215 South Cascade Street PO Box 496 Fergus Falls, Minnesota 56538-0496 218 739-8200 www.otpco.com (web site)



July 1, 2009

Ms. Patricia Van Gerpen Executive Director South Dakota Public Utilities Commission Capitol Building, 1st floor 500 East Capitol Avenue Pierre, SD 57501-5070

RE: Otter Tail Power Company's Annual DSM and Renewables Programs Report pursuant to July 21, 2006, Order in Docket No. EL05-022

Dear Ms. Van Gerpen:

Otter Tail Power Company hereby submits its Annual Report on DSM and Renewables Programs. The requirement for this report was included in the Commission's Order dated July 21, 2006, in the Big Stone II Energy Conversion Facility Permitting case referenced above.

Please contact me at (218) 739-8838 or rlspangler@otpco.com if you have any questions regarding this filing.

Yours very truly,

/s/ RON L. SPANGLER JR. Ron L Spangler Jr. Rate Case Manager Regulatory Services

wao Enclosure By electronic filing



## OTTER TAIL POWER COMPANY

## THIRD ANNUAL REPORT ON DSM AND RENEWABLE PROGRAMS

## July 1, 2009

## **REPORT RP09-4**

### I. Introduction

Otter Tail Power Company ("Otter Tail") submits its Third Annual Report on Demand-Side Management ("DSM") and Renewable Programs, pursuant to the Final Decision and Order dated July 21, 2006, in Docket No. EL05-022. Ordering paragraph no. 4 set forth the following requirement:

4. Beginning on July 1, 2007, Otter Tail Power and Montana-Dakota Utilities shall file annually a detailed report of their ongoing DSM and renewable programs and a forecast of their near- and long-term initiatives to optimize benefits related to demand-side management and renewable energy programs.

The following is Otter Tail's report in compliance with that ordering provision.

## II. Demand-Side Management Resources

Otter Tail uses a fully integrated capacity expansion model to conduct detailed computer modeling of Otter Tail's load, generation resources, DSM and conservation programs, regulatory requirements, and financial structure so that an optimal long-range plan is developed to meet customer needs. Otter Tail's current resource plan, developed in 2005 and updated in April 2006, October 2006, and January 2008, identifies the addition of up to 100 MW of conservation impacts over the 15-year planning period. Because of timing, the most recent resource plan update includes only an estimate of the consideration of the Company's recently approved South Dakota Energy Efficiency plan and includes consideration of new conservation initiatives recently passed by the latest Minnesota legislature.

Demand side management is a broad category that includes load management (direct load control and interruptible programs) as well as conservation and energy efficiency programs. We discuss these areas in two distinct categories for this filing.

## A. Load Management

<u>Direct Load Control</u> - DSM program activities that can interrupt consumer load at the time of annual peak load by direct control of the utility system operator by interrupting power

supply to individual appliances or equipment on consumer premises. This type of control usually involves residential consumers, but it can involve larger customers as well.

<u>Interruptible Load</u> - DSM program activities that, in accordance with contractual arrangements, can interrupt consumer load at times of seasonal peak load by direct control of the utility system operator or by action of the consumer at the direct request of the system operator. This type of control usually involves commercial and industrial consumers, but it can involve residential customers as well.

<u>Other Load Management</u> - DSM programs other than direct load control and interruptible load that limit or shift peak load from on-peak to off-peak time periods. It includes technologies that primarily shift all or part of a load from one time-of-day to another and secondarily may have an impact on energy consumption. Examples include space heating and water heating storage systems, cool storage systems, and load limiting devices in energy management systems. This category also includes programs that aggressively promote time-of-use (TOU) rates and other innovative rates such as real time pricing. These rates are intended to reduce consumer bills and shift hours of operation of equipment from on-peak to off-peak periods through the application of time-differentiated rates.

In all cases savings are typically reported as kilowatt or megawatt savings.

# B. <u>Energy Efficiency and Conservation</u>

Energy conservation and efficient programs are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption (reported in kilowatt-hours (kWh) or megawatt-hours (MWh), often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technologically more advanced equipment to produce the same level of end-use services (e.g., lighting, heating, motor drive) with less electricity. Examples include energy saving appliances and lighting programs, high-efficiency heating, ventilating and air conditioning (HVAC) systems or control modifications, efficient building design, advanced electric motor drives, and heat recovery systems.

