. Site Selection

Overview

Basin Electric has established the need for additional renewable energy capacity to serve forecasted member load growth demands and to meet state mandated Renewable Portfolio Standards (RPS). As such, Basin Electric is pursuing approximately 300 MW of wind development in its current resource expansion plan. Based on evaluation factors such as wind energy potential, proximity to transmission lines with available capacity, and the availability of suitable land for purchase or lease, Basin Electric is proposing to develop wind energy facilities totaling approximately 115 MW in North Dakota and 150 MW is South Dakota. This site selection study will focus only on Basin Electric's wind development efforts in South Dakota.

Wind Development Potential

As previously discussed, wind is classified according to wind power classes, which are based on typical wind speeds. These classes range from class 1 (the lowest) to class 7 (the highest). In general, wind power class 4 or higher can be useful for generating wind power with large (utility-scale) turbines. Therefore, the first step in selecting sites for the wind project began with analysis of existing wind information for the region. Figure 9 is a map of South Dakota showing general wind power classes and includes an overlay of existing major electrical transmission lines. South Dakota has large areas of wind power classes 4 and 5, indicting the potential for good to excellent wind energy resource development. Additional wind data was researched from various sources, including the database available from the Energy & Environmental Research Center (EERC), a research development, demonstration and commercialization facility at the University of North Dakota (See website at http://gis.undeerc.org/wind/viewer.htm).

Wind Powering America[9] within the U.S. Department of Energy National Renewable Energy Laboratory (U.S. DOE NREL) is a commitment to dramatically increase the use of wind energy in the United States. Wind Powering America indicates that South Dakota has wind resources consistent with utility-scale production, with good to excellent wind resource areas located throughout South Dakota. The American Wind Energy Association [10] estimated the annual wind electricity generation potential in South Dakota to be 1,030 billion kWh.

As discussed in the alternatives evaluation, a wind power facility's economic feasibility strongly depends on the amount of energy it produces. Fixed, investment-related costs are the largest component of wind-based electricity costs. To ensure economic feasibility of a wind energy facility, it should be located in an area with the high potential for power production. As such, the focus for a facility site should narrow to areas of wind power class 5 and above (excellent or outstanding wind resource potential) within South Dakota. Areas of excellent wind resource potential are located throughout most of the state.

