



UTILITIES CO.

A Division of MDU Resources Group, Inc.

400 North Fourth Street
Bismarck, ND 58501
(701) 222-7900

August 8, 2017

Executive Secretary
North Dakota Public Service Commission
State Capitol
600 East Boulevard
Bismarck, ND 58505-0480

Re: Peak Rewards Program and Cost
Recovery Mechanism
Case No. PU-17-_____

Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc. (Montana-Dakota) herewith submits for the North Dakota Public Service Commission's (Commission) consideration and approval a Peak Rewards Program and Cost Recovery Mechanism Rate 105 tariff (Peak Rewards Program). The Rate 105 tariff details an air conditioning (A/C) cycling demand response program that, upon approval, will be available to residential customers as well as the cost recovery mechanism that is applicable to all customer rate classes. The proposed rates, included on the Rate 105 tariff reflected costs for calendar year 2018. The proposed rate schedule denoted as Original Sheet Nos. 51-51.2 is included within Exhibit 1. Montana-Dakota is requesting approval of the following tariff sheets provided as Exhibit 1 of the Application to be effective October 31, 2017:

- 7th Revised Sheet No. 1.1
- 9th Revised Sheet No. 3
- 5th Revised Sheet No. 4.1
- 4th Revised Sheet No. 7.1
- 9th Revised Sheet No. 10
- 8th Revised Sheet No. 14.1
- 4th Revised Sheet No. 15.1
- 8th Revised Sheet No. 18.1
- 10th Revised Sheet No. 20.1
- 7th Revised Sheet No. 22.1
- 8th Revised Sheet No. 23.1
- 9th Revised Sheet No. 25.1
- 8th Revised Sheet No. 26

- 9th Revised Sheet No. 32.1
- 9th Revised Sheet No. 36
- Original Sheet No. 51
- Original Sheet No. 51.1
- Original Sheet No. 51.2

Montana-Dakota currently has a demand response portfolio in North Dakota that includes a Commercial Demand Response Program administered by a third party and the Company's current Interruptible Demand Response (Rate 38). These two programs combined offered approximately 24.9 MW of capacity to Montana-Dakota's integrated system in 2016; however no demand response program is currently offered to residential customers. A Residential Demand Response program was modeled as a cost effective demand side program and reflected in the two-year action plan in Montana-Dakota's 2015 Integrated Resource Plan (IRP) and a request for proposal was issued in August 2016. The Program was again determined to be a cost effective resource in the Company's 2017 IRP submitted on June 30, 2017 in Case No. PU-17-267. The Peak Rewards Program detailed herein was developed as a result. This cost effective program meets MISO capacity accreditation requirements and could help delay the need for development of future generation facilities.

The Peak Rewards Program will function as an A/C cycling program that utilizes programmable Wi-Fi thermostats to control a customer's air conditioner during times of peak demand on the system or in emergency situations. The program is designed as a bring your own thermostat (BYOT) model with a defined list of thermostats eligible for participation. A number of thermostats made by PRO1, Honeywell, and Nest will qualify. Low (approximately \$100), mid (approximately \$150), and high (approximately \$200+) cost options are available; with participants responsible for purchasing and installing an eligible thermostat. Two financial incentives are proposed and critical to the success of the program. First, customers will receive a \$60 point of sale rebate on the purchase of the thermostat. Second, customers will receive a \$10 monthly bill credit for being enrolled in the program for the summer months of June through September.

As part of the program Montana-Dakota will establish a new online marketplace where customers will be able to purchase the qualifying thermostats and be validated as qualifying customers to receive the point-of-sale rebate. This online marketplace to be available on Montana-Dakota's website, will be hosted by Simple Energy, a leading provider of this type of service that is currently operating marketplaces on behalf of several large investor owned utilities across the country. The demand response portion of the Peak Rewards Program will be administered by Itron Inc. (Itron), formerly Comverge Inc. Itron's demand response management software is capable of multiple event control strategies that can be customized for Montana-Dakota's needs. It is

projected that a cycling event will result in an average reduction of 1 kW per participant. The target for the program in total is 10 MW with 2 MW enrolled per year across Montana-Dakota's integrated electric system. A more detailed program overview is provided in Exhibit 2.

Montana-Dakota performed five benefit-cost tests (Ratepayer, Utility, Societal, Participant and Total Resources Cost) for the program to measure the cost effectiveness based on the benefit/cost ratios produced. Each of the five tests determines the cost effectiveness of the program from a different perspective as described below:

- The *Ratepayer Test* includes all of the quantifiable benefits and costs of a program and its impact on all ratepayers. The total costs saved are compared to the total increase in the revenue requirement caused by the costs of the program. A ratio greater than one indicates the program will reduce overall rates, while a ratio less than one implies the program will cause rates to increase.
- The *Utility Test* compares the cost of energy saved to the total cost of saving that amount of energy. The total cost of energy saved is compared to the costs associated with reaching those savings, i.e. incentives, administrative costs, lost margins. A benefit/cost ratio greater than one indicates the cost of energy saved is greater than the cost of saving the energy.
- The *Societal Test* measures the net costs of a conservation/DSM program based on its total costs, including the participant's and utility's costs as well as the avoided environmental externalities. The total savings are compared to the total cost of the program. A benefit/cost ratio greater than one indicates that society as a whole will benefit from the program.
- The *Participant Test* considers the economic impact of a program that accrues directly to the participating customers. The total cost to the participants is compared to the total annual benefits received in the form of rebates and bill savings resulting from implementing the program. A ratio of one indicates the program will result in savings to the participant.
- The *Total Resources Cost Test* reflects the total benefits and costs to all customers (both the participants and non-participants). A benefit/cost ratio greater than one for the TRC Test indicates the program is cost effective to all customers, both participating and non-participating.

The program scores greater than one in all five benefit-cost tests and is thus considered cost effective, as shown below.

| Test Results | NPV | B/C |
|-------------------------------|--------------|------|
| Ratepayer Impact Measure Test | \$1,386,212 | 1.20 |
| Utility Cost Test | \$1,521,751 | 1.23 |
| Societal Test | \$10,042,967 | 2.64 |
| Participant Test | \$1,916,583 | 3.46 |
| Total Resource Cost Test | \$3,479,491 | 1.73 |

For example, the Ratepayer Impact test, which reflects all quantifiable benefits and costs related to the Program, indicates the net present value of all the benefits of the Program exceeds the net present value of all the Peak Rewards Program costs by approximately \$1.4 million over the life of the program. This means that although customers would be assessed a charge resulting from this program, as discussed below, the charge is ultimately less than what would otherwise have to be collected if the Peak Rewards Program were to not be implemented at all. The input data used, results of the tests and the benefit-cost worksheets are provided in Exhibit 3.

The cost of the Peak Rewards Program attributable to North Dakota is estimated to be approximately \$538,000 in the first year. The recovery of the proposed Peak Rewards Program costs is integral to a utility offering its customers Demand Response programs. Costs to be recovered through the proposed Peak Rewards Program would be all actual costs incurred by Montana-Dakota pertaining to the program. The total program costs will be amortized over projected volumes to be sold over the next 12 month period and allocated between the rate classes based on the Company's Demand Factor No. 2 established in the Company's most recent general rate case. The proposed Peak Rewards Program charge is proposed to be implemented on January 1, 2018. The new charge will be shown as a separate line item on the bill. Following the initial one-year term, and annually thereafter, the Peak Rewards Program charge shall include any over or under collection of revenue from the preceding twelve month recovery period plus carrying costs on the monthly over or under collected amount. Billing would be on a per kWh basis and applicable to all retail rate schedules for energy sold, except those served under special contracts approved by the Commission. The annual cost to a residential customer using 980 kWh per month in North Dakota for year 1 of the program would be approximately \$3.18. The proposed rate calculation is included as Exhibit 4.