# C. Otter Tail's DSM Portfolio

Demand side management has been part of Otter Tail's energy plan since the 1940s when we encouraged customers to put timers on their water heaters. Today over 30% of our customers participate in some form of demand-side management program. Otter Tail operates a diverse DSM portfolio in all three states. In 2008 Otter Tail added 41.3 MW of new controlled load. From 2000 through 2008 we have added 218 MW of new controlled load capability system-wide. The following two parts of Table 1 summarize our achievements for the past nine years.

Additional Controlled Load Syst	tem Wide								
Otter Tail Power Company									
2000 - 2008									
Additional Controlled Load (kw) by Customer Class	2000	2001	2002	2003	2004	2005	2006	2007	2008
Residential	6,750	9,017	7,975	10,290	11,689	13,268	18,633	12,914	22,760
Commercial	6,183	11,457	9,666	12,560	6,838	9,838	15,476	14,495	18,530
Total kW	12,933	20,474	17,641	22,850	18,527	23,106	34,109	27,409	41,290
Additional Controlled Load (kw) by Load Type	2000	2001	2002	2003	2004	2005	2006	2007	2008
Dual Fuel	6.571	15.087	11.939	13,795	9,898	14.482	21.533	18.037	28,538
Heat Storage	2,845	1,922	2,891	4,658	3,992	3,776	7,120	6,169	8,417
Demand Control	2,023	2,616	2,008	2,556	2,356	2,525	2,240	974	1,114
Water Heating	1,494	850	802	1,841	2,281	2,323	3,217	2,229	3,222
Total kW	12,933	20,474	17,641	22,850	18,527	23,106	34,109	27,409	41,290

#### Table 1

Keep in mind that these numbers represent potential peak reduction, which is different than actual peak reduction. These charts reflect the installed load reduction capability, as opposed to the actual peak reduction achieved by participants, during the time of annual system peak load.

In March of 2007, Otter Tail filed with the South Dakota Public Utilities Commission ("SDPUC") a portfolio of ten conservation and energy efficiency programs covering the majority of the same end uses as our Minnesota portfolio. On May 20, 2008 the SDPUC approved Otter Tail's plan with minor modifications. The budget is less than one percent of annual South Dakota retail revenues. Among other things, the pilot project includes incentives for installing energy efficient heat pumps, lighting and motors.

Conservation and energy efficiency have been a part of our portfolio since the 1980s to some extent. The conservation improvement program in Minnesota became much more aggressive in the early 1990s. Today in Minnesota we are required to spend a minimum of 1½ percent of our Minnesota retail gross operating revenues on programs for customers. The Minnesota Omnibus Energy Bill recently passed also includes a requirement to achieve energy savings of 1½ percent of annual retail kilowatt-hour sales by 2010, based on a rolling three-year weather-normalized average. On June 1, 2008, Otter Tail filed its Minnesota Conservation Improvement Program for 2009 and 2010 which includes 18,016 MWh savings goal in 2009 and 21,236 MWh savings goal in 2010. As part of its filing, Otter Tail requested the Commissioner of the Minnesota Office of Energy Security to adjust its energy savings goal from 1.5 percent to 1.0 percent due to our most recent DSM potential study, historical investment and performance, customer makeup, service territory economic conditions, and load growth factors. Our Minnesota portfolio has approximately 25 programs to improve efficiency of lighting, motors, water heating, refrigeration, cooking, heating, cooling, and process improvements.

Since 1992 we have helped Minnesota customers conserve more than one and a half million cumulative megawatt-hours of electricity. That's roughly equivalent to the amount of electricity that 100,000 average homes would have used in a year. Minnesota customers

have conserved on average approximately 0.65 percent of the annual Minnesota kilowatthour sales.

North Dakota has a limited number of conservation and efficiency programs, primarily educational in nature. We continue to have discussions with policy makers and regulators about a more comprehensive approach to energy efficiency in North Dakota.