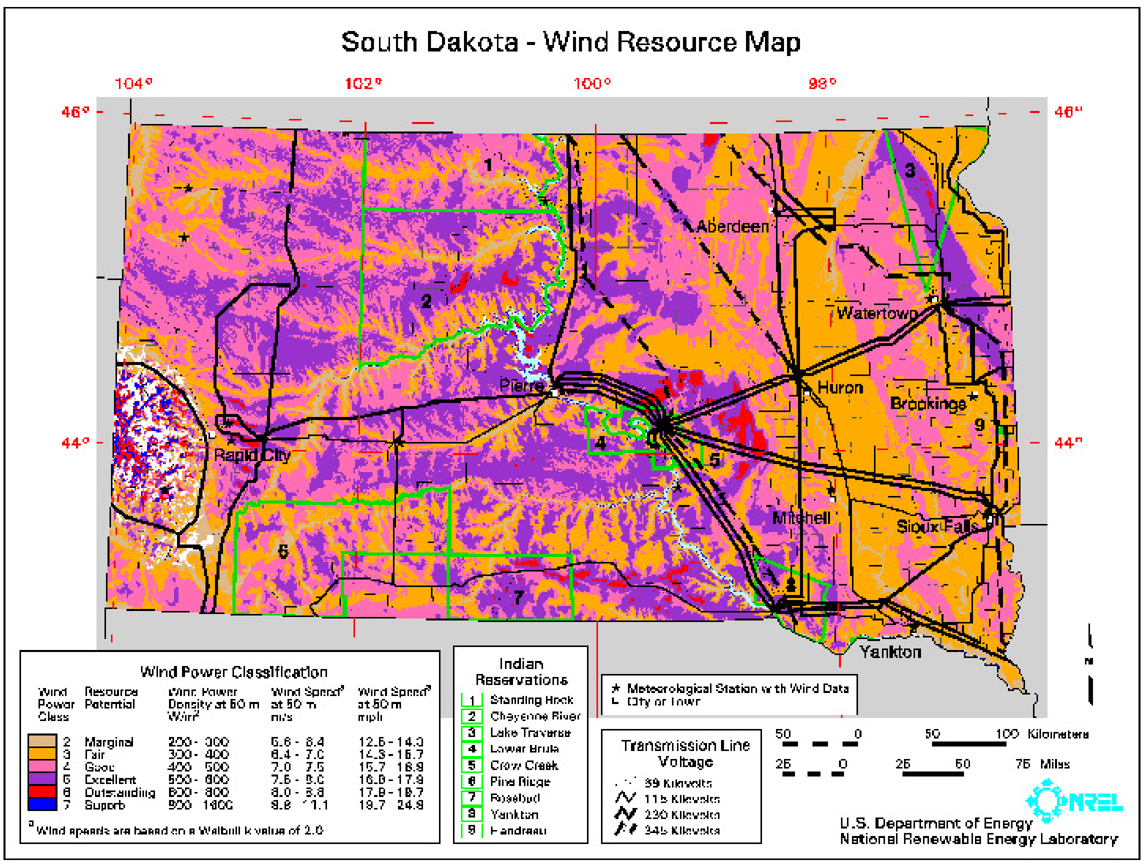

Figure 9. South Dakota Wind Resource Map[11]

[9] Source: U.S. DOE NREL website (Ref. 20)
[10] Source: American Wind Energy Association (Ref. 1)
[11] Source: U.S. DOE NREL website (Ref. 20)

Available Transmission

In order to optimize connection with the regional power grid, a wind energy facility should be located in near proximity to an existing transmission line. As depicted in Figure 9, this situation occurs in central South Dakota, where both Basin Electric and Western transmission lines cross relatively large areas of excellent wind resource potential. Reducing the length of new transmission line necessary for interconnection to the grid helps reduce overall cost and minimizes impacts to land-based resources.

Although a good wind resource area may have a transmission line located nearby, available capacity on the transmission line may be limited. Both North and South Dakota have a limited amount of transmission that was planned and built in accordance with generation facilities in the area. Electrical consumption in both North and South Dakota is much less than the actual annual generation. Much of the power produced in both states is transported on limited transmission through South Dakota to other markets, primarily to eastern loads, such as Minneapolis, Minnesota. From a practical standpoint, the availability of transmission determines if a project can even be built.

Basin Electric's transmission facilities are integrated with the Western electrical grid (known as the Integrated System or "IS"). Basin Electric generation is connected to the IS to best serve its membership; however, Basin Electric investigated potential use of non-IS transmission facilities within the service territory. This option was rejected since the current tariff structure for transmission in the region results in a "pancaking" of transmission rates, wherein the transmission tariffs of both the IS and the Midwest Independent System Operator (MISO) would apply. This pancaking greatly increases the project's delivered cost of power.

In discussions with Basin Electric's Marketing & Power Supply Planning staff, a number of transmission sites were further screened, based on that staff's knowledge of the ability of various transmission lines to carry at least 100 MW of power from a wind project.

Wind Resource Economics

The economics of a wind project are driven primarily by the amount of available energy in the wind resource. The amount of harvestable energy from wind is a function of the cube of its velocity. Therefore, a doubling of the wind speed results in an eight-fold increase in available energy. This basic rule of physics dictates project siting decisions.

For example, a 15% increase in average annual velocity can result in a 52% increase in production. Even the micro-siting of individual turbines within a project is critical. This is because just a 1 mph increase from 17 mph to 18 mph can result in an 18.7% increase in production. Such small variations in annual average wind speeds can occur within a distance of yards, not miles, in the rolling hill topography typical of most of South Dakota. Even a small change in production is significant. Assuming a typical turbine produces about 6,000 MWHs/yr, a small change of 100 MWHs can result in a net present value impact of $70,000 to $100,000 over the 25 year life of the turbine.

