
**Project Report:
Results of Industry Interviews**

for

**The South Dakota
Energy Infrastructure Authority (SDEIA)**

in fulfillment of
SDEIA Request for Proposal #2006-01

Schulte Associates LLC

November 12, 2006

ABSTRACT

This report summarizes the results of interviews conducted with various electric industry entities in South Dakota by Schulte Associates LLC on behalf of the South Dakota Energy Infrastructure Authority (SDEIA, or the Authority) during the period August through September 2006. The purpose of the interviews was to fulfill the Authority's responsibilities under South Dakota Statute HB No. 1260; South Dakota Codified Law 1-16I (2005).

In accordance with that law, the interviews were conducted with entities that produce, transmit, distribute, regulate, control and market electric power in South Dakota and neighboring states. This work was commissioned via SDEIA Request for Proposal #2006-01.

The interviews solicited industry input with regard to the following:

1. Projects for increasing electric power generation in South Dakota.
2. Enhancements needed to transmit electricity to, from and within South Dakota.
3. Activities the State and SDEIA could undertake to assist in developing South Dakota's generation and transmission infrastructure.

The report summarizes industry perspectives on these topics as provided by the interviewees.

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EXECUTIVE SUMMARY

The South Dakota Energy Infrastructure Authority (SDEIA) was created by the South Dakota Legislature in 2005 to *"diversify and expand the state's economy by developing in this state the energy production facilities and the energy transmission facilities necessary to produce and transport energy to markets within the state and outside of the state."*

By current statute, the SDEIA is required, on an annual basis, to meet with any interested generator and distributor of electricity to consumers in South Dakota to understand the generation of electricity in South Dakota and the transmission enhancements needed for the transmission of electricity to, from, and within South Dakota. The SDEIA is further required to provide recommendations to the Governor, the Legislature and South Dakota congressional delegation on activities that could be undertaken to enhance the generation of electricity in South Dakota and the transmission of electricity to, from, and within South Dakota.

To address and fulfill these objectives, Schulte Associates LLC (SA) was retained by the SDEIA to conduct interviews of electric utilities and related power agencies operating in South Dakota, and report the results to SDEIA. The report is designed to aid SDEIA in fulfilling the Authority's 2006 reporting obligations. SA performed this consulting assignment in the period August through November, 2006. The report that follows describes the findings from the interviews conducted by SA on behalf of SDEIA. Unless otherwise indicated, the opinions expressed are those of the Interviewees, not SA.

A summary of the key findings is provided below. Section references shown in parentheses indicate sections in this report where more details on each finding can be found. There was a consensus among the utilities and other entities who participated in the interview process that:

- A. The following advantages and challenges affect South Dakota's ability to increase electric energy exports in order to enhance and extend economic development in the state:
 - 1. Advantages (Section 3.1)
 - a. Land for generating facility siting is available at reasonable cost.
 - b. Water supplies for cooling and boiler makeup purposes are available.

- c. Air quality in the state is good, and the air shed at potential power plant locations can accommodate new industrial facilities equipped with appropriate emissions controls.
- d. The business and labor climate in South Dakota is favorable.
- e. Government policy is supportive, and the regulatory climate is generally favorable.
- f. With regard to the potential for wind energy development, the state has extensive geographic areas with excellent wind resources (speed and duration).
- g. With regard to the potential for coal-fired power plant development, South Dakota is located between coal deposits in neighboring states and large customer population centers to the East and South.

2. Challenges

- a. With regard to potential additional wind energy development, the challenges include (Section 3.7):
 - i. Relatively small electric market in South Dakota, and the consequent need to find export paths to customers in other states.
 - ii. Inadequate transmission in South Dakota to support exporting.
 - iii. Boundary (“seams”) issues between Midwest Independent Transmission System Operator (MISO) and non-MISO market footprints.
 - iv. Unfavorable state tax structures.
 - v. Competitive wind development momentum in nearby energy-consuming states.
 - vi. And, although the interviewees were reticent on this topic, SA would add: The apparent current lack of a willing buyer for the export quantities envisioned by the developers.
- b. With regard to potential additional coal-fired generation developments, the challenges include (Section 3.2):
 - i. Lack of competitive railroad service to haul coal from coal-producing states to power plant sites in South Dakota.
- c. With regard to potential additional nuclear generation developments, the challenges include (Section 3.3):
 - i. Lack of a national solution to long-term high-level nuclear waste storage.

B. South Dakota government should not attempt to do the following (Section 6.1):

1. Own or operate electric generation and transmission facilities.
2. Charter or conduct additional generic studies of wind energy potential or transmission routes.

C. South Dakota government could advance the production and transmission of electricity for in-state and export markets by:

1. Establishing South Dakota government as being actively interested in assisting energy development in the state (Section 6.2.1).
2. Actively participating in the search for customers (Section 6.2.2).
3. Considering and sponsoring innovative combinations of generation sources and loads (Section 6.2.3).
4. Actively addressing MISO seams issues (Section 6.2.4).
5. Sponsoring multi-state action on transmission corridors (Section 6.2.5).
6. Ensuring competitive rail service (Section 6.2.6).
7. Reviewing and adjusting state tax structures (Section 6.2.7).

A more comprehensive description of these recommendations is provided in the six chapters of the report that follow.

Summary of Findings

South Dakota's Situation is Different from that of Other States with Energy Authorities

Most of the interviewees felt the Authority was created by legislation that copied activities by other nearby states--states that have domestic coal resources to sell via export of electric generation and transmission. South Dakota does not have such coal deposits. Consequently, South Dakota's situation is different and the resulting role of the Authority needs be different than it is now, according to the interviews.

The Need to Start with Customers

In particular, the interviews indicate that an Authority with a sole focus on promoting and financing electric transmission may be misplaced and off-the-mark. An emphasis on

first identifying and securing customers for South Dakota energy seems to be missing in efforts to date, and is probably the most important “leg” on the three-legged “stool” of exporting, including generation, transmission and customers. According to many of the interviewees, if you have a customer, there is a will and desire in the industry and plenty of financing resources available to accomplish the needed transmission investment and service.

With that said, potential remains for useful Authority bonding activities to bridge current gaps in the process, such as resolving the currently problematic timing differences between wind energy developments that tend to occur incrementally, and transmission developments that happen as large, discrete projects.

An Excellent Platform for Production Resources

A consensus of the interviewees acknowledges that South Dakota offers an excellent platform for development of electric energy resources. It is geographically located between coal deposits to the west and north, and potential export markets to the east and south. This advantage needs to be matched with resolution of current limitations with regard to competitive rail service to haul the coal to South Dakota plant sites, according to the interviews. Nuclear is also seen as a possible generation alternative for the State, but only in the future when current political and spent-fuel storage issues are resolved.

South Dakota in particular also represents an excellent wind energy resource. Some of this potential is located on the Buffalo Ridge in the Northeastern part of the state, and should be viewed as an immediate priority for transmission to primary export markets to the East. The best wind areas are generally located in the middle of the state, farther from export markets. These will require either significant transmission development across the state, or innovative ways to match generation with storage on the Missouri River, or co-located electric loads that obviate the need for such transmission. Such co-located loads would also capture the additional economic development benefits of the end-use business activity too, in addition to the energy production activities.

Exporting East: Time is Short

The interviews show that the most likely electricity export markets for South Dakota are located to the east in the Twin Cities, and possibly Milwaukee and Chicago. Electric utility transmission planners in Minnesota have anticipated this, and are developing transmission projects near the South Dakota/Minnesota border that South Dakota should view as potential “on-ramps” to the transmission system headed east.¹ Can South Dakota marshal its wind and other generation opportunities and direct them to

¹ As described in Section 2.13, these transmission projects include the Big Stone Unit II project Big Stone-Canby-Granite Falls 345 kV line, and the CAPEX 2020 Brookings County-Twin Cities 345 kV line.

these on-ramps before other states otherwise fulfill the customers' needs with their own generation and associated state economic development efforts? This is a race against time and markets that the interviews clearly show, and the clock is ticking.

The Goal is Bigger than Current Role of the Authority

The interviews also show the goal of increasing exports of electric energy out of South Dakota is much bigger than the role of the Authority alone, as it is currently defined. That is, the efforts of the Authority alone are necessary, but not sufficient, to accomplish the goal. Many discrete and independent industry capabilities exist to produce and transmit electricity. However, they currently lack an overall consistent focus to specifically target these capabilities into a complete, end-to-end solution, and associated advocacy for it, that will benefit South Dakota in an organized way.

A broader economic development advocacy, coordination and solution-finding role is necessary for the state to make it clear it is in the business of electricity exporting, and to bring together customers and other industry entities to make that happen. Without such leadership, energy development will continue to occur on a project-by-project basis as it does now, without a coordinated momentum focused on overall solutions benefiting South Dakota and its citizens in particular.

Sharpening the Value Proposition

Finally, some interviewees, including advocates of exporting, suggested the state needs to more sharply define its value proposition for pursuing electric energy exports. Some development paths may entail more benefits for the state and its citizens than others. There is hope and an expectation that the development trail will provide good jobs and income for the state, and not just more electric transmission towers.

According to the interviews, the value proposition needs to include two important thrusts:

1. External value. South Dakota will be competing with other states to have their generation sources located here. This "external" portion of the value proposition must define specific advantages that South Dakota energy sources offer customers in those states that would justify a choice of South Dakota energy sources over others.²
2. Internal value. To fulfill its mission, the Authority needs to deliver specific and material "internal" value and benefits to the state and its citizens to justify the investment and risk involved in pursuing the selected energy projects. In addition,

² Example: Better wind energy regimes in South Dakota offer better wind energy production economics compared to lesser regimes elsewhere.

such an internal value proposition needs to anticipate the needs and requirements of citizens located along the way of the transmission lines facilitating the exporting, many of whom may not directly use or benefit from the energy carried by the transmission lines.

CHAPTER 1.0

INTRODUCTION

1.1 South Dakota Energy Infrastructure Authority (SDEIA)

The South Dakota Energy Infrastructure Authority (SDEIA) was created by the South Dakota Legislature in 2005 (HB No. 1260; South Dakota Codified Law 1-16I (2005))³ to “diversify and expand the state’s economy by developing in this state the energy production facilities and the energy transmission facilities necessary to produce and transport energy to markets within the state and outside of the state.”⁴

In Section 6 of the Law, SDEIA was given a charter with seven (7) parts. The first two parts, in particular, provide that the Authority shall:

- (1) *Meet with any interested owner of transmission lines in South Dakota and any interested generator and distributor of electricity to consumers in South Dakota by August first each year to understand the generation of electricity in South Dakota and the transmission enhancements needed for the transmission of electricity to, from, and within South Dakota, and to analyze how the Authority could proactively assist in developing the generation and transmission infrastructure;*
- (2) *Report its findings and make recommendations to the Governor, the Legislature, and the South Dakota congressional delegation by December first of each year concerning what the private sector, the state, and the federal government can do to create and enhance the generation of electricity in South Dakota and the transmission of electricity to, from, and within South Dakota. ...*

To help fulfill its meeting and reporting obligations in calendar year 2006, SDEIA issued a request for proposal (SDEIA RFP #2006-01) on June 27, 2006 seeking qualified consultants to:

- (a) Conduct interviews with entities that generate, transmit, or distribute electricity within South Dakota, and:
- (b) Prepare a report to the SDEIA summarizing the findings of those interviews.

³ SDCL 1-16I, Section 2. See Appendix A for the complete text of this legislation.

⁴ The term “energy” used in the legislative act implies the use of multiple energy forms. However, the Authority Board requested that the interviews and this report be focused on the electric system infrastructure only. SDEIA Request for Proposal #2006 - 01 at Page 7.

The interviews and the report were to help SDEIA define activities that the Authority and the state could undertake in future years to help develop infrastructure for the production and transmission of electric power for use within the state or for export to other load centers outside the state.

In August, 2006, SDEIA awarded a consulting contract to Schulte Associates LLC (SA) of Eden Prairie, Minnesota, for conducting the 2006 interviews and preparing a report. The interview process and report writing were accomplished in the period August to November 2006. This project report to the SDEIA is the product of that consulting effort.

1.2 Outline of the Study Process

SA and SDEIA first collaborated in identifying a list of entities and key personnel as potential candidates to be interviewed by SA. The list of organizations and their representatives ultimately interviewed by SA is provided in Appendix A.

Schulte Associates then drafted two questionnaires which were approved by the SDEIA for use with utility companies and wind energy developers, respectively. Copies of the two questionnaires are provided in Appendix B. Interviewees were invited to respond to the questionnaires in writing, and SA collected written answers to the questionnaires from most respondents. Data from the questionnaires was compiled for use in the various summary tables provided in this report.

SA then conducted face-to-face interviews with twelve (12) utilities, wind developers, transmission line companies and other interested parties at eleven (11) locations in five (5) cities in South Dakota and Minnesota. An additional seven (7) interviews were conducted by telephone. SA made notes during each interview. The notes were reduced by SA to an outline, and then a draft report, that were reviewed by SDEIA. The draft report was then revised to complete this final document.

Under ground rules adopted in advance for this project, findings reported by SA have not been attributed to individual entities or to their representatives. Instead, the results are reported for the interviewees as a group. These rules were adopted to promote openness and free exchange of ideas during the interviews. Accordingly, under the terms of the consulting assignment the notes made by SA and completed questionnaires received by SA during the interview process have been and will be retained as the property of SA, and were not made available to the SDEIA or its staff. These materials form the basis for the findings reported herein.

CHAPTER 2.0

OVERVIEW OF ELECTRIC LOADS AND THE ELECTRIC PRODUCTION AND TRANSMISSION SYSTEM IN SOUTH DAKOTA

2.1 Population Density in South Dakota

The relative concentration of electric loads in any geographic area generally follows population density. Accordingly, to consider the locations of likely electric markets for South Dakota-produced electricity, the population distribution in the Upper Midwest needs to be considered.

South Dakota covers a rectangular geographic area of approximately 77,000 square miles extending 380 miles east-to-west, with a maximum north-to-south length of 245 miles.⁵ This area, largely rural and devoted to agricultural activities, supports a population estimated at 755,000 persons in 2000.⁶ The state has 66 counties; but about 50% of the total population is concentrated in the seven (7) counties listed below on Table 2.1:

Minnehaha County, Sioux Falls	148,000
Pennington County, Rapid City	89,000
Brown County, Aberdeen	35,000
Brookings County, Brookings	28,000
Codington County, Watertown	26,000
Meade County, Sturgis	24,000
Lincoln County, Sioux Falls	<u>24,000</u>
Total for Seven Counties	374,000

For the state as a whole, the population density was only about 10 persons per square mile at the time of the last census. This represents the fifth-lowest population density of the 50 states in the U.S.⁷

⁵ Source: Thomson Gale, a part of the Thomson Corporation, c 2005, [www.city-data.com/states/South - Dakota](http://www.city-data.com/states/South-Dakota).

⁶ Source: U.S. Bureau of the Census, www.npg.org/states/sd.htm

⁷ Only North Dakota, Montana, Wyoming and Alaska have lower population densities.

2.2 Electric Load Density in South Dakota

In Calendar Year 2005, the *non-coincident* peak demand of all the electric customers in South Dakota – residential, commercial, industrial and governmental - was reported to be approximately 2,043,000 kilowatts (kW) or 2043 Megawatts (MW). This peak load was distributed between twelve (12) reporting entities as shown in Table 2.2:

TABLE 2.2
South Dakota Estimated Peak Load by Distributor, CY2005⁸

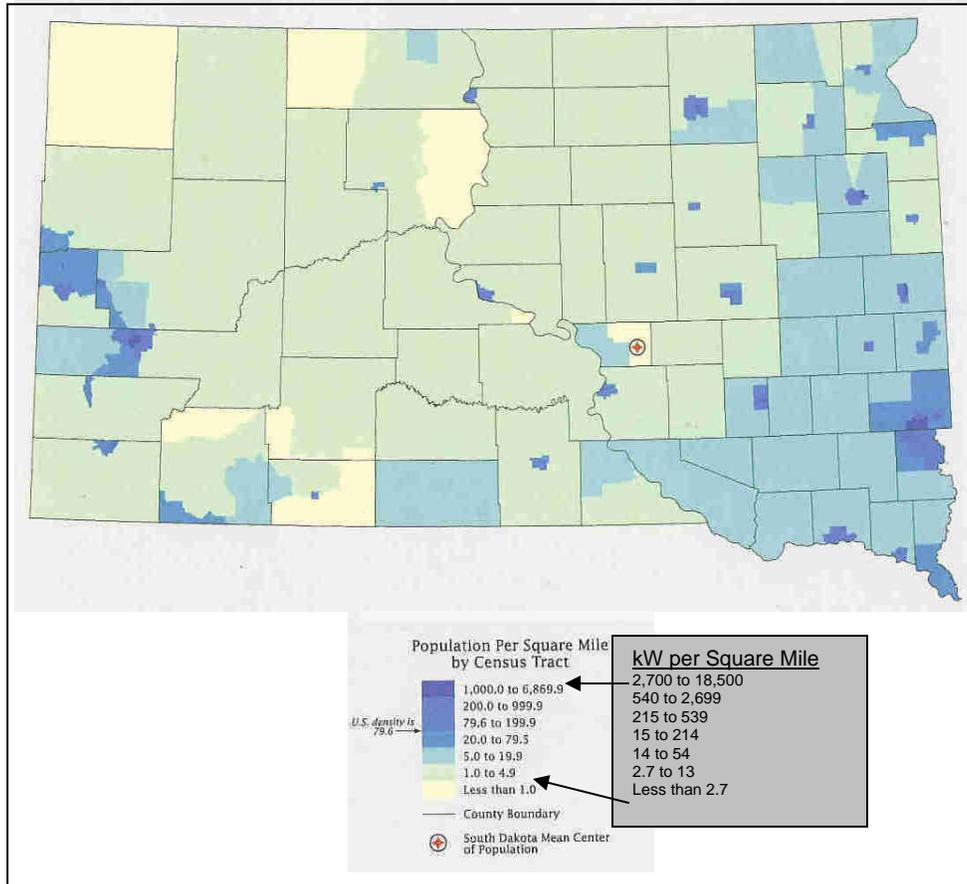
Electricity Distributor	MW	% of Total
Xcel Energy	429	21.0%
East River Coop**	398	19.5%
Black Hills Power*	329	16.1%
Northwestern Energy	305	14.9%
Municipalities	271	13.3%
Rushmore Coop***	125	6.1%
Otter Tail Power**	55	2.7%
MidAmerican Energy	33	1.6%
Montana-Dakota Utilities	33	1.6%
State Facilities***	30	1.5%
Grand Electric Coop***	20	1.0%
Ellsworth AF Base***	15	0.7%
TOTAL	2,043	100%
* Includes WY Service Territory		
** Winter Peak		
*** Estimated		

The non-coincident⁹ peak load, averaged over South Dakota’s total population, results in an average electric demand of about 2.7 kW per person. If this average electric demand is combined with the population figures stated earlier, it is possible to estimate the geographic distribution of electric loads across the state. Figure 2.1 shows that more than half of the electric load is concentrated along the Sioux Falls – Watertown – Aberdeen, and Rapid City – Sturgis corridors, at opposite ends of the state.

⁸ Value shown for MidAmerican Energy provided by MidAmerican. All other values shown provided by the South Dakota Public Utilities Commission.

⁹ The term “non-coincident” refers to the fact that the peak demands of the individual utilities typically happen at different times.

FIGURE 2.1
Estimated Concentration of Electric Load
in South Dakota, East and West,
Based on Population density¹⁰

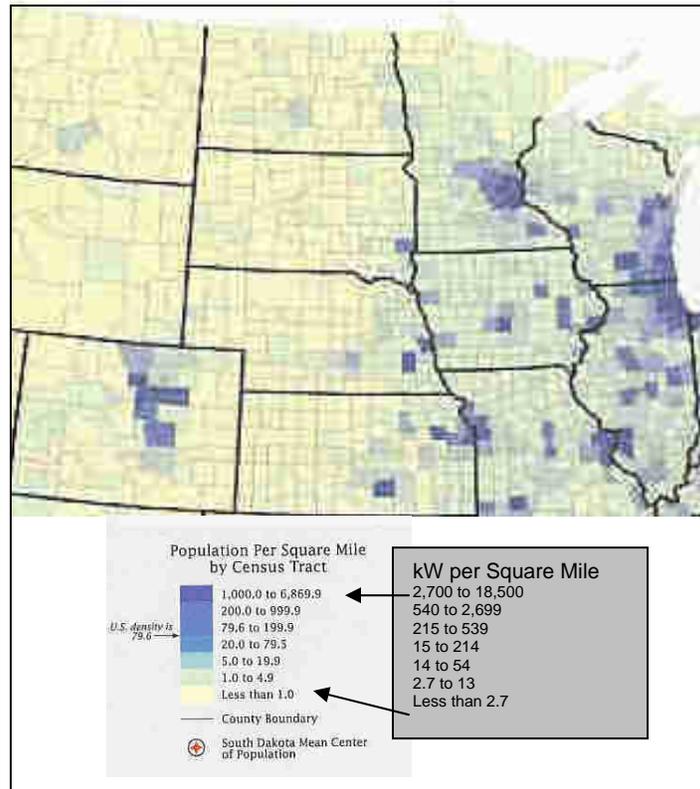


If the balance of the non-coincident peak demand in 2005, about 1000 MW, is assumed to be spread uniformly over the remaining rural counties, the average electric load density in the rural areas can be estimated at only about 27 kW per square mile, a relatively low figure.

