

August 1, 2023

2024-2026

# Energy Efficiency Partnership Triennial Plan

Docket No. EL23-



[OTPCO.COM](http://OTPCO.COM)



# Table of Contents

## OTTER TAIL POWER COMPANY 2024-2026 ENERGY EFFICIENCY PARTNERSHIP TRIENNIAL PLAN

<b>INTRODUCTION.....</b>	<b>1</b>
<b>PLAN SUMMARY.....</b>	<b>3</b>
<b>PROJECT DESCRIPTIONS.....</b>	<b>5</b>
<b>RESIDENTIAL</b>	
<b>AIR CONDITIONING CONTROL.....</b>	<b>5</b>
<b>HOME LIGHTING.....</b>	<b>7</b>
<b>SMART THERMOSTAT.....</b>	<b>9</b>
<b>HEAT PUMPS.....</b>	<b>11</b>
<b>COMMERCIAL/INDUSTRIAL</b>	
<b>HEAT PUMPS.....</b>	<b>11</b>
<b>DRIVE POWER.....</b>	<b>15</b>
<b>CUSTOM ENERGY EFFICIENCY PROJECT.....</b>	<b>17</b>
<b>COMMERCIAL DIRECT INSTALL.....</b>	<b>18</b>
<b>COMMERCIAL LIGHTING.....</b>	<b>21</b>
<b>ALL SECTORS</b>	
<b>ADVERTISING AND EDUCATION.....</b>	<b>22</b>
<b>EEP DEVELOPMENT AND PLANNING.....</b>	<b>24</b>
<b>COST RECOVERY AND FINANCIAL INCENTIVE.....</b>	<b>25</b>
<b>EVALUATION.....</b>	<b>26</b>
<b>SUMMARY.....</b>	<b>28</b>
<b>APPENDIX A: .....PROJECT INFORMATION SHEETS</b>	

## INTRODUCTION

Otter Tail Power Company (Otter Tail, the Company) presents for the South Dakota Public Utilities Commission's (PUC) consideration this 2024-2026 Energy Efficiency Partnership Triennial Plan (EEP, Plan) to market energy efficiency to South Dakota customers. The Plan, as proposed, includes projects for all customer classes and major end uses showing the greatest potential for energy savings. The Plan includes ten projects intended to achieve approximately 7.9 million kWh in annual energy savings at an approximate cost of \$650,000. Most of these costs – approximately 73 percent, or \$473,500 of the proposed budget – are expected to be customer incentives. The energy savings goal represents approximately 1.5 percent of South Dakota's 2022 retail energy sales. The budget represents approximately 1.5 percent of the State's 2022 retail revenue. The Company proposes launching these projects January 1, 2024.

<b>South Dakota Data 2022 Statistical Report</b>	
Customers	11,812
kWh sales	517,122,754
Retail revenue	\$43,762,019

Otter Tail proposes continuation of residential and commercial projects proven to bring cost-effective energy savings to South Dakota customers. Per the PUC Staff's memorandum from October 30, 2013, in Docket No. EL13-016, Otter Tail is balancing the factors described in the Commission's Direction. These factors include:

- The portfolio being cost effective from the Total Resource Cost (TRC) test,
- Maximizing participation,
- Minimizing short-term rate impacts,
- Recognizing the Ratepayer Impact Measure (RIM) test, but not excluding a program based on failure of RIM, and
- Allowing a program that fails the TRC to be included if it targets hard to reach customer segments.

The 2024-2026 portfolio benefit/cost ratios are illustrated in the following table:

<b>Utility Test</b>	<b>Total Resource Cost Test</b>	<b>Ratepayer Impact Test</b>	<b>Participant Test</b>
5.58	1.89	0.47	4.04

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

The following sections provide specific details about the 2024-2026 EEP:

- Plan Summary – The Plan Summary includes an overview of the proposed plan, a list of the individual projects, and 2022 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 estimated kWh<sup>1</sup> and kW<sup>2</sup> reductions, budgets, and participation goals.
- Cost Recovery and Financial Incentive – Cost recovery methodology and 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 of the Plan.

---

<sup>1</sup> 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, with the lighting fixture operating over 11 years.

<sup>2</sup> DSMore modeling software provides coincident peak-load reduction information, which is reported for all projects. Coincident peak savings continues to be based on the summer season.

## **PLAN SUMMARY**

In 2024-2026, Otter Tail is proposing to continue, with modifications, its 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.

