

Introduction

Otter Tail Power Company (“Otter Tail”, the “Company”) presents for the South Dakota Public Utilities Commission’s (“SDPUC”) consideration of our proposed 2016 Energy Efficiency Plan (“EEP”, “Plan”) to continue marketing energy efficiency to South Dakota (“SD”) customers. The 2016 Energy Efficiency Plan, as proposed, is a one-year extension of Otter Tail’s approved 2014-2015 Plan.

Otter Tail planned to file a 2016-2017 biennial plan on May 1, 2015. Developing a new two-year plan at the same time the first year of the current plan (2014) concludes is challenging as it does not allow sufficient time to properly analyze 2014 results. Through this filing, Otter Tail is requesting the SDPUC to approve a one-year extension of Otter Tail’s approved 2014-2015 plan for 2016.

Otter Tail also requests the SDPUC to approve Otter Tail’s plan to file three-year triennial conservation plans moving forward, with the first filing due on May 1, 2016, for the period of 2017-2019. Moving from a two-year plan to a three-year plan allows program development to commensurate once Otter Tail has had adequate time to evaluate programs that have been in operation for over a one-year period.

Otter Tail also believes a three-year plan allows for significant planning efficiencies to take place between Otter Tail’s Minnesota (“MN”) and SD service jurisdictions as many of the programs currently offered in SD are also offered in MN. Otter Tail is expected to file a three-year energy efficiency plan in MN on June 1, 2016, for 2017-2019.

Otter Tail plans to continue to use the MN Technical Reference Manual’s (“TRM”) savings algorithms to calculate energy and demand savings for most prescriptive programs in its 2017-2019 SD Energy Efficiency Plan. The TRM is a deemed savings database and is developed through a stakeholder process including utilities, electric cooperatives, energy engineering consultants, the MN Division of Energy Resources, and other interested stakeholders. This approach complies with SD Administrative Rule 20:10:38:04, which states, “a retail provider of electricity may use a deemed savings approach for projects that involve simple energy efficiency measures with documented per-measure values.”

Using the TRM will save significant program development costs for SD customers. Otter Tail’s own software package referred to internally as, “Sales & Marketing Reporting Tool” (SMRT), calculates and tracks energy and demand savings and other applicable data for each energy efficiency measure installed by EEP participants over a given time period. Keeping the SMRT system consistent between SD and MN for the same planning periods results in efficiencies for customers in both states and provides savings in programming and other development costs. Otter Tail understands that some differences will exist between the states. The Company is committed to properly addressing savings calculations specific to any state’s statutes, rules, applicable building codes, or Public Utility Commission requests.

Like the 2014-2015 Plan, the 2016 Plan includes projects for all customer classes and major end uses showing the greatest potential for energy savings. The Plan includes eleven projects intended to achieve approximately 2,808,649 kWh in annual energy savings at an approximate cost of \$353,000.

The energy savings goal represents approximately 0.7 percent of South Dakota’s 2014 retail energy sales. The budget represents approximately 1.1 percent of the SD’s 2014 retail revenue.

South Dakota Data; 2014 Statistical Report Billed Data	
Customers	11,564
kWh sales	428,328,331 kWh
Retail revenue	\$31,411,223

All 2016 programs are cost-effective. The 2016 portfolio benefit/cost ratios are illustrated in the following table:

Utility Test	Total Resource Test	Ratepayer Impact Test	Societal Test	Participant Test
7.92	3.27	1.27	3.27	2.25

This Plan will be evaluated on an ongoing basis and any major modifications will be proposed to the SDPUC in a timely manner. Major modifications would include new projects, increases to the overall proposed plan budget by more than 10 percent, or closing projects.

The following sections provide specific details about the 2016 EEP:

- Plan Summary – The Plan Summary includes an overview of the proposed plan, a list of the individual projects, and 2014 Company statistics as background information. A summary of the overall annual kWh savings goals, budgets, and proposed participation is also provided.
- Project Descriptions – This section presents the individual project descriptions and justifications, as well as kWh¹, kW, budget, and participation goals.
- Cost Recovery Mechanism and Financial Incentives – Cost recovery methodology, carrying costs, tracker balances, and other accounting matters are addressed in this section. A discussion of the Company financial incentive for providing energy efficiency projects in South Dakota is also included.
- Evaluation – This section shows the cost effectiveness test results for the Plan and assumptions associated with the cost effectiveness evaluations.
- Summary – A brief conclusion and contact information is provided.

¹ Cost per kWh reflects first year energy savings and first year costs. Lifetime costs per kWh saved will be substantially less spread over the lifetime of the technology. For example, if lighting cost per kWh is \$0.07 for first year savings, the lifetime cost would be less than \$0.01 per kWh.