For comparison, Figure 2.2 steps back from South Dakota alone, and depicts the population (and thus electric load) density for South Dakota and surrounding states.

¹⁰ Based on population density. Source: U.S Census Bureau, http://www2.census.gov/geo/maps/special/profile2k/SD_2K_Profile.pdf#search=%22Population%20density%20by%20county%20South%20Dakota%22.

FIGURE 2.2
Estimated Electric Load of Midwest States
Based on Population Density¹¹



As shown on Figure 2.2, rather than South Dakota itself, the real electricity export markets for South Dakota, based solely on population density, apparently lie to the east in the Twin Cities, Milwaukee and Chicago, to the south at Kansas City, and to the southwest in Denver. However, as discussed later, there are market and transmission capacity challenges that affect which load centers have the best potential as energy export targets for South Dakota.

2.3 Electric Energy Usage in South Dakota

Table 2.3 provides an estimate for the electric energy sold to customers in South Dakota in calendar year 2005 by the same twelve entities listed earlier.

¹¹ Based on population density. Source: U.S Census Bureau, http://www2.census.gov/geo/maps/special/profile2k/SD_2K_Profile.pdf#search=%22Population%20density%20by%20county%20South%20Dakota%22.

TABLE 2.3
Estimated Annual Electric Sales to South Dakota Customers by Entities
Distributing Power in South Dakota (CY 2005)

Distributor	MWh (in 1000's)	% of Total
East River Coop	1899	20.3%
Xcel Energy	1866	19.9%
Black Hills Power*	1417	15.1%
NorthWestern Energy	1269	13.6%
Municipalities	1091	11.6%
Rushmore Coop**	892	9.5%
Otter Tail Power	351	3.7%
MidAmerican Energy	165	1.8%
Montana-Dakota Utilities	130	1.4%
State Facilities**	131	1.4%
Grand Electric Coop**	88	0.9%
Ellsworth AF Base**	66	0.7%
TOTAL	9,365	100.0%
* Includes WY Service Territory		
** Estimated		

These twelve entities report that their combined electric energy sales in South Dakota in CY 2005 were approximately 9.3 million Megawatt-hours (MWh). Assuming that energy usage is roughly proportional to population density, the electric customers in the seven most populated counties in the state, at the two ends of the state, probably accounted for about 50% of the electric energy sold in the entire state, or 4.6 million MWh in 2005.

2.7 Forecasted Requirements for Additional Electric Capacity and Energy Needed to Supply Core Load in South Dakota, 2006-2021.

All of the utilities surveyed by SA reported expected growth in electric demand and energy use in the range of 1% to 2% per year over the next 10 to 15 years. At these compound average growth rates, the demand for new generating capacity in South Dakota might grow at the rate of about 20 MW to 40 MW per year. Energy usage might grow by 136,000 MWh annually. For comparison, one new coal-fired generating station rated at 600 MW and operating 7,000 hours per year would produce about 4.2 million MWh. Based on South Dakota's load growth alone, one new coal plant could meet all of South Dakota's incremental core customer load growth for 30 years.

2.8 Revenue from Sales of Electricity in South Dakota

Based on an estimated average retail revenue figure of \$70 per MWH,¹² the total sales of electricity to core customers in South Dakota in 2005 probably produced about \$650 million of revenue for the power distributors. (Sales of electricity for resale in South Dakota or elsewhere have been excluded from this figure.) This figure demonstrates that the electric utility business is large and important in South Dakota, before addressing any power export opportunities. Further, it provides a very good reason why state government should be and is concerned with the direction and scale of utility growth in the years ahead.

2.9 Existing Sources of Electric Generation in South Dakota

While the electric loads and revenues in South Dakota are concentrated toward the eastern and western boundaries of the state, the largest concentration of electric generation is sited in hydroelectric plants located on the Missouri River in the central part of the state. Table 2.4 shows that more than 1500 MW of hydro capacity are installed on the river and marketed by the Western Area Power Administration (WAPA). The state also holds approximately 1300 MW of other, large, generating units fired with coal, natural gas or diesel oil.

TABLE 2.4
List of Generating Facilities Located in South Dakota
Rated Larger than 10 MW

<u>Name</u>	<u>Summer Rating (MW)</u>	<u>Type of Unit</u>	<u>Marketer</u>
Oahe	556	Hydro	WAPA
Big Bend	482	Hydro	WAPA
Big Stone I	415	*ST Coal	OTP, Others
Fort Randall	361	Hydro	WAPA
Angus Anson #3	158	**CT Gas	Xcel
Gavins Point	109	Hydro	WAPA
Angus Anson #2	107	CT Gas	Xcel
Angus Anson #1	101	CT Gas	Xcel

* Steam Turbine

** Combustion Turbine

¹² U.S. Department of Energy Information Administration (EIA), **Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, South Dakota, average of all customer sectors, July 2005**, http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_a.htm.

TABLE 2.4 (continued)
List of Generating Facilities Located in South Dakota
Rated Larger than 10 MW

<u>Name</u>	<u>Summer Rating (MW)</u>	<u>Type of Unit</u>	<u>Marketer</u>
Ben French	100	CT Gas/Oil	BHP
Groton	95	CT Gas	BEPC
Spirit Mound I	52	CT Oil	BEPC
Spirit Mound II	52	CT Oil	BEPC
Watertown	51	CT Oil	MRES
Huron #2	44	CT Gas/Oil	NWPS
Highmore	40	Wind	FPL
Lange	40	CT Gas	BHP
Ben French	25	ST Coal	BHP
Lake Preston	24	CT Oil	OTP
Aberdeen	21	CT Oil	NWPS
Huron #1	11	CT Gas/Oil	NWPS
Ben French	<u>10</u>	IC Oil	BHP
Total	<u>2,854 MW</u>		

Including units rated less than 10 MW, the total installed generating capacity in South Dakota is estimated to be 2,894 MW.¹³ The installed generating capacity exceeds the estimated, non-coincident, in-state, peak electric load by about 811 MW, or 40%¹⁴, compared to the Mid-Continent Area Power Pool (MAPP) minimum installed reserve capacity requirement of 15%. This result underlines the fact that South Dakota has been and remains a state with generating capacity dedicated, in part, to serving export markets outside the boundaries of South Dakota, although as in South Dakota these export markets generally represent native retail loads of public power entities that have been served by South Dakota generation (primarily hydro power from the Missouri River) for many years.

¹³ Source: South Dakota Public Utilities Commission, October 2006.

¹⁴ If coincident peak demands were considered, this surplus of total generation over total peak load would be even larger.

Although the total 2,854 MW of installed capacity in South Dakota is large, some perspective is appropriate. A single generating plant site in Minnesota alone has 2,200 MW of installed capacity, equivalent to 77% of the generating capacity of South Dakota in total, and more than the total peak customer demands of South Dakota (Table 2.2). So, for reasons of relative scale, it should not be surprising that neighboring states do not automatically think of South Dakota as an energy exporter.

2.10 Announced Plans for Electric Production Plant Additions in South Dakota

The questionnaires written and used by SA in this project invited respondents to provide, on an open-ended basis, their announced plans for adding new electric generating facilities in South Dakota. The new power plants reported through this process and related interviews are listed below:

- **Xcel Energy Co. with PPM Energy, Wind Turbine Farm**

On September 21, 2006, PPM energy and Xcel Energy announced the start of construction of the 150 MW MinnDakota Wind Power Project in Brookings County, South Dakota and Lincoln County, Minnesota.¹⁵ They said “MinnDakota will span the wind resource-rich area on the border of South Dakota and Minnesota with approximately 50 MW located in South Dakota and 100 MW in Minnesota. The 50 MW will be the largest installation of wind power in South Dakota”

Power from the units in South Dakota will be collected at Xcel Energy’s Brookings Substation and upgraded transmission facilities will make the wind energy available to Xcel’s customers in South Dakota and Minnesota. The Brookings Substation lies within the electric market managed by the Midwest Independent Transmission System Operator (MISO)

- **Basin Electric Power Cooperative, Combustion Turbine**

Basin Electric recently completed installation of a 91 MW, natural gas-fueled, combustion turbine generator at a site near Groton, South Dakota. This plant will double in size by 2008.

- **Big Stone Unit II**

Seven utilities including Otter Tail Power, Missouri River Energy Services and Heartland Consumer Power District in South Dakota, and Great River Energy, Montana-Dakota Utilities, Southern Minnesota Municipal Power Agency and Central Minnesota Municipal Power Agency plan a 630 MW, coal-fired baseload generation addition next to Big Stone Unit I near Big Stone City, South Dakota, with an in-service date in the 2011 to 2012 time frame.

¹⁵ Press Release, PPM Energy, A Scottish Power Company, September 21, 2006

2.11 Potential Other Power Plant Additions Under Consideration or in Planning

- **Xcel Energy**

In addition to the MinnDakota wind development reported by Xcel Energy in its questionnaire response as discussed above, Xcel has subsequently announced plans for an additional 380 MW of wind developments to be in-service by 2015. According to Xcel, these developments will occur in Minnesota or eastern North or South Dakota.¹⁶

Basin Electric Power Cooperative

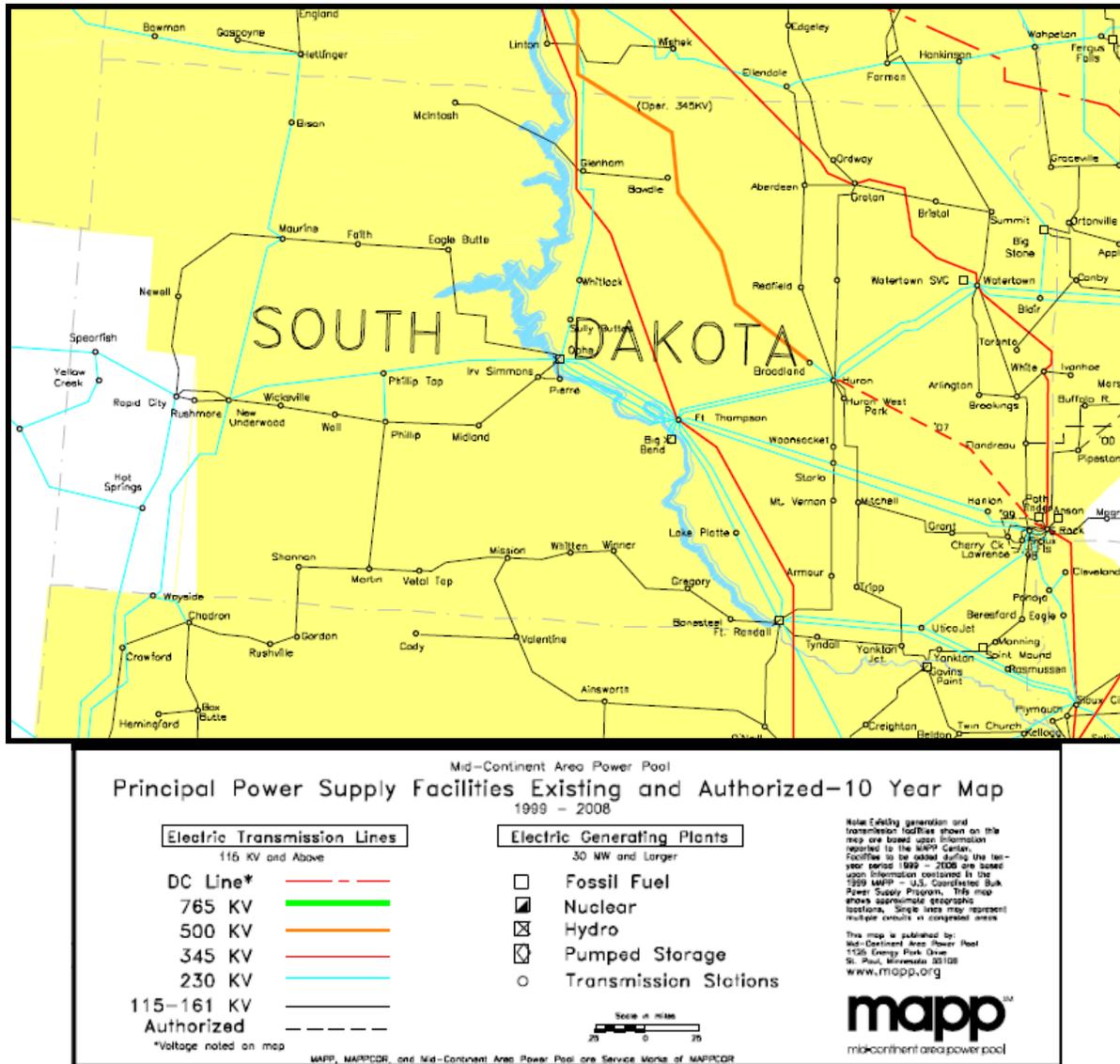
Basin recently announced initial plant siting efforts in South Dakota for a future coal-fired generation facility, with in-service as early as 2012. This development would be a nominal 600 MW unit, potentially using integrated gasification combined cycle (IGCC) technology. Sites under consideration in South Dakota are located near Selby, Pierre and Wolsey. Basin may involve other utility partners in the development if it moves forward. As noted above, Basin also plans to install an additional peaking unit at Groton.

2.12 Existing Electric Transmission Network in South Dakota

The currently existing transmission system and currently planned transmission additions in South Dakota are shown on Figure 2.3

¹⁶ “Petition to the Minnesota Public Utilities Commission to Initiate a Competitive Resource Acquisition Process for 375 MW of Base Load Generation”, Xcel Energy, November 1, 2006, at pages 1 to 9.

FIGURE 2.3
High-Voltage Electric Transmission Lines in South Dakota¹⁷



2.13 Planned Additions to the Electric Transmission Network in South Dakota

The addition of new generating units – coal and wind powered – along the eastern edge of South Dakota is prompting the planning, permitting and/or construction of new high voltage transmission lines in eastern South Dakota and western Minnesota. These developments are happening in four (4) project groups as described below:

¹⁷ Mid-Continent Area Power Pool (MAPP).

A. Xcel Energy Projects for Renewable Energy (Wind)¹⁸

In 2003, Xcel Energy announced its intent to add transmission capacity in support of its renewable energy projects. The first set of lines and substations are listed below:

- A new, 161 kV line in Jackson and Martin counties in Minnesota connecting the Lakefield Junction Substation near Lakefield, MN and the Fox Lake substation near Sherburne, Minnesota.
- A new, 345 kV line connecting the Lakefield Junction Substation in Minnesota with the Split Rock Substation near Sioux Falls, SD.
- A new, 115 kV line that will connect to the Lakefield Junction - Split Rock 345 kV line in the new Nobles substation near Worthington, MN and will connect to the existing Chanarambie Substation on the Buffalo Ridge.
- A new, 115-kV line from the new White Substation, north of Brookings, SD.
- A new 345/115/34.5 kV substation near the existing WAPA White Substation at White, South Dakota in Brookings County. The Xcel and WAPA Substations will also be interconnected by another short 345 kV line.

B. Big Stone II Transmission Project for Coal Unit Export and Renewables¹⁹

The Big Stone II owners have applied for permits and a Minnesota Certificate of Need for two transmission lines to serve as export paths for the output of its planned, coal-fired unit at Big Stone Lake. In addition to capacity for output of the Big Stone Unit II itself, the proposed transmission facilities have been planned with added capacity for future development of wind-derived energy as well.

- The Morris Line involves an upgrade of an existing, 48-mile, 115 kV line circuit between Big Stone Substation and Morris, Minnesota. It includes the construction of a new, 230 kV line from Big Stone to Ortonville, Minnesota and the rebuild of an existing 115 kV line to 230 kV from Ortonville to Johnson Junction switching station, which is also in Minnesota. The 230 kV line will be continued from Johnson Junction to the Morris Substation.
- The Granite Falls Line is planned as a 345 kV circuit from Big Stone to Granite Falls, Minnesota, and will entail the building of new line mileage and the upgrade of an existing, 115 kV line to 345 kV standards, although it will initially be

¹⁸ Xcel Energy response to SDEIA Questionnaire, August 2006

¹⁹ MRES response to SDEIA Questionnaire, August 2006

operated at 230 kV. This line will pass near the excellent wind regime areas in Northeastern South Dakota highlighted on Figure 3.1. As wind energy development continues in the area in the future, when upgraded to operate at 345kV this line is expected to provide 800 to 1000 MW of added capacity for moving wind energy to load centers in Minnesota.

C. CAPX 2020 Program, Group 1²⁰

CAPX 2020 is an abbreviation that stands for “Capacity Expansion by the Year 2020.” It refers to a planning effort by a consortium of electric utilities - cooperative, municipal and investor-owned - to ensure the reliability of the electric network serving Minnesota and the region for the future. CAPX studies have shown that the transmission backbone will require major upgrades and expansion to accommodate increased electricity use expected in Minnesota and the surrounding region through 2020.

The consortium has moved beyond planning and is now seeking permits and financing to construct four sets of transmission facilities known as CAPX Project Group I. This group includes approximately 600 miles of 345 kV lines, connecting Minnesota with North Dakota, South Dakota and Wisconsin, and a smaller 230 kV line in the Bemidji, Minnesota area. These projects are estimated to cost approximately \$1.3 billion. See Table 2.5.

**TABLE 2.5
Proposed CAPX 2020 Transmission Projects, Group 1**

Year	Description
2011	CapX Bemidji-Grand Rapids/ 230 kV
2011	CapX Southeast Twin Cities-Rochester-La Crosse / 345kV
2012	CapX Brookings, S.D.-Southeast Twin Cities / 345 kV
2012	CapX Fargo-St. Cloud/Monticello Area / 345kV

For purposes of this SDEIA project, the most interesting line is the planned 345 kV circuit from Brookings, S.D. eastbound toward the Twin Cities. It is designed to improve reliability throughout west central Minnesota, the Red River Valley, and the Twin Cities, along with enabling access to new generation, including projected wind resources to be built in the area. *In addition to the Big Stone Unit II Granite City line listed earlier, this line when constructed will represent a potential on-ramp to the transmission system within the MISO footprint for future export of energy from South Dakota.*

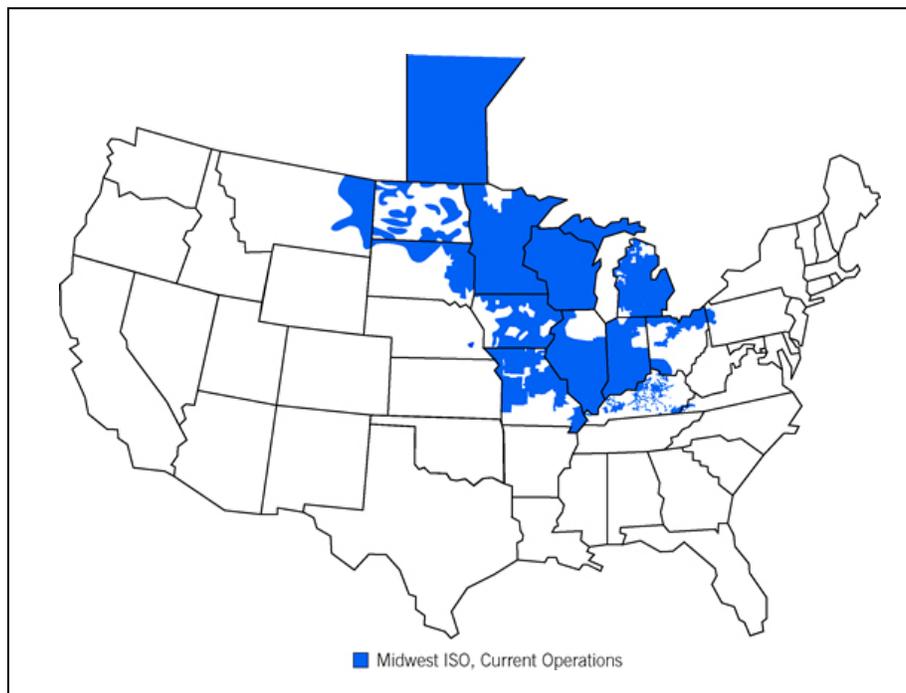
²⁰ CAPX website, <http://www.capx2020.com>.