Since the construction cost of a wind project is similar for most locations, the electrical production levels resulting from the local wind resource will dictate whether or not a project is viable. Wind projects are extremely capital-intensive, yet variable costs are small. Costs are predominantly for onsite maintenance since the "fuel" is free. That means the cost of the wind power delivered to the grid is driven by the production volume of the wind project. The fixed costs of a project must be spread over a greater or lesser number of kilowatt-hours produced by the project. In turn, this results in a greater or lesser unit cost per kilowatt-hour.

Available Land

Due to the increased interest in wind energy, many areas in South Dakota with favorable wind potential have been secured by other wind energy developers. Projects have been proposed or constructed throughout the state. Basin Electric estimates that at least 30 wind development entities currently have interest in projects in South Dakota. Basin Electric right-of-way agents have contacted landowners in the proposed project area and found land is available for lease. Most landowners have been very receptive and have a favorable view of wind energy development. Potential lease payments would provide a long term supplement to farm and ranch incomes in these rural areas.

In addition, a few sites with greater population densities were avoided. Those areas had multiple small land-holdings that would have made it difficult to site turbines, due to property ownership interest and the potential for local resident objections.

Limited Regional Investigation Sites

Several regions in South Dakota were investigated on a limited basis. They are described below.

- A site 30 to 40 miles northwest of Pierre, SD on the west side of the Missouri River: A lack of reliable wind data for this area, combined with uncertainty regarding the transmission potential displaced this site from consideration.
- A site 25 miles south of Pierre, SD: This site was eliminated due to its location within a National Grassland.
- A site in the Gettysburg, SD area: Available wind data from this area suggested the wind resource to be less than other sites considered. Also, the local transmission was a very high voltage 345 kV transmission line. Interconnection to a 345 kV line was estimated at roughly $9 to 10 Million in addition to a 5 to 8 mile interconnection line at an estimated cost of roughly $3 to 5 Million.

Sites Investigated

Taking into account all of the considerations discussed above, the following potential sites in South Dakota were investigated and given serious consideration:

- Highmore/Ree Heights
- Wessington Springs
- Reliance

- Fox Ridge
- Winner
- Crow Lake

The investigation of each is explained in greater detail below.

Highmore/Ree Heights

This area includes an existing wind project called Hyde County Wind, owned by FPL energy. Available data indicated a good wind resource and Wind Logics, a meteorological consultant from Minneapolis, was contracted to develop a 500 meter resolution wind map for the area.

A 230 kV transmission line (part of Western IS) is located within 10 miles of the site. Basin's Electric Marketing Division indicated a good potential to obtain transmission access for this site; a transmission request was subsequently submitted for this site.

Basin Electric land procurement personnel were dispatched to procure landowner easements in the area. A number of easements were obtained, but it was soon learned that another wind developer had, and was continuing to, obtain easements for a much larger project in the same area. Efforts to negotiate purchases of those easements from the other wind developer were unsuccessful and although Basin personnel were able to obtain sufficient lands to provide control of a site, they were unable to obtain satisfactory quantities of contiguous easements for a wind project. As a result, further development efforts in this area were abandoned and this site was not further pursued.

Wessington Springs

This site is located about 15 miles northwest of Wessington Springs, SD. Although transmission was considered to be available and wind data indicates an excellent wind resource (one of the best in SD), a high concentration of wetlands with waterfowl production areas was found to exist in this area. In particular, this wind site is located between two major waterfowl production areas. Given the potential impacts to wildlife, a decision was made to avoid this area.

Reliance

This site, located north of Reliance, SD was identified as an excellent wind resource through the NREL wind resource map. Site reconnaissance also indicated good wind potential, with a high ridge traversing the site from the northwest to the southeast. Wind Logics, a meteorological consultant from Minneapolis, was contracted to develop a 500 meter resolution wind map for the area. The results indicated an excellent wind resource. Additional wind data were available from one of the major landowners (who had previously erected his own met towers in the area), confirming the wind resource as excellent.