CIP Savings and Expenditures Minnesota Only									
Otter Tail Power Company									
1992 - 2008									
								Aggregate	
		Aggregate			Aggregate KW			spending /	Annual Cost
		KWH based	Cumulative kwh		(based on		Aggregate	agreggate	per kwh -
CIP Year	Annual	on lifetime for	to date thru year	Annual	measure	Annual CIP	CIP	lifetime kwh	single year
(a)	KWH (b)	each year (c)	end (d)	KW (e)	lifetime) (f)	Spending (g)	Spending (h)	(h/c)	(g/b)
1992	4,284,548	4,284,548	4,284,548	1,010	1,010	\$793,002	\$793,002	\$0.185	\$0.185
1993	7,371,451	11,655,999	11,655,999	1,903	2,913	\$1,419,874	\$2,212,876	\$0.190	\$0.193
1994	9,177,166	20,833,165	20,833,165	2,943	5,856	\$1,067,207	\$3,280,083	\$0.157	\$0.116
1995	11,970,185	32,803,350	32,803,350	3,434	9,290	\$1,603,473	\$4,883,556	\$0.149	\$0.134
1996	13,470,907	46,274,257	46,274,257	2,513	11,803	\$1,585,598	\$6,469,154	\$0.140	\$0.118
1997	17,957,861	63,307,100	64,232,118	2,760	14,442	\$1,591,258	\$8,060,412	\$0.127	\$0.089
1998	10,175,545	72,558,174	73,482,645	2,373	16,691	\$1,521,266	\$9,581,678	\$0.132	\$0.150
1999	10,258,589	81,915,611	82,816,763	2,180	18,679	\$1,579,010	\$11,160,688	\$0.136	\$0.154
2000	13,302,713	94,963,467	95,218,324	2,075	20,711	\$1,843,790	\$13,004,478	\$0.137	\$0.139
2001	10,533,420	105,316,910	105,496,887	2,244	22,922	\$1,918,475	\$14,922,953	\$0.142	\$0.182
2002	10,131,511	113,444,953	115,448,421	1,935	24,459	\$1,545,358	\$16,468,311	\$0.145	\$0.153
2003	13,681,770	122,528,207	127,126,723	2,984	26,354	\$1,703,663	\$18,171,974	\$0.148	\$0.125
2004	15,410,897	135,502,489	137,939,104	3,555	28,878	\$1,783,288	\$19,955,262	\$0.147	\$0.116
2005	18,099,987	150,821,656	153,602,476	2,874	30,589	\$1,590,411	\$21,545,673	\$0.143	\$0.088
2006	13,983,526	161,764,067	164,805,182	3,198	33,030	\$1,938,812	\$23,484,485	\$0.145	\$0.139
2007	11,468,831	168,761,383	173,232,898	3,017	34,795	\$1,862,697	\$25,347,182	\$0.150	\$0.162
2008	15,994,719	180,423,611	184,756,102	3,389	36,905	\$2,345,875	\$27,693,057	\$0.153	\$0.147
Total	207,273,626	1,567,158,947				\$27,693,057			\$0.134

### Table 2

Table 2 above shows the Minnesota Conservation Improvement Program achieved savings and costs since 1992.

## D. Near-term Objectives

As mentioned previously, the Company's long-term objective in our current resource plan identifies the addition of up to 100 MW of conservation within the next few years. This goal is defined as the Actual Peak Reduction (measured in kilowatts) achieved by consumers that participate in a utility DSM program. It reflects the changes in the demand for electricity resulting from a utility DSM program that is in effect at the same time the utility experiences its annual peak load, as opposed to the installed peak load reduction capability (i.e., Potential Peak Reduction). The DSM program should account for the regular cycling of energy efficient units during the period of annual peak load.

