

# NORTH DAKOTA TEN-YEAR PLAN



**Report RP11-5  
Resource Planning  
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By Kerry Kaseman**

**Docket No.  
PU-11-163/ PU-11-165**

**OTP-203**

## TABLE OF CONTENTS

<b>INTRODUCTION.....</b>	<b>4</b>
<b>SECTION A: EXISTING ENERGY CONVERSION FACILITIES .....</b>	<b>5</b>
<b>SECTION B: ENERGY CONVERSION FACILITIES UNDER CONSTRUCTION .....</b>	<b>6</b>
<b>SECTION C: PROPOSED ENERGY CONVERSION FACILITIES ON WHICH CONSTRUCTION IS INTENDED WITHIN THE ENSUING FIVE YEARS .....</b>	<b>6</b>
<b>SECTION D: PROPOSED ENERGY CONVERSION FACILITIES DURING THE NEXT TEN-YEAR TIME PERIOD .....</b>	<b>6</b>
<b>SECTION E: EXISTING TRANSMISSION FACILITIES (ELECTRIC) .....</b>	<b>6</b>
<b>SECTION F: EXISTING TRANSMISSION FACILITIES (PIPELINE).....</b>	<b>6</b>
<b>SECTION G: PROPOSED TRANSMISSION FACILITIES ON WHICH CONSTRUCTION IS INTENDED WITHIN THE ENSUING FIVE YEARS .....</b>	<b>7</b>
TRANSMISSION PROJECTS RELATED TO RELIABILITY CONCERNS .....	7
TRANSMISSION PROJECTS RELATED TO GENERATOR INTERCONNECTION REQUESTS.....	9
<b>SECTION H: PROPOSED TRANSMISSION FACILITIES ON WHICH CONSTRUCTION IS INTENDED WITHIN THE ENSUING FIVE YEARS (PIPELINE) .....</b>	<b>10</b>
<b>SECTION I: PROPOSED TRANSMISSION FACILITIES DURING THE NEXT TEN- YEAR TIME PERIOD (ELECTRIC AND PIPELINE).....</b>	<b>10</b>
<b>SECTION J: REGIONAL COORDINATION.....</b>	<b>11</b>
REGIONAL COORDINATION THROUGH THE MISO PROCESS .....	12
REGIONAL COORDINATION WITH NON-MISO TRANSMISSION OWNERS.....	12
<b>SECTION K: ENVIRONMENTAL INFORMATION.....</b>	<b>13</b>
AIR QUALITY .....	13
WATER QUALITY .....	14
SOLID WASTE .....	15
<b>SECTION L: PROJECTED DEMAND FOR SERVICE.....</b>	<b>15</b>
HISTORICAL GROWTH AND LONG RANGE FORECAST .....	15
DEMAND RESPONSE CAPABILITY.....	17
OPERATIONAL IMPROVEMENTS TO GENERATION FACILITIES.....	19
DESCRIPTION OF GENERATION FACILITIES.....	20

## LIST OF FIGURES

Figure 1: Proposed 345 kV line from Fargo, ND area to St. Cloud/Monticello Area.....	9
Figure 2: 2011 Candidate Multi-Value Projects.....	11

## LIST OF TABLES

Table 1: Historical Unmanaged Annual Peak Demands (MW) .....	16
Table 2: Forecasted Unmanaged Winter Peak Demands (MW).....	16
Table 3: Forecasted Unmanaged Summer Peak Demands (MW).....	17

## INTRODUCTION

In accordance with the rules and regulations of the North Dakota Public Service Commission governing the siting of energy conversion and transmission facilities pursuant to Chapter 49-22 of the North Dakota Century Code, Otter Tail Power Company, hereby files this Ten-Year Plan.

Ten copies of this Ten-Year Plan are being filed with the Commission. Notices of the filing of this report have been given to those state agencies and officers designated in Article 69-06-01-05 of the Administrative Code

## **SECTION A: Existing Energy Conversion Facilities**

1. Otter Tail Power Company, (Otter Tail) owns 35% of the 427 MW rated (Net Dependable Capacity) Coyote power generating station. Otter Tail is the operating agent and provides the filing of the appropriate Federal Forms. Other co-owners include Northern Municipal Power Agency (Minnkota Power Cooperative (MPC) acts as the agent for Northern Municipal Power Agency), Montana Dakota Utilities (MDU), and Northwestern Energy (NWE). The Coyote facility was commissioned for commercial operation May 1, 1981.
2. Otter Tail owns 100% of two combustion turbines located at Jamestown, North Dakota. These combustion turbines have a combined Net Dependable Capacity rating of 44.1 MW. These facilities were commissioned for commercial operation in 1976 and 1978.
3. Otter Tail is contracted to receive energy from a customer owned waste sunflower hull fired cogeneration facility in Enderlin, ND. No energy was received in 2010 from this facility.
4. Otter Tail purchases energy from six non-utility wind-powered generating facilities in North Dakota.
  - The first is a customer-owned two-unit facility that has a total capacity of 50 kW and delivered 5.4 MWh of energy to Otter Tail in 2010.
  - The second is a customer-owned facility that has a total capacity of 20 kW and delivered 2.053 MWh of energy to Otter Tail in 2010.
  - The third is a customer-owned facility that has a total capacity of 660 kW and delivered 357.694 MWh of energy to Otter Tail in 2010.
  - The fourth facility is the FPL Energy ND Wind II 21,000 kW wind farm owned by NextEra Energy, formerly FPL Energy, that delivered 53,816 MWh to Otter Tail in 2010.
  - Otter Tail purchases the output of 19,500 kW of wind turbines from Langdon Wind, LLC that delivered 69,898 MWh in 2010.
  - A sixth 100 kW facility is fully utilized by the customer, so no energy is delivered to Otter Tail Power.
5. Otter Tail purchases peaking capacity from two customer-owned diesel generators with a total nameplate capacity of 3.6 MW.
6. Otter Tail owns 40.5 MW of the Langdon Wind Energy Center located 6-12 miles south of Langdon, North Dakota. The portion owned by Otter Tail began commercial operation in January of 2008.
7. Otter Tail owns 48 MW of the Ashtabula Wind Energy Center located in Barnes County. The portion owned by Otter Tail began commercial operation in December 2008.
8. Otter Tail owns 49.5 MW of the Luverne Wind Energy Center located in Steele County. The portion owned by Otter Tail began commercial operation in August 2009.

