

Appendix C: Existing Resources

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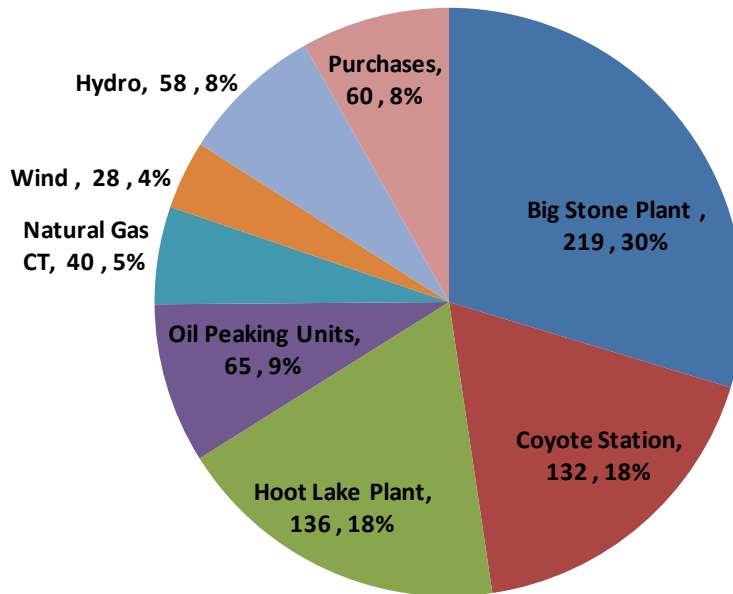
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Existing Resources

Otter Tail has a variety of existing resources available to meet the energy needs of its customers, both reliably and economically. These resources consist of existing generating facilities, the radio load management system, the Midwest ISO, purchases from other utilities, customer owned generation, the transmission and distribution network, and current Company sponsored conservation programs.

Current Otter Tail capacity resources are about 66% coal-fired in the winter and 69% in the summer. Figure 1-1 shows the composition of the 2009 Planning Year winter season capacity by resource for the Company. The 2009 summer season capacity is shown in Figure 1-2. Figures 1-3 and 1-4 show the capacity resource breakdowns by fuel type for winter and summer, respectively. Capacity resources that were resold to other utilities under wholesale transactions are included in the data. (Percentages may not add to 100% due to rounding.)

Figure 1-1: 2009 Planning Year Accredited Capacity Resources, Winter Season, Shown by Category, MW, and Percent of Total = 736.7 MW



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Figure 1-2: 2009 Planning Year Accredited Capacity Resources, Summer Season, Shown by Category, MW, and Percent of Total = 700.8 MW

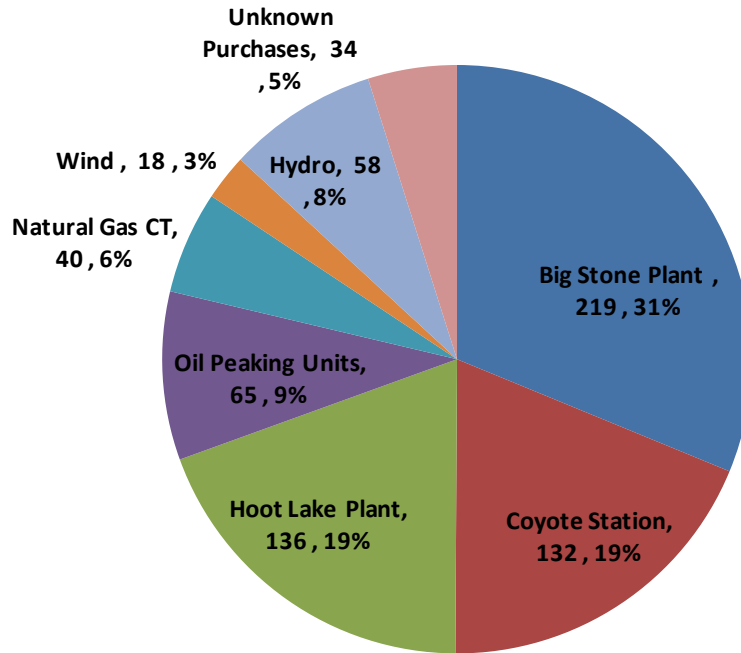
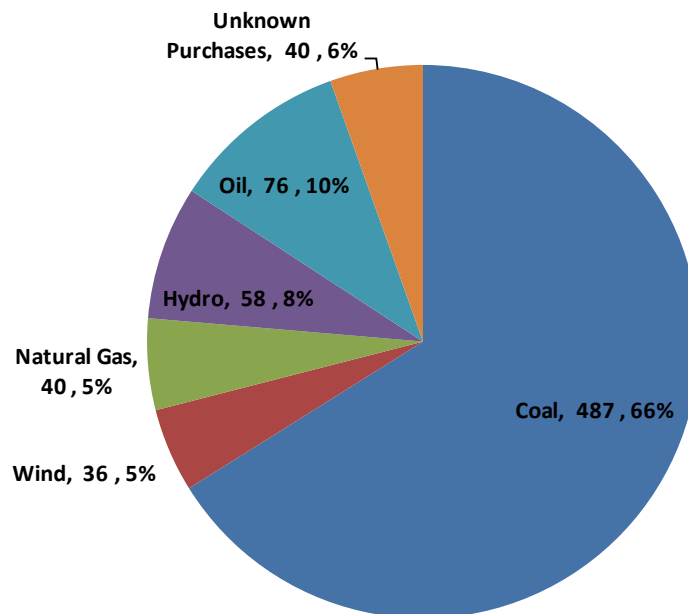
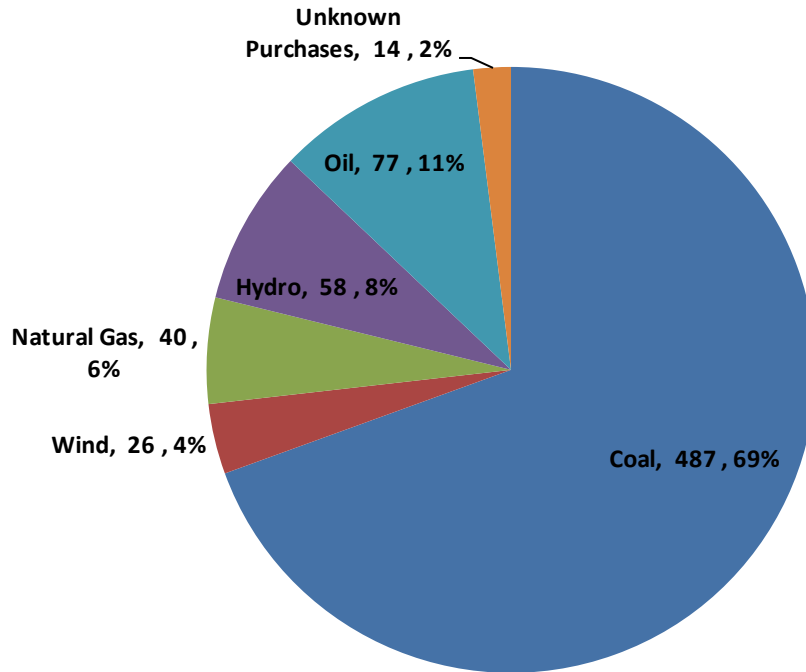


Figure 1-3: 2009 Planning Year Winter Season Accredited Capacity by Fuel Type Shown by Fuel Type, MW, and Percent of Total = 736.7 MW



**Figure 1-4: 2009 Planning Year Summer Season Accredited Capacity by Fuel Type
Shown by Fuel Type, MW, and Percent of Total = 700.8 MW**



The sources of energy used to serve customer loads in 2009 are shown in Figures 1-5 and 1-6. Historically, between 3 and 5% of the Company's identified retail load in Minnesota, on an energy basis, is actually load of other utilities. Otter Tail makes the final delivery of the energy to the customer. Under energy accounting procedures, this energy becomes identified as Otter Tail load. The sources of this energy are not under the control of Otter Tail, but the energy is included in the data shown in the graphs.