Montana-Dakota respectfully requests a review by the Commission with approval of the Peak Rewards Program and Cost Recovery Mechanism Rate 105 tariff by October 31, 2017 in order to begin marketing the program. As noted above, the rate is proposed to be implemented on January 1, 2018.

If you have any questions, please contact:

Ms. Tamie Aberle
Director – Regulatory Affairs
400 North Fourth Street
Bismarck, ND 58501
(701) 222-7856

Also, please send copies of all written inquiries, correspondence and pleadings to:

Karl A. Liepitz
Assistant General Counsel & Secretary
MDU Resources Group, Inc.
P.O. Box 5650
Bismarck, ND 58506-5650

The original and seven (7) copies of this Letter of Transmittal proposed tariff and supporting workpapers have been provided to the Commission. The filing has also been electronically submitted to the Commission.

Montana-Dakota submitted a check for the amount of \$10,000 in accordance with North Dakota Century Code Section 49-05-05. If the Commission requires additional fees, the Company will provide any additional fees as requested.

Montana-Dakota respectfully requests that this filing be accepted as being in full compliance with the filing requirements of this Commission.

Please acknowledge receipt by stamping or initialing the duplicate copy of this letter attached hereto and returning the same in the enclosed self-addressed, stamped envelope.

Sincerely,



Tamie A. Aberle
Director – Regulatory Affairs

Attachments

Exhibit 1

Exhibit 1



Montana-Dakota Utilities Co.

A Division of MDU Resources Group, Inc.

400 N 4th Street
Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4
7th Revised Sheet No. 1.1
Canceling 6th Revised Sheet No. 1.1

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Date Filed: August 8, 2017

Effective Date:

Issued By: Tamie A. Aberle
Director – Regulatory Affairs

Case No.:



Montana-Dakota Utilities Co.

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400 N 4th Street

Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4

9th Revised Sheet No. 3

Canceling 8th Revised Sheet No. 3

RESIDENTIAL ELECTRIC SERVICE Rate 10

Page 1 of 1

Availability:

In all communities served for single-phase residential electric service for domestic purposes only.

Rate:

Basic Service Charge: \$0.46 per day

Energy Charge:

October – May:

First 750 Kwh per month 6.133¢ per Kwh

Over 750 Kwh per month 3.133¢ per Kwh

June – September:

6.133¢ per Kwh

Minimum Bill:

Basic Service Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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Director - Regulatory Affairs

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4
5th Revised Sheet No. 4.1
Canceling 4th Revised Sheet No. 4.1

OPTIONAL RESIDENTIAL ELECTRIC THERMAL ENERGY STORAGE SERVICE Rate 13

Page 2 of 2

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Thermal storage space heating facilities can include the thermal storage device(s), air-source heat pumps, and associated air handling units.
2. Unless approved by the Company the maximum thermal storage facilities that may be connected under this rate schedule is 50 Kw.
3. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4
4th Revised Sheet No. 7.1
Canceling 3rd Revised Sheet No. 7.1

OPTIONAL TIME-OF-DAY RESIDENTIAL ELECTRIC SERVICE Rate 16

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1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Contract Terms:

Customer agrees to contract for service under the Optional Time-of-Day Residential Electric Service rate for a minimum period of one year. At the end of a one-year period, customer shall have the option of remaining under the Optional Time-of-Day Residential Electric Service rate or returning to the regular Residential Electric Service rate.

General Terms and Conditions:

The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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Montana-Dakota Utilities Co.

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400 N 4th Street
Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4
9th Revised Sheet No. 10
Canceling 8th Revised Sheet No. 10

SMALL GENERAL ELECTRIC SERVICE Rate 20

Page 1 of 2

Availability:

In all communities served for all types of general electric service with billing demands that do not warrant the installation of a demand meter except outside lighting, standby, resale or other customers covered by special contracts or rate schedules applicable to specific services. The customer's wiring must be so arranged so that all service can be measured through one meter. If the customer does not connect his wiring into a single system, each meter shall constitute a separate billing unit.

Rate:

Basic Service Charge: \$0.84 per day

Energy Charge:

October – May:

First 750 Kwh per month 6.520¢ per Kwh

Over 750 Kwh per month 3.520¢ per Kwh

June – September: 6.520¢ per Kwh

Minimum Bill:

Basic Service Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4

8th Revised Sheet No. 14.1

Canceling 7th Revised Sheet No. 14.1

IRRIGATION POWER SERVICE Rate 25

Page 2 of 2

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
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General Terms and Conditions:

The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4
4th Revised Sheet No. 15.1
Canceling 3rd Revised Sheet No. 15.1

OPTIONAL TIME-OF-DAY SMALL GENERAL ELECTRIC SERVICE Rate 26

Page 2 of 2

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Contract Terms:

Customer agrees to contract for service under the Optional Time-of-Day Small General Electric Service rate for a minimum period of one year. At the end of a one-year period, customer shall have the option of remaining under the Optional Time-of-Day Small General Electric Service rate or returning to the regular Small General Electric Service rate.

General Terms and Conditions:

1. Customers and their architects, contractors and electricians should consult with the Company before proceeding to design or erect installations in which there will be a substantial electric load, to make sure their equipment will meet requirements and receive adequate service.
2. Customer may take service under this rate provided customer's monthly Kwh will not exceed 4,000 Kwh per month for four consecutive months or connected load will not exceed 20 Kw.
3. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4

8th Revised Sheet No. 18.1

Canceling 7th Revised Sheet No. 18.1

GENERAL ELECTRIC SERVICE Rate 30

Page 2 of 2

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the maximum 15 minute measured demand in the current month. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Customers or their architects, contractors and electricians should consult with the Company before proceeding to design or erect installations in which there will be a substantial electric load, to make sure their equipment will meet requirements and receive adequate service.
2. Primary service rate is applicable to customers that own their own transformers, related equipment and distribution facilities downstream of the meter, satisfactory to the Company so customer can receive service and be metered at primary voltages of 2,400 volts or greater.
3. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4

10th Revised Sheet No. 20.1

Canceling 9th Revised Sheet No. 20.1

GENERAL ELECTRIC SPACE HEATING SERVICE Rate 32

Page 2 of 3

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the maximum 15 minute measured demand in the current month. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

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2. Primary service rate is applicable to customers that own their own transformers, related equipment and distribution facilities downstream of the meter, satisfactory to the Company so customer can receive service and be metered at primary voltages of 2,400 volts or greater.

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NDPSC Volume 4

7th Revised Sheet No. 22.1

Canceling 6th Revised Sheet No. 22.1

FIRM SERVICE ECONOMIC DEVELOPMENT Rate 34

Page 2 of 3

Minimum Bill:

Basic Service Charge plus Demand Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Right to Discontinue Service:

The Company reserves the right to refuse applicants who have not previously signed a contract for service under this rate if it determines either system capacity or system energy supply is projected to be insufficient, or if service reliability is expected to be at jeopardy.