The Basin Electric Marketing Division & Power Supply Planning Division indicated a good potential to obtain transmission access for this site. A new transmission line of approximately 20 miles long would be required; the new line would to cross two Native American sovereign nations as well as the Missouri River. Alternatively, a 69 kV transmission line owned by the local electrical cooperative exists in the area. Although 69 kV is inadequate for a 150 MW wind project, negotiations were initiated to upgrade the 69 kV transmission line to 115 kV or 230 kV, using the existing right-of-way. Assuming a cost of roughly $500,000 per mile for 20 miles of interconnection line, containing a 69 kV "underbuild" (two sets of conductor per structure), plus a $2.5 to $3 Million cost for the substation interconnection, the total interconnection cost for those sites were estimated at roughly $12 to $14 Million

The major landowners in the area were receptive to a wind project, but negotiations with two major critical landowners (including the landowner noted above who had erected his own met towers) failed to progress to a completed lease or option for the core area. Another major wind developer entered the area and announced a large wind project. The local electrical cooperative reported that lands surrounding the two major landowners had been leased by the new developer and that the two large landowners in the center of the project were also in negotiations with the new developer; these events seriously compromised this site.

Fox Ridge

This site, located 15-20 miles west of Faith, SD, was suggested to Basin Electric in 2006 by a community group that was seeking a local wind project to support the local school system. Preliminary siting investigation had been performed by the group and met tower data was available. The group represented the site as having an excellent wind resource as well as landowner agreements to lease property for wind turbines. Further review of the NREL wind resource map as well as other available wind data resources provided additional support for the s assertion that the site had an excellent wind resource. On-the-ground site reconnaissance also indicated good potential, with several ridges oriented somewhat transverse to the expected predominant wind direction.

A Western 115 kV transmission line traverses the site and a major Western substation is located less than five miles west of the site. This new line would involve four to six miles of 115 kV transmission line from the project collector substation to the Western interconnection point. Assuming a cost of roughly $300,000 per mile for four to six miles of interconnection line, plus a $2.5 to $3 Million cost for the substation interconnection, the total interconnection cost for those sites are estimated at roughly $3 to $5 Million.

During the initial stages of site exploration and negotiation with the Fox Ridge group, an ice storm in Nebraska caused two important transmission lines to collapse in Nebraska. The loss of those two lines resulted in transmission congestion and operating constraints on the regional system. Under the constraints imposed by the ice-caused outage, a Basin Electric power plant in Wyoming was required to reduce generation by 25% to 50% for a period of approximately six months. This weakness in the regional transmission system revealed a very high risk for the western half of South Dakota, essentially putting that entire region off-limits for Basin Electric to consider any significant wind development until the transmission system undergoes further upgrades. Accordingly, the site was not further pursued.

Winner

This site, located in south-central SD, was identified as an excellent wind resource through the NREL wind resource map. Site reconnaissance also indicated good potential, with several ridges oriented somewhat transverse to the expected predominant wind direction. Subsequent wind mapping, using historical wind data, provided additional confirmation of preliminary wind assessments further indicating this site to have an excellent wind resource.

Basin Electric Marketing & Power Supply Planning Division indicated a good potential to obtain transmission access for this site and subsequently submitted transmission requests for this site. Initial site boundaries were selected to interconnect the project to the Western system within the site boundaries, minimizing the amount of interconnection transmission line to less than a mile. However, subsequent consultation with Western revealed a reluctance to add a transmission line tap to their system in that area. As a result of that consultation, the preliminary site boundaries were revised to include a corridor to the nearest Western substation. That new line would involve five to eight miles of 115 kV transmission line from the project collector substation to the Western interconnection point. Assuming a cost of roughly $300,000 per mile for five to eight miles of 115 kV interconnection line, plus a $2.5 to $3 Million cost for the substation interconnection, the total interconnection costs are estimated at roughly $4 to $5.5 Million

With the compromising of the Reliance site as described above, this site near Winner, SD was selected as a site alternative for the NEPA process. Met towers have been installed to confirm the wind resource; much of the site has been leased to avoid a recurrence of the Reliance site issues.

Crow Lake

This area was identified as an excellent wind resource through the NREL wind resource map, supplemented by existing meteorological data from a site established by the South Dakota State University Wind Resource Assessment Network (WRAN).