### *Residential*

- Air conditioning control (promotes managing peak demand and energy of cooling systems)
- Home Lighting (promotes efficient lighting)
- Smart thermostats (promotes managing efficient operation of heating and cooling systems)
- Residential heat pumps (promotes efficient heating and cooling)

### *Commercial/Industrial*

- Commercial Heat Pumps (promotes efficient heating and cooling)
- Drive Power (promotes high efficiency motors and adjustable speed drives)
- Custom Efficiency Projects (promotes efficient energy use such as heat recovery, building envelope, and process improvements)
- Commercial Direct Install (promotes installation of lower cost energy efficiency measures in small to midsize businesses)
- Commercial Lighting (promotes efficient lighting)

### *All sectors*

- Advertising and Education
- Development

<b>2024 South Dakota Energy Efficiency Plan</b>				
<b>Customer Class</b>	<b>Budget</b>	<b>Annual kWh Savings</b>	<b>Annual kW Savings</b>	<b>Annual Participants</b>
Residential	\$195,000	1,084,462	587.4	6,288
Commercial/Industrial	\$399,000	6,880,231	860.3	979
Indirect Impact (all sectors)	\$56,000	N/A	N/A	525
<b>Totals</b>	<b>\$650,000</b>	<b>7,964,693</b>	<b>1,447.7</b>	<b>7,792</b>

<b>2025 South Dakota Energy Efficiency Plan</b>				
<b>Customer Class</b>	<b>Budget</b>	<b>Annual kWh Savings</b>	<b>Annual kW Savings</b>	<b>Annual Participants</b>
Residential	\$195,000	1,085,501	604.8	6,313
Commercial/Industrial	\$399,000	6,880,231	860.3	979
Indirect Impact (all sectors)	\$56,000	N/A	N/A	525
<b>Totals</b>	<b>\$650,000</b>	<b>7,965,732</b>	<b>1,465</b>	<b>7,817</b>

<b>2026 South Dakota Energy Efficiency Plan</b>				
<b>Customer Class</b>	<b>Budget</b>	<b>Annual kWh Savings</b>	<b>Annual kW Savings</b>	<b>Annual Participants</b>
Residential	\$195,000	1,086,541	622.1	6,338
Commercial/Industrial	\$399,000	6,880,231	860.3	979
Indirect Impact (all sectors)	\$56,000	N/A	N/A	525
<b>Totals</b>	<b>\$650,000</b>	<b>7,966,772</b>	<b>1,482.4</b>	<b>7,842</b>

## **AIR CONDITIONING CONTROL (Existing, Residential)**

---

### **A. PROJECT DESCRIPTION**

The Air Conditioning Control project will continue to include systems cycled on and off every 15 minutes during peak-demand periods through the Company's air conditioning control rider (**CoolSavings**). The project also includes heat pump systems served through Otter Tail's dual fuel and deferred load rates that are part of Otter Tail's portfolio of demand response programs. Customers who enroll in the Air Conditioning Control project receive a \$8.25 monthly bill credit for each of the summer season months—June, July, August, and September—in exchange for allowing Otter Tail to cycle the air conditioner during system peak events. Units reached through other off-peak rates receive a discounted price for energy.

Residential customers with a central air conditioner or air-source heat pump that are not currently on a controlled electric service can enroll in the **CoolSavings** option. Otter Tail relies on services from electrical contractors to install load control devices that enable cycling through a radio signal sent from the Company's load management system. Cooling system control is permitted by the **CoolSavings** rider for up to 300 hours during the summer season.

The benefits and enrollment requirements of the **CoolSavings** project are marketed to customers in the South Dakota service territory through bill inserts, bill messages, website promotions, and limited media campaigns. Yet, new enrollments have remained below the project goal in recent years. To help ensure the success of this project, Otter Tail will develop a targeted outreach campaign to engage customers to enroll in the program. We have included a small incentive budget that we propose to use if necessary to offer a one-time direct incentive for eligible new project participants. The total cost of this incentive is lower than the cost for most other types of project advertising and provides a direct benefit to participants. Once enrolled in the project, participants stay with the project for many years with a minimal number of opt-outs occurring.

### **B. PROJECT JUSTIFICATION**

The U.S. Energy Information Administration (EIA) reports that in 2022 electricity use for cooling the interior of buildings by the U.S. residential and commercial sectors was about 409 billion kWh, equivalent to about 10 percent of total U.S. electricity consumption in 2022.<sup>3</sup>

Though energy consumption for space cooling is significant, the design of a typical home air conditioning system provides excellent demand response opportunities for electric utilities and consumers alike. By cycling home air-conditioning units in 15-minute intervals through projects such as Otter Tail's **CoolSavings** project, most

---

<sup>3</sup> U. S. EIA 2023 Annual Energy Outlook, Reference case projections for 2022, Tables 4 and 5. Retrieved from: <https://www.eia.gov/tools/faqs/faq.php?id=1174&t=1>.

residential customers can contribute to delaying or eliminating the need for utilities to add peak generation resources while also reducing utility expenses with minimal, if any, adverse impacts to home comfort.

The existing Air Conditioning Control project adds to Otter Tail’s extensive portfolio of demand and price response projects. About one-third of the Company’s residential and small commercial customers are participating 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 Otter Tail is historically winter peaking, the Company is a member of Midcontinent Independent System Operator (MISO) region, which has traditionally been summer peaking. Projects and rates that reduce summer energy and capacity needs are particularly valuable in MISO.