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the greater of the maximum 15 minute measured demand in the current month or 200 Kw. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

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State of North Dakota Electric Rate Schedule

NDPSC Volume 4

8th Revised Sheet No. 23.1

Canceling 7th Revised Sheet No. 23.1

INTERRUPTIBLE LARGE POWER DEMAND RESPONSE Rate 38

Page 2 of 4

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the greater of the maximum 15 minute measured demand in the current month or 500 Kw. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

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5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. The customer shall execute an electric service agreement with the Company which will include, among other provisions, a minimum term of service and monthly Basic Service Charge payments to the Company. The monthly Basic Service Charge payments are determined on a customer by customer basis and shall include, but are not limited to, any additional costs incurred by Company for facilities, such as substations, electric lines, meters, switching devices, and circuit breakers that are necessary to provide service under this rate.

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Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4
9th Revised Sheet No. 25.1
Canceling 8th Revised Sheet No. 25.1

SMALL MUNICIPAL ELECTRIC SERVICE Rate 40 (CLOSED)

Page 2 of 3

Minimum Bill:

Basic Service Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the maximum 15 minute measured demand in the current month. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

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1. Renewable Resource Cost Adjustment Rate 55
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State of North Dakota Electric Rate Schedule

NDPSC Volume 4
8th Revised Sheet No. 26
Canceling 7th Revised Sheet No. 26

MUNICIPAL LIGHTING SERVICE Rate 41

Page 1 of 2

Availability:

For municipal lighting purposes including streets, alleys and other public grounds. Service will be provided all night, every night in the year with a minimum service requirement of 4,000 hours annually, and must be covered by written contract.

Rate:

Primary Service:
Energy Charge: 5.510¢ per Kwh

Secondary Service:
Energy Charge: 6.010¢ per Kwh

Discount: For contracts of ten years or more 10%

Kwh shall be computed according to the total rated capacity of lamps in use.

Minimum Bill:

As provided in contract.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

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Director - Regulatory Affairs

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Montana-Dakota Utilities Co.

A Division of MDU Resources Group, Inc.

400 N 4th Street
Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4

9th Revised Sheet No. 32.1

Canceling 8th Revised Sheet No. 32.1

MUNICIPAL PUMPING SERVICE Rate 48

Page 2 of 2

Minimum Bill:

Basic Service Charge plus Demand Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Primary service rate is applicable to customers that own their own transformers, related equipment and distribution facilities downstream of the meter, satisfactory to the Company so customer can receive service and be metered at primary voltages of 2,400 volts or greater.
2. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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OUTDOOR LIGHTING SERVICE Rate 52

Page 1 of 2

Availability:

For all outdoor lighting including flood lights, billboard lighting, metallic vapor yard lights, and Christmas lights in all communities served. Lighting equipment may be Company-owned or customer-owned.

Rate:

| | |
|--------------------|----------------|
| Primary Service: | |
| Energy Charge: | 6.819¢ per Kwh |
| Secondary Service: | |
| Energy Charge: | 7.225¢ per Kwh |

Kwh shall be computed according to the total rated capacity of the units in use.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Applicable to Company-owned Facilities:
 - a. The Company will install, own and operate the flood light(s), and yard light(s) including a suitable reflector, bracket for mounting and automatic device to control operating hours set to operate from dusk to dawn.

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**State of North Dakota
 Electric Rate Schedule**

Section No. 3
 Original Sheet No. 51.2

PEAK REWARDS PROGRAM & COST RECOVERY MECHANISM Rate 105

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preceding twelve-month recovery period plus carrying costs on the monthly over or under collected amount. Montana-Dakota will apply carrying charges at the rate of interest for a three-month Treasury Bill as published monthly by the Federal Reserve for the preceding month.

Rates:

| | |
|-----------------------------|----------------|
| Residential & Small General | 0.027¢ per Kwh |
| Large General | 0.025¢ per Kwh |
| Lighting | 0.010¢ per Kwh |

General Terms and Conditions:

1. Program participants must be a Montana-Dakota Residential electric customer, have central air conditioning, wireless internet service, and a program qualifying thermostat.
2. Customers need to enroll in the Peak Rewards Program only once. Customer will be enrolled automatically for all future seasons unless customer un-enrolls by notifying the program administrator.
3. Program season is June 1 through September 30.
4. There will be a maximum of 10 interruption events per season and a 4 hour maximum event duration.
5. Event time period is limited to 12:00 p.m. to 8:00 p.m. Monday through Friday local time and interruption events will not be called on major holidays.
6. One test event will be performed annually. An event can serve as the annual test event.
7. Customer may opt out of a maximum of two interruption events per season. If a customer exceeds the opt out limit in a season that customer will not receive the participation bill credit for the remainder of that season.

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**State of North Dakota
Electric Rate Schedule**

Section No. 3
Original Sheet No. 51

PEAK REWARDS PROGRAM & COST RECOVERY MECHANISM Rate 105

Page 1 of 3

Availability:

In all communities served for customers served under the Company's Residential electric service schedules meeting the eligibility requirements stated below.

Applicability:

This rate schedule provides residential electric services customers with an option to participate in the Peak Rewards Program (Program). The Program is comprised of a voluntary demand response program where the customer allows Montana-Dakota the ability to temporarily manage the customer's central air-conditioning (A/C) unit through the use of an eligible smart thermostat that is Wi-Fi enabled. The Peak Rewards Program is seasonal, running from June through September each year.

This rate schedule also outlines the cost recovery mechanism to be utilized to recover the costs of the Peak Rewards Program that is applicable to all customers.

Program Eligibility:

The Peak Rewards Program is available to residential customers meeting the following conditions:

1. Customer's home has central A/C.
2. Customer has in-home wireless internet service.
3. Customer has a qualifying thermostat installed (as identified on the Company's Marketplace website).

Purpose:

Montana-Dakota will generally utilize the program to reduce its system demand 1) during times of peak demand on the system, 2) during emergency or near-emergency situations, or 3) during limited program testing. The operation of this program will act as a demand-side resource to Montana-Dakota to help maintain service reliability for all electric customers and defer construction of additional generation facilities.

Montana-Dakota recognizes that there may be times that a temperature increase, however modest, may inconvenience customers. For this reason, participants will be allowed a maximum of two event opt-outs per season. Customers may opt out of an event by simply adjusting the thermostat while an event is in progress (i.e. overriding the temperature setting).

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**State of North Dakota
Electric Rate Schedule**

Section No. 3
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PEAK REWARDS PROGRAM & COST RECOVERY MECHANISM Rate 105

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Customer Incentives:

1. **Device Options and Rebate:** A number of thermostats made by various manufacturers are eligible for use within the Program. Low, mid, and high cost options are available; with participants responsible for purchasing and installing an eligible thermostat. To encourage enrollment and alleviate the financial burden of purchasing a qualifying thermostat, Montana-Dakota is offering a \$60 rebate on the purchase. Customers can utilize the Marketplace found on Montana-Dakota's website to shop for thermostats online and receive an immediate point-of-sale rebate or a mail-in rebate is available for those customers purchasing a qualifying device from a third party. Customers with existing Wi-Fi enabled thermostats or those looking to purchase from a third party should refer to the MDU Marketplace to confirm which thermostats qualify for the Program. Participants with multi-zone climate control installed within their home will be eligible for a maximum of two thermostat rebates.
2. **Participation Incentive:** In addition to the \$60 thermostat rebate, customers will also receive up to a \$40 bill credit for participating in the Program for the months of June through September each program year. The credit will be broken down into a monthly bill credit incentive of approximately \$10 per month and applied to qualifying customer's residential service at a rate of \$0.32787 per day. The bill credit will be prorated based on the number of days the customer is enrolled in the program during the initial program year with the full \$40 bill credit for customers enrolled for the entire June through September season.