Plan Summary

In 2016, Otter Tail is proposing to continue its 2014-2015 portfolio of cost-effective energy efficiency projects in South Dakota. The portfolio includes the projects listed below, which are described in greater detail in following sections of this filing. Otter Tail has included 2014 and 2015 approved budgets along with the 2016 proposed budget for comparison. No changes have been made from the 2014-2015 plans to the 2016 plan. Appendix A has been included to provide each program's budget, participation goals, energy savings goals, and demand savings goals. Appendix A also includes benefit-cost test results for each program.

Residential

- Air source heat pumps (promotes efficient heating and cooling)
- Geothermal heat pumps (promotes efficient heating and cooling)
- Air conditioning control (promotes managing demand and energy of cooling systems)
- Lighting (promotes efficient lighting)

Commercial/Industrial

- Custom Efficiency projects (promotes efficient energy use in large customer facilities, such as heat recovery, building envelope, and process improvements)
- DrivePower (promotes high efficient motors and adjustable speed drives)
- Lighting (promotes efficient lighting)
- Air source heat pumps (promotes efficient heating and cooling)
- Geothermal heat pumps (promotes efficient heating and cooling)

All sectors

- Advertising & Education
- Development

2014 South Dakota Energy Efficiency Plan - APPROVED				
Customer Class	Budget	Annual kWh savings	Annual kW savings	Annual Participants
Residential	\$60,000	454,404	47.4	405
Commercial/Industrial	\$258,000	2,354,244	361.8	99
Indirect impact (all sectors)	\$35,000	NA	NA	400
Totals	\$353,000	2,808,649	409.1	904

2015 South Dakota Energy Efficiency Plan - APPROVED				
Customer Class	Budget	Annual kWh savings	Annual kW savings	Annual Participants
Residential	\$60,000	454,404	47.4	405
Commercial/Industrial	\$258,000	2,354,244	361.8	99
Indirect impact (all sectors)	\$35,000	NA	NA	400
Totals	\$353,000	2,808,649	409.1	904

2016 South Dakota Energy Efficiency Plan - PROPOSED				
Customer Class	Budget	Annual kWh savings	Annual kW savings	Annual Participants
Residential	\$60,000	454,404	47.4	405
Commercial/Industrial	\$258,000	2,354,244	363.4*	99
Indirect impact (all sectors)	\$35,000	NA	NA	400
Totals	\$353,000	2,808,649	410.8	904

*The Total and Commercial/Industrial program's kW doesn't match 2014-2015 as there was a typo in the approved 2014-2015 plan. The DrivePower program was approved with 104.8 kW budgeted savings. The correct kW savings should be 106.4 kW. This is a difference of 1.6 kW, which is negligible for budgeting purposes.

AIR CONDITIONING CONTROL

(Existing, Residential)

A. PROJECT DESCRIPTION

The Air Conditioning Control program targets residential customers with central air conditioning systems. Customers who enroll in the Air Conditioning Control program receive a \$7 credit for each of the summer months – June, July, August, and September in exchange for Otter Tail cycling the air conditioner. A controller is installed to cycle a customer's cooling load on a schedule of 15 minutes on followed by 15 minutes off throughout control periods. Otter Tail cycles load to maintain customer satisfaction and minimize customer discomfort during control periods.

B. PROJECT JUSTIFICATION

The Air Conditioning Control project continues to add to Otter Tail's extensive portfolio of demand and price response projects. About one-third of the Company's residential and small commercial customers participate in one of the Company's demand response projects. Through these projects, the Company maintains system reliability, reduces the need to purchase high-priced spot market electricity, and meets our regulated resource adequacy requirements. Although historically winter peaking, the Company is a member of the summer peaking Midcontinent Independent Transmission System Operator (MISO) region. Programs and rates that reduce summer energy and capacity needs are particularly valuable.

C. LONG TERM ENERGY-EFFICIENCY GOALS

Year	2014 Approved	2015 Approved	2016 Proposed
kWh – at the generator	1,448	1,448	1,448
Cost / kWh	\$9.67	\$9.67	\$9.67
kW – at the generator	21.3	21.3	21.3
Cost / kW	\$657	\$657	\$657

D. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Project Delivery & Administration	\$14,000	\$14,000	\$14,000
Incentives ²	NA	NA	NA
Total	\$14,000	\$14,000	\$14,000
Participation	30	30	30

LIGHTING

(Existing, Residential)

A. PROJECT DESCRIPTION

The Residential Lighting Program is an expansion of the Commercial Lighting program and focuses on replacing inefficient lighting with new, more efficient products. Through the Lighting Program, residential customers have access to the same lighting products and rebates as commercial customers, although target marketing will focus on compact fluorescent (“CFL”) and light-emitting diode (“LED”) lighting. Residential customers must meet the same eligibility criteria as commercial customers including a cap on rebates at 75 percent of the total project cost and a minimum rebate of \$20. Program criteria are established to maximize benefits.