**C. LONG TERM DEMAND SIDE MANAGEMENT GOALS**

<b>Air Conditioning Control</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	29,102	30,141	31,181
Cost / kWh	\$0.28	\$0.27	\$0.26
kW – at the generator	485.1	502.4	519.7
Cost / kW	\$17	\$16	\$16

**D. PROJECT BUDGET & PARTICIPATION**

<b>Air Conditioning Control</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$6,850	\$6,850	\$6,850
Incentives	\$1,400	\$1,400	\$1,400
Total	\$8,250	\$8,250	\$8,250
Participation	700	725	750

Most of the Project Delivery and Administration costs are for local electrical contractors hired to install equipment outside the home to control the customer’s cooling system.

Participation numbers reflect cumulative participants, including customers on short-duration controlled rates and participants enrolled in previous years. Actual proposed, incremental participation is 25 participants annually.



## **HOME LIGHTING (Existing, Residential)**

---

### **A. PROJECT DESCRIPTION**

The Company's Home Lighting project promotes qualified ENERGY STAR light-emitting diode (LED) lighting sold by participating retailers located in South Dakota communities receiving retail electric service from Otter Tail Power Company. The project also provides cash rebate incentives to residential customers for hard-wired retrofits of inefficient lighting technologies to LED lighting systems. Finally, the project provides incentives for installation of hard-wired LED lighting in new construction applications.

The project's objective is to achieve energy savings through increased adoption of LED lighting in the residential market. The Company proposes a continued, up-stream approach to incentivize the purchase of LED lighting products through recruiting local retailers to stock and promote qualified, Energy Star LED lighting products. Participating retail stores will promote and sell the LED products year-round with price discounts provided at the point of purchase, significantly reducing costs for participating customers. In hard-wired retrofits and new construction applications, the Company will continue providing incentives through a cash rebate. This requires participating customers to provide documentation including invoices, receipts, and product specifications.

Otter Tail proposes to continue contracting for services with a firm specializing in recruiting and training retailers on LED lighting products to assure success in its Home Lighting project. Specific strategies in this effort will include:

1. Building a network of participating hardware retailers in smaller, rural South Dakota communities.
2. Encouraging other types of businesses outside of hardware stores as participating retailers (e.g., grocery stores).
3. Encouraging retailers to stock a variety of LED lamps and wattages, including floods, dimmable lamps, and globes.
4. Raising awareness among customers of the benefits of energy efficient lighting and the opportunity available through the project.

The Company has modified all savings calculations to reflect baseline efficacy of 45 lumens per watt as reported in the Minnesota Technical Reference Manual Version 4.0.

### **B. PROJECT JUSTIFICATION**

The U.S. EIA estimates in 2022, the U.S. residential and commercial sectors combined used about 213 billion kWh of electricity for lighting. This was about seven percent of total electricity consumption by these sectors and about five percent of total U.S. electricity consumption. Residential sector electricity consumption for lighting was

about 67 billion kWh or about four percent of total residential sector electricity consumption in 2022.<sup>4</sup>

Otter Tail’s 2022 Residential End Use Survey (REUS) indicates that while 39 percent of South Dakota homes had 11 or more LED light bulbs, 18 percent of homes still had not installed a single LED. An LED saves 85 percent of energy use over an incandescent bulb and lasts up to 25 times longer. LEDs generate much less heat than incandescent bulbs and are less of a fire hazard.

### C. MARKETING

Otter Tail’s marketing plan for Home Lighting includes the following proposed strategies:

- Retailer training, development, and network expansion regarding ENERGY STAR qualified LEDs.
- Targeted advertising to residential customers through bill inserts.
- Educational and promotional information on the Company’s website.
- Live on-site radio remotes during the campaign (as the budget permits).
- Point of sale promotional materials.
- Instant, time of sale, rebates on ENERGY STAR qualified LEDs.
- Promotions through non-profit organizations.

### D. LONG TERM DEMAND SIDE MANAGEMENT GOALS

<b>Home Lighting</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	86,818	86,818	86,818
Cost / kWh	\$0.30	\$0.30	\$0.30
kW – at the generator	7.7	7.7	7.7
Cost / kW	\$3,334	\$3,334	\$3,334

### E. PROJECT BUDGET & PARTICIPATION

<b>Home Lighting</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$12,750	\$12,750	\$12,750
Incentives	\$13,000	\$13,000	\$13,000
Total	\$25,750	\$25,750	\$25,750
Participation	5,411	5,411	5,411

<sup>4</sup> U. S. EIA 2023 Annual Energy Outlook, Reference case projections for 2022, Tables 4 and 5. Retrieved from: <https://www.eia.gov/tools/faqs/faq.php?id=99&t=3>.

## **SMART THERMOSTAT (Existing, Residential)**

---

### **A. PROJECT DESCRIPTION**

The Company's Smart Thermostat project is an offering for the residential sector. Smart thermostats provide energy savings by changing the temperature set points during unoccupied, occupied, and nighttime preferences. These changes in temperature set points reduces the operating time of the heating and cooling system.