D. MISO Northwest Transmission Project²¹

The Midwest Independent Transmission System Operator (MISO) is also active in studying transmission additions for the northwest part of its multi-state energy market. MISO's Transmission Expansion Plan 2005 contemplates construction of added transmission lines within the MISO operational area across southern Minnesota and northbound into North Dakota and central South Dakota to provide reliability, outlets for new coal and wind generation, and relief for transmission congestion at points east.

This MISO Transmission Expansion Plan highlights the seams issue that exists between MISO and non-MISO regions. Figure 2.4 illustrates the MISO operational area, or "footprint". It is within this footprint that the MISO transmission development efforts are occurring. Note that most of South Dakota, and in particular the best wind resource areas in the center of the state, are not in the MISO footprint. Accordingly, non-participation in MISO leaves most of South Dakota out of MISO transmission development plans, including the primary export markets to the east.

FIGURE 2.4
MISO Operational Area²²

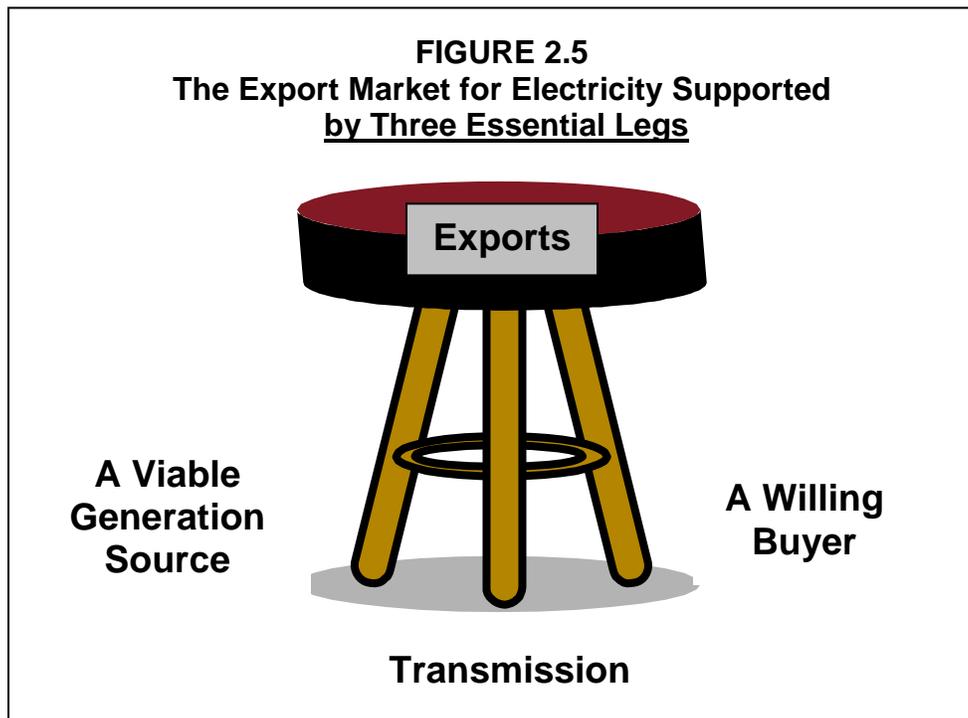


²¹ MISO response to SDEIA Questionnaire, August 2006.

²² Source: MISO.

2.14 Elements Needed to Increase Exports of Electric Energy from South Dakota – the Stool with Three Legs

The legislation underlying the formation of the South Dakota Energy Infrastructure Authority contained a particular focus on infrastructure for energy “transmission.” The interviews conducted by SA, however, revealed a widespread understanding that three elements, not just transmission facilities, are essential to further develop the electric power export market that South Dakota is seeking to expand. Several interviewees referred to the three elements in analogy to a three-legged stool (Figure 2.5):



Leg 1: The Source is the inventory of power generating resources, existing and new, which have to be in-place and operating under known tariffs or formal agreements to provide the product, electricity, for sale at a price attractive to both sellers and buyers.

Leg 2: Transmission is the collection of transmission facilities, lines and substations, existing and new, that have to be installed and operated under known tariffs or formal agreements that provide for stability, reliability, safety, backup and cost recovery for (a) sellers and buyers of exported energy, and also for (b) core customers in South Dakota and other affected parties all along the export path.

Leg 3: A Willing Buyer is the most important of all – willing buyers or customers for the exported power who will agree to purchase the energy under price conditions and other terms that will allow the recovery of costs by the power producers, the transmission line owners and other parties affected by the planned power line construction and the resulting power flows across private property.

“Wind energy development in South Dakota seems to be trying to happen backwards. Finding wind sites and interested landowners is the easy part, and is the part that usually happens first.

The hardest and most critical part is finding a willing buyer for the wind energy. When you have that, everything else, including the necessary transmission, will happen.”

An interviewee

The next three chapters of this report discuss SA’s interview findings related to each of these three legs in turn.

CHAPTER 3.0

OPPORTUNITIES AND CHALLENGES SEEN BY INTERVIEWEES IN SITING NEW POWER PRODUCTION FACILITIES IN SOUTH DAKOTA

Q3.1: Is South Dakota an attractive locale for building new electric generating capacity – coal, nuclear or wind?

A3.1: There is a broad consensus among the entities interviewed that South Dakota is generally attractive as a locale for siting new electric generating facilities that would use coal, nuclear or wind as primary energy sources.²³ The basic advantages offered by South Dakota are seen to be the following:

- Land for plant siting is available in South Dakota at reasonable cost.
- Water is probably available for cooling and boiler water makeup purposes from the Missouri River, the James River or Big Stone Lake.²⁴
- The atmospheric air quality in South Dakota is good and the air sheds at potential power plant locations can probably absorb controlled levels of emissions from new industrial facilities.
- The business and labor climate in South Dakota is favorable. Citizens understand the complex tradeoffs involved in conducting business and the workforce is productive.
- Governmental policy is supportive, the regulatory environment is generally favorable, and local planning and zoning are not impediments when it comes to developing, permitting, constructing and operating electric facilities.

Q3.2: What are the prospects for expanding electric power production in South Dakota using coal?

A3.2: All of the entities contacted by SA are well aware that there are two primary technologies for using coal to make electricity on a large and efficient scale:

²³ Interviewees had little or nothing to say about South Dakota as a place to site power plants fueled with other renewable energy sources like agricultural wastes, sunlight, or grasses. SA did not ask in these interviews about the potential for building new power plants to be fueled with natural gas or oil.

²⁴ Some interviewees pointed out that there are many competing interests using these three sources of water, and securing permits to make large scale water withdrawals from the Missouri River, the James River or Big Stone Lake may be problematic.

- Direct-fired, supercritical, steam boiler–steam turbine–electric generator plants with evaporative or air cooling of the spent steam and post-combustion clean-up of the flue gas stream.
- Integrated gasification combined cycle (IGCC) plants wherein coal is converted to a clean gas, the gas is burned in a combustion turbine-generator set, and the reject heat from the combustion turbine is used to make steam that powers a steam turbine-generator in a combined cycle. While promising, particularly for environmental performance reasons, IGCC technology has not yet been demonstrated in full-scale utility operations, although a number of plants are now proposed in the U.S. in the 2011 to 2015 time frame.

In the Great Plains region east of the Missouri River, it has been about 20 years since any electric utility has constructed a coal-burning power plant. Utilities who serve customers in South Dakota and neighboring states are now laying plans to change that situation.

Otter Tail Power Company, with six other owners, has announced plans to build a direct-fired, coal burning, steam turbine generating unit at Otter Tail's existing Big Stone Station in northeastern South Dakota. Big Stone I, built in 1975, has a net output rating of 450 MW. Big Stone II will have a net output rating of 630 MW with an in-service date of 2011 to 2012. South Dakota has issued a siting permit for Unit II. Minnesota is considering a Certificate of Need for two, related, 345 kV, outlet transmission lines that will run generally south and then east from Big Stone Station toward load centers and interconnection points in Minnesota. Big Stone II will be an immediate example of both a modern, direct-fired, supercritical coal-burning generating unit, and a South Dakota facility designed from the ground up to serve an export market for electric power.

In addition to the Big Stone II owners group, Basin Electric Power Cooperative (Basin) has announced that it is studying construction of another, coal-fired, generating station to be located at one of three alternative sites in central South Dakota. It is understood that Basin is evaluating both direct-fired and IGCC technologies for this plant which is expected to have an in-service date of 2012. Basin's new generating station will also be both a demonstration of current coal utilization technology, and a second example of a South Dakota facility planned with potential energy export capacity.

Despite the new plant announcements described above, there is a consensus among the entities interviewed by SA that South Dakota faces two primary disadvantages when it comes to promoting in-state economic development via construction of coal-fired generating stations:

- First, South Dakota has no coal resource in the ground. Coal for electric generation thus has to be imported by rail over relatively long distances. This, in turn, means that coal-fired power plants at mine-mouth in Wyoming and North Dakota can be very powerful competitors, on an energy cost basis, in the same power export markets that South Dakota may seek to serve. Moreover, coal, once loaded in rail cars, can roll through or around South Dakota to coal-fired power plants located near customer load centers. Energy by rail can thus eliminate the need, cost and opportunity for exporting electricity by wire from South Dakota.
- Second, utilities in South Dakota are convinced that competitive pricing for coal hauling by rail must be realized in South Dakota before there can be any large expansion of the coal-fired generating business in the state. The entities interviewed by SA believe that timely construction of the proposed Dakota, Minnesota & Eastern (DM&E) rail line across South Dakota will probably be required to bring competitive rail haul pricing to the state.

“When considering building a new, coal-fired power plant in South Dakota, as utilities we believe the associated land, air, water, plant technology, fuel supply and transmission issues are manageable.

It is the lack of competitive rail that scares the _____ out of us.”

A utility interviewee

Organizations interviewed by SA are also cognizant of growing concerns, worldwide, about the effects of fossil fuel combustion and carbon dioxide (CO₂) emissions on global atmospheric temperatures and the general environment. There is no consensus, but a wary expectation, that federal action may be taken over the next decade to establish emissions trading markets, or impose new taxes, in a campaign to constrain CO₂ emissions from coal-burning facilities. As a consequence, some South Dakota entities interviewed believe the state should anticipate this issue in economic development activities supporting fossil-fueled generation technologies.

Q3.3: Is there a role for nuclear power in expanding the electric generating capacity in South Dakota?

A3.3: The parties who spoke to SA during this project are of three (3) minds about a possible role for nuclear power in expanding the electric generating capacity and power export capabilities of South Dakota:

- First, there is a general consensus that nuclear power is a safe and desirable technology for electric power production. These same entities think that South Dakota would be an ideal place to site nuclear generating plants because the plants can be located at substantial distances from population centers, evacuation planning would be greatly simplified, plant security could be strong, and the state would benefit from the infusion of a high technology industry and spin-off construction and support businesses.
- Second, the same entities that think positively about nuclear power believe that there will be no new nuclear plants sited in South Dakota before 2020, at the earliest. They are aware that the spent fuel storage problem that has plagued the nuclear power industry for 40 years is still unsolved. These entities anticipate that the citizens of South Dakota will not welcome nuclear fuel storage depots in the state as an inducement to bring nuclear power stations to South Dakota.

Furthermore, there is a general industry conviction that any new nuclear plants licensed over the next ten years will most likely be sited at existing nuclear plant sites (a.k.a. brown field locations) where operating utilities already have trained personnel, plant security operations in-place, supporting vendors and auxiliary facilities that can be shared with existing units. Finally, utilities in South Dakota would probably have difficulty committing to ownership of a nuclear generating station because the 30 year hiatus in nuclear plant orders means that literally no one can make a confident estimate as to what construction costs might be for a new plant.

- Third, the persons interviewed by SA are not willing to completely discount nuclear power as a technology for use in South Dakota, because of the global warming issue that overhangs continuing use of fossil-fueled power plants. A few of the interviewees thought that South Dakota might be well served, at relatively low cost, if the engineering schools in the state were funded to offer nuclear engineering and plant operations courses, thus laying the groundwork for making a nuclear power industry viable two decades from now.

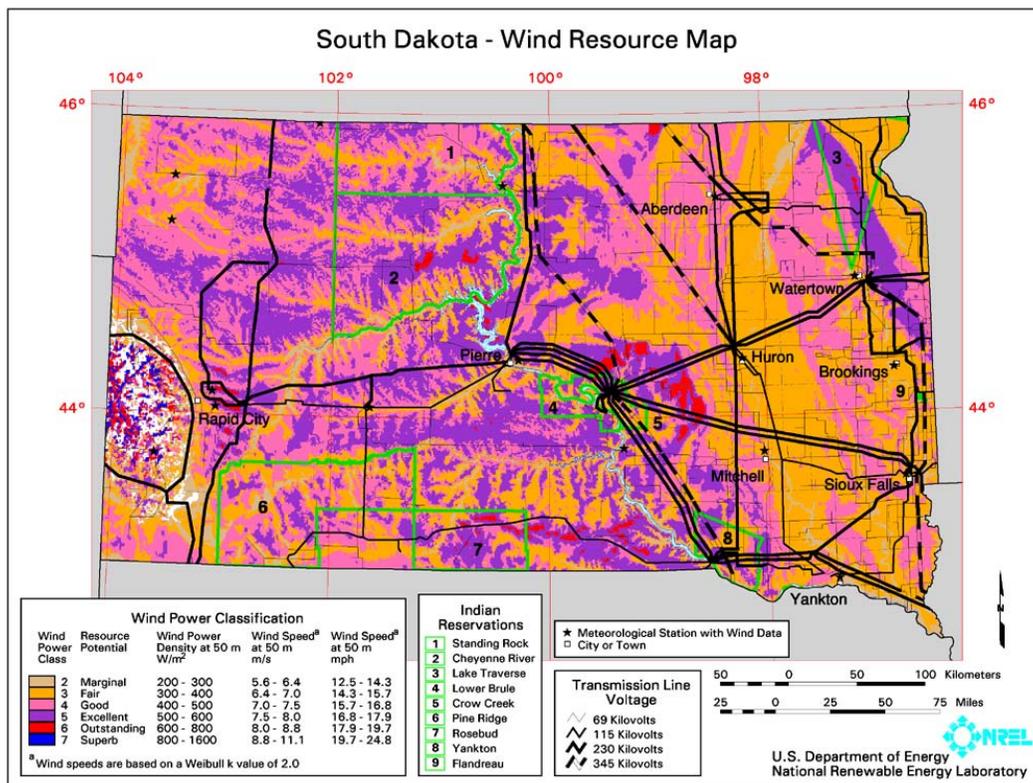
Q3.4: Does wind power represent an important opportunity for building up the power generation industry in South Dakota and increasing exports of electricity to other states?

A3.4: The organizations interviewed by SA are all well-informed about the potential for developing large wind energy farms in South Dakota. Interviewees pointed SA to several wind resource studies that indicate South Dakota, along with North Dakota, Kansas and Texas, may have the strongest and most persistent wind profiles, suitable for power generation, in the lower 48 states. The sum of plans, concepts and hopes expressed by prospective wind developers suggest that the near term wind potential, in

South Dakota alone, may be greater than 12,000 MW, a figure about six times the total, 2005, non-coincident, electric peak load in the state.

Studies of South Dakota’s wind energy potential show that some of the best areas for siting wind-powered generators to achieve high capacity factor operation are located along the South Dakota – Minnesota border (Buffalo Ridge) and in central South Dakota along an arc east of Fort Thompson. These and other high potential wind fields are shown in Figure 3.1, along with existing high voltage electric transmission lines in the state.

FIGURE 3.1
Map of Areas with High Wind Energy Potential in South Dakota²⁵



The Buffalo Ridge in Southwestern Minnesota is generally known as an excellent wind regime, and significant wind development is occurring there. Figure 3.1 shows that the Buffalo Ridge also extends from Minnesota northwesterly into northeastern South Dakota, and generally has an “excellent” resource potential, with average wind speeds

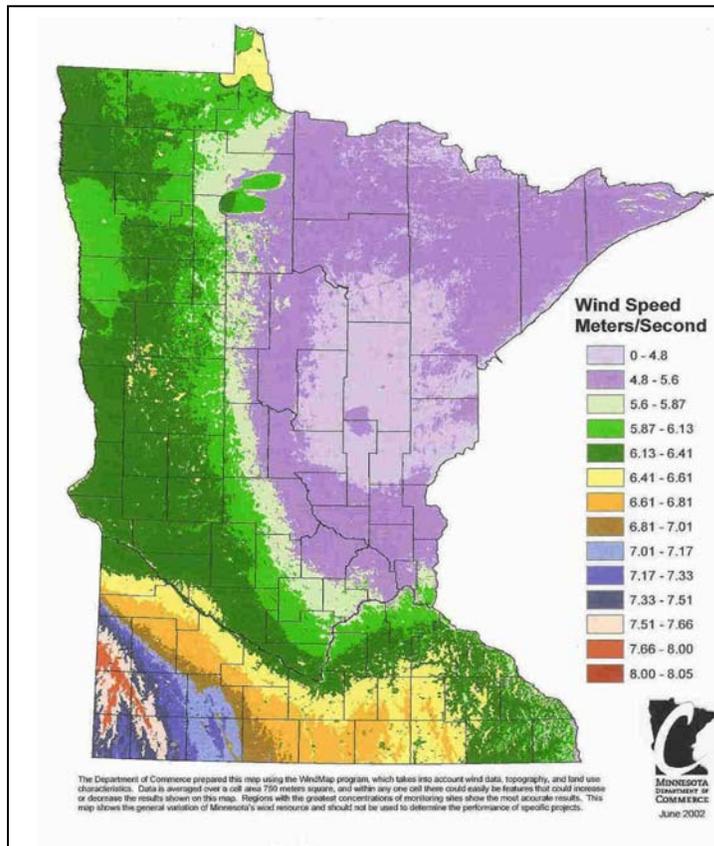
²⁵ U.S. Department of Energy National Renewable Energy Laboratory, http://www.eere.energy.gov/windandhydro/windpoweringamerica/images/windmaps/sd_50m_800.jpg. Data shown for 50 meter height.

of 7.5 to 8.0 meters per second (m/s). Small areas of “outstanding” potential (8.0 to 8.8 m/s) are also seen in this area.

Significantly, Figure 3.1 also shows that there are large additional areas in South Dakota that have wind regimes similar to or better than the Buffalo Ridge. In addition, significant areas of “outstanding” potential are noted to the east, south and northwest of Pierre, and in smaller areas near Rapid City.

Earlier, Minnesota was identified as the closest and most likely export target for energy produced in South Dakota. Figure 3.2 displays the wind regimes to be found in Minnesota itself.

FIGURE 3.2
Minnesota’s Wind Resource by Wind Speed at 50 Meters²⁶



²⁶ Minnesota Department of Commerce,
http://www.state.mn.us/mn/externalDocs/Commerce/50_Meter_Wind_Speed_013106120212_WindSpeed50.pdf

As shown on Figure 3.2, the excellent wind regimes are primarily located on the Buffalo Ridge in Southwestern Minnesota.

A comparison of Figures 3.1 and 3.2 shows that:

- Compared to Minnesota, South Dakota has more extensive land areas with “excellent” wind resources or better (areas with wind speeds of 7.5 to 8.0 m/s and above),
- South Dakota has more areas with “outstanding wind speeds” (above 8.0 m/s), but most of them are in the center of the state and some distance from Minnesota, and:
- Wind energy exported from South Dakota would likely need to pass by the best Minnesota wind regimes to get to primary markets in the Twin Cities.²⁷

This last fact, together with the additional transmission cost penalty involved in exporting South Dakota wind energy to Minnesota through Minnesota’s best wind resource, suggests that South Dakota may need to focus first and particularly on exporting its wind resources located closest to Minnesota, even though the wind resource there may be somewhat less than regimes located farther from Minnesota in the middle of South Dakota.²⁸

Q3.5: Is progress being made in the development of South Dakota’s wind energy resource?

A3.5: Interviewees told SA that wind energy developers have already leased hundreds of acres for turbine generator installations, and landowners are anxious to see the start of tower construction and lease payment flows.

One large wind farm, at Highmore, SD, is already in operation. There are 27 units there, with a combined nameplate rating of about 41 MW.²⁹ The farm was built by a subsidiary of Florida Power Group. The power output is being purchased by Basin

²⁷ In fact, as of the date of this report there were already 2000 to 3000 MW of proposed wind developments in the MISO interconnection request queue for the Buffalo Ridge area in Minnesota alone. MISO discussion at Big Stone Unit II transmission certificate of need public hearing, Morris, Minnesota, October 10, 2006.