B. PROJECT JUSTIFICATION

The United States Department of Energy indicates a typical household spends about \$90 per year, or 10 to 15 percent of its annual electric bill on lighting. Market saturations of CFLs and LEDs are very low, substantiated by Otter Tail’s 2012 Residential End Use Survey that indicates 29 percent of homes had no CFL’s, another 34 percent only had one to five CFLs, and less than two percent of all homes surveyed had LED lighting. Replacing incandescent light bulbs with more efficient lighting can save a customer up to \$35 over the life a single bulb. The lamp life for a CFL is equal to ten standard incandescent bulbs and even longer for an LED. CFLs and LEDs generate much less heat than incandescent bulbs, are less of a fire hazard, and are cool to the touch.

MARKETING

The Residential Lighting Program will be marketed through the following resources: bill inserts, website materials, and all SD EEP promotional materials.

² Participating customers receive a bill credit of \$7 for each summer month consistent with the Air Conditioning Control Rider revenue requirement.

C. LONG TERM ENERGY-EFFICIENCY GOALS

Year	2014 Approved	2015 Approved	2016 Proposed
kWh – at the generator	24,098	24,098	24,098
Cost / kWh	\$0.17	\$0.17	\$0.17
kW – at the generator	2.2	2.2	2.2
Cost / kW	\$1,852	\$1,852	\$1,852

D. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Project Delivery & Administration	\$3,046	\$3,046	\$3,046
Incentives	\$954	\$954	\$954
Total	\$4,000	\$4,000	\$4,000
Participation	340	340	340

HEAT PUMPS

(Existing, Residential, Commercial and Industrial)

A. PROJECT DESCRIPTION

The Heat Pump project targets residential and commercial customers currently using or considering the installation of standard efficiency resistance heating and cooling systems. The project offers rebates to customers for replacing standard efficiency electric systems with qualifying higher efficiency heat pump systems or for purchasing higher efficiency systems for new installations. Qualifications for project rebates will be based on Energy Star standards.

Our current rebates for an air source heat pump are \$160 per ton. A rebate based on an average sized four ton air-source heat pump is calculated as follows: $\$160 \times 4 \text{ tons} = \640 .

Geothermal heat pump rebate are higher because the energy savings are much greater and the cost for installation is much higher. Rebates for geothermal heat pumps are currently \$350 per ton. A rebate based on an average sized four ton geothermal heat pump is calculated as follows: $\$350 \times 4 \text{ tons} = \$1,400$.

The definition of a heat pump is a device that extracts energy from one substance and transfers it to another at a higher temperature. A heat pump takes low-temperature heat from an outdoor source (such as the air, ground, groundwater, or surface water) and mechanically concentrates it to produce high-temperature heat. Since most of the heat is simply moved (pumped) from the outdoor source to the indoors, the amount of electricity required to deliver it is typically less than would be required if using electric heat directly.

Otter Tail has structured the Heat Pumps project with separate energy, demand, and cost effectiveness goals for the following market segments.

- Residential air source heat pumps
- Commercial air source heat pumps
- Residential geothermal heat pumps
- Commercial geothermal heat pumps

B. PROJECT JUSTIFICATION

Space heating accounts for about eight percent of total energy use in the U.S. and represents significant potential for improved efficiency. In the residential sector, energy use for space heating accounts for nearly half of household energy consumption. About one-third of residences are electrically heated, with two-thirds of homes relying on resistance heating.

Space heating in the commercial and industrial sectors also offers an opportunity for energy savings. In any typical year, the total amount of energy used for commercial space heating doubles that used for cooling, accounting for heating 29 percent of all commercial floor space.

Otter Tail’s 2010 Demand Side Management Potential Study³ indicated that only nine percent of the Company’s commercial customers and only three percent of our residential customers in Minnesota have an air source heat pump. Otter Tail’s 2012 Residential Survey⁴ results indicate air source heat pump market saturations at six percent. The 2010 DSM Potential Study indicated that market penetration of ground source heat pumps are less than air source heat pumps, with only three percent⁵ of commercial customers owning a ground source heat pump. Residential heat pump market penetration was negligible. The Company’s 2012 Residential Survey indicates ground source heat pump saturations at three percent.

The 2010 DSM Potential Study indicated that the majority of our electric heating customers have central furnace systems (76 percent), with the balance resistance, radiant, and baseboard heating. The 2012 Residential Survey results indicate slightly less electric heating customers, with 65 percent central furnace systems, and the balance being hot-water radiators/boiler, resistance, and baseboard heating. Cooling is dominated by window and central air units.