Tier II and Tier III capable smart thermostats are the primary target of this project. Tier II are communicating thermostats that give users access to set points and the ability to schedule temperature settings from anywhere using a smart device including a mobile phone, tablet, or computer. Tier III are analytics capable thermostats that offer additional energy savings features, including coaching, Heating, Ventilation, and Air Conditioning (HVAC) diagnostics, comparative information, and geofencing, which is the use of global positioning or other tools to define boundaries. Both Tier II and Tier III have demand response capabilities and customer engagement features including customer-specific data and recommendations including filter change reminders and alerts to equipment performance changes. A new item added to this program will be the inclusion of Tier III line voltage thermostats. This type of product is newer to the market and differentiates itself by being able to handle the larger electrical load required by baseboard heating systems that do not have low voltage side operational communication. The Company will only offer one rebate per customer. The rebate is capped by the lower of either the rebate amount or invoice cost.

At this time, Otter Tail is not proposing any company-initiated control projects tied to smart thermostat technology but sees future potential as more advanced thermostats are deployed in the Company's service territory. By supporting the adoption of new thermostat technologies, the Company will prepare a foundation capable of supporting additional project services. The Company is currently in the process of deploying new Advanced Metering Infrastructure (AMI) and load management systems that could allow for more flexibility in incorporating smart thermostats into a demand response program. This ability will continue to be monitored for future potential.

### **B. PROJECT JUSTIFICATION**

The EIA 2020 Residential Energy Consumption Survey found only 10 percent of households reported having a smart thermostat in very-cold/cold climate regions.<sup>5</sup> Additionally, the EIA 2020 survey found that more than two-thirds of residents with Tier I programmable thermostats did not operate their systems using the programmable features. This is likely due to the ease of access and use of the thermostat, requiring customers to physically stand at the thermostat to set schedules. The internet connectivity abilities of Tier II and Tier III thermostats provide a solution to resolve this ease-of-use barrier. Smart thermostats provide the ability to engage

---

<sup>5</sup> <https://www.eia.gov/consumption/residential/data/2020/hc/pdf/HC%206.6.pdf>.

customers in their HVAC system’s energy usage and places the information in the palms of their hands. Tier III smart thermostats, also known as learning thermostats, can detect customer behaviors and preferences to create a temperature setting profile without the need for customer intervention. The ease of use and learning abilities of smart thermostats provide a benefit that results in energy savings over manual and Tier I programmable thermostats.

**C. LONG TERM DEMAND SIDE MANAGEMENT GOALS**

<b>Smart Thermostat</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	49,782	49,782	49,782
Cost / kWh	\$0.16	\$0.16	\$0.16
kW – at the generator	1.5	1.5	1.5
Cost / kW	\$5,178	\$5,178	\$5,178

**D. PROJECT BUDGET & PARTICIPATION**

<b>Smart Thermostat</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$3,000	\$3,000	\$3,000
Incentives	\$5,000	\$5,000	\$5,000
Total	\$8,000	\$8,000	\$8,000
Participation	40	40	40

## **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 base efficiency resistance heating and cooling systems. The project offers rebates to customers for replacing base efficiency electric resistance systems with qualifying standard or higher efficiency heat pump systems or for purchasing standard or higher efficiency systems for new installations. Residential customers will also be offered a rebate for a qualifying Energy Star Air Conditioner (AC). Qualifications for heat pump project rebates will be based on performance standards that align with the federal Inflation Reduction Act requirements as a means of reducing customer confusion and to maximize incentives available to customers.

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 Pump project with separate energy, demand, and cost effectiveness goals for the following market segments:

#### **Residential:**

- Energy Star air conditioner
- Standard air source heat pumps
- Cold-climate heat pumps
- Air-to-water heat pumps
- Geothermal heat pumps
- Pre-heating domestic hot water
- Air conditioning and heat pump quality installation
- Air conditioning and heat pump tune-up

#### **Commercial:**

- Standard air source heat pumps
- Cold-climate heat pumps
- Air-to-water heat pumps
- Geothermal heat pumps
- Pre-heating domestic hot water
- Heat pump quality installation

## B. PROJECT JUSTIFICATION

Space heating accounts for approximately 14 percent of total energy use in the U.S. and represents significant potential for improved efficiency.<sup>6</sup> In the residential sector, energy use for space heating accounts for nearly half of household energy consumption.<sup>7</sup> Based on Otter Tail's 2022 REUS, 30 percent of residential customers rely on electricity as their primary energy source for heating their homes. Approximately 60 percent of these residences use electric resistance heat as their primary heating system.

Approximately 93 percent of Otter Tail's customers have electric air-conditioning in their home. According to the 2022 REUS, approximately 78 percent of homes have cooling systems that are electric central air-conditioners or window/wall air-conditioners.