9. No unit retirements of Otter Tail facilities in North Dakota are planned within the next ten years.

**SECTION B: Energy Conversion Facilities Under Construction**

None.

**SECTION C: Proposed Energy Conversion Facilities On Which Construction Is Intended Within The Ensuing Five Years**

The 2010 Otter Tail resource plan includes the addition of 50 MW of nameplate wind generation capacity by 2012 and up to 50 MW of nameplate natural gas-fired simple cycle combustion turbine capacity by 2015. Some or all of these resources may be located in North Dakota.

**SECTION D: Proposed Energy Conversion Facilities During the Next Ten-Year Time Period**

The 2010 Otter Tail resource plan includes the addition of 50 MW of nameplate wind generation capacity by 2012 and up to 250 MW of nameplate natural gas-fired simple cycle combustion turbine capacity by 2018. Some or all of these resources may be located in North Dakota.

**SECTION E: Existing Transmission Facilities (Electric)**

In-service dates for existing transmission facilities owned (or jointly owned) by Otter Tail and operated above 115 kV include:

<u>Transmission Line</u>	<u>In-Service Date</u>
Wahpeton – Fergus Falls 230 kV	1967
Hankinson – Wahpeton 230 kV	1967
Forman – Hankinson 230 kV	1967
Ellendale – Oakes – Forman 230 kV	1967
West Fargo (Sheyenne) – Audubon 230 kV	1969
Drayton – Grand Forks (Prairie) 230 kV	1970
Big Stone – Browns Valley – Hankinson 230 kV	1974
Center – Jamestown 345 kV	1980
Underwood – Harvey 230 kV	1986
Harvey – Balta – Rugby 230 kV	2002
Luverne – Pillsbury 230 kV	2009

No transmission facilities rated above 115 kV are scheduled for retirement within the next ten years.

**SECTION F: Existing Transmission Facilities (Pipeline)**

None.

## **SECTION G: Proposed Transmission Facilities On Which Construction Is Intended Within The Ensuing Five Years**

Due to the large number of generation interconnection projects proposed on the Otter Tail system, Otter Tail anticipates that upgrades to existing transmission lines in North Dakota may be required to reliably interconnect future projects. In consideration of the uncertainty of future projects in the region, it is possible that operating guides and/or special protection schemes could be implemented as a short-term interim solution in lieu of actual transmission upgrades until other future projects are confirmed and a regional transmission plan is formulated. This regional plan would be coordinated with the local utilities and the Midwest Independent Transmission System Operator (MISO).

### **Transmission Projects Related to Reliability Concerns**

#### *Mapleton – Casselton – Buffalo 115 kV Line*

A new 12-mile 115 kV transmission line from Mapleton to Casselton was energized in October of 2008 to provide service to a new ethanol plant near Casselton. Otter Tail is planning to construct a new 115 kV line from Casselton to Buffalo in the 2012-2013 timeframe to provide reliability benefits to the area. Load within this area has reached a level in which additional support from an alternative 115 kV source is needed in the event that the 115 kV line from Mapleton to Sheyenne is out of service. Otter Tail is currently working with MISO to obtain Appendix A approval of the Casselton – Buffalo 115 kV line through the 2011 MISO Transmission Expansion Plan (MTEP11) as a baseline reliability project.

Transmission studies with the new Buffalo – Casselton 115 kV line in-service have shown overload concerns on the existing Buffalo 345/115/41.6 kV transformer and a portion of the Mapleton – Sheyenne 115 kV line. As a result of these studies, Otter Tail is working with MISO to determine if an upgrade of these two transmission facilities are required. If it is determined that they are required, these two transmission upgrades will likely not occur until the 2014 timeframe once the new Buffalo – Casselton 115 kV line is in-service. These underlying facility upgrades are included in the MTEP11 studies.

#### *Jamestown Area Voltage Control*

Previous studies have shown high voltage concerns in the Jamestown and Buffalo areas for outage of either the Jamestown to Buffalo 345 kV line or the Buffalo to Maple River (West Fargo) 345 kV line.

Likewise, recent generation interconnection studies performed through the Midwest ISO have indicated the possibility of low transient voltage concerns in the Jamestown and Buffalo areas. Since the Jamestown and Buffalo areas are prone to both high voltage and low voltage issues, it may be optimal for Otter Tail to install a reactive device with the capability to output reactive power in one situation, but be able to absorb reactive power in another situation.

Short-term mitigation of these voltage concerns (by means of switchable capacitor banks in and around Jamestown along with varying generator control voltages at Coyote) has been successful.

Otter Tail continues to monitor these concerns while trying to formulate a permanent resolution. While there are several generation interconnection projects, transmission service requests and other future transmission expansions under study, Otter Tail is staying engaged in regional planning to determine the most efficient and effective method of resolving these voltage concerns. Otter Tail is closely monitoring the development of the Spiritwood generator being constructed by Great River Energy near Jamestown. It is possible that this base-load generator could be helpful in being able to control voltages in the Jamestown area for critical contingencies in this area. This generator could defer the need to installing reactive devices near Jamestown.