Cost Recovery:

1. An adjustment per Kwh will be determined based on the projected annual program costs eligible for recovery under this mechanism and as allocated to North Dakota and the forecasted Kwh sales for the recovery period.
2. The adjustment will be applicable to all retail customers for electric energy sold, except those served under special contracts approved by the Commission.
3. Program costs shall be allocated between the rate classes based on the Company's Demand Factor No. 2 established in the Company's most recent general rate case.
4. The adjustment per Kwh will be adjusted annually to reflect the projected level of costs to be incurred during the recovery period.
5. Following the initial program year, and annually thereafter, the Peak Rewards Program charge shall include any over or under collection of revenue from the

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Tariffs Reflecting Proposed Changes



Montana-Dakota Utilities Co.

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400 N 4th Street
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Canceling 5th Revised Sheet No. 1.1

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RESIDENTIAL ELECTRIC SERVICE Rate 10

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Availability:

In all communities served for single-phase residential electric service for domestic purposes only.

Rate:

Basic Service Charge: \$0.46 per day

Energy Charge:

October – May:

First 750 Kwh per month 6.133¢ per Kwh

Over 750 Kwh per month 3.133¢ per Kwh

June – September: 6.133¢ per Kwh

Minimum Bill:

Basic Service Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- 5.6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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State of North Dakota Electric Rate Schedule

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OPTIONAL RESIDENTIAL ELECTRIC THERMAL ENERGY STORAGE SERVICE Rate 13

Page 2 of 2

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- ~~5-6.~~ Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Thermal storage space heating facilities can include the thermal storage device(s), air-source heat pumps, and associated air handling units.
2. Unless approved by the Company the maximum thermal storage facilities that may be connected under this rate schedule is 50 Kw.
3. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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OPTIONAL TIME-OF-DAY RESIDENTIAL ELECTRIC SERVICE Rate 16

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1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- 5-6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Contract Terms:

Customer agrees to contract for service under the Optional Time-of-Day Residential Electric Service rate for a minimum period of one year. At the end of a one-year period, customer shall have the option of remaining under the Optional Time-of-Day Residential Electric Service rate or returning to the regular Residential Electric Service rate.

General Terms and Conditions:

The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

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8th Revised Sheet No. 10
Canceling 7th Revised Sheet No. 10

SMALL GENERAL ELECTRIC SERVICE Rate 20

Page 1 of 2

Availability:

In all communities served for all types of general electric service with billing demands that do not warrant the installation of a demand meter except outside lighting, standby, resale or other customers covered by special contracts or rate schedules applicable to specific services. The customer's wiring must be so arranged so that all service can be measured through one meter. If the customer does not connect his wiring into a single system, each meter shall constitute a separate billing unit.

Rate:

Basic Service Charge: \$0.84 per day

Energy Charge:

October – May:

First 750 Kwh per month 6.520¢ per Kwh

Over 750 Kwh per month 3.520¢ per Kwh

June – September: 6.520¢ per Kwh

Minimum Bill:

Basic Service Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

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Canceling 6th Revised Sheet No. 14.1

IRRIGATION POWER SERVICE Rate 25

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Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- ~~5-6.~~ Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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OPTIONAL TIME-OF-DAY SMALL GENERAL ELECTRIC SERVICE Rate 26

Page 2 of 2

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- 5-6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Contract Terms:

Customer agrees to contract for service under the Optional Time-of-Day Small General Electric Service rate for a minimum period of one year. At the end of a one-year period, customer shall have the option of remaining under the Optional Time-of-Day Small General Electric Service rate or returning to the regular Small General Electric Service rate.

General Terms and Conditions:

1. Customers and their architects, contractors and electricians should consult with the Company before proceeding to design or erect installations in which there will be a substantial electric load, to make sure their equipment will meet requirements and receive adequate service.
2. Customer may take service under this rate provided customer's monthly Kwh will not exceed 4,000 Kwh per month for four consecutive months or connected load will not exceed 20 Kw.
3. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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GENERAL ELECTRIC SERVICE Rate 30

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Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the maximum 15 minute measured demand in the current month. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- 5-6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Customers or their architects, contractors and electricians should consult with the Company before proceeding to design or erect installations in which there will be a substantial electric load, to make sure their equipment will meet requirements and receive adequate service.
2. Primary service rate is applicable to customers that own their own transformers, related equipment and distribution facilities downstream of the meter, satisfactory to the Company so customer can receive service and be metered at primary voltages of 2,400 volts or greater.
3. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

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GENERAL ELECTRIC SPACE HEATING SERVICE Rate 32

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Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the maximum 15 minute measured demand in the current month. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- ~~5-6.~~ Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Customers or their architects, contractors and electricians should consult with the Company before proceeding to design or erect installations in which there will be a substantial electric load, to make sure their equipment will meet requirements and receive adequate service.
2. Primary service rate is applicable to customers that own their own transformers, related equipment and distribution facilities downstream of the meter, satisfactory to the Company so customer can receive service and be metered at primary voltages of 2,400 volts or greater.

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FIRM SERVICE ECONOMIC DEVELOPMENT Rate 34

Page 2 of 3

Minimum Bill:

Basic Service Charge plus Demand Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- 5-6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Right to Discontinue Service:

The Company reserves the right to refuse applicants who have not previously signed a contract for service under this rate if it determines either system capacity or system energy supply is projected to be insufficient, or if service reliability is expected to be at jeopardy.

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the greater of the maximum 15 minute measured demand in the current month or 200 Kw. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

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INTERRUPTIBLE LARGE POWER DEMAND RESPONSE Rate 38

Page 2 of 4

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the greater of the maximum 15 minute measured demand in the current month or 500 Kw. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- 5-6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. The customer shall execute an electric service agreement with the Company which will include, among other provisions, a minimum term of service and monthly Basic Service Charge payments to the Company. The monthly Basic Service Charge payments are determined on a customer by customer basis and shall include, but are not limited to, any additional costs incurred by Company for facilities, such as substations, electric lines, meters, switching devices, and circuit breakers that are necessary to provide service under this rate.

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SMALL MUNICIPAL ELECTRIC SERVICE Rate 40 (CLOSED)

Page 2 of 3

Minimum Bill:

Basic Service Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Determination of Billing Demand:

The demand in kilowatts for billing purposes shall be the maximum 15 minute measured demand in the current month. Demands will be determined to the nearest one-tenth kilowatt. Customers whose loads have rapidly fluctuating and/or intermittent demand characteristics shall be subject to special rules and regulations.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
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400 N 4th Street
Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4
7th Revised Sheet No. 26
Canceling 6th Revised Sheet No. 26

MUNICIPAL LIGHTING SERVICE Rate 41

Page 1 of 2

Availability:

For municipal lighting purposes including streets, alleys and other public grounds. Service will be provided all night, every night in the year with a minimum service requirement of 4,000 hours annually, and must be covered by written contract.