²⁸ For example, Xcel Energy recently announced plans to install an additional 380 MW of wind capacity by the year 2015. They anticipate this development will be accomplished in Minnesota and Eastern North Dakota/South Dakota. “Petition to the Minnesota Public Utilities Commission to Initiate a Competitive Resource Acquisition Process for 375 MW of Base Load Generation”, Xcel Energy, November 1, 2006, at pages 1 to 9.

²⁹ Joint Report of the South Dakota Energy Infrastructure Authority and South Dakota Energy Task Force, December 2005, p. 56.

Electric Power Cooperative (Basin) and integrated with the energy from other resources in the Basin delivery system.

A second wind farm in South Dakota, located northeast of Chamberlain, has a combined output of 2.6 megawatts and began commercial operation in January of 2002. Partners in the project include Central Electric Cooperative, Mitchell, SD; Basin Electric Power Cooperative, Bismarck, ND; East River Electric Power Cooperative, Madison, SD, and its member systems.

A third wind farm, rated at about 50 MW, has been announced by Xcel Energy with PPM Energy. This farm will be located in South Dakota east of Brookings in proximity to the Buffalo Ridge along the South Dakota – Minnesota border. An additional 100 MW of wind turbine capacity will be installed on the Minnesota side of the border, also along the Buffalo Ridge. The wind turbine facilities in both farms are expected to have an in-service date of 2007, and will make use of 100 GE wind turbines rated 1.5 MW each.³⁰ The electrical output from the South Dakota wind farm will be delivered to Xcel customers in South Dakota and Minnesota through a transmission interconnection at Xcel's Brookings substation. This substation is in the market area managed by the Midwest Independent Transmission System Operator (MISO).

Other potential wind energy developments in South Dakota are listed in Table 3.1, below. As shown on Table 3.1, these potential developments total more than 1,520 MW, and most of them (representing 65% of the proposed capacity) are merchant plant developments. That is, they do not currently have a defined customer.

TABLE 3.1
Potential South Dakota Wind Energy Projects³¹

<u>Project Name</u>	<u>Developer</u>	<u>MW</u>	<u>Location</u>	<u>Utility</u>
Minn-Dakota Wind	PPM	100	Brookings	Xcel
Java Wind	Superior Renewable	39	Walworth	MDU
White Wind Farm	Navitas Energy	200	Brookings	Merchant Plant
Tatanka Wind Power	Tatanka Wind Power	90	McPherson	Merchant Plant
Northern Lights Wind Farm	Northern Lights Wind Sisseton-Wahpeton	100	Roberts	Merchant Plant
Sisseton-Wahpeton Tribe	Tribe	40	Roberts	Tribe
Lower Brule Tribe	Lower Brule Tribe	40	Lyman	Merchant Plant
Andover	Andover Wind Project	30	Roberts	Merchant Plant
Missouri River Wind	MRES	70	Codington	MRES
Rolling Thunder	Clipper and BP	100	Hand/Hyde	Merchant Plant
Turkey Ridge	Clipper and BP	100	Hutchinson/Turner	Merchant Plant

³⁰ Press Release, PPM Energy, September 21, 2006.

³¹ Source: Steve Wegman, South Dakota Public Utilities Commission, October 2006.

Table 3.1 (continued)
Potential South Dakota Wind Energy Projects

Project Name	Developer	MW	Location	Utility
Wessington Springs Hills	Superior Renewable	40	Jerauld/Buffalo	Merchant Plant
Bad River	Ted Turner	100	Haakon/Stanley	Unknown
Fox Ridge	Faith School District	140	Central SD	Merchant Plant
Confidential	Confidential	90	Central SD	Confidential
Gregory County	Shell Oil	100	Gregory	Merchant Plant
Yankton Sioux	Talon LLC	40	Charles Mix	Merchant Plant
Rosebud	Disgen	65	Todd	Confidential
Pine Ridge	Unknown	40	Shannon	Merchant Plant
Total		1,524		

Q3.6: What is the current posture of South Dakota’s in-state electric utilities vis-à-vis the development and use of wind energy?

A3.6: Many of the utilities serving electric customers in the state told SA that they are intrigued with wind energy as a future resource, and they will probably be willing to invest in wind turbine generating units, or purchase the output from wind turbine farms built by others, or wheel energy from wind farms to distant customers, provided that:

- The project economics make sense vis-à-vis other generation alternatives, and
- Willing customers are identified to take and pay for the energy and transmission costs, and:
- Regulators are willing to permit charges to core customers for any un-recovered utility costs arising from wind energy transactions compelled by regulation, or:
- Environmental concerns result in the assignment of appropriate economic values or tradable renewable certificates (TRC’s) to wind-derived MWh in recognition of their favorable environmental, economic or societal attributes.

While describing the preceding hurdles for wind energy sources, some utility representatives indicated to SA that electric utilities are still adapting to a world which includes wind-driven sources. They noted that electric systems and customer loads have traditionally been designed with the philosophy that power production plants should have a constant output characteristic. They acknowledged that wind energy, with its intermittent characteristic, represents a disturbance in traditional utility engineering and planning practice. These representatives indicated that the electric

industry, and its customers, certainly have more to learn about controlling, integrating and using wind energy, and they are striving now to get that education.

Utility operators told SA that they are currently assuming that voltage control, stability and power flows can be managed in most existing networks if the nameplate capacity of the wind machines connected to load in any hour is less than 10% to 20% of the total customer demand at that same time.³² For example, if a 15% rule is applied to the entire electric system serving South Dakota on the annual peak day, and the peak load is about 2000 MW, the opportunity for using wind turbines would amount to about 300 MW in that hour.

This theoretical in-state “opportunity” for using wind power is obviously small compared to the 12,000 MW of wind energy potential estimated for the state. This calculation thus demonstrates that the wind industry can only blossom in South Dakota if it finds electric markets outside the state, and develops the transmission paths to reach those markets.³³

Fortunately, the opportunity for an attractive South Dakota value proposition for wind energy development is potentially large. The interviews identified that South Dakota’s best wind regimes may offer wind generator output that is significantly better than regimes in other states. Thus, for the same wind machine, more valuable energy could be produced every year if it is located in South Dakota compared to elsewhere (See Figures 3.1 and 3.2). This additional energy output has value that can be used to pay for additional transmission necessary to deliver it to markets, and to produce economic value to the state.

For example, the interviews indicated that a wind machine located in the best areas in South Dakota may achieve an annual capacity factor of 40% to 45% or more. This compares with nominal 35% for the same machine if it were located on the Buffalo Ridge in Minnesota. SA estimates that this five to ten percentage point difference in annual output would justify 150 to 300 miles of additional 345 kV transmission line, compared to the same machine located on the Buffalo Ridge and operating at a 35% capacity factor.

Nevertheless, this calculation also shows that if the better wind regimes in eastern South Dakota were selected for development first and exported to the east, a larger

³² For example, the Utility Wind Integration Group (UWIG) recently found that wind can be installed in quantities of up to 20% of the utility’s peak demand without causing additional system operations costs of more than \$5/MWh. *“Utility Wind Integration State of the Art”*, report by UWIG in cooperation with the American Public Power Association (APPA), Edison Electric Institute (EEI) and the National Rural Electric Cooperative Association (NRECA), May 2006.

³³ Assumes a double-circuit 345 kV line can carry 1400 to 1600 MW, and costs \$1.4 million per mile.

portion of this advantage could be reserved for the state; rather than being expended on transmission facilities for exporting energy from sites in central South Dakota.

Q3.7: What is the view of wind energy developers regarding the potential for future growth in use of South Dakota’s wind resource?

A 3.7: Wind developers speaking to SA see in South Dakota a substantial opportunity to build successful businesses while contributing to the state’s economic health. At the same time, they identified several challenges to bringing South Dakota’s wind energy to market:

1. Relatively Small Electric Market in South Dakota

The first impediment, as seen by the wind developers, is the lack of a large and growing electric load in South Dakota, and the consequent need to find export paths to load centers located east, south or west from South Dakota. In particular, wind farm developers anticipate that their best market opportunities will be found in the regional electricity market area managed by the Midwest Independent Transmission System Operator (MISO) to the east of South Dakota. The current annual peak demand in the MISO market is about 135,000 MW. If 15% of that peak demand represents the rough size of the market in MISO for wind powered generation, the opportunity for wind development in the MISO footprint is about 20,000 MW of installed nameplate wind capacity, a very large opportunity indeed.³⁴

2. Inadequate Transmission in South Dakota for Export

A second impediment is inadequate transmission facilities in both South Dakota and beyond in the regional market managed by the MISO. Studies conducted by the Western Area Power Authority (WAPA) and others indicate that the existing high voltage transmission network in South Dakota can accept and transmit about 500 MW of new wind machine capacity without major transmission system additions in-state. This available capacity, however, is divided among multiple substations and selected lines which, in the short run, will constrain the locations where wind farms can be located. The available transmission capacity, about 500 MW, is also much smaller than the available wind energy resource reported earlier. Wind energy developers are thus looking for someone to provide additional transmission paths from areas of high wind resource to regions of high electric load.

³⁴ MISO does not estimate wind potential in its service area. However, MISO reports that a total of 5,000 to 6,000 MW of interconnection requests for wind capacity were in the MISO transmission queue in areas along the Buffalo Ridge in Minnesota and Eastern South Dakota alone as of October 2006.

3. Unfavorable State Tax Structure

A third perceived impediment is the tax structure in South Dakota. The combination of contractor excise taxes, sales or use taxes on materials and new equipment, and property taxes on wind farm installations is perceived to create higher taxes for developers in South Dakota vis-à-vis developers in neighboring states.

Wind developers acknowledge that South Dakota has made favorable adjustments in the state's tax structure over the past five years; but more reductions are apparently sought. Further efforts to reduce taxes, of course, could have an unfavorable impact on the ability of the developers and the state to demonstrate economic benefits from promoting wind farm additions in areas where state, county and municipal taxes support schools, roads, and other governmental services.

4. Competing Wind Development Momentum in Nearby Energy-Consuming States

A fourth impediment or threat as seen by wind developers is that enthusiasm for wind development in other states may cause the building of wind farms close to load centers in less than ideal wind regimes.

For example, the states of Minnesota and Iowa, which represent potential wind energy export markets for South Dakota, have active wind development efforts of their own. The Minnesota legislature has established a Renewable Energy Objective (REO) for utilities specifying good-faith efforts for renewables development by the year 2015, and incentives for local, community-based wind energy projects. Iowa has adopted legislation encouraging Iowa-based generation development.

Although these states have lesser wind regimes compared to South Dakota, this activity could soak up available opportunities and customer markets for wind development in and energy exports from South Dakota. This is seen as a race against time to get the South Dakota wind resource tapped, and related transmission lines built, before lesser wind regimes located closer to markets consume the available wind opportunities.

In addition to challenges viewed by wind developers as listed above, the utility interviewees also see an additional one:

5. Boundary Issues Between MISO and non-MISO Market Footprints

The fifth perceived impediment is (in addition to the lack of available transmission capacity) the organizational and cost issues that arise at the boundary of the MISO and non-MISO market footprints (a.k.a. the "seams" issue). Exported energy crossing from non-MISO areas in South Dakota to the MISO footprint is subject to

additional, “pan-caked” transmission fees that can today add \$10/MWh to the cost of exported energy. This alone represents an increase of about 20% to 25% to the cost of exported wind energy crossing the MISO/non-MISO boundary.

The seams issue also takes other, more subtle forms that cause some South Dakota utilities to be less than enthusiastic about joining MISO and participating in transmission line construction projects that could be useful to wind energy developers. See Chapter 4.0 for more details.

CHAPTER 4.0

OPPORTUNITIES AND CHALLENGES SEEN BY INTERVIEWEES IN SITING NEW ELECTRIC TRANSMISSION FACILITIES IN SOUTH DAKOTA

Q4.1: In addition to potential wind energy developers, did other organizations interviewed by SA concur that South Dakota lacks adequate electric transmission facilities?

A4.1: The entities interviewed by SA describe the in-state electric transmission system as a network with three general purposes. In their collective view, the system:

- Provides for delivery of electricity to meet the current and forecasted future needs of in-state, on-system retail customers at a reasonable price, and:
- Provides for quality and reliability in the delivery of electricity supplied to in-state, on-system or retail customers, and:
- Provides for the delivery of electricity to the state's borders for use by off-system, remote or export customers who are willing to pay tariffs for capacity, energy and transmission services.

These same entities have two views about the adequacy of the in-state transmission network in fulfilling the above three purposes:

First, the South Dakota entities believe that the in-state transmission system is adequate to meet the current needs of their core customers for energy delivery and reliability. The same entities are making or planning added investments in the South Dakota transmission network to meet the expected future requirements of their core customers, including the core customers' needs for new coal or wind-derived generation. Furthermore, South Dakota utilities that are members of MISO and have operating facilities on the eastern edge of South Dakota are already making or planning transmission improvements in eastern South Dakota and western Minnesota for the export of some energy back into MISO from South Dakota-based coal and wind generating facilities. Those new facilities will be constructed over the next five years along the South Dakota – Minnesota border.

Second, both members and non-members of MISO acknowledge that the best potential energy export markets for South Dakota are to the east in MISO – Minneapolis, Milwaukee, Chicago, etc. Interviewees believed this to be true because:

- Those cities represent large and growing centers for customer electric needs, and
- Minnesota and Wisconsin represent particularly difficult regulatory environments for siting and permitting of new fossil-fueled generation facilities.

The interviewees generally acknowledge the transmission lines crossing the South Dakota border and continuing eastbound into Minnesota, Wisconsin and Iowa are not adequate to move additional large blocks of electric energy to big load centers in MISO.

Exports from South Dakota to the north, south and west were seen by the interviewees as having less potential. North Dakota has extensive lignite coal deposits where mine-mouth generating plants can be located. Wyoming and Montana have vast sub-bituminous coal deposits. As a result, these three states are energy exporters themselves. And, there is essentially little transmission capacity from South Dakota west to these two states (See Figure 2.3).

The state of Iowa is very supportive of local wind and other generation developments there. Nebraska is a 100% public power state, and it has a natural tendency to take care of its own needs. These observations cause the persons interviewed by SA to believe that electric load centers to the east represent the primary market for South Dakota.

Non-MISO members interviewed by SA indicated, however, that they have little incentive to join MISO or to build additional transmission capacity in South Dakota to serve export markets in MISO because:

- In their view, membership in MISO represents additional costs to their customers and members that do not provide corresponding benefits. Simply, MISO was created in part to provide a open-access transmission market for competitive generation sources; while South Dakota has historically enjoyed low-cost generation already, and forecasts only modest load growth.
- MISO's current transmission tariffs add significant costs to energy exported by non-MISO members into MISO.
- MISO's current transmission tariffs could cause significant cost shifting to (and cost increases for) South Dakota core retail customers if South Dakota entities joined MISO.
- MISO's cost allocation system (a.k.a. "Attachment O") applicable to new transmission investments by South Dakota entities could impose new transmission costs on core customers, without offsetting benefits, for lines built in South Dakota to carry export energy,

- MISO has *transmission congestion points deep within its own transmission network*. Thus, South Dakota cannot become a large power exporter to Minneapolis, Milwaukee, Chicago or other points east by addressing transmission constraints inside South Dakota's borders alone. That is, some transmission issues are outside of South Dakota's ability to influence.

Some of the cooperatives and municipal power agencies interviewed by SA also provided another explanation for their low enthusiasm for building additional transmission in South Dakota to serve export loads. These public power agencies observed that they are principally chartered to acquire and deliver energy at reasonable cost to their customers, and their business models do not drive them to search for added revenues and profits from export power transactions. These organizations are not required or motivated to earn ever larger margins to satisfy shareholders or other owners.

“Like other relatively sparsely-populated states, South Dakota has a lot of public power utilities and federal agencies serving the state. These entities’ missions have historically focused on serving the needs of their local, retail customers. They do not have a profit motive interest in doing things like exporting electricity to customers they do not directly serve.

This represents a natural challenge for South Dakota in its interest to export more electricity to other states via or through these entities.”

An interviewee

Despite all the issues stated above, most South Dakota entities, including public power and federal agencies, told SA that they would be prepared to make additional transmission investments for power exports if:

- There is a willing buyer, a willing seller, or both to repay the transmission capital investment and incremental operating costs for new lines and substations; or
- For regulated utilities, regulators agree to impose on core customers incremental transmission costs not recoverable from export suppliers or their customers; or
- For public power agencies, the new transmission lines would provide incremental revenues to offset other transmission costs now being experienced by core customers; and

- Someone is able to convince all the citizens of all the states along the export path that the planned transmission facilities are needed and will provide value to affected landowners, the general public and the environment; or
- The federal government uses its powers under the 2005 Energy Act to designate a transmission corridor for a national need, and provides for expedited permitting and land acquisition policies along that corridor; and
- It can be demonstrated that parallel power flows caused by exports will not adversely affect other parts of the South Dakota network or other systems.

In short, the organizations who own or could provide transmission facilities for power exports wanted SA and state government to understand that there is no lack of will, and probably no lack of financing, to build transmission facilities in South Dakota where a willing power supplier and/or a willing customer can be identified to pay the annual fixed and operating costs for the line and substations.³⁵

This viewpoint suggests that the legislatively-mandated focus of the Authority, which many interviewees viewed as being originally established as a carbon-copy of similar legislation in other states, may in some ways be “barking up the wrong tree”. That is, the state bonding authority to finance new transmission development may not have a useful purpose in promoting additional exports because there are plenty of financing sources already in place.

Some wind developers saw this somewhat differently. Because wind energy developments tend to occur incrementally in a modular way, and large transmission developments tend to happen in large increments all at once, there is a mismatch in timing between them. A chicken-and-egg situation develops where a wind development needs a large transmission project in-place to achieve economies of scale to keep transmission costs down, but the entire wind farm (and resulting revenues to pay for the transmission development) will not happen right away. So, the wind development revenues cannot pay the immediate costs of the needed transmission, and the transmission cannot be justified unless the entire wind development is in place.

³⁵ In this one area, there is apparently a difference of views between utilities and wind developers as to what constitutes the real impediment to further realization of South Dakota’s wind energy potential.

“Wind energy typically gets built in a modular, incremental way over time. Large transmission lines get built in “lumps”, with a lot of capacity installed all at one time.

Reconciling the time and investment/revenue differences between these additions is an important part of the puzzle.”

A wind developer interviewee

From the interviews, one perspective of this mismatch in timing is that singular large “big-bang” transmission projects are not really helpful in getting initial wind developments going in South Dakota. This view holds that large, high-voltage lines (e.g., 345 kV) take too long to plan and implement, and thereby delay development of the wind resource. It is more likely that wind energy will be developed in 50 MW to 100 MW projects; not 1,000 MW ones. Accordingly, if lower-voltage projects (in the 69 kV to 115 kV range) are pursued initially, they better fit the ramp-up pattern of incremental wind developments, and thereby enable wind development progress quicker than large transmission projects would allow.

The flip-side of this view is that such lower-voltage projects, while they may help local development activities, do not address the need to export larger quantities of wind energy over longer distances. The line losses inherent in lower-voltage transmission lines would consume a significant amount of the wind energy before it could get to market. This is a major consideration in South Dakota’s interest in exporting wind energy over significant distances.

In SA’s view, the Authority’s bonding capabilities may be helpful in addressing the mismatch between the leadtimes of wind energy and transmission. The Authority could bond initial financing of the necessary large transmission lines to bridge the time until the wind development’s revenues can support the associated costs. The Authority would then recover its costs from wind export revenues after the full wind development is in place. In essence, the Authority’s bonding power would be used as seed money to get the transmission in place, and thereby support the wind–development-to-follow over the ensuing years. Authorities in other states are now considering offering tax-exempt bonding, which would have to be authorized at the federal level. If approved, this could be used as an additional improvement in the South Dakota Authority’s efforts as well.

With regard to the Authority’s bonding authority for transmission developments, some interviewees noted that the mere availability of transmission financing sources is not

necessarily the entire answer for development of a project. There was a view that the state’s bonding capabilities may actually be able to act faster and entail fewer “strings-attached” than federal financing sources traditionally used by public power utilities. So, even though traditional federal financing may be available to these utilities, the state of South Dakota may be able to create a relative value proposition entailing speed and flexibility, for export projects that would benefit the state.

“There are many considerations in choosing a financing source for a transmission project. If the State of South Dakota could find a way through its bonding authority to make it faster and easier to accomplish projects that help South Dakota and have fewer administrative strings attached compared to alternative sources, that could be a competitive advantage for South Dakota energy projects.”

A utility interviewee

Further, on the topic of transmission, SA found unanimous agreement among the utilities interviewed that South Dakota government should not seek to directly own or operate any electric transmission facilities. Some entities thought SDEIA could use its bonding authority to help others acquire transmission facilities; provided the Authority could recover its loaned monies in a reasonably short period of time.