### *CapX Transmission Initiative*

Otter Tail is a participant in the CapX 2020 effort that is currently in the process of permitting four different transmission lines referred to as the CapX Group 1 projects. These projects include:

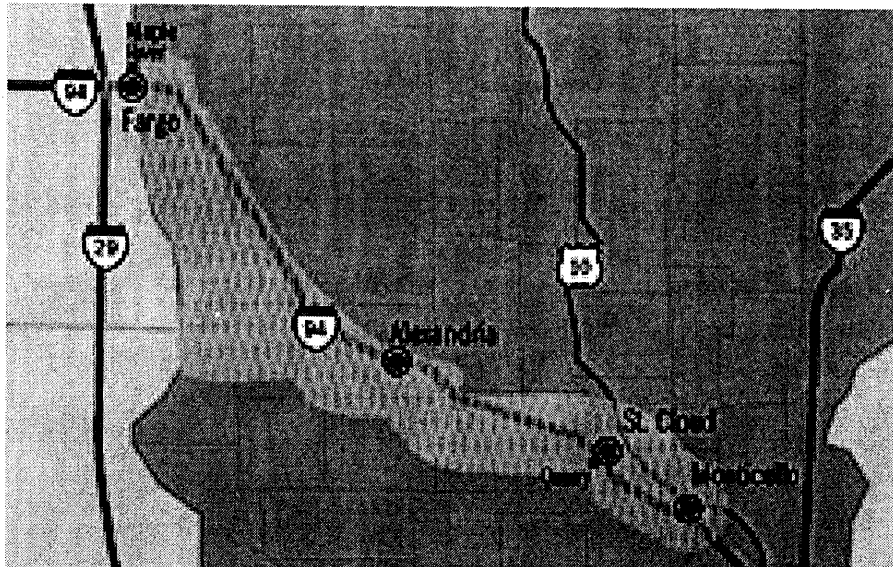
- Brookings County – Hampton 345 kV Line (approximately 200 miles)
- Fargo – Monticello 345 kV Line (approximately 250 miles)
- Hampton – Rochester – LaCrosse 345 kV line (approximately 150 miles)
- Bemidji – Grand Rapids 230 kV Line (approximately 70 miles)

Otter Tail is an owner in the Brookings County – Hampton, Fargo – Monticello, and Bemidji – Grand Rapids projects.

A portion of one of the initial projects, a proposed 345 kV transmission line from the Fargo, ND area to the Monticello, MN area is located in North Dakota and is shown in Figure 2. The project participants have received a Certificate of Need for the Minnesota portion of the project and expect to obtain a route permit for the Minnesota portion of the project in June of 2011. The project participants are working through the state processes to obtain a Corridor Certificate and a Route Permit for the North Dakota portion of the project. The current schedule for this project plans to build this new line in sections starting from the south (Monticello, MN) and working towards the northwest (Fargo, ND) with the entire line expected to be in-service around mid-2015.

As part of the Fargo – Monticello 345 kV project, the project participants are working with Minnkota Power Cooperative to construct a new 345/230 kV substation just north of Mapleton called Bison. It is anticipated that the new substation will tap the existing Buffalo – Maple River 345 kV line and the Pillsbury – Maple River 230 kV line. Two new 345/230 kV transformers are currently planned for the Bison substation to offer some support to the Fargo area and help unload the existing 345/230 kV transformers at the Maple River substation. The new Bison substation will need to be energized as part of the final portion of the project from Alexandria to Fargo in the mid-2015 timeframe.

**Figure 1: Proposed 345 kV line from Fargo, ND area to Monticello Area**



## Transmission Projects Related to Generator Interconnection Requests

### *Jamestown Area 115 kV Line Upgrades*

Otter Tail is expecting that approximately 12 miles of 115 kV line between the Jamestown Peaking Plant substation and the Jamestown 345 kV substation will need to be upgraded as a result of the generator addition at Spiritwood. The upgrade of the 115 kV line will need to be coordinated through the Generator Interconnection Procedures at MISO. It is anticipated that temporary operating guides will be implemented to allow short-term operation of the plant prior to the physical line upgrade being completed.

### *Sheyenne – Audubon 230 kV Line*

Transmission studies for the wind farms connecting to the Maple River Substation have identified potential line loading issues along the Sheyenne – Audubon 230 kV line. Current results of the transmission studies are indicating structure improvements are necessary along the Sheyenne – Audubon 230 kV line to allow increased conductor-to-ground clearances to achieve a higher line capacity. Otter Tail expects that these structure improvements will be completed in the 2014 timeframe.

### *Ellendale – Oakes – Forman – Hankinson 230 kV Line*

Through the generator interconnection process at MISO, Otter Tail is currently performing facilities studies to determine the cost and schedule of upgrading the 230 kV line from Ellendale to Hankinson to accommodate a group of generators included within the DPP cycle 5 studies. If this group of generators decides to proceed, an upgrade of this line would be required. This upgrade would involve approximately 83 miles of 230 kV line and would require rebuilding the existing line with new structures and larger conductor. The exact timing of this upgrade and any associated state permitting requirements will be determined in the future.

Otter Tail continues to see a lot of activity within North Dakota related to increased interests in new wind generation development, large load expansions related to the ag-processing industry and energy transport industry. As these projects are further developed, it is possible that additional transmission will be required. Further study analysis will be required to determine the optimum transmission plan and will be coordinated through local and regional transmission planning processes in place at MISO.

**SECTION H: Proposed Transmission Facilities On Which Construction Is Intended Within The Ensuing Five Years (Pipeline)**

None.