Rate:

Primary Service:
Energy Charge: 5.510¢ per Kwh

Secondary Service:
Energy Charge: 6.010¢ per Kwh

Discount: For contracts of ten years or more 10%

Kwh shall be computed according to the total rated capacity of lamps in use.

Minimum Bill:

As provided in contract.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
6. Peak Rewards Program & Cost Recovery Mechanism Rate 105

Date Filed: June 26, 2017

Effective Date: Service rendered on and after August 7, 2017

Issued By: Tamie A. Aberle
Director - Regulatory Affairs

Case No.: PU-16-666



Montana-Dakota Utilities Co.

A Division of MDU Resources Group, Inc.

400 N 4th Street
Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4
8th Revised Sheet No. 32.1
Canceling 7th Revised Sheet No. 32.1

MUNICIPAL PUMPING SERVICE Rate 48

Page 2 of 2

Minimum Bill:

Basic Service Charge plus Demand Charge.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Power Factor Clause:

The Company reserves the right to require the customer to install adequate equipment so that at all times it can operate its facilities to maintain a power factor between 90% lagging and 90% leading. If the customer operates outside this range, the maximum 15 minute integrated reactive kilovolt amperes in excess of 50% of the maximum 15 minute integrated kilowatt demand for the same month will be billed at \$3.35 per Kvar of such excess demand.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- ~~5-6.~~ Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Primary service rate is applicable to customers that own their own transformers, related equipment and distribution facilities downstream of the meter, satisfactory to the Company so customer can receive service and be metered at primary voltages of 2,400 volts or greater.
2. The foregoing schedule is subject to Rates 100-112 and any amendments or alterations thereto or additional rules and regulations promulgated by the Company under the laws of the state.

| | |
|--|---|
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Montana-Dakota Utilities Co.

A Division of MDU Resources Group, Inc.

400 N 4th Street
Bismarck, ND 58501

State of North Dakota Electric Rate Schedule

NDPSC Volume 4
8th Revised Sheet No. 36
Canceling 7th Revised Sheet No. 36

OUTDOOR LIGHTING SERVICE Rate 52

Page 1 of 2

Availability:

For all outdoor lighting including flood lights, billboard lighting, metallic vapor yard lights, and Christmas lights in all communities served. Lighting equipment may be Company-owned or customer-owned.

Rate:

| | |
|--------------------|----------------|
| Primary Service: | |
| Energy Charge: | 6.819¢ per Kwh |
| Secondary Service: | |
| Energy Charge: | 7.225¢ per Kwh |

Kwh shall be computed according to the total rated capacity of the units in use.

Payment:

Bills will be considered past due if not paid by the due date shown on the bill. Past due bills are subject to a late payment charge in accordance with the provisions of Rate 100 or any amendments or alterations thereto.

Adjustment Clauses:

Bills are subject to the following adjustments or any amendments or alterations thereto:

1. Renewable Resource Cost Adjustment Rate 55
2. Generation Resource Recovery Rider Rate 56
3. Environmental Cost Recovery Rider Rate 57
4. Fuel and Purchased Power Adjustment Rate 58
5. Transmission Cost Adjustment Rate 59
- ~~5-6.~~ Peak Rewards Program & Cost Recovery Mechanism Rate 105

General Terms and Conditions:

1. Applicable to Company-owned Facilities:
 - a. The Company will install, own and operate the flood light(s), and yard light(s) including a suitable reflector, bracket for mounting and automatic device to control operating hours set to operate from dusk to dawn.

| | |
|--|---|
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**State of North Dakota
Electric Rate Schedule**

Section No. 3
Original Sheet No. 51

PEAK REWARDS PROGRAM & COST RECOVER MECHANISM Rate 105

Page 1 of 3

Availability:

In all communities served for customers served under the Company's Residential electric service schedules meeting the eligibility requirements stated below.

Applicability:

This rate schedule provides residential electric services customers with an option to participate in the Peak Rewards Program (Program). The Program is comprised of a voluntary demand response program where the customer allows Montana-Dakota the ability to temporarily manage the customer's central air-conditioning (A/C) unit through the use of an eligible smart thermostat that is Wi-Fi enabled. The Peak Rewards Program is seasonal, running from June through September each year.

This rate schedule also outlines the cost recovery mechanism to be utilized to recover the costs of the Peak Rewards Program that is applicable to all customers.

Program Eligibility:

The Peak Rewards Program is available to residential customers meeting the following conditions:

1. Customer's home has central A/C.
2. Customer has in-home wireless internet service.
3. Customer has a qualifying thermostat installed (as identified on the Company's Marketplace website).

Purpose:

Montana-Dakota will generally utilize the program to reduce its system demand 1) during times of peak demand on the system, 2) during emergency or near-emergency situations, or 3) during limited program testing. The operation of this program will act as a demand-side resource to Montana-Dakota to help maintain service reliability for all electric customers and defer construction of additional generation facilities.

Montana-Dakota recognizes that there may be times that a temperature increase, however modest, may inconvenience customers. For this reason, participants will be allowed a maximum of two event opt-outs per season. Customers may opt out of an event by simply adjusting the thermostat while an event is in progress (i.e. overriding the temperature setting).

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**State of North Dakota
Electric Rate Schedule**

Section No. 3
Original Sheet No. 51.1

PEAK REWARDS PROGRAM & COST RECOVERY MECHANISM Rate 105

Page 2 of 3

Customer Incentives:

1. Device Options and Rebate: A number of thermostats made by various manufacturers are eligible for use within the Program. Low, mid, and high cost options are available; with participants responsible for purchasing and installing an eligible thermostat. To encourage enrollment and alleviate the financial burden of purchasing a qualifying thermostat, Montana-Dakota is offering a \$60 rebate on the purchase. Customers can utilize the Marketplace found on Montana-Dakota's website to shop for thermostats online and receive an immediate point-of-sale rebate or a mail-in rebate is available for those customers purchasing a qualifying device from a third party. Customers with existing Wi-Fi enabled thermostats or those looking to purchase from a third party should refer to the MDU Marketplace to confirm which thermostats qualify for the Program. Participants with multi-zone climate control installed within their home will be eligible for a maximum of two thermostat rebates.

2. Participation Incentive: In addition to the \$60 thermostat rebate, customers will also receive up to a \$40 bill credit for participating in the Program for the months of June through September each program year. The credit will be broken down into a monthly bill credit incentive of approximately \$10 per month and applied to qualifying customer's residential service at a rate of \$0.32787 per day. The bill credit will be prorated based on the number of days the customer is enrolled in the program during the initial program year with the full \$40 bill credit for customers enrolled for the entire June through September season.

Cost Recovery:

1. An adjustment per Kwh will be determined based on the projected annual program costs eligible for recovery under this mechanism and as allocated to North Dakota and the forecasted Kwh sales for the recovery period.
2. The adjustment will be applicable to all retail customers for electric energy sold, except those served under special contracts approved by the Commission.
3. Program costs shall be allocated between the rate classes based on the Company's Demand Factor No. 2 established in the Company's most recent general rate case.
4. The adjustment per Kwh will be adjusted annually to reflect the projected level of costs to be incurred during the recovery period.
5. Following the initial program year, and annually thereafter, the Peak Rewards Program charge shall include any over or under collection of revenue from the

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**State of North Dakota
 Electric Rate Schedule**

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PEAK REWARDS PROGRAM & COST RECOVERY MECHANISM Rate 105

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preceding twelve-month recovery period plus carrying costs on the monthly over or under collected amount. Montana-Dakota will apply carrying charges at the rate of interest for a three-month Treasury Bill as published monthly by the Federal Reserve for the preceding month.