The data indicates that about 19% of the total energy generated or purchased in 2009 was known to be from renewable resources. About 19% of the 2009 energy was purchased from entities where the energy source is unknown. Some may have been renewable. In the data, the energy classified as renewable includes energy from biomass, hydro, wind, solar, and waste.

The following subsections include information and discussions of Otter Tail's existing resources by category as well as discussion of the MISO pool, Midwest Reliability Organization (MRO), and transmission resources. The ratings data provided in this discussion will be based on current MISO ratings under Module E's resource adequacy requirements and as provided for Planning Year 2, which is June 1, 2010 through May 31, 2011.

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Figure 1-5: 2009 System Generation by Existing Resources, 4,284,146 MWh for Retail

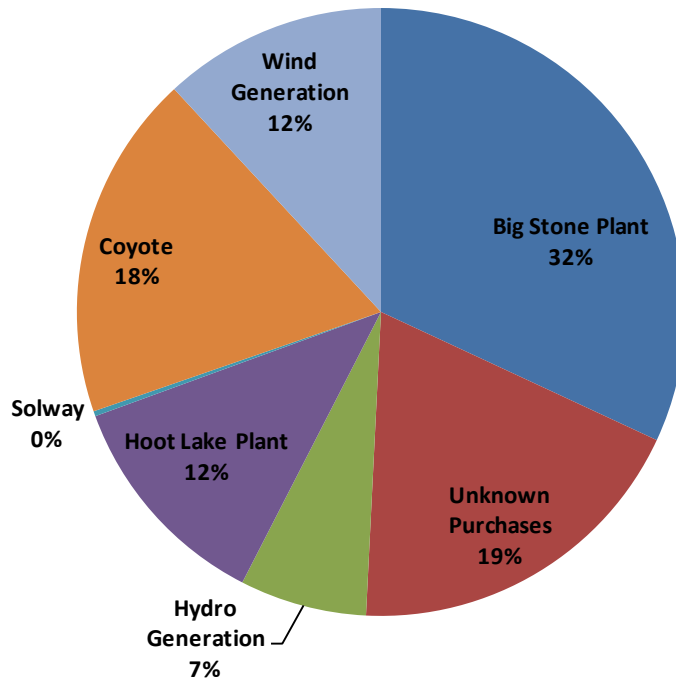
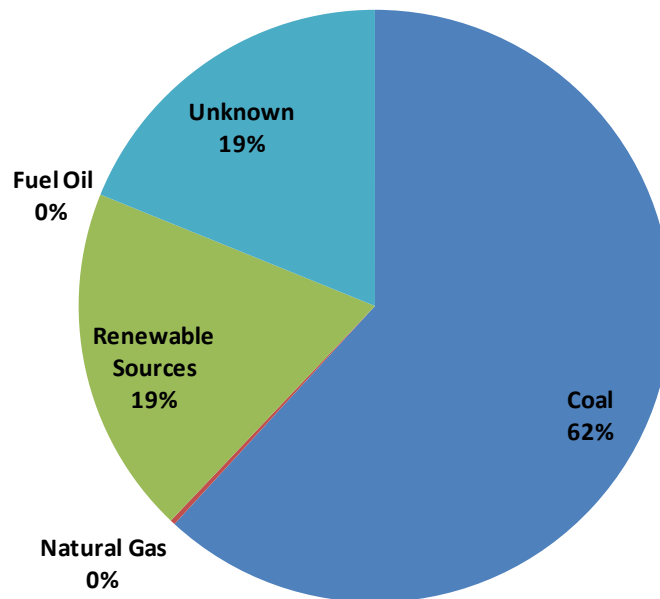


Figure 1-6: 2009 System Generation by Fuel Type, 4,284,146 MWh for Retail



1.1 Hydroelectric Facilities

Otter Tail has 6 units located at five dams on the Otter Tail River near Fergus Falls, MN and 2 units located at a dam on the outlet of Lake Bemidji at Bemidji, MN. These hydro units were constructed in the early 1900's and were the backbone of the generating resources for Otter Tail Power for many years in the early days of the Company. The total capability of all of the hydro units is about 3.7 MW.

The hydro units located on the Otter Tail River are under FERC jurisdiction and were licensed for the first time in 1991. The cost of the licensing process exceeded 1.3 million dollars. All of these units were built prior to licensing requirements. The units are predominantly operated in run of river mode without pondage capability except for Hoot Lake and Wright Lake behind the Hoot Lake Hydro. Prior to the FERC licensing, there was a small amount of pondage and cycling capability with these units that increased the amount of energy obtained from the water flow. The FERC license required a change to strict run of river operation. All units have a FERC classification of low hazard status.

All of the hydro units in run of river mode have had updated reservoir level monitoring systems installed to aid in complying with the operating requirements of the FERC license. Automatic level control systems have also been installed at a number of the units to control the reservoir level using the signal from the reservoir level monitoring system. Significant other equipment upgrades were completed in the past 15 years, to upgrade electrical control and protection equipment.

Bemidji Hydro

The Bemidji Hydro units were built in 1907. These units were authorized by Congress and are not subject to FERC jurisdiction. OTP acquired ownership of these units in the 1940's. The Net Dependable Capacity (NDC) and Unforced Capacity (UCAP) rating of the Bemidji unit #1 is 200 kW. Unit #1 has a nameplate rating of 240 kW. The #2 unit has a nameplate rating of 500 kW, but has not been submitted as a capacity resource because of reduced operation due to low water conditions. As water conditions improve, it may once again be submitted as a capacity resource. The Unit #1 generator stator and rotor field was rewound in 2008. Typical annual generation for these two units is about 700 – 1,100 MWh depending on water availability.

Dayton Hollow Hydro

Dayton Hollow Dam was built in 1909 with two generators installed. A third generator was added in 1917. One of the original generators was retired and removed in 1964. The Unit #2 turbine and generator were refurbished in 2006 and the turbine also had a major repair in 2008 – 2009. The current Dayton Hollow #1 unit has a nameplate rating of 520 kW and its NDC and UCAP rating is 500 kW. The #2 unit, with an NDC and UCAP rating of 500 kW, has a nameplate rating of 450 kW. Annual generation from the Dayton Hollow units is about 5,000 – 7,000 MWh. Otter Tail is trying to amend the current FERC hydro license to allow the re-installation of a third turbine and generator at Dayton Hollow Hydro. If successful, it could be on-line as soon as 2011. The estimated NDC of unit #3 will be 800 kW.

Hoot Lake Hydro

The Hoot Lake Hydro, built in 1914, has a nameplate rating of 1,000 kW with an NDC and UCAP rating of 800 kW. The hydro originally had two units, but one unit was retired with the addition of the Hoot Lake #3 steam unit in 1964. The Hoot Lake Hydro is part of a system that was developed to make further use of the Otter Tail River. Diversion Dam was built on the Otter Tail River and part of the water from the river is diverted through an underground tunnel to Hoot Lake that flows into Wright Lake. The two

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lakes were created from the diverted water. The water from Wright Lake flows through the Hoot Lake structure, and is used in the hydro unit and for cooling water for the Hoot Lake steam units. The arrangement allows the cooling water for the steam plant to be gravity fed, rather than pumped, through the plant and improves the efficiency of the units. Hoot Lake Hydro has been generating about 3,000 - 4,000 MWh annually. The City of Fergus Falls also makes use of the Diversion Dam system as water supply for the city.