Survey results indicate that market penetrations of electric heating are significant, and substantial energy savings can be achieved by promoting more efficient heat pumps in all segments.

C. LONG TERM ENERGY-EFFICIENCY GOALS

2014 Approved	Residential Air Source	Residential Geothermal	Commercial Air Source	Commercial Geothermal
kWh – at the generator	222,277	206,583	134,044	523,938
Cost / kWh	\$0.09	\$0.11	\$0.10	\$0.11
kW – at the generator	6.5	17.4	3.9	43.6

³ 2010 DSM Potential Study was conducted in Minnesota.

⁴ 2012 Otter Tail Residential Survey was conducted in SD, MN, and ND. Results are reported for all three states.

⁵ While specific South Dakota data is not available, it is assumed that South Dakota market penetrations would be less than in Minnesota where heat pump rebates have been offered for a significantly longer period.

Cost / kW	\$2,941	\$1,319	\$3,351	\$1,308
2015 Approved	Residential Air Source	Residential Geothermal	Commercial Air Source	Commercial Geothermal
kWh – at the generator	222,277	206,583	134,044	523,938
Cost / kWh	\$0.09	\$0.11	\$0.10	\$0.11
kW – at the generator	6.5	17.4	3.9	43.6
Cost / kW	\$2,941	\$1,319	\$3,351	\$1,308
2016 Proposed	Residential Air Source	Residential Geothermal	Commercial Air Source	Commercial Geothermal
kWh – at the generator	222,277	206,583	134,044	523,938
Cost / kWh	\$0.09	\$0.11	\$0.10	\$0.11
kW – at the generator	6.5	17.4	3.9	43.6
Cost / kW	\$2,941	\$1,319	\$3,351	\$1,308

D. PROJECT BUDGET & PARTICIPATION

2014 Approved	Residential Air Source	Residential Geothermal	Commercial Air Source	Commercial Geothermal
Project Delivery & Administration	\$9,000	\$7,250	\$7,000	\$17,625
Incentives	\$10,000	\$15,750	\$6,000	\$39,375
Total	\$19,000	\$23,000	\$13,000	\$57,000
Participation	25	10	15	25

2015 Approved	Residential Air Source	Residential Geothermal	Commercial Air Source	Commercial Geothermal
Project Delivery & Administration	\$9,000	\$7,250	\$7,000	\$17,625
Incentives	\$10,000	\$15,750	\$6,000	\$39,375
Total	\$19,000	\$23,000	\$13,000	\$57,000
Participation	25	10	15	25

2016 Proposed	Residential Air Source	Residential Geothermal	Commercial Air Source	Commercial Geothermal
Project Delivery & Administration	\$9,000	\$7,250	\$7,000	\$17,625
Incentives	\$10,000	\$15,750	\$6,000	\$39,375
Total	\$19,000	\$23,000	\$13,000	\$57,000
Participation	25	10	15	25

LIGHTING

(Existing, Residential, Commercial and Industrial)

A. PROJECT DESCRIPTION

The Lighting Program focuses on replacing inefficient lighting systems with new and retrofit systems based on more efficient technology. Typical retrofit applications include the following.

- Inefficient incandescent bulbs replaced by screw-in compact fluorescent and LED lamps.
- Inefficient fluorescent and HID systems replaced by high efficiency fluorescent and LED systems.
- Lighting system controls.

B. PROJECT JUSTIFICATION

The U.S. Energy Information Administration (“EIA”) reports that in 2011, the commercial and industrial sectors accounted for 60 percent of all electricity used in the United States. The commercial sector, including commercial and institutional buildings and street and highway lighting, consumed about 275 billion kilowatt-hours of electricity for lighting, or 21 percent of commercial sector electricity consumption in 2011. The Department of Energy (“DOE”)’s Energy Star Building Manual reports similarly that lighting accounts for 18 percent of electricity generated in the U.S., with another four to five percent of total electricity consumption used to remove waste heat generated by lighting. The DOE further reports that lighting in commercial buildings accounts for 71 percent of lighting electricity use and 35 percent of the overall electricity use in commercial buildings.

As is often the case with lighting technology, the energy efficiency of specific *new* lighting products has improved, but opportunities still exist for improvements in existing commercial, industrial, and farm buildings. Relatively recent data from the EIA indicates that fluorescent lighting technology represents 80 percent of all lighting used in commercial buildings. Approximately 26 percent of this fluorescent lighting is inefficient T12 technology and 25 percent is metal halide or mercury vapor. Fluorescent high bay luminaires provide up to 70 percent energy savings compared to traditional high-intensity discharge (“HID”) lighting systems. In commercial applications, high performance T8 or T5 fluorescent systems reduce energy use by 20 percent over typical three-lamp T8 Parabolic luminaires, and return even higher energy savings when replacing T12 fluorescent lighting systems still commonly used today.