Rates:

| | |
|-----------------------------|----------------|
| Residential & Small General | 0.027¢ per Kwh |
| Large General | 0.025¢ per Kwh |
| Lighting | 0.010¢ per Kwh |

General Terms and Conditions:

1. Program participants must be a Montana-Dakota Residential electric customer, have central air conditioning, wireless internet service, and a program qualifying thermostat.
2. Customers need to enroll in the Peak Rewards Program only once. Customer will be enrolled automatically for all future seasons unless customer un-enrolls by notifying the program administrator.
3. Program season is June 1 through September 30.
4. There will be a maximum of 10 interruption events per season and a 4 hour maximum event duration.
5. Event time period is limited to 12:00 p.m. to 8:00 p.m. Monday through Friday local time and interruption events will not be called on major holidays.
- 1-6 One test event will be performed annually. An event can serve as the annual test event.
7. Customer may opt out of a maximum of two interruption events per season. If a customer exceeds the opt out limit in a season that customer will not receive the participation bill credit for the remainder of that season.

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Program Introduction

The proposed Peak Rewards Program will be part of Montana-Dakota's Demand Side Management (DSM) portfolio. DSM is a cost-effective resource planning tool a utility can use to meet two objectives: (1) to potentially offset future generation resource costs through load management and/or conservation measures and (2) to enhance customer service through the offering of programs to customers that will help reduce their overall demand and/or energy requirements. The Peak Rewards Program was also included as a cost effective DSM program in the 2015 and recently filed 2017 Integrated Resources Plans.

The Peak Rewards Program is projected to add 2 MW of demand response to Montana-Dakota's generation portfolio in 2018 and grow to a total of 10 MW in 2022. Montana-Dakota will receive MISO Resource Adequacy credits for the enrolled capacity, which will lower the amount of supply side resources required to meet customer load.

The Peak Rewards Program would be offered to residential electric customers in Montana, North Dakota, and South Dakota, and operated as a Bring Your Own Thermostat (BYOT) program. The program would use a programmable Wi-Fi enabled thermostat to control a customer's air conditioner during times of MISO declared and local emergency situations. Customers would receive a rebate on the purchase of a program qualified thermostat and an annual capacity payment for their participation in the program. This program would also provide additional energy efficiency savings through the use of the programmable Wi-Fi enabled thermostat functions.

Program Incentives:

| Measure | Incentive Level |
|--|------------------------|
| Wi-Fi Programmable Thermostat Rebate | \$60 one-time rebate |
| Residential Demand Response Capacity Payment | \$40 per season |

Program Rules:

- Customer would be required to be a Montana-Dakota residential electric customer, have central AC, Wireless internet access, and a program qualifying thermostat
- Program Season: June 1 – September 30
- Maximum of 10 events per season and 4 hour event duration
- Control time period limited to 12-8pm Monday-Friday and no major holidays

- Customer may opt out of a maximum of two events per season
- One test event will be performed annually (an event can serve as the annual test)
- Customer will receive a one hour notification of an event (via SMS, T-Stat, mobile application, & Email notification)

Program Details

Montana-Dakota will deliver this program with the assistance of two third party partners, Itron Inc. (formerly Comverge) and Simple Energy, Inc. Both partners were selected through a competitive Request for Proposal (RFP) process that was issued on August 1, 2016. An overview of the two partnerships is below:

Itron Partnership and Program Administration

Montana-Dakota has engaged Itron to provide overall program administration and development assistance, hosted demand response management software (DRMS), marketing support and design, and customer service and support. The partnership with Itron, who is a leader in implementing similar demand response programs, will provide Montana-Dakota with a proven partner to achieve overall program goals.

As part of the overall program administration and development Itron will provide Montana-Dakota with connectivity for all selected thermostat manufacturers to enable the demand response function for the enrolled customer's thermostat. The various fees associated with the manufacturers will be passed along to Montana-Dakota and are part of the overall program costs.

Itron will provide a Montana-Dakota branded enrollment portal where customers will enroll, opt out, or cancel their participation in the program. The enrollment portal will directly link to the Itron hosted DRMS and will be connected to the Online Marketplace. To facilitate the verification process for customer enrollment, Montana-Dakota will be required to share its residential customer account list which will include customer name, service address, and account number. The customer list will be provided to Itron through a secure file transfer and all appropriate Non-Disclosure provisions safeguarding this information sharing are included in the Itron Agreement.

The Itron DRMS which is branded IntelliSOURCE will provide overall management of the program including monitoring of enrolled thermostats for online/offline status, dispatching events or tests and reporting and measurement and verification data for the program. IntelliSOURCE

will be customized and configured specifically for Montana-Dakota's Peak Rewards Program, but does have the ability to be expanded to include other demand response programs and devices in the future.

IntelliSOURCE will provide the capability to provide multiple control strategies for events, which will include standard cycling control, temperature setback, temperature set point, and adaptive cycling of enrolled thermostats. These different control strategies will allow Montana-Dakota the ability to maximize the amount of load provide by each participant and minimize customer comfort impacts during events. IntelliSOURCE will also provide the ability to geographically call events for only those thermostats located in a certain area of the Company's service territory that maybe experiencing a localized emergency.

Itron will also provide marketing support and design assistance that will include development of the overall marketing approach, creative design, placement of email marketing campaigns, and mobile application marketing with thermostat vendors. Montana-Dakota will control and approve all marketing material and channels used by Itron.

Itron will provide the overall Customer Service and Support function for the program and will serve as the primary point of contact for the customer. Itron will assist customers with enrollment and program inquiries and timely resolution of all customer service issues related to the program. Itron will provide this from their centralized call center and service will be provided by trained customer service representatives that are well versed in demand response programs. Montana-Dakota and Itron's customer service centers will coordinate and provide for warm and cold transfers between them as needed to ensure excellent customer service for customers. The program will be marketed with a separate 1-800 number for all program inquiries.

Simple Energy Partnership and Online Marketplace

Montana-Dakota's partnership with Simple Energy will provide the Peak Rewards Program with a utility branded e-commerce site where customers can securely purchase the program qualified Wi-Fi thermostats. The e-commerce site will be branded the Montana-Dakota Marketplace (Marketplace) and will allow customers to browse, compare, and purchase the qualifying thermostats online, with the opportunity for instant online rebates at the point-of-sale (POS).

The POS rebate will be provided to customers once they have been verified as a Montana-Dakota residential electric customer. The verification process will require customers to provide

their Montana-Dakota account number. In order to facilitate the verification process for POS rebates Montana-Dakota will be required to share our residential customer account list which will include customer name, service address, and account number. The customer list will be provided to Simple Energy through a secure file transfer and all appropriate Non-Disclosure provisions safeguarding this information sharing are included in the Simple Energy Agreement.