Pisgah Hydro

Pisgah Hydro, with a nameplate rating of 520 kW, was built in 1918. The generator stator and rotor was rewound in 2001. The turbine was rebuilt in 2005. This unit has an NDC and UCAP rating of 700 kW, and provides about 3,500 – 4,500 MWh during normal years.

Taplin Gorge (Friberg) Hydro

Taplin Gorge, also known as Friberg, was constructed in 1925. The structure is well known in the Fergus Falls area because the powerhouse is a replica of the tomb of the former Italian ruler, Theodoric. Taplin Gorge has a nameplate rating of 560 kW and an NDC and UCAP rating of 500 kW. The generator was rewound in 1999. Annual generation is in the 3,000 – 4,200 MWh range.

Wright (Central) Hydro

Wright Dam (also called Central) is located in downtown Fergus Falls, and has been the location of a dam since the 1880's. It originally provided power via drive belts to industries located nearby. The current structure was built in 1922. The generator, with a nameplate rating of 400 kW, has an NDC and UCAP rating of 500 kW. The turbine was rebuilt and the generator cleaned and rewedged in 2002 – 2003. Annual generation is in the range of 2,000 – 3,000 MWh.

1.2 Peaking Facilities

Otter Tail has a number of peaking units on the system. Some consist of internal combustion units, but most of the capacity is comprised of combustion turbines. Generally, Otter Tail's peaking units operate on a very limited basis annually, either for emergency or extreme peak times, or for testing purposes.

In the summer of 2001, an inlet fogging system was added to each of the three GE Frame 5 peaking units. The inlet fogging system is to be used during the summer months to increase the output of the turbines during the hotter weather conditions by lowering the temperature of the incoming air. Combustion turbine output is severely impacted by air density, so the denser cooler air allows for higher output capability.

Jamestown Combustion Turbines

Otter Tail has two fuel oil-fired combustion turbines located at Jamestown, ND. These units, of 1976 and 1978 vintage, have a NDC rating of 22,000 kW and 22,100 kW. The UCAP ratings of the units are 19,200 kW and 15,500 kW. These units operate a limited number of hours annually. These units are operated for emergency, peaking, and testing situations, as well as for economy during periods when market prices support it. The Frame 5 units at Jamestown operate a very limited number of hours during the year. The calculation that is used to convert NDC to UCAP penalizes generating units with low service hours. MISO recognized this and will be implementing a new method for accrediting units with low service hours (less than 80 service hours) to help address this issue. This new methodology will go

into effect in Planning year 3 (June 1, 2011) and Otter Tail expects to see higher UCAP ratings for the Frame 5 units under this new method.

Lake Preston Combustion Turbine

Lake Preston is a third combustion unit, identical to the Jamestown units, located at Lake Preston, SD. This unit was installed in 1978 and is rated at 22,100 kW for NDC and 14,400 kW for UCAP. This unit is also fired with fuel oil and has limited operation. The unit usually operates for emergencies, peak loads, and testing, but is also used for area voltage support under certain transmission line switching and outage scenarios. The Frame 5 unit at Lake Preston operated a very limited number of hours during the year. The calculation that is used to convert NDC to UCAP penalizes generating units with low service hours. MISO recognized this and will be implementing a new method for accrediting units with low service hours (less than 80 service hours) to help address this issue. This new methodology will go into effect in Planning year 3 (June 1, 2011) and Otter Tail expects to see higher UCAP ratings for the Frame 5 units under this new method.

Solway Combustion Turbine Plant

Otter Tail brought on-line a new General Electric LM6000 dual-fuel combustion turbine just prior to the 2003 summer season. 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 and delay area transmission upgrades for a period of years. The LM6000 is an aeroderivative machine, powered by a Boeing 747 engine, and is one of the most fuel-efficient simple cycle turbines in the world. This unit has an NDC rating of 41,900 kW and a UCAP rating of 39,000 kW. A 1,250 kW emergency diesel generator was included to provide emergency service and black start capability in the event of a regional outage. That emergency diesel has an NDC rating of 1,300 kW and a UCAP rating of 1,200 kW.

Hoot Lake Diesels

There are two internal combustion diesel units located at the Hoot Lake Steam Plant. Unit #2A has an NDC and UCAP rating of 200 kW, and unit #3A is rated at 200 kW. The diesels were installed as emergency units in case of a blackout, to provide lighting and minimum service to the plants. They are capable of synchronizing with the system and are accredited. Typically these units have only operated for extreme emergency and testing purposes.

Big Stone Diesel

The Big Stone Plant has an internal combustion emergency diesel unit as well. Otter Tail's 53.9% ownership of this unit amounts to 600 kW of NDC and UCAP rating. This unit also operates only for extreme emergency or testing purposes, but can synchronize with the system and is submitted as a capacity resource. The unit was installed in 1975 with the construction of the Big Stone Plant.

Fergus Control Center Diesel

A 2,000 kW diesel unit was installed at Otter Tail's System Control Center to serve as a standby generator for the facility, in accordance with NERC reliability criteria. The System Control Center was added to an existing Company building that contains the main business computers for Otter Tail. The system is staffed 24 hours per day and must have firm electric service to keep the System Control Center in operation during outages. The standby generator will supply emergency power, when required, to the total System Control Center and to the computer facilities. This unit has an NDC rating of 2,000 kW and a

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UCAP rating of 1,900 kW.

New EPA Emission Standards for Stationary Engines

On March 3, 2010 the U.S. Environmental Protection Agency issued new national emission standards for hazardous air pollutants for existing stationary compression ignition reciprocating internal combustion engines. Engines affected by the new standards are required to be in compliance by May 3, 2013. The new standards include emissions limitations, operating limitations, maintenance requirements, performance tests, recordkeeping requirements, and reporting requirements. Compliance with the new standards will require the addition of equipment in some cases. Otter Tail will be evaluating whether it will be economic to comply with the new EPA emission standard for the Big Stone Diesel, Hoot Lake Diesels, and Fergus Control Center Diesel.

1.3 Baseload Resources

Otter Tail Power has partial or full ownership of four coal-fired generators located at three plants. Until 1988 Otter Tail's coal-fired units had burned primarily North Dakota lignite. Some early units, long since retired, had used eastern coals, but lignite had been the fuel of choice for many years. Following a fuel switch in 1988 at Hoot Lake Plant and in 1995 at Big Stone Plant to low-sulfur western sub-bituminous coal, Coyote is the only plant still burning lignite coal. The coal-fired units also use fuel oil for startup, and flame stabilization at times. The use of fuels at each facility is discussed in the following sections.

Otter Tail is always reviewing opportunities to improve the efficiency and operation of its units. The improvements and conservation efforts within the generating stations have helped Otter Tail maintain some of the lowest system heat rates in its history.

Hoot Lake Plant

The Hoot Lake Plant, consisting of unit #2 and unit #3, is located in Fergus Falls, MN. Hoot Lake #1 generator, built in 1948 with a nameplate rating of 7,500 kW, was retired at the end of 2005. The boiler was retained as a source of emergency heat.