A few organizations noted that South Dakota had apparently based its legislation forming SDEIA on similar legislation adopted in neighboring states – Wyoming, North Dakota and Kansas, for example. The same organizations noted that corresponding authorities formed in other states were better positioned to loan money for energy projects than is SDEIA because other states have monies collected in reserve funds from severance taxes charged on their in-state production of fossil fuels – oil, natural gas or coal. South Dakota is thought to have no such reserve funds holding dollars that can be invested in bonds to finance energy projects.

Also, interviewees noted the other states with similar Authorities have more to gain from an economic development perspective in building electric transmission facilities, because it supports the use and generation of associated state severance taxes associated with indigenous energy supplies in those states such as coal deposits. As discussed in Chapter 5, this concept may be applicable to wind energy as a result be a source of income and associated value proposition for Authority efforts in South Dakota.

CHAPTER 5.0

OPPORTUNITIES AND CHALLENGES SEEN BY INTERVIEWEES IN FINDING CUSTOMERS FOR ELECTRIC ENERGY TO BE PRODUCED IN SOUTH DAKOTA FOR IN-STATE USE AND EXPORT TO OTHER STATES.

Q5.1: What did interviewees say about the likelihood that customers will come if South Dakota builds power plants and transmission lines for exporting electricity?

A5.1: The first annual report issued by the South Dakota Energy Infrastructure Authority in December 2005³⁶ was almost silent on the subject of customers, the third leg of the power export stool described earlier by SA. The first report, at page 62, included only an isolated recommendation that:

The state should consider ways to identify potential buyers of South Dakota wind energy. Examples of possible purchasers may include: 1) in-state or out-of-state utilities, 2) federal and state facilities, 3) businesses interested in green power, and 4) entities (business, governmental or other) from low-wind-resource parts of the country interested in supporting renewable energy from out-of-state or out-of-region.

In the project conducted this year, SA found that the interviewees also had a low level of attention and focus on potential customers for electric energy that might be produced from new facilities sited in South Dakota. In fact, only two of the 19 interviewees contacted by SA volunteered comments on the importance of having or finding customers. SA believes this observed lack of focus on customers is an important finding from the 2006 interviews. In SA's view, this situation may in fact represent the proverbial "elephant in the room" -- the big fragrant topic everyone quietly knows is there, but does not talk about.

The completed interviews indicate that wind energy developers, for example, have concentrated their search for customers on electric utilities. The developers confirmed that their business plans are generally built around leasing land, building wind farms, and then selling the farms to utilities, or negotiating purchased power agreements with utilities, to accomplish distribution of the energy. In their business models, the acquisition of ultimate customers – residential, commercial, industrial or governmental – is thus left to someone else -- namely the utilities. So, in the three-legged stool of

³⁶ "Joint Report of the South Dakota Energy Infrastructure Authority and South Dakota Energy Task Force", December, 2005. A copy of this report can be found at: <http://www.2010initiative.com/energy/SDEIARreport.pdf>.

exporting discussed earlier in this report, the wind developers by themselves are a necessary, but not sufficient, leg in the process of accomplishing exports.

SA asked wind developers about other alternatives for selling the output of wind farms to industrial firms, into pumped-storage hydro projects³⁷, or to heating and cooling loads where storage of energy might be accomplished to smooth out the intermittent nature of wind power. The wind developers expressed a low level of interest in efforts to find such customer loads; in part because they believe wind energy should command a premium price and not be seen as a source of “dump” power or off-peak energy.

Wind developers are also interested in sales to utilities because utilities have peak loads, and thus installed generation on-line, that are large enough to absorb wind power with its intermittent operating characteristics. In short, from the interviews it was clear that the wind developers are focused on their core business of producing wind energy, and perceive that creating or aggregating customer electric loads or markets for them is a question that belongs to others to answer.

Public power entities – coop, municipal and federal – have another way of looking at the customer question. Their business models, in general, are based on producing and distributing energy to their existing customers with reliability and low cost. They have assigned geographic service areas that define their territorial boundaries.³⁸ They are not in the business of searching for new customers, revenues and margins outside their service territories and thus are hard-pressed to find a rationale (i.e., a value proposition) for spending effort on growing an energy export market for themselves or South Dakota.

Finally, investor-owned companies have a financial incentive to search for new customers in new markets. In their present business environment, however, regulators have shown little enthusiasm for load building or approving rates for underutilized generating facilities and transmission lines that might be constructed under the philosophy of “build it and they will come.”

The lack of focus on finding customers should be seen as a real obstacle to building an export market for electricity made in South Dakota. The interviews conducted by SA thus suggest that South Dakota could and should do something more creative to strengthen the search for export power customers.

³⁷ For example, a combination of wind energy and a development like the Gregory County Pumped Hydro Storage Facility on the Missouri River might offer a unique, 100% renewable and dependable electric energy and capacity resource. The pumped hydro facility would provide a local electric load for the intermittent wind output when the wind energy would be available. The electric output of the pumped hydro facility could then be delivered during peak electric load times; thereby maximizing the value of the wind-produced electricity.

³⁸ Utility service territories are defined in SDCL 49-34A-43 and -44.

Simply, in SA's view:

The interviews show that there is currently no natural momentum among current energy development and utility participants to work together to find a coordinated and comprehensive solution to export large quantities of energy out of the state for purposes of benefiting the state.

The Authority and/or other units of South Dakota government may be in the best position to coordinate and promote such a comprehensive solution.

Another part of the customer puzzle relates to the existing electric consumers in South Dakota. Interviewees pointed out that existing consumers in South Dakota are already:

- Using large blocks of renewable energy generated by the hydroelectric plants on the Missouri River. They do not need to look to wind or other renewable resources to demonstrate their commitment to emissions control or environmental betterment, and:
- Enjoying relatively low electric rates due to the proximity of coal-fired generation in Wyoming and North Dakota, and federal dams on the Missouri River. Participation in economic dispatch and transmission improvements over a wider region thus offers little opportunity for South Dakota consumers to realize significant reductions in electric rates. In fact, their participation in pooling of generation resources over a larger area may tend to drive up electric rates for South Dakota customers.

These interviewees extended these two observations to make the argument that South Dakota needs to develop an explanation or value proposition that clearly lays out the advantages – economic, environmental and societal - that the state's existing consumers should experience if South Dakota is successful in developing an export market for energy derived from coal, nuclear or wind. This value proposition will need to be convincing for landowners where transmission lines might be routed, and for electric customers who may experience increased rates.

“In considering increasing energy exports, the state needs to keep in mind the Hippocratic Oath that medical doctors take:

That is: First, do no harm.”

A utility interviewee

A large coal-fired or nuclear power plant project would deliver more than 1,000 jobs during its four to five-year construction period, and 100 to 200 ongoing operating jobs when the plant goes in-service. Wind energy proponents argue that an alternative project using wind with natural gas-fired capacity as a reliability backup would entail more jobs than a coal plant.³⁹ An alternative view is that to the extent this is true, it merely shows that a coal plant is more efficient than a wind alternative in producing energy with less labor.⁴⁰ High voltage transmission lines, once they are built, generally entail relatively few jobs for their maintenance and operations.

So, some interviewees asked the important question: What is in it for the State of South Dakota to promote additional electric energy exports? Are lease payments to a small set of landowners for wind energy developments sufficient? Does the prospect of 1,000 construction jobs for two or three years justify the State taking the financial risk of bonding for large energy developments? What is in it for the South Dakota landowners along the way of the transmission lines to remote markets to make them feel good about their participation in such developments? Should the State be aggressive in extracting considerations from the developers of large wind projects, in exchange for the state's assistance in getting the projects to happen? The answers to these and related questions need to be an important part of the value proposition the Authority develops for its activities going forward.

Severance Tax Concept

None of the interviewees volunteered that South Dakota should mirror its neighboring coal-producing states who supplement their tax revenues with coal severance taxes applied to all coal mined in and shipped out of state. For example, the State of Wyoming generates about \$100 million/year in coal severance taxes, or about 15% of the state's total tax collections.

Utility interviewees were generally negative on the idea of a "wind energy severance tax" in South Dakota, because they were concerned such a state tax would be extended to other forms of generation as well. Wind developers did not like the idea because it would further add to the current economic challenges of selling wind energy to customers.

³⁹ Testimony of Randall R. Goldberg, In the Matter of Application of Otter Tail Power Company on Behalf of the Big Stone Unit II Co-Owners for an Energy Conversion Facility Site Permit for the Construction of the Big Stone II Project, South Dakota Public Utilities Commission Case No. EL 05-022, May 19, 2006.

⁴⁰ Rebuttal Testimony of Randall M. Stuefen, In the Matter of Application of Otter Tail Power Company on Behalf of the Big Stone Unit II Co-Owners for an Energy Conversion Facility Site Permit for the Construction of the Big Stone II Project, South Dakota Public Utilities Commission Case No. EL 05-022, June 9, 2006.

However, in SA's view, the concept of a severance tax on exported wind energy may have some merit for the State of South Dakota as an economic development tool to help make wind developments happen in the state. That is, it could be a source of funds to pay back prior bonding efforts for energy projects, and establish a revolving pool of funding to promote and encourage new ones. And, it could be a useful element in an overall value proposition for the Authority's efforts, because it would entail a new source of added tax revenue for the State and its citizens. Citizens would likely feel better about investing in energy projects if they could see a clear return of benefits to the state as a result.

Simply, as an analogy to coal resources and associated severance taxes in neighboring states, South Dakota's value proposition would say the state has better wind energy regimes to sell to the market place. And, that benefit justifies the additional transmission needed to deliver it to markets, and possibly the State retaining a portion of that benefit through some form of energy or export fee.

For comparison, the states of North Dakota and Wyoming charge coal severance taxes that add about \$0.23/MWh to \$0.46/MWh, respectively to the cost of electricity from a coal-fired power plant. Assuming a wind farm can produce electricity for about \$40/MWh to \$50/MWh, charging a severance tax equivalent to North Dakota or Wyoming on a \$ per MWh basis would add only 0.6% to 1% to the cost of wind energy. Meanwhile, a 500 MW wind farm operating at a 40% annual capacity factor would generate between \$420,000 to \$800,000/year in annual tax revenues, using the North Dakota and Wyoming range of coal severance taxes per MWh as an example.

CHAPTER 6.0

WHAT COULD SOUTH DAKOTA STATE GOVERNMENT DO THAT WOULD HELP ADVANCE THE ELECTRIC POWER INDUSTRY AND THUS ECONOMIC DEVELOPMENT IN SOUTH DAKOTA?

Q6.1: Were the organizations interviewed by SA able to suggest some activities that South Dakota could undertake to promote economic development by encouraging the construction of new electric power plants or transmission lines?

A6.1: Things the State of South Dakota Should Not Do

The organizations interviewed by SA demonstrated strong feelings and very consistent thinking about a few activities that the State of South Dakota should not undertake at this time. The interviewees recommended that South Dakota state government should adopt the Hippocratic Oath when it comes to conducting activities in the electric power industry – Do No Harm. They recommended, furthermore, that South Dakota:

- Should not seek to directly own or operate electric generation plants or transmission facilities. The parties interviewed believe that existing organizations, either public power or investor-owned companies, can be found to build, own and operate new facilities when and where willing customers can be identified for the electric product.

“We would encourage the Authority to not do anything crazy; like trying to own and operate generation or transmission facilities themselves.”

An interviewee

- Should not acquire land and set about permitting-for-construction a site for a new nuclear generating facility. The parties interviewed believe such a State-sponsored project would be premature, given that the nuclear spent fuel storage problem is not yet solved, and the nuclear industry is talking about first trying to license new units adjacent to existing, operating, nuclear plants in other states.
- Should not sponsor additional generic wind energy potential and transmission corridor studies for South Dakota. Interviewees told SA that numerous studies have

already been done by WAPA and other entities.⁴¹ The studies have all reached the same general conclusions:

- The Plains States, including South Dakota, have very large wind resources.
- Existing electric transmission facilities in the Plains States are inadequate to move large blocks of wind energy to load centers remote from the wind fields.
- New, high capacity, long-line transmission facilities are technically feasible.
- New transmission facilities will require large capital investments and may encounter siting and permitting problems.

According to the interviews, the coupled opportunities and challenges in wind and transmission line development are well understood. What has been missing in South Dakota is the energy to act on large projects that have already been proposed.

Utility interviewees further recommended that South Dakota:

- Should not seek to establish a mandatory Renewable Energy Objective (REO)⁴² for the state's utility companies. Utilities told SA that they:
 - a. Are already investing time and dollars to understand the role that renewable energy sources – wind, solar, biomass, agricultural waste – could play as future additions to generating plant; and:
 - b. Will make investments and agreements at the right time to bring renewable sources on-line when customers are identified and willing to pay for the energy and related environmental benefits.

Wind energy developers, of course, did not share this utility view. They saw that:

- REO's are supportive of necessary renewables developments, and
- They represent an excellent marketing tool for wind energy.

⁴¹ Eleven different studies were summarized in "Analysis of Wind Resource Locations & Transmission Requirements in the Upper Midwest," May 2004, A Report to Congress by the Office of Energy Efficiency and Renewable Energy, Office of Electric Transmission and Distribution, U.S. Department of Energy, http://www.nrel.gov/wind/pdfs/upper_midwest.pdf.

⁴² Renewable Energy Objectives and other similar forms of state legislation encourage or require utilities to supply a given percentage of their retail sales using renewable energy sources.

After talking about activities that should not be pursued, the organizations interviewed by SA then struggled to suggest activities that the State could or should sponsor to cause growth in the electric utility sector and its revenues from power production for export markets. The activities that were recommended are described below:

6.2 Things the State of South Dakota Should Do

Interviewees suggested the following things South Dakota should do to encourage energy production and transmission development:

6.2.1 Establish South Dakota as Being Actively Interested in Assisting Energy Development in the State

South Dakota could make it known to potential customer utilities in surrounding states that it wants responsible energy development to occur in the state, and it is prepared to actively work with utilities and developers to help make such projects happen.

***“Utilities in other states who may be potential future electric customers of generating facilities in South Dakota need to know that South Dakota is actively in the exporting business.*”**

At this point, South Dakota appears to ‘sort-of’ be in the exporting business.”

A utility interviewee

For efficiency and focus of efforts and clarity in communications, the State may need to establish one or two very visible, rallying-point projects. For example, this might include working with wind developers and utilities in establishing one or two discrete, large-scale wind energy projects that would be served by a single common transmission development, perhaps in coordination with other energy projects such as the Big Stone Unit II or Basin Electric coal-fired generation projects.

6.2.2 Actively Participate in the Search for Customers

South Dakota could direct the Authority or State agencies to participate with interested South Dakota utilities and energy resource developers to conduct an aggressive and far-ranging search for customers who would be willing to purchase electric energy produced by and exported from existing and new sources in South Dakota.

- This effort would include a search for the price, volume, quality and other conditions under which customers would be willing to buy the power made in South Dakota.

-
- The effort would be conducted with knowledge and expectation that the potential customers will have their own ideas about what energy developments they want to accomplish (wind energy, coal, etc.), and that there may be creative ways to combine energy deliveries from coal, wind, hydro and other sources to address firm power needs while meeting environmental goals to reduce emissions.
 - The effort would be conducted with knowledge that possible constraints on CO₂ emissions from fossil-fueled plants could significantly increase the relative value of wind-derived energy from South Dakota. Or, adoption of new or increased renewable energy objectives in other states could increase the market for wind energy.
 - The effort might include joint efforts to bring together the interests of an energy consuming state with the energy production capabilities of South Dakota to enact multi-state initiatives of specific projects. An example would be a multi-state effort to deliver a large block of wind energy over a dedicated transmission line to a particular input port of a consuming state, with the participating states taking actions individually or together to address various barriers along the way.
 - The effort would be conducted with knowledge that the opportunities for South Dakota to export energy may close over time if, in the absence of actions by South Dakota, other coal, nuclear or wind generation additions are made first in other exporting states, or closer to load centers located remote to South Dakota.

In short, these interviewees suggested that the State should first identify potential customers,⁴³ find out/understand what their needs and interests are, and demonstrate to them that South Dakota wants to be their energy partner. Then a mutually beneficial project-specific approach should be pursued that that fulfills the customer's specific needs in the developments they want to accomplish and featuring a South Dakota location.

6.2.3 Consider and Sponsor Innovative Combinations of Generation Sources and Loads

Issues surrounding generation resources located in South Dakota, particularly wind energy, include the reliability of the resource and transmission required to deliver it to remote markets.

Some of these issues may be better addressed, or more specifically avoided, if the State would sponsor and develop innovative combinations of generation sources and loads. For example, issues regarding the reliability implications of the intermittence of

⁴³ Such customers were generally thought to be utilities who have already announced plans for large wind energy developments, but have not yet fulfilled those plans with specific projects or locations.

the wind resource (and associated increased costs per MWh of transmission to export it) could potentially be addressed by the following:

- Using wind in combination with energy storage. If wind could be combined with energy storage capabilities, the electric output of the wind machines could be stored during times when customer loads are low, and then used with customer demand was high. This would not only address the reliability issues with wind, it would offer an opportunity to use the wind energy during high-value market periods.

A number of the interviewees were aware of the Gregory County Pumped Hydro Facility proposal on the Missouri River that was originally proposed in the 1980s. As originally proposed, the Facility would use off-peak coal-fired energy to pump water from the Missouri River to an impoundment area on the bluffs above the river. If wind were used to pump the water instead of coal, the overall combined wind/storage project would be both reliable and 100% renewable.

A variation of this storage idea would be to develop large wind energy fields and then coordinate their output with the dispatch of existing hydro facilities on the Missouri River. When the wind fields are producing electric energy, the hydro facilities electric output (and associated water discharge) would be backed down a similar amount. This would essentially accomplish hydro energy storage without requiring construction of new water impoundment areas.⁴⁴

- Locating useful electric loads that do not depend on constant electric supply near the wind energy fields. This concept is similar to energy storage, but the ultimate end-use for the wind-produced energy would be located near the wind energy source, thereby obviating the need for transmission. An example would be hydrogen production, where the wind energy would be used to produce hydrogen and the hydrogen stored and prepared for shipment by truck or rail. That way, the transmission line is the highway or rail that carries the end product; rather than electricity.

6.2.4 Actively Address the MISO Seams Issue

Cost and operational coordination issues that occur across the MISO/Non-MISO boundary are a barrier to exports out of most of South Dakota that is not currently in the MISO footprint. While a simple solution would be to have public power entities such as WAPA and other public power entities in South Dakota join MISO, they have not done so for reasons as described in Chapter 4.0.

⁴⁴ One interviewee warned SA that existing water allocations, water flow requirements and power generating schedules on the Missouri River may be so restrictive that any new uses for the river water may encounter serious impediments.

Potential actions for the State of South Dakota to address this issue include:

- Work with state public power entities including WAPA and others to develop agreements with MISO that enable specific exports from the state that do not incur pan-caked transmission cost penalties.
- Focus state efforts on energy exports that do not depend on non-MISO transmission systems.
- Develop transmission additions such that they are an extension of the MISO footprint from MISO to the generation sites. An example would be a dedicated wind energy transmission line from central South Dakota to the MISO footprint that does not connect to non-MISO systems.

As noted earlier, most or all of these actions would likely require that the State focus its effort on specific areas of the state (for example, a particular large wind energy development in a defined area to be served by a specific transmission line development), to limit the breadth of geographic issues that would be involved in resolving MISO/Non-MISO seams issues.

6.2.5: Sponsor Multi-State Action on Transmission Corridors

A small number of interviewees suggested that South Dakota could advocate and lead a multi-state action by South Dakota, North Dakota, Minnesota, Iowa, Wisconsin and Illinois to define a few transmission corridors that could be used for moving substantial blocks of coal, nuclear or wind-derived energy from producers in the West to large and high energy cost load centers in the East.

- This effort would require additional coordination with MISO, affected utilities, federal agencies and public interest organizations. This could include the development of interstate compacts for getting transmission lines built across state lines.⁴⁵
- The effort would need to include development of a strong value proposition for the citizens in all of the participating states; and address the beneficial, regional and national values that transmission line construction could bring to South Dakota and other states participating in the corridor pact.
- The multi-state effort should also include drafting of agreements for coordinating the siting, permitting and taxing regulations, and regulatory processes, along said corridors so transmission facilities can be planned and built under generally known conditions and in reasonable time frames.

⁴⁵ Several interviewees expressed concern that this process would result in Minnesota-like review processes, which they viewed as overly burdensome, being used for the entire line.

In particular, as noted earlier, the State should be more active in addressing MISO/non-MISO boundary issues as they affect the ability of South Dakota to export energy into the MISO footprint.

While supportive of multi-state action, many interviewees were less hopeful for useful results from current federal efforts to establish federally-designated transmission corridors. While these interviewees were generally in favor of the concept, they felt that federal intervention in such topics would take too long to be really useful.