The Minnesota Demand Side Management Potential Study indicates additional investments in energy efficiency lighting are highly cost-effective.

PROJECT MODIFICATIONS

For 2016, Otter Tail proposes the following modifications to enhance participation in the Lighting Program and improve cost effectiveness of the South Dakota EEP plan. Specifically, proposed modifications include:

Removal of Rebate Incentives for T12 Lighting Retrofits

The federal Energy Independence and Security Act legislation that became effective July 14, 2012, raised efficiency standards for general service fluorescent lamps, including two-foot U-bend and four-foot and eight-foot linear T8 and T12 lamps. Specifically, the EISA legislation eliminated manufacturing and importing of:

- Most four-foot, full wattage and energy saving T12 lamps
- All two-foot, full wattage and energy savings U-shaped T12 lamps
- All full-wattage 75-watt F96T12 and 110-watt F96T12HO (high output) lamps
- Most energy savings 60-watt F96T12 and 95-watt F96T12HO lamps
- All four-foot, T8 basic (first generation) 2800 lumen lamps
- Some eight-foot T8 Slimline (single pin) and HO lamps

EISA changes will at some point begin to affect availability of the inefficient, T12 fluorescent lighting products listed above. As these lamps become increasingly scarce, customers will likely need to convert to more efficient T8 fluorescent lighting systems for reasons other than energy efficiency, primarily because replacement lamps and ballasts for current T12 lighting systems will be obsolete. Consequently, Otter Tail believes it would be prudent to discontinue offering incentives to customers operating these inefficient systems for retrofits to industry-standard T8 fluorescent lighting systems.

Otter Tail specifically proposes to offer a small incentive for customers to retrofit from old, inefficient T12 fluorescent lighting systems to low-watt T8 systems featuring 25- or 28-watt lamps and energy efficient electronic ballasts. Proposed incentives for these low-watt T8 retrofits would be based on the incremental energy reduction between a standard T8 lighting system and a reduced wattage T8 fluorescent lighting system. As customers' T12 fluorescent fixtures, lamps, and ballasts continue to fail and replacement components become unavailable, it is very likely that customers operating T12 fluorescent systems will naturally progress to the industry standard T8 fluorescent systems with no incentive. However, offering a small incentive for these customers to adopt the most efficient T8 systems available will help move this market toward the most efficient options available in T8 fluorescent options.

Otter Tail further proposes to offer customers the full incentive for customers choosing to retrofit existing T12 fluorescent systems with hard-wired LED systems. The Company feels that the higher incentive level is prudent to cover the higher incremental costs needed to move customers toward higher-cost LED systems as replacements for inefficient T12 fluorescent systems. To account for the likely shorter remaining T12 system life, Otter Tail proposes to claim only three years of savings with the T12 system as the baseline efficiency. Otter Tail would then apply 4.9 years of savings using a standard-efficiency T8 system as the baseline. This methodology would more accurately reflect energy savings from T12 to LED retrofits and would be consistent with methodologies applied to similar retrofits in the Minnesota Conservation Improvement Program.

Otter Tail proposes to continue offering incentives for customers retrofitting from other inefficient lighting systems (metal halide, mercury vapor, high pressure sodium and incandescent) to efficient fluorescent lighting systems.

1. Increased incentives

To date, Otter Tail has successfully reached the commercial lighting market with relatively modest rebate levels. As the program has matured, the next level of market penetration is becoming increasingly difficult to achieve. In addition, eliminating incentives and the possibility for energy savings from projects associated with conversions of T12 fluorescent lighting impacted by 2007 EISA legislation will further reduce the market potential for energy savings from commercial lighting retrofit projects.

Otter Tail proposes to continue the following customer incentives to encourage a growing, or at least stable, lighting efficiency program for 2016.

Measure	Former incentive	Proposed incentive
Screw-in CFL	\$.05/watt reduced	\$.10/watt reduced
Screw-in LED	\$.20/watt reduced	\$.20/watt reduced
Hi-bay T8 (from HID)	\$.20/watt reduced	\$.40/watt reduced
Hard-wired CFL	\$.20/watt reduced	\$.40/watt reduced
Hard-wired LED	\$.20/watt reduced	\$.40/watt reduced
Lighting controls (daylighting and occupancy sensors)	10% of installed cost	\$200/connected kW

2. Lighting control incentives

For 2016, Otter Tail will continue the incentive for lighting controls (mainly occupancy sensors and daylight sensors) by offering an incentive based on “total kW of efficient lighting load connected” instead of a rebate based on a “percentage of installed cost.” This change will improve the administrative efficiency of the program, as it is often impractical to track separate product and installation costs of lighting controls in large lighting projects.