Hoot Lake #2, was built in 1959 with a nameplate rating of 53,500 kW. The NDC rating is 60,400 kW and a UCAP rating of 57,300 kW. The unit has experienced improved efficiencies in recent years as a result of efforts to reduce station service requirements. This unit also switched to burning sub bituminous coal in the late 1980's. Part of the improved efficiencies is associated with burning sub bituminous coal, and part is due to improvements made in reducing station service requirements. Efficiency measures have included replacing the original lighting with new lighting technologies, improved control systems, variable speed drives, and other measures. The switch to sub-bituminous coal has reduced the usage of fuel oil for flame stabilization. The #2 unit is designed as a base load unit, saw intermediate service during the 1980's and 1990's, and is now typically operated in base load service again. The unit is equipped with an electrostatic precipitator for particulate removal and over-fire air and low-NO_x burners for NO_x emissions reduction.

Hoot Lake #3 is the largest of the three Hoot Lake units, with an NDC rating of 84,700 kW and a UCAP rating of 82,300 kW. This 75,000 kW nameplate unit was added in 1964, and is also now burning sub-bituminous coal. Here again, the use of sub-bituminous coal has reduced the need for fuel oil usage for flame stabilization. The unit is also equipped with an electrostatic precipitator for particulate removal and

over-fire air and low NO_x burners for NO_x emissions reduction. Hoot Lake #3 was designed for base load duty, but saw mostly intermittent use during the 1980's and 1990's. The unit now operates most of the time, although market conditions this year have resulted in a return to cycling duty for Hoot Lake #3, with that unit being cycled off-line some weekends for economics.

The following data is provided relative to the Company's future expectations for the Hoot Lake Plant units.

Hoot Lake #2 and #3 - A more thorough evaluation of alternatives for Hoot Lake Plant will be included in the Company's subsequent resource plans. Otter Tail has conducted a preliminary review of the condition of various plant components associated with these units. The review included visual inspection, discussion with plant personnel, and review of the available plant design documentation and maintenance and operating records and reports.

The most significant risks to continued operation of these units appear to be compliance with any new environmental initiatives. Low sulfur coal is now being used in these units. Over-fire air and low-NO_x burners have been installed on Unit #2 and Unit #3. The units are allocated SO₂ allowances, but the amount of the allowances each unit receives will be reduced in 2010. The physical plant site is constrained for space. New environmental compliance requirements that would require installation of significant physical equipment may be problematic. Unless and until any new requirements are established, it is unknown what technologies would be required for compliance and whether those technologies would be economic.

Units #2 and #3 provide voltage control for the western Minnesota area, where there is a lack of any other significant generation capable of supporting the system. Future possibilities for this site, in addition to coal-fired generation, include conversion to natural gas. The closest suitable natural gas line is approximately 40 miles away. The natural gas alternatives considered as potential resources in this resource plan are assumed to be located at green field sites. However, Hoot Lake would be considered as a potential brown field site for natural gas generation.

Big Stone Plant

The Big Stone Plant, of which Otter Tail owns 53.9%, became commercial on May 1, 1975. Montana-Dakota Utilities and Northwestern Public Service are co-owners in this unit, with Otter Tail serving as the operator. The unit has a nameplate rating of 414,000 kW. Otter Tail's ownership share of the unit provides for an NDC rating of 256,500 kW and a UCAP rating of 230,100 kW. Improvements have come about as the result of conservation, operational efforts, and equipment updates within the plant. Station service represented 6.44% of gross generation in 1988. In 2009, station service represented 4.43% of gross generation.

The switch to sub-bituminous coal in late 1995 helped to reduce the plant net heat rate. Other efficiency improvements, and the installation of a new low-pressure rotor in 1996, have also helped to lower the heat rate level at Big Stone Plant. A new high-pressure/intermediate pressure rotor was installed in 2005 and improved efficiency by about 2%.

Big Stone Plant, located near Milbank, SD, had been fueled primarily with North Dakota lignite. Following the expiration of the lignite coal contract in 1995, a switch to western sub bituminous was made. The switch to sub-bituminous coal has reduced sulfur dioxide emissions, improved plant heat rate,

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and resulted in fuel cost savings. Big Stone Plant was equipped with the first of a kind advance hybrid particulate collector, which is a combination of a fabric filter and an electrostatic precipitator. The U.S. Department of Energy granted 49% funding to Otter Tail and the co-owners for the installation of a new Advanced Hybrid (AH) unit for particulate emissions control at Big Stone Plant. The AH was installed in September 2002, but there were ongoing operational issues that resulted in plant derates. Despite numerous modifications to design, the AH never met performance expectations. In 2007, the AH was converted to a pulse-jet baghouse. The new baghouse has operated as designed. The three-year average generator availability is anticipated to improve since the project's completion, resulting in an improved accreditation of the unit to around 230 MW by 2011.

Big Stone Plant has burned alternative fuels since 1989. Deliveries of alternative fuels peaked in the mid to late 90's. After a thorough review of the Big Stone Plant use of alternative fuels, the plant decided to end the program at the end of 2009

Several factors led Big Stone to this decision. Capital repairs were required for the handling facility, primarily new walking floors. Supplies of the various fuels has 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. The POET Biorefining ethanol plant (formerly Northern Lights Ethanol) is located on the Big Stone Plant site. Big Stone Plant supplies steam for ethanol production. The steam is extracted part of the way through the electrical production process, so by serving the ethanol plant, Big Stone is truly a cogeneration plant involving the sequential use of the energy for two different purposes. The cogeneration operation does not impact the plant's ability to generate electricity.

Coyote Station

The Coyote Station, located near Beulah, ND is a lignite-fired mine mouth facility. Otter Tail owns 35% of this 414,000 kW nameplate unit. Coyote's NDC rating for Otter Tail's ownership share is 150,000 kW and the UCAP rating is 134,300 kW. The Coyote Station was declared commercial on May 1, 1981 and is equipped with a flue gas desulfurization unit and a baghouse. Otter Tail Power became the operating agent of the facility on July 1, 1998. The other co-owners of this facility are Northern Municipal Power Agency, Montana-Dakota Utilities, and Northwestern Public Service. Minnkota Power Cooperative acts as the agent for Northern Municipal Power Agency.

The Coyote Station is a sister unit to Big Stone, but six years newer. The Coyote Station approved outlet rating is limited to 427,000 kW due to transmission limitations. Otter Tail's share of this is 149.45 MW. The facility also has two emergency diesel generators that are not accredited in MISO due to the transmission limitations.

Coyote completed a high-pressure/intermediate pressure rotor replacement in 2009 that resulted in about a 2% increase in efficiency. It also increased the UCAP rating of the plant by about 6,000 kW.

1.4 Demand Resources

Otter Tail has two demand resources registered under Module E with MISO. Both resources are load modifying resources (LMR) that are netted from the demand forecast and available to MISO in emergency events. 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 MISO in the event of an emergency. This obligation does not preclude the Company from relying on these resources to control for capacity events or economic reasons outside of a MISO emergency event.

Direct Load Control – The Radio Load Management System

The first 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 85 MW in December through February, 25 MW in the shoulder months of March, April, October, and November, and 5 MW in the summer months of May through September. 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 and customers with dual-fuel load may choose to switch to an alternate fuel, particularly during a period of lower prices.

Winter season manageable 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 as able to achieve higher levels than the level accredited, those higher levels related to peak control levels during a minimum number of hours and were impacted by weather and load diversity. Those higher levels do not represent the typical levels of control that Otter Tail Power Company is confident can be sustained. 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 all of the 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 parts 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, enabling the Company to register this demand resource with MISO.

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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 20 MW for each month of the 2010 planning year. 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 load level during a capacity event.