Space heating in the commercial and industrial sectors also offers an opportunity for energy savings. In a typical year, the total amount of energy used for commercial space heating nearly triples that used for cooling.<sup>8</sup>

Otter Tail's Heat Pump project provides both residential and commercial customers with a way to add greater efficiency to electric heating and cooling systems. According to the United States Environmental Protection Agency (EPA), geothermal heat pumps are among the most efficient and comfortable heating and cooling technologies currently available, because they use the earth's natural heat to provide heating, cooling, and often, water heating.<sup>9</sup> They use the constant temperature of the earth which allows the system to reach high efficiencies (300 percent to 600 percent) on the coldest winter nights.<sup>10</sup> The illustration below is an example of the energy efficiency capabilities of geothermal heat pumps. The geothermal heat pump delivers more than four units of heat for each unit of energy used. As a result, it can reduce annual heating and cooling costs by 70 percent.



<sup>6</sup> U. S. EIA 2023 Annual Energy Outlook, Reference case projections for 2022, Table 4. Retrieved from: <https://www.eia.gov/tools/faqs/faq.php?id=96&t=3>.

<sup>7</sup> <https://www.eia.gov/energyexplained/use-of-energy/homes.php>.

<sup>8</sup> Assuming 25 percent of all commercial floor space is heated.

<sup>9</sup> [https://www.energystar.gov/products/geothermal\\_heat\\_pumps](https://www.energystar.gov/products/geothermal_heat_pumps).

<sup>10</sup> <http://energy.gov/energysaver/geothermal-heat-pumps>.

An air-source heat pump operates at more than 200 percent efficiency, and when operated with supplemental electric heating that assists during the coldest weather, the system can reduce total heating costs by 30 to 50 percent. Cold climate heat pumps (CCHP) can reduce customer heating costs even further by operating at temperatures of 0°F and below. A report conducted by the Center for Energy and Environment found space heating energy savings of 39 to 65 percent.<sup>11</sup>

While Otter Tail has seen success in growing our Heat Pump project in South Dakota, we also realize challenges ahead. Our service territory is very rural and dependent on a strong agricultural economy to drive economic activity. Up-front capital investment in heat pumps can be large for many customers, especially for geothermal heating and cooling. However, with recent compressor technology advancements, heat pumps offer greater energy savings opportunities at a lower cost than traditional heat pump systems.

The Company is monitoring recent federal opportunities, as part of the Inflation Reduction Act, for heat pump incentives and efficiency requirements. Otter Tail referenced these guidelines when designing program heat pump efficiency requirements. This allows for simplified communication with customers and the ability for customers to stack rebates, maximizing incentives and lowering their cost.

### C. LONG TERM DEMAND SIDE MANAGEMENT GOALS

<b>Residential Heat Pumps</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	918,760	918,760	918,760
Cost / kWh	\$0.17	\$0.17	\$0.17
kW – at the generator	93.1	93.1	93.1
Cost / kW	\$1,644	\$1,644	\$1,644

<b>Commercial Heat Pumps</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	761,629	761,629	761,629
Cost / kWh	\$0.17	\$0.17	\$0.17
kW – at the generator	71.8	71.8	71.8
Cost / kW	\$1,838	\$1,838	\$1,838

<sup>11</sup> [https://www.aceee.org/files/proceedings/2016/data/papers/1\\_700.pdf](https://www.aceee.org/files/proceedings/2016/data/papers/1_700.pdf).

#### D. PROJECT BUDGET & PARTICIPATION

<b>Residential Heat Pumps</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$27,400	\$27,400	\$27,400
Incentives	\$125,600	\$125,600	\$125,600
Total	\$153,000	\$153,000	\$153,000
Participation	137	137	137

<b>Commercial Heat Pumps</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$19,500	\$19,500	\$19,500
Incentives	\$112,500	\$112,500	\$112,500
Total	\$132,000	\$132,000	\$132,000
Participation	97	97	97



## **DRIVE POWER (Existing, Commercial, and Industrial)**

---

### **A. PROJECT DESCRIPTION**

The goal of the Drive Power project is to educate dealers and customers on the benefits of installing variable frequency drive (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 Drive Power project offers incentives to make entire motor systems more energy efficient by encouraging the installation of VFDs that control motor loads more efficiently.

The Drive Power project offers customers incentives for purchasing and installing the following energy efficient measures in electric motor-driven systems:

- Adjustable speed drives, also known as variable speed drives, variable frequency drives, and invertors.
- Open drip proof (ODP) and total enclosed fan cooled (TEFC) motors exceeding NEMA Premium efficiency in new purchase applications and when replaced at failure.
- ODP and TEFC Motors meeting NEMA Premium efficiency when replaced prior to failure.
- Electronically commutated motors in nonresidential HVAC and exhaust fan applications.