**SECTION I: Proposed Transmission Facilities During The Next Ten-Year Time Period (Electric and Pipeline)**

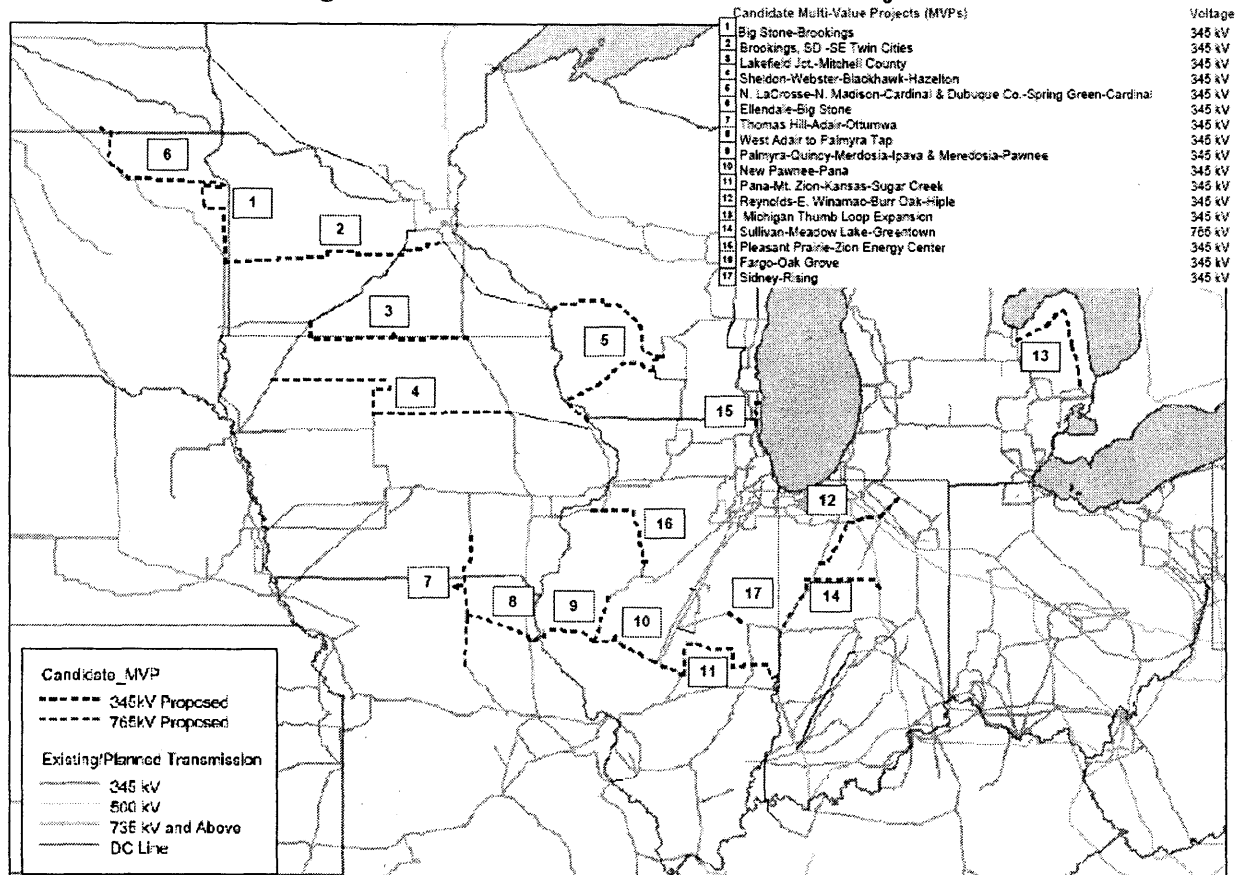
In 2008, MISO initiated the Regional Generation Outlet Study (RGOS). The objective of this study was to develop a set of transmission portfolios that will help Load Serving Entities (LSEs) meet their Renewable Portfolio Standard (RPS) mandates at the lowest delivered wholesale energy cost. RGOS assumed a regional set of wind zones chosen in conjunction with the Organization of MISO States via a least-cost wind siting methodology. RGOS concluded with three different transmission portfolios designed at meeting state RPS mandates using different transmission overlay techniques. MISO reduced the three different transmission portfolios to a set of transmission projects compatible with all three RGOS portfolios. These projects, along with other projects identified from other MISO studies, created the 2011 Candidate Multi-Value Project ("MVP") Portfolio. This portfolio of projects is intended to represent a set of projects that will provide benefit under all alternative future scenarios of wind or transmission build-out.

The 2011 Candidate MVP Portfolio analysis was initiated by MISO in late 2010 to further evaluate the portfolio of projects from the RGOS efforts. This study is evaluating the Candidate MVP Portfolio against the MVP cost allocation criterion with the objective of designing a transmission portfolio which provides widespread benefits as a first step towards a regional transmission plan. The final portfolio is envisioned to reduce the wholesale cost of energy delivery for the consumer by enabling the delivery of low cost generation to load, reducing congestion costs, and increasing the system reliability, regardless of the future generation mix.

As part of the 2011 Candidate MVP portfolio, a new Big Stone South – Ellendale 345 kV line is being evaluated by MISO as a potential project needed to deliver renewable generation from the Ellendale area to the broader MISO transmission network. Given that this transmission project is within the Otter Tail service territory, Otter Tail is actively engaged with MISO and other stakeholders in pursuing the development of this transmission project. Transmission studies to support the business case development of these projects are underway with studies completed in late July and a final report expected in September. If transmission studies indicate that the Big Stone South – Ellendale 345 kV line meets the criterion needed to qualify as an MVP, Otter Tail expects that the MISO Board of Directors will approve this project (in conjunction with other projects in the 2011 candidate MVP portfolio) as Appendix A status in December 2011. The MISO BOD approval is envisioned to trigger state regulatory efforts to get this project approved for construction in the upcoming 10 year horizon (between 2015 and 2020). The following

figure shows all of the transmission projects under evaluation during the 2011 Candidate MVP portfolio studies within the MISO footprint.

**Figure 2 – 2011 Candidate Multi-Value Projects**



Otter Tail expects that, as the transmission system approaches its full capability, and with the numerous proposed generation projects within North Dakota, it is inevitable that additional transmission, as well as upgrades to the existing system, will be required to meet the needs of the system. Otter Tail continues to participate in transmission studies looking at the adequacy of the transmission system throughout North Dakota.

**SECTION J: Regional Coordination**

Otter Tail conducts transmission planning in a coordinated environment, involving neighboring utilities, load serving entities, state regulatory commissions and members of the public to collaborate in the planning process.

There are several different transmission initiatives underway within the region that are investigating the feasibility of expanding the capability of the transmission grid in order to integrate additional resources. Other than the on-going interconnection studies being completed by MISO, one major effort underway by MISO is the 2011 Candidate MVP portfolio study, which was mentioned above. Otter Tail continues to actively participate in these efforts to ensure that a reliable and economic transmission system is built across the region in a coordinated manner.