MISO Market Implications

The allowance of Aggregators of Retail Customers (ARC) in Minnesota, North Dakota, or South Dakota could decrease the amount of demand response the Company is able to register with MISO, particularly for firm service level type contracts. The Company would then be required to provide firm capacity to the customer so that the customer could then sell their demand response capability into the energy market. Rather than being able to net the capability from their reported forecast to MISO, the Company would have to add resources to the accredited resource stack to meet a higher resource adequacy requirement. Resource planning implications are significant should ARCs be allowed to aggregate demand response traditionally under the jurisdiction of the regulated utility and used as a resource in long-term planning.

1.5 Transactions

A 10-year capacity purchase of 50 MW from Manitoba Hydro Electric Board (MHEB) expired on April 30, 2010. After discussions between the two Companies, the contract was not renewed or extended. However, Otter Tail did enter into the following short-term contracts:

- A 50 MW capacity and energy contract with Minnesota Power from 05/01/2010 – 04/30/2011. The energy would be provided during on-peak weekdays in a 5x16 structure.
- A 50 MW 5x16 energy-only contract with Northern States Power from June 2011 to December 2013.
- A 35 MW capacity-only contract with Wisconsin Electric Power Company from 06/01/2010 – 05/31/2011.
- A 50 MW capacity-only contract with Wisconsin Electric Power Co. from 06/01/2011 – 05/31/2013.
- A 50 MW capacity-only contract with Great River Energy from 12/01/2010 – 12/31/2014.

The Company is currently in negotiations to secure 75-100 MW of capacity and related energy to bridge the 2013-2015 time period prior to additions of potential resources as defined in the resource plan.

Otter Tail has a number of large commercial customers that are shared loads with the local rural electric cooperative. These loads are in areas that may be in one utility’s service territory, but are located where the other utility already had the necessary facilities to handle the load. In order to reduce costs and avoid duplication of facilities, these loads have been shared. In the accounting process, these loads are usually served as if they are Otter Tail customers, and then 50% of the energy is purchased wholesale from the other utility at the retail rate used to serve the customer. All of the retail energy shows up as Otter Tail energy with a 50% wholesale energy purchase, even though Otter Tail only served half of the load. The amount of energy received by Otter Tail for serving such customers in 2008 and 2009 was 90,614 MWh and 77,855 MWh, respectively.

WAPA Allocation to Native American Tribes

The Western Area Power Administration (WAPA) is a federal Power Marketing Agency that provides capacity and energy from hydroelectric facilities located on the Missouri River to preference customers. Otter Tail Power does not qualify as a preference customer. Native American tribes are preference customers eligible to receive the federal power. The tribes, however, are not utilities in the same manner as typical WAPA preference customers such as municipals and rural electric cooperatives. The tribal lands are typically served by a combination of existing utilities.

In order to facilitate the delivery of the electricity to the tribes, or the economic benefits of the low-cost federal electricity, WAPA developed a process in which the electricity is delivered to the utilities providing electric service on tribal lands. Each tribe has the right to determine which tribal entities receive the benefits. For the customers designated by the tribe as receiving the benefits, WAPA delivers the electricity to Otter Tail at the WAPA rate, and then Otter Tail provides a bill credit to the customer. The bill credit is essentially equal to the difference in cost between the WAPA power and the embedded Otter Tail cost of generation, less expenses to administer the program. Otter Tail has filed the appropriate information with and received approval from the state regulatory commissions in the states involved.

Otter Tail has five tribes that receive the benefits of the WAPA power. The current capacity amount varies monthly from a low of 4.3 MW to a high of 5.6 MW, with annual energy of 29,870,425 kWh. Otter Tail also receives the load based reserve margin benefit with the capacity. Because the tribes have the right to change who receives the benefit and such changes may move benefits from tribal customers served by Otter Tail to tribal customers served by another utility, the amount of capacity and energy received for the tribal loads may vary over time. The current amount of tribal allocation that is received through Otter Tail is included in all analysis scenarios. None of the WAPA power qualifies for compliance with the Minnesota Renewable Energy Objective, as all of the WAPA hydroelectric facilities are greater than 100 MW when considering all units at a specific location.

Customer Owned Generation

Otter Tail has worked with several customers who desired to install small diesel generators for back-up emergency power. These units are owned by the customers and capable of being interconnected to Otter Tail's system. The capacity from these units is purchased by Otter Tail and submitted as behind the meter capacity resources registered with MISO. Currently the NDC rating of these units is 10,400 kW in total and the UCAP rating is 9,800 kW in total.

On March 3, 2010 the U.S. Environmental Protection Agency issued new national emission standards for hazardous air pollutants for existing stationary compression ignition reciprocating internal combustion engines. Engines affected by the new standards are required to be in compliance by May 3, 2013. The new standards include emissions limitations, operating limitations, maintenance requirements, performance tests, recordkeeping requirements, and reporting requirements. Compliance with the new standards will require the addition of equipment in some cases. Otter Tail currently contracts for roughly 10 MW of capacity with customers who own generation that will be impacted by these new standards. Otter Tail recognizes that these customers may choose to forego meeting the standards and would no longer be eligible to the Company for resource adequacy compliance.

Otter Tail also has power purchase agreements with several wind generation facilities as described in the following section.

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1.6 Wind Generation Resources

Otter Tail has more than 180 MW of wind generation on the system, including utility owned and contracted wind generation. The Company owns 138 MW of wind generation. These owned wind facilities are listed in Table 1-1. In 2009, Otter Tail's owned wind generation facilities made up almost 9% of the Company's total generation. Because the Luverne facility came on-line late in 2009, the Company expects owned wind generation to increase from 2009 levels. Accreditation for wind facilities during the 2010 Planning Year is 8% of nameplate capacity, or 11 MW for Otter Tail's owned resources. Wind generation that is purchased by Otter Tail from customers or other entities is identified in Table 1-2. Customer owned units do not have the ownership name included to protect customer information.

Table 1-1: Otter Tail Owned Wind Generation Facilities

Owned Wind Resource	State	Nameplate Capacity	Commercial Operation Date
Langdon Wind Energy Center	ND	40.5 MW	January 2008
Ashtabula Wind Energy Center	ND	48 MW	November 2008
Luverne Wind Energy Center	ND	49.5 MW	September 2009

Table 1-2: Contracted Wind Generation Facilities

Name and Owner	State	kW Rating
FPL Energy ND Wind II - NextEra	ND	21,000
Hendricks Wind I	MN	900
Borderline Wind	MN	900
EMS	SD	90
Langdon Wind Energy Center – NextEra	ND	19,500
Customer-Owned	ND	660
Customer-Owned	MN	35
Customer Owned	MN	39.5
Customer-Owned	MN	39.5
Customer-Owned	MN	39.5
Customer-Owned	MN	7.2
Customer-Owned	ND	20
Customer-Owned	MN	1,650
Customer-Owned	MN	225
Customer-Owned	MN	1.8
Customer-Owned	MN	2.6
Customer-Owned	ND	50
Customer-Owned	ND	100
Customer-Owned	SD	1.8
Customer-Owned	SD	2.4

At this time there are approximately a half-dozen other customer-owned installations planned or in various stages of development. As shown in Table 1-2, Otter Tail has contracts for roughly 45 MW of wind generation. Often generation from smaller, customer owned units is used to serve the customer and only the surplus generation is sold to Otter Tail. Accreditation of contracted wind generation facilities for the 2010 Planning Year is 3.2 MW. Total wind generation, contracted and owned, made up approximately 12% of the Company’s total generation in 2009.