The Company has found that aggressive marketing tactics and goals are required to achieve the actual peak reduction defined in our integrated resource plan. Table 3 below defines our DSM goals for the next two years.

r Tail Power Company				
9-2011				
Additional Controlled Load			2010	2011
(kw) by Customer Class	2008 Actual	2009 Proposed	Estimated	Estimated
Residential	22,760	12,534	11,675	11,675
Commercial	18,530	14,305	13,325	13,325
Total kW	41,290	26,839	25,000	25,000
Additional Conservation			2010 Proposed	2011
Savings by State	2008 Actual	2009 Proposed	•	Estimate
MN - CIP - KWH	15,994,719	18,015,930	21,236,338	21,500,00
SD - EEP - KWH	part of '09	1,143,446	571,723	571,723
Total Proposed KWH Savings	15,994,719	19,159,376	21,808,061	22,071,72
MN - CIP - KW	3,389	5,093	5,808	5,850
SD - EEP - KW	part of '09	416	208	208
Total Proposed KW Savings	3,389	5,509	6,016	6,058
Additional Conservation			2010 Proposed	2011
Spending by State	2008 Actual	2009 Proposed		Estimate
MN - CIP	\$2,345,875	\$3,578,200	\$4,172,300	\$4,223,00
SD - EEP	\$41,794	\$167,806	\$104,800	\$104,800
Total Proposed Spending	\$2,345,875	\$3,746,006	\$4,277,100	\$4,327,80

### Table 3

## III. Renewable Resources

Otter Tail uses a fully integrated capacity expansion model to conduct detailed computer modeling of Otter Tail's load, generation resources, conservation programs, regulatory requirements, and financial structure so that an optimal long-range plan is developed to meet customer needs. Otter Tail's current resource plan identifies the addition of up to 160 MW of new wind generation within the next few years.

Of the 160 MW of new wind generation identified in Otter Tail's current resource plan, the following Otter Tail wind projects are commercially operational or under construction. In March 2006 Otter Tail issued a Request for Proposal (RFP) for up to 75 MW of renewable generation as the first step to develop the wind generation identified in the resource plan. After analyzing approximately 45 proposals that were received, final negotiations commenced with some of the developers. In March 2007, Otter Tail announced participation in 60 MW of wind generation in the Langdon Wind Project. Construction commenced in June 2007 and commercial operation occurred in December 2007 and January 2008. In early 2008 Otter Tail announced its intention to own another 48 MW of wind generation identified as part of the Ashtabula project in North Dakota. This project

became fully operational by December 2008. In May 2009 Otter Tail announced it will own 49.5 MW of the Luverne Wind Project located in Steele County, North Dakota. Construction on the Luverne Wind Project began during June 2009 and is expected to be operational by late 2009. The addition of the Luverne Wind Project will bring total wind generation resources to more than 180 MW.

Additional discussions are underway with other potential wind projects, mostly small developer owned installations consisting of one or two wind turbines. Otter Tail is also involved in discussions on other potential projects including a biomass-fired facility, a municipal solid waste-fired facility, a heat recovery installation, and anaerobic digestion of agricultural waste. At this time it is too early to know whether any of these projects will reach operation.

During 2008 the amount of electricity derived from qualified renewable resources was equivalent to 7 to 8 percent of adjusted retail sales. This percentage is expected to grow in a few years to comply with various state renewable portfolio standards and objectives.

Otter Tail serves customers in three states: Minnesota, North Dakota, and South Dakota. Each state has varying policies regarding renewable energy and Otter Tail strives to meet regulatory requirements while maintaining economical and reliable electricity service to customers in all three states. The states' mandates, policies, and/or objectives regarding renewable generation in Otter Tail's service territory are summarized in the following bulleted list.

<u>Minnesota:</u> A renewable energy objective has been established to have 7 percent of retail electric sales come from qualifying renewable resources by 2010, and a new renewable energy standard requires 12 percent by 2012, 17 percent by 2016, 20 percent by 2020, and 25 percent by 2025.

<u>North Dakota:</u> A state renewable and recycled energy objective has been established to have 10 percent of all electricity sold at retail within the state by the year 2015 be obtained from renewable energy and recycled energy sources.

<u>South Dakota:</u> A state renewable, recycled, and conserved energy objective has been established to have 10 percent of all electricity sold at retail within the state by the year 2015 be obtained from renewable, recycled, and conserved energy sources.

Through the Tail*Winds* program, Otter Tail offers retail customers in all three state jurisdictions the opportunity to purchase wind-generated energy in 100-kilowatt-hour blocks, giving them the flexibility to buy enough wind power for their entire home or business or just a few appliances.

With the existing renewable resources and plans for additional development, Otter Tail expects by 2012 or earlier to have at least 15 percent of its total energy requirements for the total three-state system being provided by renewable resources. Otter Tail expects to be fully in compliance with the renewable energy standards and objectives in the three-state service territory and should be in a position to sell surplus renewable energy credits.