A 230 kV double circuit transmission line (part of Western IS) was located within 9 – 12 miles of the site area. The Basin Electric Marketing and Power Supply Planning Division indicated a good potential to obtain transmission access for this site, and submitted transmission requests for this site. Assuming a cost of roughly $400,000 per mile for 10 miles of interconnection line and a $4.5 to $5 Million cost for the substation, the total interconnection cost for the site was estimated at roughly $8.5 to $9 Million.

Wind Logics, a meteorological consultant from Minneapolis, was contracted to develop a 500 meter wind map for the area, with the results indicating an excellent wind resource. Meteorological towers (met towers) were erected to measure the wind and correlation of this met tower data with the WRAN site was initiated. In general, subsequent wind measurements are confirming the wind resource.

An Opportunities and Constraints Analysis was performed by an environmental consultant to identify any issues for "fatal flaws" of this site. The report indicated Crow Lake to be an acceptable site, with minimal environmental issues, all of which could be addressed.

Given the above, the Crow Lake site was selected as one of the alternative sites for NEPA analysis.

Potential Impact Index Assessment

As part of the siting process, Basin Electric commissioned a Potential Impact Index (PII) Assessment for the Crow Lake, Winner, and Fox Ridge project sites.

The PII Assessment was performed in general accordance with the USFWS Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines dated May 13, 2003 (2003 USFWS Guidance). The PII represents a "first cut" analysis of the suitability of sites proposed for development. It does so by estimating use of the site by selected wildlife species as an indicator of potential impact. Emphasis of the PII is on initial site evaluation and is intended to provide more objectivity than simple reconnaissance surveys.

Although the PII protocol is designed primarily to evaluate potential impacts on aerial wildlife from collision with turbines and infrastructure, potential impacts to fish, other aquatic life, and mammals were also considered.

The PII Assessment utilized the following steps in ranking sites by their potential impact on wildlife:

1. Identification of potential project sites being considered for development; Crow Lake, Winner, and Fox Ridge were evaluated.

2. Selection of a Reference site in an area where wind development would likely result in the maximum negative impact on wildlife, resulting in a high PII score.

3. Evaluation of the potential project sites to assess the risk to wildlife, and to rank the sites relative to each other using the Reference Site as a standard.

Evaluations were conducted by qualified geologist/biologists who were familiar with local and regional geology and wildlife. The final selection of the Reference Site was reviewed and approved by the USFWS. A Site Location Map indicating the approximate location of the Reference, Crow Lake, Winner, and Fox Ridge Sites is included with the PII, attached.

The PII was derived from the results of three checklists (attached) generally following the PII Checklist and Forms provided in the 2003 USFWS Guidance. The checklists were developed and applied as follows:

1. The Physical Attribute checklist considered topographic, meteorological, and site characteristics that may influence bird and bat occurrence and movements.

2. The Species Occurrence and Status checklist includes: Birds of Conservation Concern at the Bird Conservation Region level; federally-listed Endangered, Threatened, and Candidate Species; bird species of high recreational or other value (e.g., waterfowl, prairie grouse); and State Endangered, Threatened, and Rare species listed by the State Natural Heritage Program.

3. The Ecological Attractiveness checklist evaluated the presence and influence of ecological magnets and other conditions that would draw birds or bats to the site or vicinity.

The checklists were developed from readily available public information. References for information utilized in completion of the checklists are included in the References section of the PII Checklists.

Each checklist has boxes that were checked for a particular attribute or species found at the Reference Site or a potential project site. The number of boxes in each checklist was based on variations in the number of physical attributes and species of concern in the region. Each checklist was assigned a divisor (p), which was developed by dividing the number of boxes in a checklist by the total number of boxes in all three checklists. Boxes in a checklist were checked if the condition or species was known or strongly suspected to occur. The PII was calculated from the checklist totals for each of the Potential Project Sites and the Reference Site.

Based on the results of the PII, the Reference Site had a total score of 331 compared to a total score of 269 for the Winner Site, 239 for the Crow Lake Site, and 214 for the Fox Ridge Site. The conclusion of the PII Checklist includes the need for additional site specific environmental analysis and site reconnaissance for the selected potential project sites.