1.7 Energy Efficiency Programs

Otter Tail Power Company operates a number of Demand-Side Management Programs in its service territory. In Minnesota, some of these projects are part of the Company’s Conservation Improvement Program (CIP) filing with the Office of Energy Security. The Company’s CIP results have been on target with the planned CIP goals in the 2005 resource plan filing. Data shown assumes winter season savings. The following sections detail CIP projects in effect in Minnesota, and those planned for implementation in 2010. The Company is filing its 2011, 2012, 2013 CIP filing on July 1, 2010. Only currently approved programs are included in Table 1-3.

Table 1-3: Actual Conservation versus 2005 Planned Conservation, Winter Season

Year	Cumulative Planned MW Savings	Cumulative Actual MW Savings
2006	3.200	3.198
2007	6.300	6.215
2008	9.400	9.603
2009	13.500	17.076

Hotpacks

Residential customers who install a new water heater receive a Hotpack. The Hotpack consists of a water-saver showerhead, water flow tester, a kitchen and bath aerator, pipe wrap insulation, and water temperature gauge card. An educational piece describing the Hotpack components, appropriate installation instructions, and how to benefit from efficient water heating is also included.

Appliance Recycling

A refrigerator and freezer recycling program where customers will be offered \$50/working unit. Program runs from July through September. Appliance Recycling Centers of America (ARCA) will be responsible for the implementation of the program.

House Therapy

House Therapy is a project designed to address the energy efficiency of residential and multifamily homes. The project emphasizes one-on-one customer education and housing thermal integrity, including weatherization. The project also provides other services such as replacing water heaters and older, inefficient refrigerators and freezers, as well as installing low-flow showerheads and compact fluorescent bulbs. This project also includes Habitat for Humanity and other low-income housing projects.

Residential Demand Control (RDC)

The Residential Demand Control (RDC) project is primarily a load management project that is close to a

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real-time pricing environment. The RDC project gives electric space heating customers a significant degree of control over the size of their electric service bill. The RDC allows customers to choose which portion of the household energy use, such as water heaters and dryers, will be controlled by Otter Tail Power Company in peak periods. Customers receive a lower rate for allowing the company to control their load. The RDC project allows Otter Tail Power Company to shed a portion of the electric load during peak periods, and provides the utility significant load management capabilities. Ultimately, the customer is the entity that chooses the level of control commensurate with the resulting electrical costs that is best for the customer.

“On for Conservation!” - Community & College Energy Challenge

Through technology improvements, changes in behavior, and education the Company aims to cut energy use by 10 - 15 percent by 2015 through the “On for Conservation!” program. This program is a community and college energy challenge. For the first time in Minnesota’s history an entire town served by Otter Tail Power Company and every single residence in that community was chosen to be “On for Conservation!” Rothsay, MN is Otter Tail’s “On for Conservation!” town and the University of Minnesota, Crookston, a college campus served by Otter Tail Power Company, was chosen to be Otter Tail’s “On for Conservation!” campus.

Commercial/Industrial Lighting

Otter Tail Power Company promotes the installation of energy-efficient lighting to commercial and industrial customers by offering rebates for retrofit and new construction applications. The Electric Power Research Institute indicates that commercial building operators can reduce energy costs as much as 40% by using cost-effective lighting technologies, indicating that energy-efficient lighting system designs can be a highly strategic means to enhance overall operating profitability. The program provides rebates for the purchase of technologies such as T8 lamps, compact fluorescent fixtures and lamps, efficient HID lighting, induction lighting systems, electronic ballasts, and occupancy sensors. Otter Tail also provides cash incentives to customers choosing the most efficient lighting technologies on the market for new construction applications.

Efficient Motor Rebate Project

Otter Tail’s commercial and industrial sectors show great potential for improvements in efficiency and conservation. Motors are estimated to consume almost half of all electrical use in the United States and over 70% of all electricity in the industrial sectors. The primary objective of the Company’s efficient motor rebate project is to encourage customers to move to higher efficiency motors and lower overall energy usage, thereby reducing the utility’s system peak demand. Otter Tail has adopted the NEMA Premium efficiency requirements for the project.

Adjustable Speed Drive Rebate

Induction motors are the workhorses of industry, used widely and often exclusively in virtually every manufacturing plant and office building. However, the single most potent source of energy savings in induction motor systems lies not in the motor, but rather in the controls that govern the motor’s operation. Adjustable speed drives (ASDs), also known as variable speed drives (VSDs), variable frequency drives (VFD’s), or variable frequency invertors (VFIs), are one method of modifying or controlling motor behavior that is a proven option for improving performance and efficiency in drive systems.

Adjustable speed drives can be used to match the speed of an AC motor to the requirements of a fluctuating load, such as a pump that must move volumes of fluid that change in the course of a

production shift. When this happens, the control valves, dampers, or other throttling mechanisms can be removed (or locked in full open positions), thereby dramatically improving energy efficiency. E-Source reports that in cube-law applications, energy savings from speed drives can exceed 50%.

The Adjustable Speed Drive Rebate project provides cash incentives to customers installing adjustable speed drive controls on motors for both HVAC and other non-seasonal applications.

Commercial & Industrial Grants

The C&I Grant Project is designed to tap the conservation and efficiency potential of commercial and industrial customers by partially funding cost-effective conservation projects. Customized grant awards are made based on Otter Tail's analysis of the calculated benefits to be derived from proposals developed and submitted by the customer. All grants must pass both the societal and utility tests of 1.0.

Compressed Air Audits

Compressed air is a critical operations component for industrial facilities, with many industrial customers referring to compressed air as the 'fourth utility' in their plant. Although industrial customers are intense users of compressed air, it is very expensive to produce. Research by E-Source indicates that only 20 to 25 percent of input electricity results in useful compressed air energy delivered to the plant's air system. The Compressed Air Audit reimburses customers for 80% of the costs of a compressed air system audit. The maximum incentive for any audit is \$10,000 and all audits must meet minimum standards.

Heat Pumps – Residential and Commercial

This project targets customers with inefficient electric resistance heating and cooling systems. Customers will be offered an incentive to move to the more efficient electric air-source or geothermal heat pump. The project is designed to reduce both winter and summer peak demands as well as over all energy usage.

Commercial Cooking

The Commercial Cooking Project is designed to promote high-efficiency electric cooking by offering rebates for new and retrofit installation in commercial kitchens of electric cooking equipment such as solid state electric fryers, griddles, vacuum steamers, range tops with convection ovens, convection ovens, Quartz infrared ovens, induction cook tops, microwave/convection ovens, and food warmers.

Commercial Refrigeration

The Commercial Refrigeration Project is designed to promote high-efficiency refrigeration technologies by offering rebates for new and retrofit installation into commercial business operations of compressor systems, condenser systems, sub cooling systems, refrigerated display cases, and air circulation.

Advertising and Education

The Advertising and Education Project is designed to promote customer awareness of energy-saving practices through newspaper, radio, and television campaigns, and thereby increase participation in Otter Tail's CIP Projects. This also includes residential education. The primary purpose of the project is educational outreach targeting Minnesota customers across economic groups in the customer base. The project includes an Internet based on-line home energy audit available to customers 24 hours per day, 7 days per week. Customers can access additional information through an on-line library.

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Financing

The Customer Financing Project is designed to provide low interest loans for energy-efficiency improvement projects included in the Conservation Improvement Program. These improvements include, but would not be limited to, lighting, motors, variable speed drives, and heat pumps.