### **B. PROJECT JUSTIFICATION**

The EIA reports that the industrial sector used 25 percent of all electricity consumed in the U.S. in 2022. Manufacturers in this sector accounted for 78 percent of industrial electricity consumption, with 51 percent of that electricity consumed by machine drive systems (motors, pumps, fans, etc).<sup>12</sup> At the same time, the U.S. Department of Energy's sourcebook for improving motor and drive system performance reports that electricity costs make up about 96 percent of the total life-cycle cost of a motor, while capital costs and maintenance account for 3 percent and 1 percent, respectively.<sup>13</sup> Engineering principles in motor systems state that reducing motor speed by 50 percent will result in power consumption of only one-eighth of a motor running at full speed, suggesting huge savings opportunities in motor controls. Adjustable Speed Drives (ASDs) are a highly effective technology for modifying or controlling motor operation that is recognized for improving performance and efficiency in drive systems.

---

<sup>12</sup> U.S. Energy Information Administration. Retrieved from: <https://www.eia.gov/energyexplained/electricity/use-of-electricity.php>.

<sup>13</sup> Lawrence Berkeley National Laboratory and Resource Dynamics Corporation. (September 2008). *Improving Motor and Drive System Performance: A Sourcebook for Industry*.

### C. LONG TERM DEMAND SIDE MANAGEMENT GOALS

<b>Drive Power</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	3,428,036	3,428,036	3,428,036
Cost / kWh	\$0.02	\$0.02	\$0.02
kW – at the generator	433.5	433.5	433.5
Cost / kW	\$185	\$185	\$185

### D. PROJECT BUDGET & PARTICIPATION

<b>Drive Power</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$11,000	\$11,000	\$11,000
Incentives	\$69,000	\$69,000	\$69,000
Total	\$80,000	\$80,000	\$80,000
Participation	165	165	165

**CUSTOM ENERGY EFFICIENCY PROJECT  
(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 technical 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 may also be used for verifying impact savings.

**B. LONG TERM DEMAND SIDE MANAGEMENT GOALS**

<b>Custom Energy Efficiency</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	286,910	286,910	286,910
Cost / kWh	\$0.21	\$0.21	\$0.21
kW – at the generator	35.3	35.3	35.3
Cost / kW	\$1,671	\$1,671	\$1,671

**C. PROJECT BUDGET & PARTICIPATION**

<b>Custom Energy Efficiency</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$7,000	\$7,000	\$7,000
Incentives	\$52,000	\$52,000	\$52,000
Total	\$59,000	\$59,000	\$59,000
Participation	4	4	4

## **COMMERCIAL DIRECT INSTALL (Existing, Commercial)**

---

### **A. PROJECT DESCRIPTION**

Otter Tail's Commercial Direct Install (CDI) project provides free installation of low-cost energy efficiency measures for participating small to mid-sized commercial customers. These measures are installed at no cost to the participant. The project further capitalizes on personal interactions to ensure customers in this market segment have opportunity to engage on:

- Benefits of energy efficiency and conservation.
- Energy efficiency opportunities available in the customer's business operations.
- Quick, easy, and affordable measures that have a direct, immediate impact on reducing energy bills.

The CDI project will retrofit participating businesses with easily installed, lower-cost energy efficiency measures that will immediately demonstrate benefits through reduced energy expenses.

### **B. PROJECT JUSTIFICATION**

The small to midsize business (SMB) sector generally represents 97 percent of Otter Tail's commercial customer base in South Dakota and consumes 22 percent of commercial energy, yet often is less likely to participate in energy efficiency projects.<sup>14</sup> Common barriers often contributing to low participation rates include customers' shortage of capital or labor, low awareness and understanding of efficiency project, cultural or language differences, and split incentives between building tenants and owners.

Otter Tail's CDI project provides free installation of low-cost energy efficiency measures for participating SMB commercial customers. The project further capitalizes on personal interactions to ensure customers in this market segment have opportunity to engage on:

- Benefits of energy efficiency and conservation.
- Energy efficiency opportunities available in the customer's business operations.
- Quick, easy, and affordable measures that have a direct, immediate impact on reducing energy bills.

The CDI project will retrofit participating businesses with easily installed, lower-cost energy efficiency measures that will immediately demonstrate benefits through reduced energy expenses.

---

<sup>14</sup> Otter Tail Power 2022 customer counts and retail sales data.

Otter Tail will leverage the synergy between the commercial Advertising and Education and the CDI projects to focus on energy efficiency among the SMB segments. Benefits of the project will include:

- On-site energy assessments.  
Participating customers will receive a free energy assessment and follow-up documentation through the Advertising and Education project. The simple two-page report summarizes three or four most cost-effective opportunities for improving energy efficiency unique to each participant's business. Reports will provide detailed information on estimated savings, costs, and paybacks for recommended efficiency measures.
- Direct-installation efficiency measures.  
The CDI project will provide free installation of the following measures:
  - Cold-beverage vending machine controllers.
  - Faucet aerators, pre-rinse spray valves, domestic water heater pipe insulation, and reduced water heater temperature set-points in businesses with electric water heating.
  - LED spot lamps, A-lamps, T8 lamp replacements, and exit sign retrofit kits.