Community Factors

The proposed wind energy facility would need local personnel for the routine operation and maintenance of site infrastructure. A site located near a larger rural community may be desirable, as there are typically more opportunities and choices for commerce, employment of other family members, and schools. Basin Electric has experienced occasional difficulty in recruiting and retaining qualified individuals for positions in remote locations. Workforce availability, however, was only a minor consideration in the site selection process for this project.

The area near Crow Lake, SD, may also be favorable since there are two currently operational Basin Electric wind turbines located near the project area. Basin Electric has not received any citizen complaints regarding two operational turbines. There appears to be general acceptance and enthusiastic support for wind energy in the vicinity of the project area and throughout South Dakota.

Summary

Table 1 depicts site selection and evaluation criteria for various PrairieWinds SD-1 site alternatives. The Highmore/Ree Heights and Reliance Site Alternatives were removed from further consideration since the land was leased by other developers. The Wessington Springs Site Alternative was dropped from consideration due to proximity to multiple waterfowl production areas. The Fox Ridge Site Alternative was removed from consideration due to serious transmission constraints. The remaining Site Alternatives (Winner and Crow Lake) appear favorable for development and are discussed in greater detail below.

Table 1. Selection and Evaluation Criteria

Site	Local Transmission Available	Additional Transmission Line Needed	Sufficient Land Available to Lease
Highmore/Ree Heights	Yes (Request Submitted)	10-12 Miles	Compromised by other developers
Wessington Springs	Yes	Not investigated	Wildlife Habitat
Reliance	Yes (Non-firm)	20 +Miles	Compromised by other developers
Fox Ridge	Yes (High Risk)	5-6 Miles	Yes
Winner	Yes (Request Submitted)	5-6 Miles	Yes
Crow Lake	Yes (Request Submitted)	9-12 Miles	Yes

Winner Site Alternative

This site alternative, located in south central South Dakota near the community of Winner, was identified as an excellent wind resource through the NREL wind resource map. Site reconnaissance also indicated good potential, with several ridges oriented somewhat transverse to the expected predominant wind direction. Subsequent wind mapping, using historical wind data provided additional confirmation of preliminary wind assessments, indicating this site to have an excellent wind resource. Meteorological towers have been installed to confirm the wind resource.

Environmental studies at the Winner Site Alternative were conducted in late 2008. Various resources such as vegetation, water, wetlands, soils, wildlife, cultural, and community issues were quantified to facilitate the assessment of potential impacts. While there are potential issues that would need to be addressed, it appears the site would be viable for wind energy development.

Crow Lake Site Alternative

This area was identified as an excellent wind resource through the NREL wind resource map, supplemented by existing meteorological data from a site established by the South Dakota State University Wind Resource Assessment Network (WRAN). Wind Logics, a meteorological consultant from Minneapolis, was contracted to develop a 500 meter wind map for the area, with the results indicating an excellent wind resource. Meteorological towers were erected to measure the wind and correlation of this met tower data with the WRAN site was initiated. In general, subsequent wind measurements are confirming the wind resource.

Environmental studies at the Crow Lake site were conducted in late 2007. Various resources such as vegetation, water, wetlands, soils, wildlife, cultural, and community issues were quantified to facilitate the assessment of potential impacts. While there are potential issues that would need to be addressed, it appears the site would be viable for wind energy development.

Conclusion

The site selection process has resulted in two alternative sites, a site near Crow Lake, SD and a site near Winner, SD. The results of the PII indicate the Reference Site had a total score of 331 compared to a total score of 269 for Winner and 239 for Crow Lake. Crow Lake is the owner's preferred site based on several factors including, but not limited to, available transmission, wind resource, land availability and use, and topography. The ongoing environmental analysis will provide additional insight into both sites. The Fox Ridge site is currently not viable because of potential issues with transmission.

Based on information collected to date, Basin Electric proposes to carry both the Crow Lake and Winner sites forward for further evaluation through the NEPA process as implemented by the United States Department of Agriculture (USDA) Rural Development Service (RUS).

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