Simple Energy will setup, host, and operate the Marketplace on behalf of Montana-Dakota, including securing and managing participating marketplace manufacturers, distributors, and other vendor partners as required. Once the customer purchases the Wi-Fi thermostat through the Marketplace, Simple Energy will provide all customer fulfillment and customer support for the products purchased.

Simple Energy will also provide Montana-Dakota with online marketing services which will include email marketing campaigns and online advertisements promoting the marketplace.

Who's Eligible?

The Peak Rewards Program will be available to all Montana-Dakota residential electric customers who are served under any currently applicable tariff in the states of Montana, North Dakota, and South Dakota. In order to participate residential electric customers will be required to have central air conditioning, in home Wi-Fi installed, and either have or install a qualifying Wi-Fi enabled thermostat.

Incentives

Montana-Dakota is proposing to provide two financial incentives to customers as part of this program. The financial incentives are critical to achieve the program goals and retain enrolled customers in the program from year to year.

First, customers who do not currently have a qualifying Wi-Fi enabled thermostat installed in their home will receive a \$60 rebate for the purchase of a qualifying thermostat. This rebate will be available as a POS rebate if purchased from the MDU Marketplace or customers will have the ability to submit a mail-in rebate application for qualifying thermostats purchased through other vendors. Customers that have a zoned heating and cooling system would qualify for up to two thermostat rebates. The thermostat rebate is necessary to lower the upfront cost of purchasing the Wi-Fi thermostat which is required for participation in the program. The \$60 rebate per thermostat is approximately 50% of the cost of the lowest cost Wi-Fi thermostat option qualifying for the program.

Montana-Dakota is also proposing that the Wi-Fi thermostat rebate will be available to homebuilders for new construction homes in the Company's service territory. Each participating homebuilder will have a cap of 10 rebates per year. Extending the Wi-Fi thermostat rebate to homebuilders is necessary to incentivize placement of qualifying Wi-Fi thermostats in new homes when they are built. Montana-Dakota believes that new homeowners would be reluctant to change out a new thermostat in their new home, therefore effectively delaying their participation into the program for several years. Montana-Dakota and its program partners through the various marketing channels will target the new homeowner for enrollment into the program. Montana-Dakota will also work with participating homebuilders to market their homes as demand response ready.

The second incentive will be a \$40 bill credit for being enrolled and participating in the demand response program for the months of June through September each program year. The rebate will be broken down into a monthly bill credit incentive of approximately \$10 per month and will be applied as a credit of \$0.32787 per day. The daily credit mechanism will allow Montana-Dakota to prorate the bill credit based upon the number of days the customer was enrolled in the program during the program year and provide the full \$40 bill credit for customers enrolled for the entire season. The annual capacity payment is necessary to keep customers enrolled in the program and is similar (on a \$/kW month basis) to the annual capacity payments provided under Montana-Dakota's Commercial Demand Response program and Interruptible Demand Response Rate.

Program Marketing

Montana-Dakota's marketing staff will provide overall approval of all marketing material and outreach channels used. In addition Montana-Dakota will be responsible for placement of all traditional media, direct mail, and bill inserts that promote the program. Itron will provide marketing plan development and design assistance, including placement of all email and in app marketing. Simple Energy in coordination with Montana-Dakota will provide placement of additional email marketing and other online marketing channels related to the Marketplace.

Montana-Dakota, with the assistance of Itron and Simple Energy will effectively market the program through the following channels:

- Montana-Dakota's website, social media
- Bill inserts

- Email marketing
- In app marketing
- Direct mail
- Online marketing channels
- Traditional marketing channels
- HVAC contractor and builder relationships and promotion.

Participation

Montana-Dakota is forecasting a program participation rate of approximately 2,000 customers per year for the next five years, or a total of 10,000 customers enrolled in the program by 2022. On average, each customer is expected to provide 1 kW of load reduction during events for a total of 10 MW of demand response attributable to this program. The overall saturation rate required to achieve the program goals is approximately 15% of Montana-Dakota’s residential electric customers who have central A/C. The saturation rate is based on 2016 residential customer counts and estimated central air conditioning saturation rates. As shown in the table below the saturation rates vary by state.

| | Residential Customers | Residential AC Saturation | Total Available | Participation Goal | Residential Saturation |
|--------------|------------------------------|----------------------------------|------------------------|---------------------------|-------------------------------|
| Montana | 20,435 | 53% | 10,728 | 2,000 | 18.6% |
| North Dakota | 79,894 | 65% | 51,612 | 7,500 | 14.5% |
| South Dakota | 6,674 | 64% | 4,245 | 500 | 11.8% |
| Total | 107,003 | | 66,585 | 10,000 | 15.0% |

Market research for similar programs other utility companies have deployed and Itron has managed show that a 20-30% saturation rate is achievable in most cases. Therefore, Montana-Dakota believes the required program participation and saturation rates by state and in total are achievable.

Montana-Dakota expects the program will have some annual churn as customers enroll and leave the program, which will require more customers to be enrolled to meet the program goals. The churn rate is forecasted to be 3% annually or approximately 60 customers in year one. As with any program, some level of churn is unavoidable; however, Montana-Dakota will work to minimize the churn rate by providing excellent customer service and allowing customers to elect alternate control strategies if necessary.

Montana-Dakota also expects some level of leakage will occur with providing the POS rebates on the Marketplace. Leakage is defined as customers who receive a Wi-Fi thermostat rebate, but do not enroll in the Peak Rewards Program. Montana-Dakota anticipates the leakage rates will be nominal; however we plan to include a program enrollment disclaimer on the Marketplace and will have customer follow-up procedures in place to help minimize the leakage.

The program cost due to the leakage is expected to be offset by the customers that do not apply for the Wi-Fi Thermostat rebate and the customers that already have a qualifying thermostat prior to the effective date of the program. At this time, Itron estimates there are approximately 3,000 qualifying Nest brand thermostats and 1,500 qualifying Honeywell brand thermostats in and around Montana-Dakota's service territory.

Qualifying Thermostats

Montana-Dakota chose a BYOT type of approach for this program versus a direct install approach as it provides customer flexibility in the types of devices that can participate in the program. In many direct install programs customers only have the choice of one or maybe two types of Wi-Fi Thermostats. With a BYOT approach Montana-Dakota could potentially allow all brands of Wi-Fi thermostats. This flexibility does however come with a cost, as the number different manufacturers you allow has a direct impact cost due to the required fees charged for each manufacturer.

In order to balance the cost and provide customer flexibility Montana-Dakota chose a mix of thermostats that would provide a low (approximately \$100), medium (approximately \$150), and high (approximately \$200 +) cost thermostat option and includes the manufacturers with the largest market share of Wi-Fi Thermostats.

The mix of thermostats chosen includes PRO1, Honeywell, and Nest. PRO1 will have two thermostat options (one in the low and one in the medium price ranges). Honeywell will have three to five thermostat options covering each price range. Nest's primary offering is in the high cost range. As the Wi-Fi thermostat market continues to evolve Montana-Dakota has the ability to add to the program qualifying thermostat mix.