### Existing Renewable Resources

A summary of 2008 existing renewable resources is shown in Table 4. Otter Tail owns and purchases hydro, wind, and biomass energy. In 2008, Otter Tail utilized 262,833 MWh of hydroelectric power, 285,847 MWh of wind power, 868 MWh of biomass, and 0.4 MWh of photovoltaic power to serve retail customer loads in all three states. Some of the resources are fully dedicated to Otter Tail. Others are customer owned and are used to serve some or all of the customer's load with Otter Tail receiving the surplus. Resources used to either partially or fully serve the customer's own load is identified in the table.

	Table 4: Existing Renewable Resources						
Name	Technology	Location	Ownership	Rating (kW)	2008 MWh to OTP	Self-Serve	
Hendricks Wind	Wind	Hendricks, MN	Purchase	900	2,455	No	
Borderline Wind	Wind	Hendricks, MN	Purchase	900	1,345	No	
Customer B	Wind	Gary, SD	Purchase	90	141	No	
Customer A	Wind	Madison, MN	Purchase	225	39	Yes	
Customer C	Wind	Jamestown, ND	Purchase	50	3	Yes	
Customer D1	Wind	Morris, MN	Purchase	1,650	1,142	Yes	
Big Stone	Biomass	Big Stone, SD	Own	256,025	868	No	
FPL Energy ND Wind II	Wind	Edgeley, ND	Purchase	21,000	60,610	No	
OTP Hydros	Hydro	MN	Own	4,338	23,260	No	
Manitoba Hydro Electric Board	Hydro	Manitoba	Purchase	50,000	209,600	No	
Western Area Power Administration	Hydro	ND and SD	Purchase	5,566	29,973	No	
Langdon Wind, LLC	Wind	Langdon, ND	Purchase	19,500	69,559	No	
Langdon Wind	Wind	Langdon, ND	Own	40,500	133,640	No	
Customer J	Wind	NY Mills, MN	Purchase	1.8	3	Yes	
Customer F	Wind	Fergus Falls, MN	Purchase	39.5	14	Yes	
Ashtabula Wind	Wind	Barnes County, ND	Own	48,000	16,654	No	
Customer G	Wind	Fergus Falls, MN	Purchase	39.5	3	Yes	
Customer H	Wind	Fergus Falls, MN	Purchase	39.5	13	Yes	
Customer E	Wind	Belcourt, ND	Purchase	660	224	Yes	
Customer K	Wind	Benson, MN	Purchase	1.8	0.3	Yes	
Customer T	Photovoltaic	MN	Purchase	3	0.4	Yes	
Customer L	Wind	Fordville, ND	Purchase	20	1	Yes	

### Renewable Resource Projects Under Development

A number of renewable resource projects are in various stages of development or investigation. Table 5 identifies various projects that are under discussion and have moved beyond the initial contact phase. Some of these projects will be developed and some will not.

Table 5: Renewable Resource Projects Under Development						
Facility	Rating (kW)	Location	Status			
Wind	1,000	Pembina County, ND	PPAsigned – construction not started			
Wind	1,650	Stevens County, MN	PPA under development			
Wind	< 1,200	Cass County, ND	Under discussion			
Wind	150	Becker County, MN	Under discussion			
Small Hydro	Unknown	Norman County, MN	Very early discussion phase			
Biomass	< 4,500	Otter Tail County, MN	Under discussion			
Photovoltaic	Unknown	Stevens County, MN	Under discussion			
Wind	<2,000	Walsh County, ND	Under discussion			
Wind	<2,000	Norman County, MN	Under discussion			
Heat Recovery	6,000 - 8,000	Clearwater County, MN	Under discussion			
Anaerobic Digestion	10,000 – 12,000	Stevens County, MN	Under discussion			
Wind	49,500	ND	Under Construction			
Wind	Unknown	McIntosh County, ND	Negotiations underway			

Dated this 1st day of July 2009.

OTTER TAIL POWER COMPANY

By: <u>/s/ KERRY KASEMAN</u> Kerry Kaseman, Sr. Credit Administrator