C. LONG TERM ENERGY-EFFICIENCY GOALS

Year	2014 Approved	2015 Approved	2016 Proposed
kWh – at the generator	244,790	244,790	244,790
Cost / kWh	\$0.22	\$0.22	\$0.22
kW – at the generator	75.0	75.0	75.0
Cost / kW	\$675	\$675	\$675

D. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Project Delivery & Administration	\$24,900	\$24,900	\$24,900
Incentives	\$29,100	\$29,100	\$29,100
Total	\$54,000	\$54,000	\$54,000
Participation	23	23	23

DRIVE POWER

(Commercial and Industrial)

A. PROJECT DESCRIPTION

The DrivePower project is intended to offer incentives for efficient motor and variable frequency drive (“VFD”) installations. The Motors prescriptive rebate project has been part of Otter Tail’s South Dakota EEP since inception. Prescriptive incentives for variable frequency drives (also known as adjustable speed drives, variable frequency drives, and inverters) have been offered since 2014. For 2016, Otter Tail proposes to continue offering a prescriptive rebate for VFDs and motors as part of a combined DrivePower project. In other states, Otter Tail has experienced success in achieving market penetration with a similar strategy, and customers express appreciation for a simplified, more expedient process.

The goal of the DrivePower project is to educate dealers and customers on the benefits of installing VFD motor controls as well as new and replacement electric motors that meet or exceed the National Electrical Manufacturers Association (“NEMA”) Premium® efficiency requirements. Rather than simply isolating opportunities for electric motor efficiency upgrades, the DrivePower program offers incentives to make the entire motor systems more energy efficient by encouraging the installation of VFD’s to more efficiently control motor loads.

B. PROJECT JUSTIFICATION

Induction motors are the workhorses of industry, used widely in virtually every manufacturing plant and office building across the country. However, E Source reports that 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. VFDs can provide significant benefits in matching a motor’s performance to the requirements of the process load.

The International Energy Agency estimates that electric motors and the systems they drive represent the single largest electrical end-use, consuming more than twice as much electricity worldwide as lighting. Currently, estimates indicate that electric motors account for 43 percent to 46 percent of all global electricity consumption at about 7,100 TWh per year. By 2030, without comprehensive and effective energy efficiency policy and programs, consumption could grow to 13,360 TWh per year.

Electric motors convert electrical power into mechanical power within a motor-driven system. The vast majority of the electricity used in an electric motor-driven system is consumed by the electric motor itself. In electric motor-driven systems, some energy losses occur in the motor itself, but energy losses are greater in the rest of the mechanical system to which the motor is coupled. In a typical electric motor-driven system, the three major routes to achieving energy savings include:

- 1) Use of properly sized, energy-efficient motors
- 2) Use of adjustable speed drives to match motor speed and torque to the system mechanical load requirements.
- 3) Optimization of the complete system, including correctly sized motor, pipes and ducts, efficient gears and transmissions, and efficient end-use equipment.

Proposed incentives for VFD's are as follows:

VFD Application	Incentive/HP
Seasonal/HVAC Motor Load	\$45/HP
Non-seasonal Motor Load	\$95/HP

C. LONG TERM ENERGY-EFFICIENCY GOALS

Year	2014 Approved	2015 Approved	2016 Proposed
kWh – at the generator	482,713	482,713	482,713
Cost / kWh	\$0.13	\$0.13	\$0.13
kW – at the generator	106.4	106.4	106.4
Cost / kW	\$592	\$592	\$592

D. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Project Delivery & Administration	\$20,980	\$20,980	\$20,980
Incentives	\$42,020	\$42,020	\$42,020
Total	\$63,000	\$63,000	\$63,000
Participation	31	31	31

CUSTOM ENERGY EFFICIENCY PROGRAM (Existing, Commercial and Industrial)

A. PROJECT DESCRIPTION AND JUSTIFICATION

The Custom Energy Efficiency project incentivizes commercial and industrial customers for energy saving equipment installations and process changes that improve energy efficiency. The Custom Energy Efficiency project is a comprehensive project that is designed to cover energy saving applications that are not served by the Company's other prescriptive rebate projects.

Impact savings estimates from Custom Energy Efficiency projects are provided to Otter Tail by the customer in a project proposal. The proposal presents detailed demand and energy savings for each proposed measure that are reviewed and verified by Otter Tail engineering staff. If necessary, modifications are made to the proposal and an iterative process takes place with the customer to ensure accuracy of savings calculations and appropriate documentation of proposed improvements. Otter Tail offers assistance to commercial and industrial customers to help them determine the energy and demand savings necessary in developing a custom efficiency project proposal. In addition, the customer often works with internal or third party engineers to determine and verify savings. End-use metering is also an option for verifying impact savings.