## **Regional Coordination through the MISO Process**

As a transmission-owning member of the MISO, Otter Tail participates in various transmission planning efforts, the most significant of which is the annual MISO Transmission Expansion Planning (“MTEP”) process. The MTEP process involves a variety of planning analyses to determine the performance of the transmission system for a wide variety of conditions. Through the MTEP process, MISO, with input from various stakeholders, evaluates the system for both reliability and economic needs.

Local planning of the Otter Tail facilities, less than 100 kV, is primarily coordinated on a subregional level. Otter Tail’s locally planned projects are reviewed by MISO and become part of the MTEP. Developing local transmission plans at a subregional level and rolling them up to MISO provides for regional coordination of local transmission plans, which leads to transmission projects being built in a coordinated manner to address the transmission needs of the larger region. This coordination for identifying new transmission projects also augments the larger region by providing for a transmission plan that maximizes the benefits of the new projects, and in many cases, reduces the number of new transmission projects that are needed than if transmission planning was done solely on an individual basis. Regional coordination of local transmission plans also results in study efficiencies by keeping a broader group of utilities, states, and stakeholders informed through the transmission planning process.

During the course of the MTEP process, MISO seeks opportunities to coordinate or consolidate, where possible, individually defined transmission projects into more comprehensive, cost-effective developments. MISO coordinates with Transmission Owners, and considers the input from various stakeholder groups (through the Subregional Planning Meetings, Planning Subcommittee, and Planning Advisory Committee) to develop expansion plans to meet the needs of the transmission system. This multi-party collaborative process allows for all projects with regional and inter-regional impacts to be analyzed for their combined effects on the transmission system. Moreover, this collaborative process is designed to ensure the most efficient and cost-effective transmission expansion plan is developed, while giving consideration to the inputs from all stakeholders.

Additionally, subregional, state, and non-MISO coordination is necessary because the Otter Tail transmission system is highly interconnected with neighboring non-MISO/Mid-Continent Area Power Pool (“MAPP”) transmission owners. The Otter Tail transmission system is nearly the farthest, most western border of the MISO footprint; therefore, it is interconnected with several transmission-owning utilities that are not members of MISO, but instead remain members of MAPP.

## **Regional Coordination with non-MISO Transmission Owners**

Otter Tail participates in the CapX 2020 (Capacity Expansion by 2020) effort, which is a joint initiative of transmission-owning electric utilities in Minnesota and the surrounding region created on the basis of expanding the electric transmission grid to ensure electric reliability for several years into the future. The CapX 2020 utilities (including cooperatives, municipal utilities and investor-owned utilities) collaboratively assess the current transmission system and plan for the necessary future transmission infrastructure investments. This collaborative process and the planning studies performed as part of this effort are coordinated with MISO.

Otter Tail has Integrated Transmission Agreements (ITA) with Central Power Electric Cooperative, Missouri River Energy Services, Minnkota Power Cooperative, and Great River Energy. These agreements provide for joint use of transmission facilities in common areas of service and require that the utilities jointly plan and coordinate additional facilities required for the common service area. In addition, Otter Tail has agreements for joint use of transmission and interconnection with Xcel Energy, East River Electric Cooperative, Montana-Dakota Utilities, Manitoba Hydro, Northwestern Energy, and Western Area Power Administration. These agreements were all precipitated through joint studies and coordination of facilities required to provide high reliability of service at the minimum cost. Facilities proposed and committed to through this local process become part of the MTEP.

As discussed above, Otter Tail coordinates extensively with its neighboring utilities to share system plans and identify system enhancements through the MISO, and through local participation in coordinated transmission planning (such as CapX 2020, and the ITAs). Otter Tail's participation in the MISO study process provides coordinated planning for the entire 15-state MISO footprint, while participation in various working groups and committees provides for coordinated planning on a subregional basis, which includes both utilities that are MISO members and utilities that are not MISO members.

#### **SECTION K: Environmental Information**

Otter Tail employees are involved with other groups in a variety of organizations to keep informed on various environmental issues. Edison Electric Institute (EEI), the Utility Air Regulatory Group, and the Lignite Energy Council all provide information exchange on environmental issues. On an individual basis, employees participate in Energy and Environment Research Center (EERC) conferences, Air and Waste Management Conferences, and Minnesota Pollution Control Agency (MPCA) task forces and other informational meetings. Otter Tail, along with other government and industrial entities, funds various types of research projects such as the Energy and Environment Research Center's Coal-Ash Research Resources Consortium (CARRC) and the Center for Air Toxic Metals (CATM). The CARRC was established to evaluate potential beneficial uses of coal combustion by-products. CATM is devoted to the study of the emission, control, and fate of hazardous air pollutants with primary emphasis on mercury.

Otter Tail Power generating plants are subject to stringent federal and state standards and regulations regarding, among other things, air, water and solid waste pollution. Otter Tail estimates that operation and maintenance expenditures related to environmental items at Coyote Station in 2010 were \$3,458,298. In addition, there was \$40,083 in capital expenditures relating to environmental items at Coyote Station in 2010.

Otter Tail Power has complied in the past and will continue to comply with all requirements of the Public Service Commission in siting, operating and maintaining all proposed energy conversion and transmission facilities located in North Dakota.

#### **Air Quality**

Pursuant to the Federal Clean Air Act (the Act), the United States Environmental Protection

Agency (EPA) has promulgated national primary and secondary standards for air pollutants. The Coyote Station has sulfur dioxide removal equipment. The removal equipment, referred to as a dry scrubber, consists of a spray dryer, followed by a fabric filter. The Coyote Station is currently operating within all presently applicable federal and state air quality and emission standards.

On December 19, 1996, the EPA adopted nitrogen oxide emissions regulations that are applicable to cyclone-fired boilers such as those used at the Coyote Station. The regulations required that the cyclone boilers meet the emission standards beginning on January 1, 2000 and Coyote Station meets those standards.