6.2.6 Ensure Competitive Rail Service

There was a consensus among utility interviewees that competitive rail service is critical to the viability of future coal-fired generation options in the state. Although not currently a specified role for the Authority, these interviewees were adamant that the State needs to do whatever is necessary to ensure competitive rail service is available. Primary among these actions would be to ensure the proposed DM&E railroad upgrade happens, and in a timely manner.

6.2.7 Review and Adjust State Tax Structures

South Dakota could, pro-actively, review again the State's excise, sales and property tax structures as they apply to electric power generating and transmission facilities; and reposition the tax structures as needed to make South Dakota more comparable to, or more competitive with, surrounding states who are competing with South Dakota to attract new facilities.

- This activity would need to be conducted with knowledge that South Dakota also needs to find a strong value proposition that will convince citizens in the state that housing new power plants and transmission lines in South Dakota will bring benefits. The benefit argument may be hard to make if tax abatement policies for new power facilities erodes the tax base in the state.
- The proposed review of South Dakota's tax structure should also provide a current comparison with taxing structures used in other, nearby states. To compete in the export power market, South Dakota will need to make sure that it is neither over-pricing nor under-pricing the capacity and energy it offers into the export market.

6.3. Other Suggestions

The interviewees provided SA with a collection of various additional suggestions for possibly improving South Dakota's electric production and transmission capabilities. These other ideas are listed in Appendix C. They were not brought forward into the body of this report because the ideas were mentioned by only one or two entities or, in the view of SA, were not main themes that SDEIA could build upon.

APPENDICES

Appendix A: South Dakota Codified Law 1-16I

Appendix B: List of Organizations and Representatives Interviewed by SA

Appendix C: Questionnaires for Utilities and Wind Developers

Appendix D: Additional Suggestions and Ideas for Authority Action

Appendix E: Schulte Associates LLC Contact Information

APPENDIX A
South Dakota Codified Law 1-16I (2005)

SOUTH DAKOTA ENERGY INFRASTRUCTURE AUTHORITY

Section 1. Terms used in this Act mean as follows:

- (1) "Authority," the South Dakota Energy Infrastructure Authority created pursuant to this Act;
- (2) "Board," the board of directors of the authority.

Section 2. The South Dakota Energy Infrastructure Authority is created to diversify and expand the state's economy by developing in this state the energy production facilities and the energy transmission facilities necessary to produce and transport energy to markets within the state and outside of the state.

Section 3. The authority may provide for the financing, construction, development, maintenance, and operation of new or upgraded energy transmission facilities. The authority may own, lease, or rent such facilities. The authority may enter into partnerships with public and private entities to develop and operate such facilities.

Section 4. If the authority becomes the owner or partial owner of any energy transmission facility, the authority shall divest itself of ownership as soon as economically practical. Recovery by the authority of its net investment in the energy production facility or energy transmission facility is deemed to be economically practical.

Section 5. In order to finance energy transmission facilities authorized pursuant to this Act, the authority may issue and have outstanding bonds to finance such facilities in an amount not to exceed one billion dollars. However, no bonds may be issued until the issuance of the bonds is specifically approved by an act of the legislature. The authority shall have contracts sufficient to justify the issuance of bonds.

Section 6. The authority shall:

- (1) Meet with any interested owner of transmission lines in South Dakota and any interested generator and distributor of electricity to consumers in South Dakota by August first each year to understand the generation of electricity in South Dakota and the transmission enhancements needed for the transmission of electricity to, from, and within South Dakota, and to analyze how the authority could proactively assist in developing the generation and transmission infrastructure;
- (2) Report its findings and make recommendations to the Governor, the Legislature, and the South Dakota congressional delegation by December first of each year concerning what the private sector, the state, and the federal government can do to

create and enhance the generation of electricity in South Dakota and the transmission of electricity to, from, and within South Dakota. The report due December 1, 2005, shall address and quantify market opportunities for the development, use in-state, and export of South Dakota's enormous wind power resource;

(3) Annually evaluate state laws and rules affecting electric generation and electric transmission and make recommendations to the Governor and the Legislature for improvements by December first of each year;

(4) Annually evaluate federal laws and rules affecting electric generation and electric transmission and make recommendations to the South Dakota congressional delegation for improvements by December first of each year;

(5) Identify opportunities where owners of transmission lines in South Dakota and generators and distributors of electricity to consumers in South Dakota can cooperate to improve and increase electric transmission in South Dakota and communicate those opportunities to owners, generators, and distributors of electricity in South Dakota;

(6) Assist any entity that wants to build new or upgrade existing electric transmission facilities to, from, and within South Dakota by helping the entity develop a business plan and identify financing options; and

(7) Assist other state transmission authorities and any federal or regional entity wanting to build new or upgrade existing transmission facilities to deliver electricity to, from, and within South Dakota.

Section 7. The governing and administrative powers of the authority are vested in its board of directors consisting of five members. The Governor shall appoint the directors, with the advice and consent of the Senate. Not all members of the board may be of the same political party. The terms of the members of the board may not exceed six years. The terms of the initial board of directors shall be staggered by the drawing of lots so that not more than two of the director's terms shall end at the same time. Members of the board may serve more than one term.

Section 8. The Governor may remove any member of the board for cause, including incompetence, neglect of duty, or malfeasance in office.

Section 9. Members of the board shall receive compensation for the performance of their duties as established by the Legislature in accordance with § 4-7-10.4 from the funds of the authority. Members may be reimbursed at rates established by the Bureau of Personnel for necessary expenses, including travel and lodging expenses, incurred in connection with the performance of their duties as members.

Section 10. Each member of the board shall, before entering upon the duties of office, take and subscribe the constitutional oath of office.

Section 11. The board may appoint an executive director. The executive director may not be a member of the board. The executive director shall hold office at the discretion of the board. The executive director shall be the chief administrative and operational officer of the authority, shall direct and supervise its administrative affairs and general management, shall perform such other duties as may be prescribed from time to time by the board, and shall receive compensation fixed by the board. The executive director shall attend all meetings of the board. However, no action of the board or the authority is invalid on account of the absence of the executive director from a meeting. The board may engage the services of such other agents and employees as they deem appropriate, including attorneys, appraisers, scientists, researchers, engineers, accountants, credit analysts, and other consultants, and may prescribe their duties and fix their compensation.

Section 12. The board shall meet on the call of the chair, upon the written request of four members of the board, or upon the request of the executive director.

Section 13. A majority of the members of the board constitute a quorum for the transaction of business. All official acts of the authority shall require the affirmative vote of at least four members of the board at a meeting of the board at which the members casting those affirmative votes are present.

Section 14. Notwithstanding any other law to the contrary it is not a conflict of interest for a trustee, director, officer, or employee of any financial institution, investment banking firm, brokerage firm, commercial bank or trust company, architectural firm, utility company, engineering firm, mining firm, insurance company, energy company, or any other firm, person, or corporation to serve as a member of the authority, if the trustee, director, officer, or employee abstains from deliberation, action, and vote by the authority in each instance where the business affiliation of any such trustee, director, officer, or employee is involved.

Section 15. Each meeting of the authority for any purpose whatsoever shall be open to the public as required by chapter 1-25. Notice of meetings shall be as provided in the bylaws of the authority. Resolutions need not be published or posted.

Section 16. The executive director or other person designated by the authority shall keep a record of the proceedings thereof and shall be custodian of all books, documents, and papers filed with the authority, the minute books or journal of the authority and its official seal. The executive director or other person designated by the authority may cause copies to be made of all minutes and other records and documents of the authority and may give certificates under the official seal of the authority to the effect that such copies are true copies and all persons dealing with the authority may rely on such certificates.

Section 17. The authority shall establish and collect fees, schedules of fees, rentals and other charges for the use of the transmission facilities of the authority as the board

may determine, and may borrow funds for the execution of the purposes of the authority, and mortgage and pledge any lease or leases granted, assigned, or subleased by the authority.

Section 18. The authority may:

- (1) Have perpetual succession as a body politic and corporate exercising essential public functions;
- (2) Sue and be sued in its own name;
- (3) Have an official seal and alter the seal at will;
- (4) Maintain an office at such places within the state as the authority may designate;
- (5) Make and execute contracts and all other instruments necessary or convenient for the performance of its duties and the exercise of its powers and functions under this Act;
- (6) Employ fiscal consultants, engineers, attorneys, and such other consultants and employees as may be required and contract with agencies of the state to provide staff and support services;
- (7) Procure insurance against any loss in connection with its property and other assets, including loans and notes in such amounts and from such insurers as it may deem advisable;
- (8) Borrow money and issue bonds as provided by this Act;
- (9) Procure insurance, letters of credit, guarantees, or other credit enhancement arrangements from any public or private entities, including any department, agency, or instrumentality of the United States or the state, for payment of all or any portion of any bonds issued by the authority, including the power to pay premiums, fees, or other charges on any such insurance, letters of credit, guarantees, or credit arrangements;
- (10) Receive and accept from any source financial aid or contributions of moneys, property, labor, or other things of value to be held, used, and applied to carry out the purposes of this Act subject to the conditions upon which the grants or contributions are made, including, gifts or grants from any department, agency, or instrumentality of the United States for any purpose consistent with the provisions of this Act;
- (11) To the extent permitted under its contract with the holders of bonds of the authority, consent to any modification with respect to the rate of interest, time, and payment of any installment of principal or interest, or any other term of any contract,

loan, loan note, loan note commitment, contract, lease, or agreement of any kind to which the authority is a party;

(12) To make loans and grants to, and enter into financing agreements with, any governmental agency or any person for the costs incurred in connection with the development, construction, acquisition, improvement, maintenance, operation, or decommissioning of electric transmission facilities, or for the maintenance of the physical or structural integrity of real or personal property incorporated or which may be incorporated into such facilities, in accordance with a written agreement between the authority and such governmental agency or person. However, no such loan or grant may exceed the total cost of such facilities as determined by the governmental agency or person and approved by the authority;

(13) Cooperate with and exchange services, personnel, and information with any governmental agency;

(14) Enter into agreements for management on behalf of the authority of any of its properties upon such terms and conditions as may be mutually agreeable;

(15) Sell, exchange, lease, donate, and convey any of its properties whenever the authority finds such action to be in furtherance of the purposes for which it was organized;

(16) Acquire, hold, lease, and dispose of real and personal property, and construct, develop, maintain, operate, and decommission electric transmission facilities;

(17) Indemnify any person or governmental agency for such reasonable risks as the authority deems advisable if the indemnification is a condition of a grant, gift, or donation to the authority. However, any such obligation to indemnify may only be paid from insurance or from revenues of the authority, and such obligation does not constitute a debt or obligation of the State of South Dakota;

(18) Do any act and execute any instrument which in the authority's judgment is necessary or convenient to the exercise of the powers granted by this Act or reasonably implied from it;

(19) After consultation with the Public Utilities Commission and any other relevant governmental authority, establish and charge reasonable fees, rates, tariffs, or other charges for the use of all facilities administered by the authority and for all services rendered by it;

(20) Investigate, plan, prioritize, and establish corridors for the transmission of electricity; and

(21) Acquire by condemnation, in accordance with chapter 21-35, within the state any properties necessary or useful for the authority's purposes. However, the authority may not condemn any existing facilities.

Section 19. The authority may invest any funds not needed for immediate investment in the following:

(1) Bonds, notes, certificates of indebtedness, treasury bills, or other securities constituting direct obligations of, or obligations the principal of and interest on which are fully guaranteed or insured by, the United States of America;

(2) Obligations issued by or obligations the principal of and interest on which are fully guaranteed or insured by any agency or instrumentality of the United States of America;

(3) Certificates of deposit or time deposits constituting direct obligations of any bank which is a qualified public depository or any savings and loan association which is a savings and loan depository under the Public Deposit Insurance Act pursuant to chapter 4-6A, unless sufficient volume of such certificates is not available at competitive interest rates. In that event, the authority may purchase noncollateralized direct obligations of any bank or savings institution or holding company if such institution or holding company is rated in the highest two quality categories by a nationally recognized rating agency;

(4) Obligations of any solvent insurance company or other corporation or business entity existing under the laws of the United States or any state thereof, if the obligation of the insurance company or other corporation or business entity is rated in the two highest classifications established by a standard rating service of insurance companies or a nationally recognized rating agency;

(5) Short term discount obligations of the Federal National Mortgage Association;

(6) Obligations issued by any state of the United States or any political subdivision, public instrumentality, or public authority of any state of the United States, which obligations are not callable before the date the principal thereof will be required to be paid and which obligations are fully secured as to both sufficiency and timely payment by, and payable solely from, securities described in subdivision (1) and which obligations are rated in the highest investment classification by at least two standard rating services of such obligations.

Any securities may be purchased at the offering or market price thereof at the time of the purchase. All securities so purchased shall mature or be redeemable on a date or dates prior to the time when, in the judgment of the authority, the funds so invested will be required for expenditure. The express judgment of the authority as to the time when any funds will be required for expenditure or be redeemable is final and conclusive. Investment in any obligation enumerated in this section may be made either directly or

in the form of securities of, or other interests in, an investment company registered under the Federal Investment Act of 1940, whose shares are registered under the Federal Securities Act of 1933, and whose investments are limited to these obligations.

Section 20. The authority may issue revenue bonds, notes, or other evidences of indebtedness to pay the cost incurred in connection with developing, constructing, acquiring, improving, maintaining, operating, and decommissioning electric transmission facilities. For the purpose of evidencing the obligations of the authority to repay any money borrowed, the authority may, pursuant to resolution, from time to time issue and dispose of its interest bearing revenue bonds, notes, or other instruments and may also from time to time issue and dispose of such bonds, notes, or other instruments to refund, at maturity, at a redemption date or in advance of either, any revenue bonds, notes, or other instruments pursuant to redemption provisions or at any time before maturity. All such revenue bonds, notes, or other instruments shall be payable solely from the revenues or income to be derived with respect to such facilities, from the leasing or sale of such facilities, or from any other funds available to the authority for such purposes. The revenue bonds, notes, or other instruments may bear such date or dates, may mature at such time or times not exceeding forty years from their respective dates, may bear interest at such rate or rates, may be in such form, may carry such registration privileges, may be executed in such manner, may be payable at such place or places, may be made subject to redemption in such manner and upon such terms, with or without premium as is stated on the face thereof, may be authenticated in such manner, and may contain such terms and covenants as may be provided by an applicable resolution.

Section 21. Any holder of any revenue bonds, notes, or other instruments issued by the authority may bring suits at law or proceedings in equity to compel the performance and observance by any corporation or person or by the authority or any of its agents or employees of any contract or covenant made with the holders of such revenue bonds, notes, or other instruments, to compel such corporation, person, the authority, and any of its agents or employees to perform any duties required to be performed for the benefit of the holders of any such revenue bonds, notes, or other instruments by the provision of the resolution authorizing their issuance and to enjoin such corporation, person, the authority, and any of its agents or employees from taking any action in conflict with any such contract or covenant.

Section 22. If the authority fails to pay the principal of or interest on any of the revenue bonds or premium, if any, as the same become due, a civil action to compel payment may be instituted in the appropriate circuit court by the holder or holders of the revenue bonds on which such default of payment exists or by an indenture trustee acting on behalf of such holders. Delivery of a summons and a copy of the complaint to the chair of the board constitutes sufficient service to give the circuit court jurisdiction of the subject matter of such a suit and jurisdiction over the authority and its officers named as defendants for the purpose of compelling such payment.

Section 23. Notwithstanding the form and tenor of any such revenue bonds, notes, or other instruments and in the absence of any express recital on the face of any such

revenue bond, note, or other instruments that it is non-negotiable, all such revenue bonds, notes, and other instruments shall be negotiable instruments. Pending the preparation and execution of any such revenue bonds, notes, or other instruments, temporary revenue bonds, notes, or instruments may be issued as provided by resolution.

Section 24. To secure the payment of any or all of such revenue bonds, notes, or other instruments, the revenues to be received by the authority from a lease agreement or loan agreement shall be pledged, and, for the purpose of setting forth the covenants and undertakings of the authority in connection with the issuance thereof and the issuance of any additional revenue bonds, notes, or other instruments payable from such revenues, income, or other funds to be derived from electric transmission facilities, the authority may execute and deliver a trust agreement. A remedy for any breach or default of the terms of any such trust agreement by the authority may be by mandamus proceedings in the appropriate circuit court to compel the performance and compliance therewith, but the trust agreement may prescribe by whom or on whose behalf the action may be instituted.

Section 25. The revenue bonds or notes shall be secured as provided in the authorizing resolution which may, notwithstanding any other provision of this Act, include in addition to any other security a specific pledge or assignment of and lien on or security interest in any or all revenues or money of the authority from whatever source which may by law be used for debt service purposes and a specific pledge or assignment of and lien on or security interest in any funds or accounts established or provided for by resolution of the authority authorizing the issuance of such revenue bonds, notes, or other instruments. Any pledge made by the authority of revenues or other moneys received or to be received by the authority pursuant to an agreement with a governmental agency relating to a project to pay revenue bonds, notes, or other evidences of indebtedness of the authority shall be binding from the time the pledge is made. Revenues and other moneys received or to be received by the authority pursuant to an agreement with a governmental agency relating to a project so pledged to pay revenue bonds, notes, or other evidences of indebtedness of the authority shall be held outside of the state treasury and in the custody of the authority or a trustee or a depository appointed by the authority. Revenues or other moneys received or to be received by the authority pursuant to an agreement with a governmental agency relating to a project so pledged to pay revenue bonds, notes, or other evidences of indebtedness of the authority and thereafter received by the authority or such trustee or depository shall immediately be subject to the lien of the pledge without any physical delivery thereof or further act, and the lien of any pledge shall be binding against all parties having claims of any kind of tort, contract, or otherwise against the authority or the State of South Dakota, irrespective of whether the parties have notice thereof. Neither the resolution nor any other instrument by which a pledge is created need be filed or recorded except in the records of the authority.

Section 26. The State of South Dakota pledges to and agrees with the holders of the revenue bonds and notes of the authority issued pursuant to this Act that the state

will not limit or decrease the rights and powers vested in the authority by this Act so as to impair the terms of any contract made by the authority with such holders or in any way impair the rights and remedies of such holders until such revenue bonds, notes, or other instruments, together with interest thereon, with interest on any unpaid installments of interest, and all costs and expenses in connection with any action or proceedings by or on behalf of such holders, are fully met and discharged. The authority may include these pledges and agreements of the state in any contract with the holders of revenue bonds, notes, or other instruments issued pursuant to this section.

Section 27. Nothing in this Act may be construed to authorize the authority to create a debt of the state within the meaning of the Constitution or statutes of South Dakota and all revenue bonds, notes, other instruments and obligations issued by the authority pursuant to the provisions of this Act are payable and shall state that they are payable solely from the funds pledged for their payment in accordance with the resolution authorizing their issuance or in any trust indenture or mortgage or deed of trust executed as security therefor. The state is not in any event liable for the payment of the principal of or interest on any bonds, notes, instruments, or obligations issued by the authority or for the performance of any pledge, mortgage, obligation, or agreement of any kind whatsoever which may be undertaken by the authority. No breach of any such pledge, mortgage, obligation, or agreement may impose any pecuniary liability upon the state or any charge upon its general credit or against its taxing power.

Section 28. The state and all counties, municipalities, political subdivisions, public bodies, public officers, banks, bankers, trust companies, savings banks and institutions, building and loan associations, savings and loan associations, personal representatives, conservators, trustees, and other fiduciaries may legally invest any debt service funds, money, or other funds belonging to them or within their control in any bonds or notes issued pursuant to this Act.

Section 29. Any documentary material or data made or received by the authority for purposes under this Act, to the extent that such material or data consists of trade secrets, scientific or technical secrets, matters involving national security, or commercial or financial information regarding the operation of a business, may not be considered public records, and are exempt from disclosure. Any discussion or consideration of such information may be held by the authority in executive session.

Section 30. The authority may acquire title to any electric transmission facility with respect to which it exercises its authority.

Section 31. The authority may acquire by purchase, lease, gift, or otherwise any property or rights to any property from any person or any governmental agency, whether improved for the purposes of any prospective project or unimproved. The authority may also accept any donation of funds for its purposes from any of those sources.

Section 32. The authority may acquire, develop, construct, improve, maintain, operate, and decommission any electric transmission facilities, either under its own direction or through collaboration with any approved applicant, or to acquire any project through purchase or otherwise, using for that purpose the proceeds derived from its sale of revenue bonds, notes, or other instruments or governmental loans, grants, or other funds and to hold title to those projects in the name of the authority.

Section 33. The authority may enter into intergovernmental agreements with any governmental agency.

Section 34. The authority may share employees with governmental agencies.

Section 35. The provisions of § 5-2-19 do not apply to real or personal property given to the authority.