Technical Research

Technical Research will assist industrial customers in researching new technologies such as infrared drying, new manufacturing procedures, and other cutting edge processes and equipment. Information gained from the research will compliment the commercial and industrial grant project. This project also includes market research, which will identify and support demand-side management opportunities. It is designed to enhance CIP projects and DSM efforts by gathering information that may be used across multiple DSM project lines. In addition, the project provides for a means to secure and use end-use metering and data-logging devices for a variety of CIP and DSM projects.

Air Conditioning Control

This project offers customers a monthly billing credit for allowing the Company to cycle their central air conditioners during peak periods. Air conditioning loads will be controlled in 15 minute increments (15 minutes on, 15 minutes off) for up to 8-hours. Customers must enroll in the project for a minimum of one year. Control can take place in the months of June, July, August, and September. During these months the customer receives a \$7 credit on their account for allowing the control.

Change A Light

Otter Tail participates in Change a Light, Change the World project. The program is designed to offer residential customers the opportunity to purchase compact fluorescent light bulbs at a significantly discounted price and includes Christmas LED lighting as well.

Plan Review

This project is designed to encourage building owners, architects, and design engineers to incorporate energy efficient designs into new building construction. The project reviews proposed building plans and specifications during the preliminary design process. The review is free to customers and offers incentives for energy efficient improvements.

1.8 Mid-Continent Area Power Pool/Midwest Reliability Organization

Otter Tail had been a member of the Mid-Continent Area Power Pool (MAPP) since the late 1970's. The MAPP reliability function is now under the Midwest Reliability Organization (MRO). The MRO establishes the standards to which utilities must perform. The wholesale marketing function was separated into the Power & Energy Market, which has evolved into the Midwest Energy Marketers Association. The transmission function of MAPP is known as the Regional Transmission Committee (RTC). Otter Tail is no longer a member of the RTC, but Otter Tail continues to coordinate transmission planning and transmission operations studies with the non-MISO parties in our region that are still a part of the MAPP RTC.

We accomplish this coordination through participation in several working groups and committees. Some of these groups and committees include:

- Northern MAPP Subregional Planning Group (NM SPG)
- Missouri Basin Subregional Planning Group (MB SPG)
- Northern MAPP Operating and Review Working Group (NMORWG)
- Transmission Reliability Assessment Working Group (TRAWG)

The NM SPG and MB SPG meetings provide forums to discuss members' planned projects (including the identification of member-system enhancements that could relieve congestion or integrate new resources), share study results, and establish ad-hoc study groups for regional and local concerns at all voltage levels. The SPGs provide forums for the coordination of individual utility transmission plans, coordination with other SPGs, and coordination with neighboring non-MAPP utility systems.

NMORWG performs seasonal operating studies for the Northern MAPP region and defines specific operating guides relevant to different operating conditions. The NMORWG meetings provide a forum for exchanging information with neighboring transmission owners regarding projects that are being built and operated in the near-term operating horizon.

The TRAWG performs transmission system assessments for MAPP members that are required by the reliability standards defined by the North American Electric Reliability Corporation (NERC). Given that the Otter Tail system is highly integrated with MAPP members, it is required to stay actively engaged in these studies in order to coordinate these system assessments with our neighboring transmission owners. This coordination also eliminates any duplication that may occur if each transmission owner would be performing their own assessments individually.

Over the past couple of years MISO has worked to develop a resource adequacy construct, under orders from FERC. Initially MISO defaulted to the existing power pool entities if a utility belonged to a power pool. Otter Tail's membership in MAPP served that role. Effective June 1, 2009 MISO commenced full operation of its resource adequacy construct (known as Module E, so designated because that is the module of the FERC tariff in which resource adequacy is addressed). To avoid belonging to two separate regional reserve sharing groups with different rules and requirements, Otter Tail ceased its membership in the MAPP GRSP in early 2009 and now is subject to the reserve requirements of MISO Module E.

1.9 Midwest Independent Transmission System Operator (MISO)

Otter Tail continues to play an active role in the regional transmission planning efforts. While Otter Tail still leads and conducts studies to ensure the adequacy of the transmission system to serve its customers, all transmission planning activities related to regional transmission are coordinated with the MISO and the surrounding non-MISO transmission owners.

Transmission planning occurs at several different levels from individual utility plans, to local joint utility plans to broad regional studies. Regardless of the type of studies, the forum for which these studies are carried out is through a regional transmission planning process. Otter Tail actively participates in several MISO study groups, some of which include the West Subregional Planning Meetings, which are forums for regional transmission planners to discuss the needs and projects related to the transmission system to the Western Reliability Studies Task Team (WRSTT), which is presently being formed by MISO for transmission owners in western MISO to discuss specific studies related to the MISO Transmission Expansion Plan.

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Otter Tail closely coordinates its transmission planning efforts with both MAPP and the MISO. For transmission planning purposes, MISO performs three primary functions. The first two are federally mandated processes established by FERC, generator interconnection and delivery service, and the third process is related to expansion planning.

MISO administers and processes requests to use the transmission system of the MISO transmission owners. MISO has established procedures for processing generation interconnection and delivery service transmission requests of generators and market participants. Through this FERC mandated process, MISO offers the area utilities opportunities to participate in “ad-hoc” study groups to provide input and review of the technical studies completed for generation interconnection or delivery service. In addition to these FERC mandated requirements, MISO also performs expansion planning studies on an annual basis. These expansion planning studies are referred to as the Midwest ISO Transmission Expansion Plan (MTEP) and focuses on a variety of studies, from reliability assessments to targeted studies focused on a particular issue or item. Otter Tail’s transmission system falls within the MISO West region. Through the MTEP process, MISO completes a reliability analysis assessing the transmission system performance against the regional reliability criteria. In the event that standards are not met, additional analysis is completed to find a mitigation to a particular system issue. Otter Tail actively participates in the MTEP efforts by attending meetings, reviewing study results and providing input into the study process.

MISO has also sponsored targeted studies in the region as part of the MTEP process. Otter Tail actively participates in many of these targeted studies, including the Regional Generation Outlet Study (RGOS), Top Congested Flowgates Study, Western Interface Limit Study, as well as other targeted studies. Through these various study efforts, Otter Tail attends meetings, reviews study results and provides input into the study processes.

In addition to the specific study opportunities, the MISO conducts meetings of several stakeholder groups, which include the Planning Subcommittee (PS), the Planning Advisory Committee (PAC), the Regional Economic and Criteria Benefits Task Force (RECB TF), the Interconnection Process Task Force (IPTF), Subregional Planning Meetings (SPM), among several others. These meetings are attended by various representatives of the different stakeholder groups at MISO. These meetings act as a forum between MISO staff and the stakeholders to provide input into the processes of the MISO. Otter Tail regularly attends several of these meetings to stay engaged within the MISO transmission planning process as well as provide input and feedback to the MISO.

Otter Tail has been an active participant in the CapX 2020 effort. The CapX 2020 sponsoring companies embarked on a transmission study developing a long-term transmission plan to ensure reliable service to customer loads in the year 2020. The CapX 2020 utilities are currently engaged in permitting what is termed as the “Group 1” projects, which include three 345 kV projects and one 230 kV project within Minnesota. The efforts of the CapX 2020 studies have been closely coordinated with the MISO planning process.

In addition to these previously mentioned planning-related activities, Otter Tail is also monitoring other regional transmission development initiatives, such as the Green Power Express, the Strategic Midwest Area Renewable Transmission (SMARTransmission) Study, and the Upper Midwest Transmission Development Initiative (UMTDI), and the Eastern Interconnection Planning Collaborative (EIPC). Otter Tail is a regular participant in meetings and conference calls related to these study initiatives.