B. LONG TERM ENERGY-EFFICIENCY GOALS

Year	2014 Approved	2015 Approved	2016 Proposed
kWh – at the generator	968,760	968,760	968,760
Cost / kWh	\$0.07	\$0.07	\$0.07
kW – at the generator	134.6	134.6	134.6
Cost / kW	\$528	\$528	\$528

C. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Project Delivery & Administration	\$28,500	\$28,500	\$28,500
Incentives	\$42,500	\$42,500	\$42,500
Total	\$71,000	\$71,000	\$71,000
Participation	5	5	5

ADVERTISING AND EDUCATION

(Existing, Residential, Commercial and Industrial)

A. PROJECT DESCRIPTION AND JUSTIFICATION

The goal of advertising and education efforts is to inform, persuade, remind, and add value. Advertising and education makes individuals aware of product options and energy efficiency choices, informs them about those options, and assists the individual in making decisions about a course of action or purchase. Effective advertising and education prepares an individual to respond when a need or opportunity arises. This likely does not occur simultaneously with the message being received but has an effect, none-the-less, on decisions made.

The range and complexity of energy related decisions consumers make continue to multiply. This is due to the variety of energy-powered technologies used in modern life; the variety of construction materials available; the number of construction techniques represented in today's housing stock; and the number of options available for heating, cooling, and ventilation systems.

The primary purpose of this project is educational outreach targeting residential customers and children across economic groups from within the Otter Tail customer base. The project objective is to promote consumer awareness of energy-saving practices and to educate both today's consumers and future consumers to help prepare them to make lifestyle choices and buying decisions that maximize energy efficiency and savings.

Components of the Advertising and Education project include presenting educational assemblies to school-aged children and their teachers, as well as providing educational materials such as newsletter articles and literature, and web-based educational information.

- **Educational assemblies for school aged children and teachers.**

The Energy Connection program is a production and tour offered by the Minnesota Science Museum. We plan to continue offering the energy tour free to selected schools in South Dakota in the spring of 2016. The goal will be to provide the assembly program to at least four schools. The assembly program targets students in fourth through sixth grades with interactive displays and activities to develop an understanding of energy, alternative fuels and energy resources used to generate electricity, and energy conservation methods to use at home and at school. The program is supplemented with materials for teachers to assist them in meeting their energy education requirements for fourth through sixth grades.

- **Literature, newsletters, general information.**

Appropriate literature and material will be located and ordered or developed and produced as companion pieces to support the programs and technologies offered in this portfolio and the general energy efficiency education effort. Customers will be offered educational materials as free resources online, as a part of the advertising campaigns, in local company offices in the South Dakota service territory, and through a bimonthly newsletter for residential customers.

- **Internet based resources**

Ads and promotional campaigns developed through this project will direct customers to www.otpc.com where they will find a variety of conservation tips and resources. The most significant tool available to customers on the web is an energy feedback tool that provides an online energy audit and bill analysis tool. Called Bill Analyzer, this tool helps individuals understand their individual energy consumption patterns, identify causes for changes in consumption, compare their use to other similar households, and to be guided to actions to reduce their personal energy use. Studies have shown that energy feedback programs are successful in driving household energy savings of two percent or more through behavior and prescriptive changes. This tool is available for web self-service and through contact with customer service center representatives.

The objective of the Advertising and Education project is to educate approximately 400 students on energy use, its impact on the environment, and how behavior and technology interact; to drive customers to participate in the Bill Analyzer project; and to distribute energy efficient literature to customers upon their request. The project will also support other advertising efforts in specific projects.

B. LONG TERM ENERGY-EFFICIENCY GOALS

This project is not a direct impact project; therefore no estimates have been made to determine any effects on peak demand or energy consumption.

C. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Project Delivery & Administration	\$10,000	\$10,000	\$10,000
Total	\$10,000	\$10,000	\$10,000
Participation	400	400	400

EEP DEVELOPMENT AND PLANNING

(Existing)

A. PROJECT DESCRIPTION

Research and development are critical steps in ensuring that Otter Tail's Energy Efficient Plan in South Dakota remains relevant and effective to South Dakota Customers over the long term. The Development and Planning Project is designed to allow for both long-term and near-term management and development of the EEP at Otter Tail.

The Project will encompass analyzing new trends and technologies, conducting EEP-related strategic planning (economic and impact), and EEP-related regulatory coordination and compliance. Analysis activities will focus on national, state, and other utility trends; demand side management potential, load research, legislative and regulatory activity, and private sector development of new technologies and programs aligned with energy efficiency efforts.