On February 23, 2010, the North Dakota Department of Health (NDDOH) issued a Best Available Retrofit Technology Permit to Construct to Coyote Station. The permit was issued under the North Dakota Regional Haze Implementation Plan. Due to concerns with the initial compliance averaging time and compliance schedule conveyed by the U.S. Environmental Protection Agency, the NDDOH issued a revised Permit to Construct. The revised permit requires installation of NOx control technology that will reduce the discharge of NOx emissions to levels below 0.50 lb/mmBtu as measured by a 30-day rolling average. Compliance with the limit must be met beginning on July 1, 2018.

The Act contains a list of hazardous air pollutants (HAPs), which includes certain substances believed to be emitted by Otter Tail plants. The Act called for EPA studies of the effects of emissions of the listed pollutants by electric utility steam generating plants. The EPA completed the studies and sent reports to Congress, and on December 14, 2000, the EPA announced that it affirmatively decided to regulate only mercury emissions from electric generating units. The EPA published final mercury emission rules in the May 18, 2005 Federal Register that would have allowed the EPA to regulate mercury emissions based on a cap and trade approach. On February 8, 2008, the United States Court of Appeals for the District of Columbia granted petitions for review of the EPA mercury rules. The Court issued a mandate vacating the rules on March 14, 2008, and the Supreme Court denied the appeals of other parties to the litigation on February 23, 2009. The EPA rulemaking is now proceeding under the maximum achievable control technologies (MACT) provision of the Act section 112(d) for existing units and section 112(g) case-by-case MACT provisions for affected new units. The EPA issued a proposed MACT rule on March 16, 2011 that would place restrictions on several HAPs, including mercury. EPA and petitioners have agreed to a schedule where EPA would adopt final MACT rules by November 16, 2011. As proposed, the MACT rule would require Coyote Station to install control technology to reduce mercury emissions, and new continuous monitoring equipment would be required to verify compliance with the MACT standards. Otter Tail will determine whether or not Coyote will also need to make reductions of other HAPs once the final rule is adopted.

The two combustion turbines located at Jamestown are not impacted by the Act's emission reduction standards.

### **Water Quality**

The Federal Water Pollution Control Act Amendments of 1972, and amendments thereto, provide for, among other things, the imposition of effluent limitations to regulate discharges of

pollutants, including thermal discharges, into the waters of the United States. The EPA has established effluent guidelines for the steam electric power generating industry. Discharges must also comply with state water quality standards. Water discharge permits for the Coyote Station were renewed on April 1, 2008 for a five-year term.

Section 316(b) of the Clean Water Act requires facilities to install the best technology available (BTA) for minimizing adverse environmental impact caused by cooling water intake structures. Coyote Station utilizes cooling towers that meet the classification of closed-cycle cooling, which has historically been considered to be a BTA. However, on March 28, 2011 EPA signed a proposed rule that would revise Section 316(b). If finalized, the proposed rule would require Coyote Station to submit studies and documentation to prove that its intake structure meets all of the rule's specifications, and Coyote may also need to install technologies such as a fish handling and return system. Comments on the proposed rule are due on July 19, 2011, and according to a settlement agreement EPA must issue a final rule by July 27, 2012.

### **Solid Waste**

The EPA has promulgated various solid and hazardous waste regulations and guidelines. These provide for the comprehensive control of various solid and hazardous wastes from generation to final disposal. The North Dakota Department of Health issued Coyote Station permits for disposal of ash and other solid wastes.

On May 4, 2010, EPA released two alternative proposals to regulate disposal of coal combustion residuals (CCRs) which include fly ash, bottom ash, boiler slag, and Flue Gas Desulfurization materials.

The Bevill Amendment to the Resource Conservation and Recovery Act (RCRA) excludes CCRs from regulation as hazardous waste under Subtitle C of the Act. However, EPA was directed to study the impacts of CCRs and make a determination of whether or not regulation of CCRs under Subtitle C was necessary. The EPA determined that regulation of CCRs was not warranted in 1993. In 2000, EPA concluded that significant improvement had been made in waste management practices as a result of state requirements, but gaps still remained. At that time, EPA decided to retain the Bevill exemption and to establish minimum national standards for CCR management under Subtitle D of RCRA, which would be managed by the states. The Subtitle D standards were never issued as part of the 2000 determination.

EPA began its re-review of CCR regulation following the December 2008 rupture of a Tennessee Valley Authority surface impoundment located near Kingston, Texas. Public statements by the EPA Administrator and other EPA officials signaled that EPA intended to regulate CCRs as hazardous waste under Subtitle C. While, it is clear from their May 4, 2010 proposal that they would prefer to regulate CCR under Subtitle C, they offered two proposals for public comment, one under Subtitle C and the other under Subtitle D. Over 400,000 comments on the proposals were submitted to EPA, which they must evaluate prior to issuing a final rule.

## **SECTION L: Projected Demand For Service**

### **Historical Growth and Long Range Forecast**

Otter Tail had an unmanaged winter peak of 832 MW on January 18, 2011 for the hour ending at 10 a.m. The ten-year historical growth of Otter Tail's unmanaged annual peak demand is shown in Table 1. For the purposes of Table 1, annual data reflects the Midwest ISO planning year that begins in May of the listed year and extends through April of the following year.

**Table 1: Historical Unmanaged Annual Peak Demands (MW)**

Year	Peak	Annual Growth %	Cumulative Growth %
2001	642	0.0	0.0
2002	689	7.3	7.3
2003	717	4.1	11.4
2004	712	-0.7	10.7
2005	690	-3.1	7.6
2006	727	5.4	13.0
2007	740	1.8	14.8
2008	810	9.5	24.3
2009	818	1.0	25.3
2010	832	1.7	27.0

A long-range forecast was made using an econometric model developed with the assistance of Christensen Associates of Madison, Wisconsin. This model is designed to incorporate a number of different assumptions about variables such as weather, economic growth, and demographics.

Three scenarios were used in this forecast: the Base Scenario, the Upper Scenario, and the Lower Scenario. The Base Scenario represents the best-fit econometric forecast of the statistically significant variables impacting customer load. The Upper and Lower Scenarios are calculated using confidence intervals that effectively describe the uncertainty around the forecast values.