All of these transmission planning activities are then combined into, and are consistent with, the MN state transmission planning process.

Transmission Interconnections

On May 9, 2002, the Commission gave conditional authority to Otter Tail to transfer operating control of certain transmission facilities to the Midwest Independent Transmission System Operator, Inc. ("MISO"). Since joining MISO and transferring operational control of its high voltage transmission facilities to MISO, Otter Tail has seen positive benefits in this relationship regarding the generator interconnection processes.

Since Otter Tail joined MISO, several generators have successfully interconnected to the Otter Tail electric system under MISO's generator interconnection procedures. Under MISO's Open Access Transmission and Energy Markets Tariff (TEMT), all generator interconnection requests (regardless of generator size or interconnecting voltage level) are required to abide by the MISO generator interconnection process if the generator intends on engaging in wholesale transactions. The MISO, as an independent system operator, ensures comparable treatment for all customers and it is staffed to provide and administer this service. Otter Tail receives value and efficiencies from the MISO process given that MISO is staffed to administer its procedures and, as an independent organization, ensures comparable treatment to all parties involved. Additionally, Otter Tail stays actively engaged in several MISO studies and provides information regarding the transmission system when reviewing study results and giving direction for future studies. This is an efficient process and a benefit to all parties since Otter Tail has ultimate knowledge and familiarity with its system and most efficiently and effectively provides this service. Project coordination, administration, and filing requirements fall upon MISO, thus freeing up Otter Tail's resources to focus on its key priority of providing clean, efficient, and low cost energy to its customers.

Locational Marginal Pricing (LMP) Energy Market and Ancillary Services Market (ASM)

The Midwest ISO Locational Marginal Pricing (LMP) energy market was introduced on April 1, 2005. The MISO subsequently introduced the Ancillary Services Market (ASM) on January 6, 2009. Both market introductions went well, but utility operations and market functions have changed significantly. Many of the key preparations and day-to-day activities since commencement of the markets include:

- Development of software interfaces and procuring or developing new software systems.
- Training of employees.
- Developing after-the-fact data flows to ensure a seamless transition in the accounting and regulatory areas.
- Active involvement in filings related to the Energy Market at the Federal Energy Regulatory Commission ("FERC") and state commissions. This includes settlement proceedings for the non-MISO Load Serving Entities located within the Otter Tail Power Company Control Area.
- Nominating and receiving Auction Revenue Rights (ARRs) and Financial Transmission Rights (FTR) allocations to safeguard Otter Tail's native load.
- Developing business practices, strategies and risk management policies to accommodate an LMP and ASM Market.
- Actively participating in the numerous Midwest ISO committees seeking to ensure that Otter Tail's best interests and the interests of its customers were not adversely impacted by decisions and policies resulting out of these committees.

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Market operations continue to go smoothly, and the company is generally pleased with the transition to the centralized energy and ancillary services markets.

MISO Resource Adequacy (Module E)

Otter Tail's reserve requirements are established by MISO under Module E of the MISO Tariff. There are changes from the MAPP reserve requirements, some of which have reduced reserve requirements and some of which have increased reserve requirements. Under MAPP, Otter Tail was required to carry a 15% reserve margin on its annual actual peak demand. The reserve margin was applied to actual loads experienced, and compliance was verified after-the-fact through compliance audits.

The MISO Module E process is applied before-the-fact based on forecasted normalized loads. MISO verifies one month prior to the start of each month that each load serving entity has sufficient designated capacity resources to meet the forecasted normalized monthly peak demand plus the reserve margin. MISO does not conduct after-the-fact compliance audits to determine if reserve requirements were actually met. The only after-the-fact audit on the part of MISO is to compare the actual normalized monthly peak demand to forecasted normalized monthly peak demand. If the normalized actual demand is more than one standard deviation above the normalized forecasted peak demand, the utility is reported to the appropriate state commission as having under-forecast its peak demand.

For the second planning year (June 2010 – May 2011) the MISO reserve margin requirement is 11.94%. The reserve margin consists of two components. 4.50% of the 11.94% is applied to peak demand as a reserve margin. The remaining 7.44% consists of the average generator unavailability factor as reported in the Generator Availability Data System (GADS) for the region. Generator equivalent forced outage data and the duration of the outages is used to calculate a factor through which a generator rating is reduced based on its actual availability. This rating is called unforced capacity (UCAP). For a utility with exactly average generator availability, the effective reserve margin is then 11.94% in total. For a utility with generation performing better than the average, the total effective reserve margin is less than 11.94% and for a utility with generation that experiences a higher forced outage rate the total effective reserve margin is higher than 11.94%.

MISO Module E results in lower reserve requirements in many months, because it is applied on a monthly basis and in general utilities are surplus capacity in the shoulder months. The MAPP method, in contrast, was applied to the annual peak demand. Further reductions in reserve requirements occur because MISO Module E is applied to a normalized base 50-50 forecast, while the MAPP method was applied to the actual load served.

At this time MISO only recognizes summer generator ratings. Otter Tail is negatively impacted in the reserve calculations because Otter Tail is winter peaking and does not gain the extra winter capacity on generating units impacted by ambient temperature conditions, especially combustion turbines. Combustion turbine capability is impacted by ambient air temperature, and winter ratings can be 25-30% higher than summer season ratings.

MAPP uses actual generation data to develop capacity ratings for intermittent resources such as wind. For the first planning year, MISO chose to grant wind capacity accreditation at 20% of nameplate rating. In some months the MISO rating is higher than the MAPP rating and in winter months the MISO rating

tends to be lower than the MAPP rating. MISO has now completed further studies of the reliability benefit provided by wind generation and has reduced the capacity accreditation of wind generation to 8% of nameplate rating. MISO has also indicated in its study results that as wind penetration increased within MISO the reliability benefit of wind generation will decrease, expecting to plateau at about 3% of nameplate rating.

The MISO consequences for non-compliance are more severe than the MAPP consequences. MAPP deficiency allocations were based on seasonal data. The MAPP penalty was about \$104,000 per MW per season for a deficit. Once a monthly deficit occurred, a second capacity deficit in the same season did not incur additional penalty. The MISO penalty for the 2010 Planning Year is \$90,000 per MW per month and each monthly deficit incurs a new penalty.

1.10 Transmission Facilities

Otter Tail serves many very small communities located in a geographical area about the size of the State of Wisconsin. The characteristics of the customer loads and locations have required an extensive transmission system. When compared to many investor-owned utilities, Otter Tail's customer count per mile of transmission facilities is quite small. To minimize cost Otter Tail has become party to several integrated transmission agreements. The Company participates in many shared networks with other investor owned utilities, municipals, G & T cooperatives, and rural electric cooperatives. In many cases, a 41.6 kV or 69 kV transmission line will serve an equal number of non-Otter Tail and Otter Tail distribution substations.

These agreements have resulted in over 200 points of interconnection with other utilities. Such a network adds to the complexity of operating the electrical system, but also adds the capability for the facilities of one utility to provide either full time or emergency service to another utility. The ultimate result is reduced cost and increased reliability for the customer. Table 1-4 lists the mileage of various voltage classes of transmission lines. All of these lines are overhead lines except for 0.57 miles of underground cable in the 41.6 kV class.

Table 1-4: Circuit Miles of Transmission by Voltage

Voltage (kilovolts)	Circuit length
345 kV	48 miles
230 kV	417 miles
115 kV	862 miles
69 kV	212 miles
41.6 kV	3,764 miles