B. LONG TERM ENERGY-EFFICIENCY GOALS

This project is not a direct impact project; therefore, no estimates have been made to determine any effects on peak demand or energy consumption.

C. PROJECT BUDGET & PARTICIPATION

Year	2014 Approved	2015 Approved	2016 Proposed
Development and Planning	\$25,000	\$25,000	\$25,000

Cost Recovery and Financial Incentive

Otter Tail has established a balancing account to track South Dakota conservation costs, including a carrying charge for the time value of the money invested in energy efficiency projects incurred by the Company. The tracker also accounts for amounts collected from customers through the conservation cost recovery charge. The conservation cost recovery charge is collected monthly based on the applicable adjustment factor multiplied by the Customer's monthly energy (kWh) usage. For billing purposes, the cost recovery charge is combined with other charges as part of the energy adjustment that appears on customers' electric service bills.

We are not currently recovering any of these costs in base rates. The conservation cost recovery mechanism is an appropriate means to recover costs associated with developing and implementing the South Dakota Energy Efficiency Partnership.

On May 1 of each year, the Company plans to file a Status Report detailing the previous year's EEP results, including energy savings and expenses. In addition, the Company will request approval of a financial incentive, an update to the amount of the conservation cost recovery charge, and approval to continue the adjustment charge on customers' bills, effective July 1, of that year.

Otter Tail requests a financial incentive for the 2016 EEP consistent with the incentive proposal filed on May 1. The following table shows the proposed incentive for 2014, 2015, and 2016 capped at 30 percent of budgeted annual EEP expenses. The financial incentive realized by the Company would be based on actual expenses and filed annually in the May 1 Status Report.

SD Energy Efficiency Financial Incentive	2014	2015	2016
Proposed EEP Budget	\$353,000	\$353,000	\$353,000
Percent of Budget	30%	30%	30%
Financial Incentive (cap)	\$105,900	\$105,900	\$105,900

Evaluation

Otter Tail uses DSMore™ software to analyze programs and to calculate benefit-cost test results for each direct-impact project and for the aggregate EEP portfolio including indirect impact project costs. A summary of the cost effectiveness of the portfolio is presented in the following table for each year of the 2014-2015 and 2016 EEP.

2014 Energy Efficiency Plan Benefit / Cost Results Approved				
Participant Test	Ratepayer Impact Test	Total Resource Test	Societal Test	Utility Test
2.13	1.16	2.91	2.91	6.93
2015 Energy Efficiency Plan Benefit / Cost Results Approved				
Participant Test	Ratepayer Impact Test	Total Resource Test	Societal Test	Utility Test
2.19	1.22	3.09	3.09	7.43
2016 Energy Efficiency Plan Benefit / Cost Results Proposed				
Participant Test	Ratepayer Impact Test	Total Resource Test	Societal Test	Utility Test
2.25	1.27	3.27	3.27	7.92

Externality values are typically included in the Societal Test. For this analysis, the Company did not include any externality values in the Societal or Total Resource Test.

DSMore™ incorporates data from the Company's Integrated Resource Plan, transmission cost models, and financial parameters to model our customer load profiles, system peaks, line losses, customer rates, marginal energy costs, avoided capacity costs, and avoided transmission and distribution costs. Results for the individual projects are provided in Appendix A along with benefit/cost test results for each project.

Otter Tail used the following discount rates as inputs to DSMore™ for the 2016 analysis. The Societal Test discount rate uses the 20-year T-bill rate as of March 1, 2013.

Participant Test Residential	Participant Test Commercial	Ratepayer Impact Test	Total Resource Test	Societal Test	Utility Test
2.68%	8.5%	8.5%	2.68%	2.68%	8.5%

Summary

Otter Tail's proposal to extend the 2014-2015 Plan for an additional year presents projects for all customer classes and major end uses. The Plan includes projects intended to achieve approximately 2,808,649 kWh in annual energy savings at an approximate total cost of \$353,000. DSMore™ results continue to demonstrate that the Plan passes all cost effectiveness tests.

Following the Plan's implementation and evaluation, the Company will continue to provide reviews to the Commission of the Company's performance compared to the budgets every year by May 1. The Company aims to achieve a financial incentive for providing energy efficiency projects to South Dakota customers. This incentive is proposed as 30 percent of actual EEP expenses, capped at 30 percent of proposed budget.

We, respectfully, request the Commission approve the extension of the 2014-2015 Energy Efficiency Portfolio and incentive plan through the 2016 planning year.

We also, respectfully, request the Commission to approve our proposal to file a three-year plan for 2017-2019 on May 1, 2016. As described previously, this plan will align Otter Tail's conservation plans in our multi-state jurisdiction. Aligning these plans creates significant efficiencies, resulting in development and evaluation cost savings for South Dakota customers.