Otter Tail's projected unmanaged winter peak demand is presented in Table 2 and Otter Tail's unmanaged summer peak demand is presented in Table 3. In Table 2, winter data reflects the Midwest ISO planning year in which the winter season begins in November of the listed year and extends through April of the following year. In Table 3, summer begins in May and ends in October of the listed year.

**Table 2: Forecasted Unmanaged Winter Peak Demands (MW)**

Year	Lower	Base	Upper

2011	744	801	828
2012	755	798	840
2013	773	816	859
2014	794	838	882
2015	814	859	903
2016	838	884	929
2017	868	914	961
2018	879	927	974
2019	891	939	987
2020	903	952	1,001

**Table 3: Forecasted Unmanaged Summer Peak Demands (MW)**

Year	Lower	Base	Upper
2011	664	699	748
2012	675	717	760
2013	687	729	772
2014	704	748	791
2015	726	770	814
2016	746	791	835
2017	770	816	861
2018	800	847	893
2019	812	859	906
2020	824	872	920

It is important to note that the data provided in Tables 2 and 3 do not reflect planned or committed energy efficiency efforts in Minnesota and South Dakota and that some demand savings would be realized from such efforts. Otter Tail anticipates the demand savings could be as much as 39 MW by 2020 based on plans in Minnesota and South Dakota. North Dakota has not approved an energy efficiency plan for implementation.

**Demand Response Capability**

Otter Tail has two Demand Resources registered under Module E with the Midwest ISO. Both resources are load modifying resources (LMR) that are netted from the demand forecast prior to calculation of the reserve obligation. These resources are obligated to provide sustained load reduction for up to 4 hours at a time and be available five times in the summer to the Midwest ISO in the event of a declared reliability emergency. This obligation does not preclude the Company from relying on these resources to control for capacity events or economic reasons outside of a Midwest ISO emergency event.

*Direct Load Control – The Radio Load Management System*

The first Demand Resource, "Direct Load Control," represents the Company's extensive radio load management system that is used to control customer load during economic or capacity events. This resource was accredited at 10 MW for June 2011 through September 2011, 25MW for October 2011 and May 2012, 40 MW for November 2011 and March and April 2012, and 85 MW for December 2011 through February 2012. Otter Tail has approximately 129,500 customers and approximately 41,000 of those customers have some type of load control. The level of control that is available can vary with temperature, customer behavior, and load control responsiveness. For example, more load control is available during extremely cold temperatures in the winter than during moderate temperatures.

Winter season demand response loads are in several categories and can reach as high as 130 MW. These manageable loads include water heaters, thermal storage, residential demand controllers, commercial time of use rates, small dual fuel heating systems, and large dual fuel (industrial and bulk interruptible loads). The radio load management system also has the capability of interrupting as much as 20 MW of summer peak load in the months of June through September. These summer loads consists primarily of water heaters, irrigation, the large dual fuel industrials and residential air conditioning. Otter Tail continues to add customers to the newest program that allows cycling control of residential central air conditioning (15 minutes on, 15 minutes off).

Although 2009 measurement data showed the load management system was capable of achieving higher levels than the level accredited, those higher levels related to control levels during a minimum number of hours (less than 4) and were impacted by weather and load diversity. Additional testing and analysis needs to be conducted before Otter Tail would be confident accrediting our demand response at the higher levels. The newness of the Module E accreditation, the measurement and verification requirements for continued accreditation, and the risk of potential penalties were also significant factors in the lower accreditation level registered by the Company.

Over a 4 year period from 2003 to the summer of 2007, Otter Tail replaced a significant portion of our load management equipment. This included over 40,000 radio receivers on customer's premises. Software and hardware technologies were implemented to allow the use of the Company's voice radio communication system for load management signal transmissions.

The update of the radio load management system was necessary since the previous technology was over 20 years old and replacement components were becoming difficult to find. Otter Tail had also experienced a continued reduction, due to failed radio receivers, in the overall effectiveness of the system leading to a reduction in the total megawatts of controlled load. The replacement of the load management system has improved the amount of controllable load and provided greater confidence in the system.

#### *Firm Service Level – Customer Contracts*

The second Demand Resource registered with MISO is a "Firm Service Level" resource that represents Otter Tail's contract with a large industrial customer to shed load to a firm service level in the event of a capacity event. This resource was certified at 15 MW for

each month of the 2011/2012 planning year (June 2011 through May 2012). Unlike the "Direct Load Control" resource that reduces load when called upon by our load management system, this resource must demonstrate that it did not exceed the registered firm service level during a capacity event.

The Company's current resource plan adds 5 MW of summer capability and 10 MW of winter capability every five years. Of particular benefit to the Company is the smoothing of the reserve obligation that Demand Resources provide from winter to summer.

As a company, Otter Tail will continue to use a combination of Demand Resources, energy efficiency, and purchase agreements with other utilities to help meet future capacity deficits. Otter Tail also continues to study and assess the potential for future additions to its generation.

Otter Tail has purchased summer and winter season peaking capacity for the year 2011. The Company has capacity purchase contracts with Minnesota Power totaling 50 MW from May 1, 2010 through April 30, 2011, with Wisconsin Electric Power Company totaling 35 MW from June 1, 2010 through May 31, 2011, and 50 MW from June 1, 2011 through May 31, 2013, and finally with Great River Energy totaling 50 MW from December 1, 2010 through December 31, 2014. Further detailed information may be obtained from Otter Tail's Resource Plan documents that are filed with the Minnesota Public Utilities Commission. Copies of the Company's Resource Plans are provided to the North Dakota Public Service Commission. The Company's current Resource Plan was filed June 25, 2010.

### **Operational Improvements to Generation Facilities**

Otter Tail continues to explore operating improvements at its generating facilities to increase their efficiency and to lower the cost of production.