### **C. MARKETING**

Otter Tail will analyze data including customer count, community energy use per customer, aggregated savings achieved from EEP participation to date, and interest and community enthusiasm in selecting communities for participation in the CDI program.

Otter Tail will rely on commercial energy management representatives for initial introductions of the program concept to community leaders. After confirming interest from the community, Company staff will conduct outreach calls to customers most likely to be interested in the program and schedule assessment and direct install services in the same call.

Actual assessments will focus on installation of low-cost end use efficiency measures and identification of other opportunities for improving efficiency. Otter Tail's field representatives will receive copies of all completed assessments and will work closely with the Company's audit and direct install services provider to follow on the best customer leads for possible participation in the Company's other prescriptive efficiency programs, including Commercial Lighting, Drive Power, and other applicable programs.

**D. LONG TERM DEMAND SIDE MANAGEMENT GOALS**

<b>Commercial Direct Install</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	48,638	48,638	48,638
Cost / kWh	\$0.27	\$0.27	\$0.27
kW – at the generator	7.2	7.2	7.2
Cost / kW	\$1,797	\$1,797	\$1,797

**E. PROJECT BUDGET & PARTICIPATION**

<b>Commercial Direct Install</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$8,000	\$8,000	\$8,000
Incentives	\$5,000	\$5,000	\$5,000
Total	\$13,000	\$13,000	\$13,000
Participation	643	643	643

## COMMERCIAL LIGHTING (Existing, Commercial, and Industrial)

---

### A. PROJECT DESCRIPTION

The Commercial Lighting project provides incentives to commercial and industrial customers installing qualifying energy-efficient lighting technologies in new construction applications and for retrofits converting to energy-efficient lighting technologies such as LED lamps, fixtures, and lighting controls.

### B. PROJECT JUSTIFICATION

The U.S. EIA estimates that in 2022 the residential and commercial sectors consumed about 213 billion kWh of electricity for lighting, representing about seven percent of total electricity consumption for these two sectors combined and about five percent of total U.S. electricity consumption.<sup>15</sup> Large buildings that are dominated with internal heat-generating processes often use far more air conditioning than heating. As a result, these are excellent candidates for lighting efficiency upgrades as they can experience an HVAC energy-savings bonus of 40 percent or more in addition to efficiency gains from the actual lighting efficiency improvements.

### C. LONG TERM DEMAND SIDE MANAGEMENT GOALS

<b>Commercial Lighting</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
kWh – at the generator	2,355,018	2,355,018	2,355,018
Cost / kWh	\$0.05	\$0.05	\$0.05
kW – at the generator	312.4	312.4	312.4
Cost / kW	\$368	\$368	\$368

### D. PROJECT BUDGET & PARTICIPATION

<b>Commercial Lighting</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$25,000	\$25,000	\$25,000
Incentives	\$90,000	\$90,000	\$90,000
Total	\$115,000	\$115,000	\$115,000
Participation	70	70	70

<sup>15</sup> U. S. EIA 2023 Annual Energy Outlook, Reference case projections for 2022, Tables 4 and 5. Retrieved from: <https://www.eia.gov/tools/faqs/faq.php?id=99&t=3>.

## **ADVERTISING AND EDUCATION (Existing, Residential, Commercial, and Industrial)**

---

### **A. PROJECT DESCRIPTION AND JUSTIFICATION**

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 building stock; and the number of options available for heating, cooling, and ventilation systems.

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

Components of the Advertising and Education project include providing educational materials such as bill inserts, brochures, flyers, and other literature to customers; providing web-based educational information and personalized data about energy use and energy conservation options; offering educational presentations to students and their teachers; and offering energy assessments for small to midsize businesses. The assessments for small and midsize businesses will be provided as an educational resource alongside the proposed Commercial Direct Install project.

- **General information literature**

Materials will be developed and produced to support the projects and technologies offered in this portfolio as well as general energy efficiency education. Pieces will include bill inserts, brochures, flyers, and other educational materials.

- **Internet based resources**

Online tools and materials developed through this project will direct customers to [www.otpco.com](http://www.otpco.com) where they will find a variety of conservation tips and resources. Additionally, by year-end 2023, Otter Tail is retiring its online Energy Feedback tool, the Aclara Home Energy Analyzer platform, and launching a new customer engagement portal "My Account" as an online energy feedback tool. The Company will leverage this portal with customers to provide energy usage information through interactive charts and heat maps that include weather data, energy use, and billing costs. Customers may interact with the data to add energy markers to enable them to track the impacts of new equipment additions, equipment removal, and lifestyle changes. This detailed information will help customers to make changes to impact their usage patterns and reduce overall monthly bills.



The Advertising and Education program will support in part the addition of energy conservation messaging including additional steps customers can take to achieve their energy savings goals. Customers that use the home profile and energy savings plans within the portal will be included as program participants.