Section 36. The authority shall designate a qualified public depository as defined in § 4-6A-1 as a depository of its money. Those depositories shall be designated only within the state and upon condition that bonds approved as to form and surety by the authority and at least equal in amount to the maximum sum expected to be on deposit at anyone time shall be first given by the depositories to the authority, those bonds to be conditioned for the safekeeping and prompt repayment of the deposits. If any of the funds of the authority are deposited by the treasurer in any such depository, the treasurer and the sureties on the treasurer's official bond are, to that extent, exempt from liability for the loss of any of the deposited funds by reason of the failure, bankruptcy, or any other act or default of the depository. However, the authority may accept assignments of collateral by any depository of its funds to secure the deposits to the same extent and conditioned in the same manner as assignments of collateral are permitted by law to secure deposits of the funds consistent with the provisions of chapter 4-6A.

Section 37. The income of the authority and all land, improvements, equipment, fixtures, or other property interests owned by the authority are exempt from all taxation in the State of South Dakota. The authority is exempt from the provisions of chapter 47-31A.

Section 38. The authority is attached to the Department of Tourism and State Development for reporting purposes. The authority shall submit such records, information, and reports in the form and at such times as required by the secretary. However, the authority shall report at least annually.

Section 39. Notwithstanding any other provisions of law, all funds received by the authority shall be set forth in an informational budget as described in § 4-7-7.2.

APPENDIX B

List of Industry Interviewees

Utilities

- Basin Electric Power Cooperative, Bismarck, ND
 - Mike Eggl, Manager, Communications & Government Relations
 - Dale Niezwaag, Senior Legislative Representative
 - Chris Vandeventer, Legislative Representative

- Black Hills Corporation, Rapid City, South Dakota⁴⁶
 - Kyle White, Vice President – Corporate Affairs
 - Michael Fredrich, Director of System Operations & Maintenance and Engineering, Black Hills Power

- East River Electric Power Cooperative, Madison, South Dakota
 - Jeffrey Nelson, General Manager

- Heartland Consumers Power District, Madison, South Dakota
 - Mike McDowell, General Manager
 - Tim Muellenberg, Manager of Customer Relations and Administration
 - John Knofczynski, Manager of Engineering

- MidAmerican Energy Company, Des Moines, Iowa
 - Brent Gale, Senior Vice President for Regulation and Legislation
 - Dean A. Crist, Vice President, Regulation
 - Gus Skovgaard, Manager, Regional Government Relations

- Montana-Dakota Utilities Company, Bismarck, North Dakota
 - Andrea Stomberg, Vice President, Electric Supply

- Missouri River Energy Services, Sioux Falls, South Dakota
 - Thomas Heller, Chief Executive Officer
 - Mrg Simon, Manager, State Governmental Relations
 - Raymond Wahle, Director, Power Supply and Operations

- Nebraska Public Power District, Norfolk, Nebraska
 - Did not respond to invitation to be interviewed.

⁴⁶ Mike Trykoski, SDEIA Board of Directors Chairman, also attended this meeting with the permission of Black Hills Corporation.

- Northwestern Energy
 - David Gates, Vice President, Wholesale Operations (Butte, MT)
 - Pamela A. Bonrud, Director, Regulatory Affairs, South Dakota/Nebraska
- Otter Tail Power Company, Fergus Falls, Minnesota
 - Chuck MacFarlane, President & CEO
- Rushmore Electric Power Cooperative, Rapid City, South Dakota
 - Vic Simmons, General Manager
- Western Area Power Authority (WAPA), Billings, Montana
 - Edward Weber, Transmission Manager
- Xcel Energy, Sioux Falls, South Dakota
 - Jim Wilcox, Government & Regulatory Services
 - Robin Kittel, Director, Transmission Business Relations (Denver, Colorado)

Wind Energy Developers

- Clipper Windpower Development Company, Inc., with BP Alternative Energy North America Inc.
 - Thomas Feiler, Leader, Regional Development, Clipper
 - Emily Sanders, Development Project Manager, Clipper
 - Doug Broadfoot, Environmental & Land Manager, BP
 - Fred Mitro, Business Developer, BP
 - Janette Whitehead, Wind Business Developer, BP
 - FPL Energy
 - Did not respond to invitation to be interviewed.
 - Navitas Energy, Minneapolis, Minnesota
 - Christopher F. Moore, Managing Director
 - PPM Energy
 - Raymond Grube, Managing Director, Mid-Continent Region
 - Mark Perryman, Manager, Operations & Maintenance, Mid-Continent Region (Brookings, SD)
 - Wind on the Wires
 - Beth Soholt, Executive Director
-

State Utility Regulators

- South Dakota Public Utilities Commission, Pierre, South Dakota
 - Greg Rislov, Commission Advisor

Transmission Companies

- ITC Holdings Corporation, Novi, Michigan
 - Joseph R. Dudak, Vice President, Major Contracts & Special Projects
 - David A Svanda, Svanda Consulting, Williamston, Michigan
- Midwest Independent Transmission System Operator, Inc. (MISO), St. Paul, Minnesota
 - Clair J. Moeller, Vice President, Transmission Asset Management
 - Bill Malcolm, Manager of State Regulatory Affairs

APPENDIX C

Interview Questions for Utilities and Wind Developers

SCHULTE ASSOCIATES LLC (SA)

**QUESTIONS FOR INTERVIEWING
REPRESENTATIVES FROM ELECTRIC GENERATION AND
TRANSMISSION ENTITIES ON BEHALF OF
SOUTH DAKOTA ENERGY INFRASTRUCTURE AUTHORITY (SDEIA)
August 14, 2006**

INTRODUCTION

The South Dakota Energy Infrastructure Authority (SDEIA) was created in 2005 to help diversify and expand South Dakota's economy by encouraging development of energy production and transmission facilities necessary to produce and transport energy to markets inside and outside of South Dakota. (See SDCL 1-16I).

Section 6 of SDCL 1-16I requires the Authority to:

(1) Meet with any interested owner of transmission lines in South Dakota and any interested generator and distributor of electricity to consumers in South Dakota ... to understand the generation of electricity in South Dakota and the transmission enhancements needed for the transmission of electricity to, from, and within South Dakota, and to analyze how the authority could proactively assist in developing the generation and transmission infrastructure;

(2) Report its findings and make recommendations to the Governor, the Legislature, and the South Dakota congressional delegation by December first of each year concerning what the private sector, the state, and the federal government can do to create, and enhance the generation of electricity in South Dakota and the transmission of electricity to, from, and within South Dakota....

Schulte Associates LLC (SA) has been retained by the SDEIA to assist SDEIA in fulfilling this two-part assignment.

You have been designated to represent your organization in a process whereby Schulte Associates will meet with representatives from interested generators and distributors of electric energy in South Dakota. SA will collect information on behalf of the SDEIA from these representatives, and then write a report to SDEIA. The report will be used to help chart the course for fulfilling the SDEIA mission over the next several years. Thank you for your willingness to participate.

You will be scheduled for an interview with Schulte Associates to secure your input into this process. One or more SDEIA directors may attend the interviews. To help you prepare and to

streamline the interview process, the interview questions are provided below for your consideration in advance.

The questions are divided into two parts: Part A contains background questions regarding statistical information on your organization. Part B provides questions regarding your operations, and possible future roles for the SDEIA.

It would be helpful if you can submit the answers to the Parts A and B in writing in advance of your scheduled interview. Instructions for submitting written responses are provided at the end of the questions list. Otherwise, SA will be happy to collect your responses during the interview.

INSTRUCTIONS

Please provide your responses to the following questions on behalf of your organization. You may type your answers into an electronic copy of the question list (you can request an electronic copy in Microsoft Word format by sending an e-mail to: rhs@schulteassociates.com), or write the answers next to the questions on a printed paper copy of the list, or provide the answers in writing on separate sheets that are coded to show the number of the question being answered.

If a particular question is not applicable to your organization or you have no opinion, you may annotate it “not applicable,” or “no opinion,” or simply leave the answer space blank. The questions are designed to promote discussion and a response to every question is not required.

Communications from you concerning the interview process or the question list can be directed to Robert H. Schulte at Schulte Associates LLC, Tel: 952-949-2676.

Your individual responses to these questions and your comments during the interview will be retained and kept confidential by Schulte Associates LLC, and will not be shared with SDEIA or its staff.

Interview results will be reported to SDEIA as a group. Your individual responses will not be attributed to you, unless you agree in advance that your responses may be attributed to you or your organization.

Only members of Schulte Associates LLC will be present at the interviews unless your organization grants permission for a SDEIA Board Member or staff member to attend.

INTERVIEW QUESTIONS

PART A – QUESTIONS SEEKING BACKGROUND STATISTICAL INFORMATION (Answers requested in advance in writing)

1.0 Your Name and Affiliation:

1.1 Please provide your name, title, organization, address, phone numbers and e-mail address.

2.0 Background Information

Where appropriate, a copy of your most recent annual report may be submitted in response to the following questions:

2.1 In what states does your organization have core electric customers – residential, commercial, industrial? (Exclude sales-for-resale customers)

2.1.1 How many core electric customers did your organization have in South Dakota: residential, commercial, and industrial – in CY 2005?

2.2 Approximately how much electric energy, in MWH, did your organization deliver to all of its core electric customers in CY2005 – residential, commercial, and industrial?

2.2.1 Of this total, approximately, how much electric energy, in MWH, did your organization deliver to core customers in South Dakota in CY2005?

2.2.2 Of this total, approximately how much energy in MWH was generated in South Dakota? (This could be 2.2.1)

2.2.3 What would you estimate the total economic benefit of the electric energy generated in South Dakota to be for the state?

2.3 What peak load, in MW, did your organization experience in CY2005 excluding sales for resale? Did the peak occur in summer or winter?

2.3.1 Of this total, what peak load, in MW, did your organization have in South Dakota in CY2005, excluding sales for resale.

- 2.4 How much electric generating capacity, in MW, is owned by your organization?
 - 2.4.1 What part of this capacity, in MW, is located in South Dakota?

 - 2.5 How much electric energy, in MWH, did your organization generate for itself in CY 2005?
 - 2.5.1 How much electric energy did your organization purchase from other sources in CY2005?

 - 2.6 How much electric energy did your organization sell to other parties, excluding its core customers, in CY2005?

 - 2.7 How much electric energy did your organization generate in South Dakota and export to core and resale customers in other states in CY2005?

 - 2.8 How much electric energy did your organization wheel or transmit for other parties in CY 2005, without taking ownership of said energy?

 - 2.9 How many miles of electric transmission line, by voltage class, does your organization have in all states where it has core customers?
 - 2.9.1 Of this total, how many miles of electric transmission line, by voltage class, does your utility have in South Dakota?

 - 2.10 Does your organization also engage in other business activities, particularly in the energy area?
 - 2.10.1 Natural gas production, transmission or distribution?
 - 2.10.2 Petroleum production, transmission of distribution?
 - 2.10.3 Coal production, sales or delivery?
 - 2.10.4 Other businesses; e.g. delivery of telephone, cable television, internet, home security, appliance sales, etc.?
-

- 2.11 What form of ownership is used in your organization?
 - 2.11.1 Privately owned?
 - 2.11.2 Investor-owned?
 - 2.11.3 Cooperative?
 - 2.11.4 Municipal
- 2.12 What was the approximate year-end 2005 total capitalization of your organization?
- 2.13 What were the approximate total annual 2005 revenues earned by your organization?
 - 2.13.1 Of this total, approximately what percentage was related to your electric utility business?
- 2.14 Approximately what percentage of your year-end, 2005, capitalization was related to your electric utility business?

3.0 Expansion Plans for Your Organization

- 3.1 Over the next ten to 15 years, what growth rates is your organization forecasting for peak electric load and annual energy sales on a *total company* basis?
 - 3.1.1 Over the next ten to 15 years, what growth rates is your organization forecasting for peak electric load and energy use by its core customers *in South Dakota*?
 - 3.1.2 Over the next ten to 15 years, is your organization forecasting growth in its electric sales for resale? Where are these sales expected to occur – inside your organization’s service territory, or outside its service territory?
- 3.2 Has your organization announced its intent to add electric generating capacity over the next ten to 15 years?
 - 3.2.1 What formal generation planning processes is your organization subject to (e.g., state integrated resource planning)
 - 3.2.2 What facilities have been announced (technology, fuel type, MW of capacity and in-service year)?

- 3.2.3 Where will these new facilities be located (in particular, highlight which would be located in South Dakota)?
- 3.2.4 What is the announced size of the planned investments (in \$, and nominal year in which the dollars are expressed)?
- 3.2.5 Of the planned facilities to be located in South Dakota, what would be the beneficial economic impact to South Dakota (e.g., # of permanent jobs, related indirect jobs, investment in South Dakota infrastructure, annual revenues to the state and residents, etc.)
- 3.3 Does your organization have other generating capacity additions in planning that have not yet been announced? Can you say anything about those plans?
- 3.4 Has your organization announced its intent to add electric transmission capacity over the next ten to 15 years?
 - 3.2.1 Will your planned transmission investment be subject to review in a regional, network planning process?
 - 3.4.1 What facilities have been announced (voltage, total power transfer capability and circuit-miles)?
 - 3.4.2 Where will the transmission lines start and end? In particular, highlight those facilities that would be located in South Dakota.
 - 3.4.3 What is the announced size of the planned investments (in \$, and nominal year in which the dollars are expressed)?
- 3.5 Does your organization have other transmission capacity additions in planning that have not yet been announced? Can you say anything about those plans?

******End of Part A******

Part B – QUESTIONS RELATED TO YOUR OPERATIONS AND POSSIBLE FUTURE ROLES OF THE AUTHORITY. (These Questions will be discussed during the Interview. Answers may be submitted in writing.)

4.0 Advantages, Disadvantages, Opportunities, Threats, Strengths and Weaknesses Facing Potential Developers of New Electric Generating and Transmission Capacity in South Dakota

- 4.1 Is there a fully functioning and openly competitive market for electric energy in the geographic areas where your organization does business?
 - 4.1.1 Does your answer apply to the areas your organization serves in South Dakota?
 - 4.1.2 If South Dakota’s state government had a larger role in the development of electric generation or transmission facilities, how might this affect the operation and effectiveness of the existing market?
- 4.2 Is South Dakota an attractive locale for building new electric generating capacity or transmission lines?
 - 4.2.1 Please list your organization’s perception of the advantages, opportunities, and strengths that might be realized by siting new facilities in South Dakota.
 - 4.2.2 Please list your organizations perception of the disadvantages, threats and weaknesses that might be experienced by siting new facilities in South Dakota.
 - 4.2.3 Does your organization perceive that local zoning and planning requirements are an advantage or a potential barrier to additional generation and transmission developments in South Dakota?
- 4.3 Is South Dakota attractive or potentially attractive as a location for building electric generating and transmissions facilities to serve customers in load centers located outside of South Dakota – Minneapolis, Omaha, Denver, etc.?
- 4.4 Do “pan-caked” transmission rates or other differences between adjacent operating systems and control areas in South Dakota represent a material barrier to effective export of electric energy from South Dakota to neighboring states? (Yes/No).

- 4.4.1 If yes, what are those barriers, and how can they be resolved/mitigated?
 - 4.5 Does South Dakota potentially provide distinct opportunities for building generating facilities using renewable fuels – wind, biomass, hydro, etc.? If so, please describe such opportunities.
 - 4.5.1 Today, major wind energy developments on the Buffalo Ridge in Southeastern Minnesota extend right up to the Minnesota/South Dakota state line, and abruptly stop before crossing into South Dakota. Why would you say that happens?
 - 4.5.1.1 What would it take to enable those wind energy developments to continue into South Dakota?
 - 4.5.2 What would you say it would take to enable South Dakota to be a major producer and exporter of wind energy to other states?
 - 4.5.3 In your opinion, has the wind energy resource in South Dakota (i.e., wind speeds and locations) been defined enough to support good large-scale wind energy development decisions right now? (Yes/No)
 - 4.5.3.1 If yes, what studies have been done, and who has performed them?
 - 4.5.3.2 If no, what should be done to further define the resource to support such decisions?
 - 4.5.4 In your opinion, should South Dakota sponsor the development of a combined wind resource/electricity market/transmission corridor study to identify the best locations for wind development in the state, considering wind regimes, electricity markets and associated transmission requirements?
 - 4.5.5 Do you believe other sources of renewable energy (e.g., sunlight, switchgrass or agricultural wastes) can make a material contribution to energy development in South Dakota.
 - 4.6 Could South Dakota be attractive as a location for building new nuclear generating facilities? (Yes/No)
 - 4.6.1 What obstacles would need to be overcome to bring this about?
-

- 4.6.2 Would South Dakota itself need to be part of the long-term, nuclear, spent-fuel storage solution to make this possible?
 - 4.7 Does South Dakota provide distinct opportunities for building coal-fired power plants, compared to neighboring states? (Yes/No)
 - 4.7.1 Are railroad and water resources adequate? Please describe.
 - 4.7.2 Are other necessary supporting factors present? Please describe.
 - 4.7.3 Does South Dakota provide distinct opportunities for addressing potential future carbon dioxide (CO₂) concerns related to the combustion of coal and other fossil fuels in future generation additions?
 - 4.7.3.1 Does South Dakota have appropriate geologic formations for sequestering CO₂, or opportunities for employing CO₂ for industrial or agricultural purposes?
 - 4.7.3.2 How would you say South Dakota should deal with the potential future issues of CO₂ management and sequestration for additional future coal plants located in the state?
 - 4.8 Does South Dakota provide distinct opportunities for building additional hydro power plants? (Yes/No).
 - 4.9 Does South Dakota provide distinct opportunities for building wind energy systems combined with pumped storage hydro on the Missouri River? (Yes/No)
 - 4.10 Does anything need to be done to the existing electric transmission grid in South Dakota so potential new generating plants could transfer electric energy to neighboring states? If yes, please provide examples
- 5.0 Possible Roles for South Dakota State Government, and SDEIA, in the Continuing Development of Electric Generating Capacity and Transmission Facilities – in-state, regional and national**
- 5.1 Do you foresee that the State of South Dakota, through SDEIA or some other entity, could play a useful role in the development of new generating and transmission facilities for electric customers in and outside South Dakota? (Yes/No). If yes, what are some examples of how the State could play a useful role? If no, why not?

- 5.1.1 Should South Dakota revise or adopt *legislation* and regulations to make the state more attractive as a center for new electric power facilities? (Yes/No) If yes, what are some examples of how the state could do that? If no, why not?
- 5.1.2 Should South Dakota use the tax system, bonding authority or subsidies to promote the development of new power facilities in-state that would attract energy-intensive industrial concerns and jobs to the state? (Yes/No) If yes, what are some examples of how the state could do that? If no, why not?
- 5.1.3 Should South Dakota use the tax system, bonding authority or subsidies to promote the development of new power facilities in-state that could be used for exporting energy to customers out-of-state? (Yes/No) If yes, what are some examples of how the state could do that? If no, why not?
- 5.1.4 Should South Dakota support the development of federally-designated interstate transmission development corridors to facilitate transmission development for future generation facilities, including both fossil-fired and wind energy developments? (Yes/No).
- 5.1.5 Should South Dakota pursue the development of federally-supported interstate electric transmission systems similar to the interstate highway system? (Yes/No).
- 5.1.6 Should South Dakota pursue the establishment of interstate transmission compacts to encourage and facilitate such developments between states? (Yes/No)
- 5.1.7 Should South Dakota government participate in the ownership of new power generating and transmission facilities to help mitigate financial risk for existing utilities in the development of large new plants, plants using new technology, or transmission lines serving non-core customers out-of-state? (Yes/No). If yes, what are some examples of how the state could do that? If no, why not?
- 5.2 Are there particular areas in the electric production and transmission business where the State of South Dakota and the SDEIA should *not* seek to become a participant? (Yes/No). If yes, what are some examples of where the state should specifically not seek to be a participant?

- 5.3 Should South Dakota use its resources and influence to become a catalyst for re-working the *national* electric transmission grid? (Yes/No). If yes, what are some examples of how the state might do that? If no, why not?
- 5.4 Should South Dakota use its resources to promote energy conservation measures? (Yes/No). If yes, what are some examples of how the state might do that? If no, why not?
- 5.5 Should South Dakota enact a renewable energy mandate, as some other states have done, specifying a percentage of utilities' retail energy sales that shall be supplied by renewable sources by a future date certain? (Yes/No)
- 5.6 Should South Dakota government participate in the ownership of new power generating and transmission facilities to help mitigate financial risk in the development of large new plants, plants using new technology, or transmission lines serving non-core customers out-of-state? (Yes/No). If yes, what are some examples of how the state could do that? If no, why not?
- 5.7 In addition to those listed above, are there any other roles or ways South Dakota and the SDEIA could materially encourage development of additional generation and transmission facilities in the state, and thereby help the state and regional economy? What are they?