#### *Big Stone Plant:*

There were three significant projects completed in 2007 that contributed to improved performance in 2008 and will continue pay dividends in the future. A generator stator rewind has significantly reduced the risk of a major failure. The replacement of the Advanced Hydrid Particulate Collector (AHPC) was successful and the new baghouse has operated as designed. A condenser/circulating water pump upgrade has provided significant improvement in summer Net Plant Heat Rate, eliminated summer load restrictions and eliminated the on-going corrosion problem with condenser tubes.

#### *Coyote Station:*

The Coyote Station is a sister unit to Big Stone Plant, but six years newer. In order to correct design deficiencies with the existing low-pressure rotor, a new rotor was installed in 2003. The new rotor improves overall plant efficiency by approximately 2%. Coyote also completed a high-pressure/intermediate pressure rotor replacement in 2009 that resulted in

about a 2% increase in efficiency. The Coyote Station approved outlet rating is only 427 MW, due to transmission limitations.

*Jamestown, ND, Lake Preston, SD, and Solway, MN Peaking Plants:*

The units continue to be operated during load peaking conditions and to provide transmission stability during emergency conditions and maintenance situations. They have also seen additional run time for reliability reasons in the Midwest ISO market. Otter Tail continues to review ways to improve the unit's efficiency. Improvements at Jamestown and Lake Preston include an upgrade of control systems and the installation of an inlet fogging system to increase summer ratings in 2001.

Otter Tail added a GE LM6000 combustion turbine (CT) unit at Solway, MN in the spring of 2003. The unit includes inlet chilling to improve the summer rating and efficiency, as well as water injection for NOX control and increased output. Interruptible natural gas is the primary fuel with fuel oil as the back-up fuel supply. The combustion turbine also includes a clutch to allow synchronous condensing service to support the transmission system. The LM6000 is an aero-derivative machine, powered by a Boeing 747 engine, and is one of the most fuel-efficient simple cycle turbines in the world.

*Hoot Lake Plant:*

Hoot Lake Plant has also taken steps to lower its operating costs. Both Units #2 and #3 continue to maintain high levels of rating capability and performance. Unit #1, a 7.5 MW nameplate unit built in 1948, was retired in 2005.

**Description of Generation Facilities**

Otter Tail owns or is a co-owner of the following generating facilities:

Coyote Station is a coal fired 427 MW (Net Dependable Capacity) facility located near Beulah, North Dakota. Coyote Station is a mine-mouth fed facility that uses ND lignite for its fuel source. Otter Tail is a co-owner with Montana Dakota Utilities (MDU), Northern Municipal Power Agency (Minnkota Power Cooperative (MPC) acts as the agent for Northern Municipal Power Agency), and Northwestern Energy (NWE). Otter Tail has a 35% ownership share in Coyote Station and is the operating agent of Coyote Station. The net generation from Coyote Station in 2010 was 3,063,984 MWh.

Big Stone Plant (BSP) is a coal fired 475 MW (Net Dependable Capacity) facility located near Milbank, South Dakota. In association with using sub-bituminous coal for its fuel source, Big Stone Plant has also burned a limited amount of alternative fuels such as tire-derived-fuel, refuse-derived-fuel, and agricultural biomass. BSP has burned alternative fuels since 1989. Deliveries of alternative fuels peaked in the mid to late 90's. After a thorough review of the BSP's use of alternative fuels, the plant decided to end the program at the end of 2009.

Several factors led BSP to this decision. Capital repairs were required for the handling facility, primarily new walking floors. Supplies of the various fuels have dwindled, with BSP being the outlet of last resort in many cases. Maintenance costs for routine upkeep remain consistent, even

with a lower number of tons moving through the facility. Tire derived fuel continues to create problems in the fuel conditioners, resulting in higher than expected maintenance costs. Finally, new EPA requirements for reporting of emissions from biofuels make it nearly impossible to burn these fuels and comply with the reporting needs. The plant intends to mothball the handling system. If other opportunities present themselves in the future, they will be evaluated.

Otter Tail is a co-owner with MDU, MPC, and NWE. Otter Tail has a 53.9% ownership share in Big Stone and is also the operator of the BSP. The net generation from BSP in 2010 was 3,169,192 MWh.

Hoot Lake Plant is a coal-fired facility consisting of 2 generators with a combined capacity of 145.1 MW (Net Dependable Capacity) located in Fergus Falls, Minnesota. Hoot Lake Plant burns sub-bituminous coal as its fuel supply and receives rail shipment from Burlington Northern. Otter Tail is the sole owner/operator of the Hoot Lake facility. Net generation for Hoot Lake Plant in 2010 was 809,769 MWh.

Otter Tail owns and operates 6 run-of-river hydro units in Minnesota. The total capacity of the six units is about 4 MW. The six hydro units produced net generation of 25,631 MWh in 2010.

Otter Tail owns two CT units in Jamestown, ND and a single CT unit in Lake Preston, SD. The Net Dependable Capacity rating for Jamestown unit #1 and unit #2 are 22.0 MW and 22.1 MW, respectively. The Net Dependable Capacity rating for the Lake Preston unit is 22.1 MW. All three units burn #2 fuel oil that is delivered by truck and stored in above ground storage tanks. Net generation for the three combustion turbines was 1,274 MWh in 2010.

Otter Tail also has a 2,000 kW standby diesel generator located at its System Operations Control Center in Fergus Falls, MN. The generator had net generation of about 24 MWh in 2010.

Otter Tail owns a 41.9 MW (Net Dependable Capacity) LM6000 CT unit and a 1.250 MW diesel unit at Solway, MN. Net generation for Solway in 2010 was 43,818 MWh.

Otter Tail owns 40.5 MW of the Langdon Wind Energy Center located 6-12 miles south of Langdon, North Dakota. The portion owned by Otter Tail had net generation of about 141,152 MWh in 2010. Otter Tail owns 48 MW of the Ashtabula Wind Energy Center located in Barnes County, North Dakota. The portion owned by Otter Tail had net generation of about 145,715 MWh in 2010. Otter Tail owns 49.5 MW of the Luverne Wind Farm located in Steele County, North Dakota. The portion owned by Otter Tail had net generation of 165,732 MWh in 2010.