- **Educational assemblies for students and teachers**

Otter Tail proposes to offer an interactive classroom program to up to four schools each year that will explain the scientific principles behind energy efficient heat pump technologies. The target student group is eighth grade students, with schools having the option to include students in surrounding grades. The interactive assembly explores the mechanical and physical principles that apply to heat pumps and heat pump efficiency. The program is supplemented with materials for teachers. Schools will be invited to sign up for the assembly on a first come, first served basis with a three-year rotation among eligible schools to maximize the number of students that have the opportunity to see the assembly.

- **On-site energy assessments for small commercial customers**

Participating customers will receive a free energy assessment and a follow-up report documenting findings and recommendations. The simple two-page report summarizes the most cost-effective three or four opportunities for improving energy efficiency unique to each participant’s business. Reports will provide detailed information on estimated savings, costs, and paybacks for recommended efficiency measures.

**B. LONG TERM DEMAND SIDE MANAGEMENT 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**

<b>Advertising and Education</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Project Delivery & Administration	\$41,000	\$41,000	\$41,000
Total	\$41,000	\$41,000	\$41,000
Participation	525	525	525

## **EEP DEVELOPMENT AND PLANNING (Existing)**

### **A. PROJECT DESCRIPTION**

Research and development are critical steps in ensuring that Otter Tail’s EEP 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 project aligned with energy efficiency efforts.

### **B. LONG TERM DEMAND SIDE MANAGEMENT GOALS**

Development and Planning 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**

<b>Development and Planning</b>			
	<b>2024</b>	<b>2025</b>	<b>2026</b>
Development and Planning	\$15,000	\$15,000	\$15,000

## **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 Triennial Plan.

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 2024-2026 EEP consistent with the incentive proposal filed on May 1. The following table shows the proposed incentive for 2024, 2025, and 2026 capped at 30 percent of budgeted annual EEP expenses. The financial incentive realized by the Company would be based on the lesser of the budget or actual expenses and filed annually in the May 1 Status Report.

<b>SD Energy Efficiency Financial Incentive</b>	<b>2024</b>	<b>2025</b>	<b>2026</b>
Proposed EEP Budget	\$650,000	\$650,000	\$650,000
Percent of Budget	30%	30%	30%
<b>Financial Incentive (cap)</b>	<b>\$195,000</b>	<b>\$195,000</b>	<b>\$195,000</b>

## EVALUATION

Otter Tail uses DSMore™ software to analyze projects 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 2024-2026 EEP and for the three years combined.

<b>2024 Energy Efficiency Plan - Benefit / Cost Results</b>			
Participant Test	Ratepayer Impact Test	Total Resource Cost Test	Utility Test
4.04	0.47	1.89	5.59
<b>2025 Energy Efficiency Plan - Benefit / Cost Results</b>			
Participant Test	Ratepayer Impact Test	Total Resource Cost Test	Utility Test
4.04	0.47	1.88	5.56
<b>2026 Energy Efficiency Plan - Benefit / Cost Results</b>			
Participant Test	Ratepayer Impact Test	Total Resource Cost Test	Utility Test
4.04	0.47	1.89	5.59
<b>2024 - 2026 Energy Efficiency Plan - Benefit / Cost Results</b>			
Participant Test	Ratepayer Impact Test	Total Resource Cost Test	Utility Test
4.04	0.47	1.89	5.58

For this analysis, the Company excluded externality values in the TRC 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 2024-2026 analysis. The Residential Participant Test discount rate is calculated using the United States Department of the Treasury's (Treasury) 20-year Constant Maturity (CMT) Rate, which averaged 3.3 percent between January 3, 2022, and December 30, 2022.

The TRC test discount rate is based on the theory that energy efficiency investments are funded by both the utility and the ratepayers that participate in the programs. Utilities invest money in the programs and customer participants pay incremental costs for equipment at their homes and businesses. For the TRC test, Otter Tail used a blended discount rate balancing its weighted cost of capital and the 20-year treasury rate to reflect both the utilities and customers cost of capital.

<b>Participant Test Residential</b>	<b>Participant Test Commercial</b>	<b>Ratepayer Impact Test</b>	<b>Total Resource Cost Test</b>	<b>Utility Test</b>
3.3%	7.09%	7.09%	5.2%	7.09%

## **SUMMARY**

Otter Tail's 2024-2026 Plan presents projects for all customer classes and major end uses. The Plan includes projects intended to achieve approximately 4.6 million kWh in annual energy savings at an approximate total cost of \$650,000. DSMore™ results demonstrate that the Plan passes all required cost effectiveness tests.

Otter Tail proposes launching these projects January 1, 2024. Following the Plan's implementation and evaluation, the Company will 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 savings and net benefits to South Dakota customers. This incentive is proposed as 30 percent of actual EEP expenses, capped at 30 percent of proposed budget. This incentive structure is consistent with historical utility incentive practices.

We respectfully request the Commission approve the 2024-2026 Energy Efficiency Portfolio and incentive plan.