6.0 Wrap-up

- 6.1 Are there any other issues or topics with regard to generation and transmission development in South Dakota that you would like to bring to the attention of the SDEIA?

******End of Part B******

THANK YOU FOR YOUR PARTICIPATION!!

***Interview responses will be reported as a group.
Your individual responses will not be attributed
to you or your organization, unless you agree in advance.***

Please return your written responses to Part A, Part B or both sets of questions to Schulte Associates LLC prior to your interview by one of the following modes:

Fax: (952) 906-1228, or:

E-mail: rhs@schulteassociates.com, *or*:

Mail to:
Schulte Associates LLC
9072 Palmetto Drive
Eden Prairie, MN 55347

If it is not possible to send the responses in advance,
please bring them to your scheduled SA interview.

SCHULTE ASSOCIATES LLC (SA)

**QUESTIONS FOR INTERVIEWING
REPRESENTATIVES FROM ORGANIZATIONS DEVELOPING WIND
ENERGY SYSTEMS FOR ELECTRIC POWER GENERATION**

SA CONDUCTING INTERVIEWS ON BEHALF OF
SOUTH DAKOTA ENERGY INFRASTRUCTURE AUTHORITY (SDEIA)

August 9, 2006

INTRODUCTION

The South Dakota Energy Infrastructure Authority (SDEIA) was created in 2005 to help diversify and expand South Dakota's economy by encouraging development of energy production and transmission facilities necessary to produce and transport energy to markets inside and outside of South Dakota. (*See SDCL 1-16I*).

Section 6 of SDCL 1-16I requires the Authority to:

(1) Meet with any interested owner of transmission lines in South Dakota and any interested generator and distributor of electricity to consumers in South Dakota ... to understand the generation of electricity in South Dakota and the transmission enhancements needed for the transmission of electricity to, from, and within South Dakota, and to analyze how the authority could proactively assist in developing the generation and transmission infrastructure;

(2) Report its findings and make recommendations to the Governor, the Legislature, and the South Dakota congressional delegation by December first of each year concerning what the private sector, the state, and the federal government can do to create, and enhance the generation of electricity in South Dakota and the transmission of electricity to, from, and within South Dakota....

Schulte Associates LLC (SA) has been retained by the SDEIA to assist SDEIA in fulfilling this two-part assignment.

You have been designated to represent your organization in a process whereby Schulte Associates will meet with representatives from interested generators and distributors of electric energy in South Dakota. SA will collect information on behalf of the SDEIA from these representatives, and then write a report to SDEIA. The report will be used to help chart the course for fulfilling the SDEIA mission over the next several years. Thank you for your willingness to participate.

You will be scheduled for an interview with Schulte Associates to secure your input into this process. One or more SDEIA directors may attend the interviews. To help you prepare and to streamline the interview process, the interview questions are provided below for your consideration in advance.

The questions are divided into two parts: Part A contains background questions regarding statistical information on your organization. Part B provides questions regarding your operations, and possible future roles for the SDEIA.

It would be helpful if you can submit the answers to the Parts A and B in writing in advance of your scheduled interview. Instructions for submitting written responses are provided at the end of the questions list. Otherwise, SA will be happy to collect your responses during the interview.

INSTRUCTIONS

Please provide your responses to the following questions on behalf of your organization. You may type your answers into an electronic copy of the question list (you can request an electronic copy in Microsoft Word format by sending an e-mail to: rhs@schulteassociates.com), or write the answers next to the questions on a printed paper copy of the list, or provide the answers in writing on separate sheets that are coded to show the number of the question being answered.

If a particular question is not applicable to your organization or you have no opinion, you may annotate it “not applicable”, or “no opinion”, or simply leave the answer space blank. The questions are designed to promote discussion, and a response to every question is not required.

Communications from you concerning the interview process or the question list can be directed to Robert H. Schulte at Schulte Associates LLC, Tel: 952-949-2676, or e-mail: rhs@schulteassociates.com.

Your individual responses to these questions and your comments during the interview will be retained and kept confidential by Schulte Associates LLC, and will not be shared with SDEIA or its staff.

Interview results will be reported to SDEIA as a group. Your individual responses will not be attributed to you, unless you agree in advance that your responses may be attributed to you or your organization.

Only members of Schulte Associates LLC will be present at the interviews unless your organization grants permission for a SDEIA Board Member or staff member to attend.

INTERVIEW QUESTIONS

PART A – QUESTIONS SEEKING BACKGROUND STATISTICAL INFORMATION (Answers requested in advance in writing)

1.0 Your Name and Affiliation:

1.1 Please provide your name, title, organization, address, phone numbers and e-mail address.

2.0 Background Information

Where appropriate, a copy of your most recent annual report may be submitted in response to the following questions:

2.1 In what states does your organization already own and/or operate installed wind machines for electric power generation?

2.1.1 What are the numbers and capacity ratings of these machines by state?

2.2 Approximately how much wind-derived electric energy, in MWH, did your organization deliver to all of its customers in CY2005?

2.2.1 Of this total, approximately, how much, wind-derived electric energy, in MWH, did your organization deliver to customers based in South Dakota in CY2005?

2.2.2 Of this total, approximately how much wind-derived electric energy was generated in South Dakota?

2.2.3 What would you estimate the total economic benefit of the wind-derived electric energy generated in South Dakota to be for the state?

2.3 Does your organization own or control any transmission lines dedicated to transporting wind-derived electric energy? (If yes, where are these lines located and what are their approximate lengths and voltage ratings?)

2.4 Does your organization also engage in other business activities, particularly in the energy area?

2.4.1 Natural gas production, transmission or distribution?

2.4.2 Petroleum production, transmission or distribution?

- 2.4.3 Coal production, sales or delivery?
- 2.4.4 Other businesses; e.g. delivery of telephone, cable television, internet, home security, appliance sales, etc.?
- 2.5 What form of ownership is used in your organization?
 - 2.5.1 Privately owned?
 - 2.5.2 Investor-owned?
 - 2.5.3 Cooperative?
 - 2.5.4 Municipal?
- 2.6 Approximately, what was the year-end, 2005, total capitalization of your organization?
 - 2.6.1 How much of this total capital was invested in wind machines and related equipment for electric power generation?
- 2.7 Approximately, what were the total, annual, 2005 revenues earned by your organization?
- 2.8 Of this total, what percentage was related to your wind-derived electric energy business?

3.0 Expansion Plans for Your Organization

- 3.1 Over the next ten to 15 years, what growth rates are you planning or expecting, on a total organization basis, in your wind-derived electric energy business as measured by capital invested, wind machines added, MW added, energy sold, revenues realized or some other meaningful measure?
 - 3.1.1 Over the next ten to 15 years, what growth rate is your organization forecasting for your wind-derived electric energy business *in South Dakota*?
 - 3.3 Has your organization announced its intent to add wind-derived electric generating capacity over the next ten to 15 years?
 - 3.3.1 What facilities have been announced (technology, MW of capacity and in-service year)?
 - 3.3.2 Where will these new facilities be located (in particular, highlight which would be located in South Dakota)?
 - 3.3.3 What is the announced size of the planned investments (in \$, and nominal year in which the dollars are expressed)?
-

- 3.3.4 Of the planned facilities to be located in South Dakota, what would be the beneficial, economic impact to South Dakota (e.g., # of permanent jobs, related indirect jobs, investment in South Dakota infrastructure, annual revenues to the state and residents, etc.)

- 3.4 Does your organization have other, wind-derived generating capacity additions in planning that have not yet been announced? Can you say anything about those plans?

- 3.5 Has your organization announced its intent to invest in electric transmission capacity over the next ten to 15 years to support wind-derived electric capacity additions?
 - 3.5.1 Will your planned transmission investment be subject to review in a regional, network planning process?
 - 3.5.2 What facilities have been announced (voltage, carrying capacity and circuit-miles)?
 - 3.5.3 Where will the transmission lines start and end? In particular, highlight those facilities that would be located in South Dakota.
 - 3.5.4 What is the announced size of the planned investments (in \$, and nominal year in which the dollars are expressed)?

- 3.6 Does your organization have other transmission capacity additions in planning that are related to wind-derived electric energy additions, and have not yet been announced? Can you say anything about those plans?

******End of Part A******

Part B – QUESTIONS RELATED TO YOUR OPERATIONS AND POSSIBLE FUTURE ROLES OF THE AUTHORITY. (These Questions will be discussed during the interview. Answers may be submitted in writing.)

4.0 Advantages, Disadvantages, Opportunities, Threats, Strengths and Weaknesses Facing Potential Developers of New, Wind-Derived, Electric Generating Capacity in South Dakota

- 4.1 Is there a fully functioning and openly competitive market for electric energy in the geographic areas where your organizations has wind machines or plans to have wind machines? (Please focus on South Dakota, in particular.)
 - 4.1.1 Is wind-derived, electric generation an effective competitor in the geographic areas where your organization has wind machines? If no, why not?
 - 4.1.2 Does wind-derived, electric capacity and energy require special tax treatment and/or legislative/regulatory rulemakings to be competitive vis-à-vis electric energy derived from fossil fuels in the areas you serve?
 - 4.2 Is South Dakota an attractive locale for building new, wind-derived electric generating capacity and related transmission lines?
 - 4.2.1 Please list the perceived advantages, opportunities, and strengths, as seen by your organization that can be realized by siting facilities in South Dakota.
 - 4.2.2 Please list the perceived disadvantages, threats, or weaknesses as seen by your organization that may be experienced when siting facilities in South Dakota.
 - 4.2.3 Do you perceive that local planning and zoning requirements are an advantage or a potential barrier to additional wind machine development in South Dakota?
 - 4.3 Is South Dakota attractive or potentially attractive as a location for building wind machines and related transmissions facilities to serve customers in load centers located outside of South Dakota – Minneapolis, Omaha, Denver, etc.?
 - 4.4 Do “pan-caked” transmission rates or other differences between adjacent operating systems or control areas in South Dakota represent a material barrier to effective export of wind-derived electric energy from South Dakota to neighboring states? (Yes/No).
-

- 4.4.1 If yes, what are those barriers, and how can they be resolved/mitigated?
- 4.4.2 Today, major wind energy developments on the Buffalo Ridge in Southeastern Minnesota extend up to the Minnesota/South Dakota state line, and abruptly stop before crossing into South Dakota. Why would you say that happens?
- 4.4.3 What would it take to enable those developments to continue into South Dakota?
- 4.5 What would you say it would take to enable South Dakota to be a major producer and exporter of wind energy to other states?
- 4.6 In your opinion, has the wind energy resource in South Dakota (i.e., wind speeds and locations) been defined enough to support economic, large-scale, wind energy development decisions right now? (Yes/No)
 - 4.6.1 If yes, what studies have been done, and who has performed them?
 - 4.6.2 If no, what should be done to further define the resource to support such decisions?
- 4.7 In your opinion, should South Dakota sponsor the development of a combined wind resource/electricity market/transmission corridor study to identify the best locations for wind development in the state, considering wind regimes, electricity markets and associated transmission requirements?
- 4.8 Do you believe other renewable energy sources (e.g., sunlight, switchgrass, agricultural wastes, anaerobic digesters, etc.) can make a material contribution to energy development in South Dakota? (Yes/No)
- 4.9 Does South Dakota provide distinct opportunities for building wind energy systems combined with pumped storage hydro on the Missouri River? (Yes/No)
- 4.10 Does anything need to be done to South Dakota's electric transmission grid to facilitate the production and export of wind-derived electric energy? If yes, please provide examples.

5.0 Possible Roles for South Dakota State Government, and SDEIA, in the Continuing Development of Electric Generating Capacity and Transmission Facilities – in-state, regional and national

- 5.1 Do you foresee that the State of South Dakota, through SDEIA or some other entity, could play a useful role in the development of new, wind-derived generating facilities and related transmission lines for electric customers in and outside South Dakota? (Yes/No). If yes, what are some examples of how the State could play a useful role? If no, why not?
 - 5.1.1 Should South Dakota revise or adopt *legislation* and regulations to make the state more attractive as a center for new wind-derived power generating facilities? (Yes/No) If yes, what are some examples of how the state could do that? If no, why not?
 - 5.1.2 Should South Dakota use the tax system, bonding authority or subsidies to promote the development of new, wind-derived power facilities in-state that would attract energy-intensive industrial concerns and jobs to the state? (Yes/No) If yes, what are some examples of how the state could do that? If no, why not?
 - 5.1.3 Should South Dakota use the tax system, bonding authority or subsidies to promote the development of new, wind-derived power facilities in-state that could be used for exporting energy to customers out-of-state? (Yes/No) If yes, what are some examples of how the state could do that? If no, why not?
 - 5.1.4 Should South Dakota support the development of federally-designated interstate transmission development corridors to facilitate transmission development for future generation facilities, including both fossil-fired and wind energy developments? (Yes/No).
 - 5.1.5 Should South Dakota pursue the development of federally-supported interstate electric transmission systems similar to the interstate highway system? (Yes/No).
 - 5.1.6 Should South Dakota pursue the establishment of interstate transmission compacts to encourage and facilitate such developments between states? (Yes/No)
 - 5.1.7 Should South Dakota government participate in the ownership of new power generating and transmission facilities to help mitigate financial risk in the development of large new plants, plants using new technology, or

transmission lines serving non-core customers out-of-state? (Yes/No). If yes, what are some examples of how the state could do that? If no, why not?

- 5.2 Are there particular areas in the electric generation and transmission business where the State of South Dakota and the SDEIA should *not* seek to become a participant? (Yes/No). If yes, what are some examples of where the state should specifically not seek to be a participant?
- 5.3 Should South Dakota use its resources and influence to become a catalyst for reworking the *national* electric transmission grid? (Yes/No). If yes, what are some examples of how the state might do that? If no, why not?
- 5.4 Should South Dakota use its resources to promote energy conservation measures? (Yes/No). If yes, what are some examples of how the state might do that? If no, why not?
- 5.5 Should South Dakota enact a renewable energy mandate as some other states have done, specifying a percentage of utilities' retail energy sales that shall be supplied by renewable sources by a future date certain? (Yes/No)
- 5.6 In addition to those listed above, are there any other roles or ways South Dakota and the SDEIA could materially encourage development of additional generation and transmission facilities in the state, and thereby help the state and regional economy? What are they?

6.0 Wrap-up

- 6.1 Are there any other issues or topics with regard to generation and transmission development in South Dakota that you would like to bring to the attention of the SDEIA?

******End of Part B******

THANK YOU FOR YOUR PARTICIPATION!!

***Interview responses will be reported as a group.
Your individual responses will not be attributed
to you, unless you agree in advance.***

Please return your written responses to Part A, Part B or both to
Schulte Associates LLC prior to your interview by one of the following modes:

Fax: (952) 906-1228, or:

E-mail: rhs@schulteassociates.com, or:

Mail to:
Schulte Associates LLC
9072 Palmetto Drive
Eden Prairie, MN 55347

If it is not possible to send your responses in advance,
please bring them to your scheduled SDEIA interview.

APPENDIX D

A LISTING OF OTHER SUGGESTIONS OFFERED TO SA FOR THINGS THAT SOUTH DAKOTA COULD DO, OR NOT DO, TO FURTHER THE PRODUCTION AND TRANSMISSION OF ELECTRIC POWER AS AN ECONOMIC DEVELOPMENT TOOL

The following suggestions were offered by individual or small numbers of interviewees, but did not see much support from the interviewees as a group.

D.1 Become a Forum for Soliciting Advice on Specific State Energy Proposals

Some of the organizations interviewed by SA indicated their appreciation that South Dakota State government, through SDEIA's 2006 interview process, was demonstrating its interest in the future of the electric power industry in the State. They suggested that SDEIA could provide the forum for gathering input from entities involved in South Dakota's power industry, when and if State Government proposed to undertake specific initiatives to help advance power production and transmission in South Dakota.

- Interviewees would be willing to meet with their counterparts in the offices of SDEIA when and if some *specific* proposals are offered by the State for discussion and action.
- Interviewees were *not* enthusiastic about meeting periodically with SDEIA for *general* information exchanges. The parties interviewed by SA have other forums for receiving and discussing general information.

D.2 Create a Nuclear Engineering Program at State Universities

One interviewee commented that South Dakota could demonstrate its interest in nuclear energy in a tangible way, and lay the groundwork for building nuclear facilities in the State after 2020, by encouraging and funding the establishment, now, of a nuclear engineering program at one or both of the State's engineering colleges. (SA understands that the State is already building up in-State know-how and college offerings in the area of renewable energy – wind, solar, biomass, and so forth).

D.3 Propose and Promote Energy Conservation Measures

SA heard a consensus that State promotion of energy conservation measures for all forms of energy would be appropriate; but few specifics were offered by interviewees in writing or in-person. One interviewee did recommend that the Authority could provide a valuable service by encouraging the use of ground source heat pumps for space heating in residential and commercial applications. This suggestion was directed at conserving electricity, natural gas, fuel oil and propane.

D.4 Change Laws Affecting Power Plant Construction

One interviewee recommended that South Dakota should change the legislation which purportedly blocks the start of new power plant construction if the air quality permit for the plant is being appealed. Another party recommended that South Dakota should consider changing the legislation which grants the Legislature approval authority over water withdrawals from lakes and streams for power plant use. Both suggestions were directed at removing potential impediments to the construction of new power production facilities in the State.

D.5 Expand the SDEIA Charter

One interviewee suggested that the mission and charter of SDEIA should be made larger to include consideration of and activity on:

- Transport of ethanol fuels. South Dakota's production of ethanol is growing rapidly, and transport of this product by rail is fraught with rail service and price problems. Maybe ethanol could be better handled by pipeline.
- Anaerobic digesters using agricultural waste to make methane. SDEIA's role here could be to organize and oversee numerous research projects that are underway to explore the practical uses of digesters as a source of fuel to replace natural gas.

D.6 Conduct Public Education Programs

Two interviewees told SA that the general public, landowners and local advocates for wind development are struggling to understand energy production and transmission issues related to electricity. In particular, these parties do not understand the processes involved in planning, permitting, funding, building and operating electric transmission lines. The public needs additional education to understand, at some level, engineering concepts like parallel power flows, voltage control, stability, current carrying capacity and synchronous operation. Maybe SDEIA could help to establish public education programs in support of any State effort to make power exporting an economic development strategy.

D.7 Support Federally-Designated Transmission Corridors

Several interviewees in this 2006 survey told SA that it would be helpful if South Dakota supported the concept for and development of federally-designated transmission corridors, especially if rules were made simpler along such corridors for acquiring land and permitting construction across state boundaries. Other interviewees saw the federal designation as a nice concept, but federal intervention in such matters would take too long to be really effective.

D.8 Oppose Federally Financed and Owned Transmission Networks

While supporting the concept of federally-designated transmission corridors, interviewees were generally opposed to the idea of having federal financing and

ownership of a national, electric, transmission network that might be modeled on the earlier interstate highway system. The parties who spoke to SA hold the belief that existing public power and investor-owned firms have both the capability and the willingness to build needed transmission facilities in the Plains States; provided that they make economic sense; i.e., there is some clear way to recover the capital and operating costs for the new lines.

D.9 Enact Utility Cost Recovery and Risk Mitigation Mechanisms or Incentives

One interviewee noted that, under traditional regulatory rules, when a regulated utility undertakes a major energy resource development, it is not able to begin recovery of its investment until that facility goes into service.⁴⁷ The state legislature, working with the Public Utilities Commission, could investigate enacting various forms of advanced cost recovery (and thereby reduced risk) for utilities who undertake specific generation or transmission projects in the state.

This could take the form of an ability to accomplish cost recovery of project or development costs during the project construction period, or automatic rate adjustment mechanisms that would take place without a full rate case if the project fulfills certain requirements, etc.

D.10 Revise SDEIA's Bonding Authority

A small number of interviewees suggested that the state could revise the bonding authority granted in legislation to SDEIA so the authority could also be used to provide incentives for building power production or utilization facilities that employ cutting-edge technologies with higher than normal business risk:

Technologies suggested by interviewees included:

- Power plants using coal gasification
- Processes for making and using hydrogen
- Energy storage units
- Processes for load shaping; i.e., methods for matching customer loads to intermittent wind resources.

D.11 Use Tax-Free Bonding Authority to Share Investment Risk in New, Conventional or Unconventional Production and Transmission Facilities Built by Utilities or Others

Development and construction of major energy production facilities involve high levels of risk for the developer. One way to encourage development would be for the state to share risks involved in plant and transmission line permitting; thereby reducing the risk

⁴⁷ In utility industry terms, such expenditures are called "Construction Work in Progress" (CWIP). CWIP is typically not recoverable from an investor-owned utility's ratepayers until it is formally added to the utility's ratebase as part of a general rate case proceeding before the state utilities commission.

faced by the developer or utility in embarking on permitting activities for which, depending on the outcome, they may lose their entire investment in the permitting work.

APPENDIX E

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