Measurement and Verification (M&V)

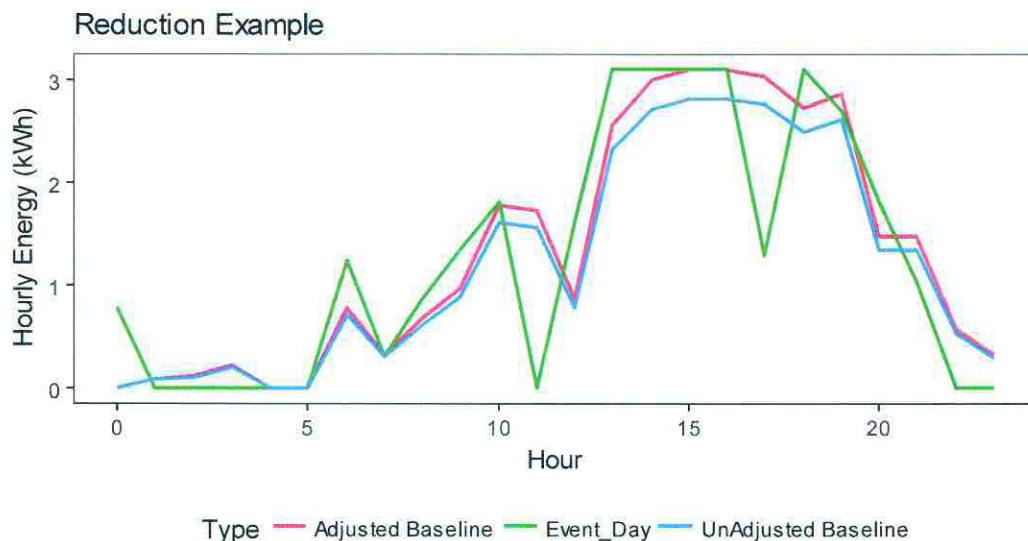
Montana-Dakota is proposing an M&V methodology to verify the amount of demand reduction during an event or test. The methodology is based on commonly used approaches for demand response programs and is similar to the methodology used in the Company's Commercial

Demand Response Program. The event or test event data required for the M&V will be provided from the IntelliSOURCE system which collects a minimum of hourly runtime intervals and for some thermostats will have five-minute interval data.

The proposed M&V methodology is a 4 of 5 baseline estimate that will be based on a stipulated kW value for the average sized A/C unit in the program, measured runtime of each enrolled thermostat during non-event hours for the previous four of five days, and measured runtime during the hours of the event or test. The Stipulated kW value is estimated to be 3.16 kW per participant and is based on a three ton, 13 SEER A/C unit. This value will be updated based on random sampling of enrolled customers and enrolled customer surveys.

The measured runtime of five prior non-event, non-weekend, and non-holiday days will provide a baseline for the runtime of each A/C unit. This will provide average runtime under what is assumed similar weather when compared to the event day. The four highest days will be chosen for the baseline and on an hour by hour basis the energy use will be averaged, which will then constitute the unadjusted baseline.

In order to better correlate to the weather on the event day a multiplicative adjustment to the unadjusted baseline will be done using the hour prior to the event. A ratio of the event day use to the unadjusted baseline use will be calculated. This will constitute the adjusted baseline. The actual event day hourly energy usage will then be subtracted from adjusted baseline value to determine the kW load reduction for each thermostat. A graphical example of the unadjusted baseline, adjusted baseline, and event day hourly usage is shown below.



Program Costs and Assumptions

The program lifetime is assumed to be 15 years, with a first-year cost of approximately \$725,000. The first-year cost of the program attributable to North Dakota is estimated to be approximately \$538,000. The input data used, results of the tests and the benefit-cost worksheets are provided in Exhibit 3.

Program fixed versus variable costs are approximately split 50/50 over the life of the program. The fixed costs are primarily program management, marketing, and the Marketplace. Variable costs are primarily thermostat vendor fees and customer incentives.

As shown in Attachment B the benefit cost analysis shows that the program scores greater than one in all five benefit costs tests and is thus considered feasible. The primary assumptions included in the model are:

- 1 kW average load reduction per participant
- 2 MW per year ramp rate with 10 MW in five years
- 15% overall saturation of residential electric customers with central AC
- \$60 thermostat incentive and a \$40 DR capacity payment per year.

Montana-Dakota understands these key assumptions are primary drivers in the benefit cost analysis so a sensitivity analysis was also performed, indicating that approximately 7.5 MW reduction was the breakeven on cost-effectiveness.

Summary

Montana-Dakota currently has a demand response portfolio in North Dakota that includes a Commercial Demand Response Program administered by a third party and the Company's current Interruptible Demand Response (Rate 38). These two programs combined offered approximately 24.9 MW of capacity to Montana-Dakota's integrated system in 2016; however, no demand response program is currently offered to residential customers. The Peak Rewards Program detailed herein will provide a cost effective demand response offering to residential customers.

The Peak Rewards Program meets MISO capacity accreditation requirements, has the ability to potentially offset future generation resource costs, and can enhance customer service through the offering of programs to residential customers that can help reduce their overall demand and/or energy requirements.

Table 1
Ratepayer Impact Test

Project: Air Conditioning Cycling Program
Program Years: 2018-2022

| Year | Benefits | | | | | | | | | | | Costs | | | | | | Annual Benefits Less Costs (O) | | | | | | |
|----------------------|--|---|----------------------------|-----------------|--------------------|----------------------------|--------------------------|------------------------------|------------------------------|----------------------------|-----------------------|--------------------|-------------------|---------------------|------------------------------|------------------------------|----------------------------|--------------------------------|-----------------|-------------------------|---------------------|--------------------------|-------------------------|--|
| | Summer kWh Requirements Reduction (A1) | Total Program Participants By Year (A2) | Total Energy Reduction (A) | Energy Cost (B) | Energy Savings (C) | Variable O&M Sav. /kWh (D) | Variable O&M Savings (E) | Summer Demand Reduction (F1) | Winter Demand Reduction (F2) | Total Demand Reduction (F) | Demand Savings/kW (G) | Demand Savings (H) | Total Savings (I) | Electric Margin (J) | Summer Energy Reduction (K1) | Winter Energy Reduction (K2) | Total Energy Reduction (K) | | Lost Margin (L) | Program Admin Costs (M) | Incentive Costs (N) | Direct Program Costs (O) | Total Project Costs (P) | |
| 1 2018 | 66,257 | 1,500 | 66,257 | \$0.02987 | \$1,979 | \$0.00000 | \$0 | 1,895 | 0 | 1,695 | \$100.80 | \$170,856 | \$172,835 | \$0.06859 | 61,500 | 0 | 61,500 | \$2,557 | \$7,500 | \$150,000 | \$388,067 | \$548,124 | (\$375,289) | |
| 2 2019 | 132,514 | 3,000 | 132,514 | 0.03164 | 4,193 | 0.00000 | 0 | 3,389 | 0 | 3,389 | 103.82 | 351,846 | 356,039 | 0.07168 | 123,000 | 0 | 123,000 | 5,344 | 7,581 | 212,700 | \$322,967 | 548,592 | (192,553) | |
| 3 2020 | 198,771 | 4,500 | 198,771 | 0.03271 | 6,502 | 0.00000 | 0 | 5,084 | 0 | 5,084 | 106.94 | 543,683 | 550,185 | 0.07491 | 184,500 | 0 | 184,500 | 8,377 | 7,663 | 275,481 | \$363,580 | 655,100 | (104,915) | |
| 4 2021 | 265,028 | 6,000 | 265,028 | 0.03432 | 9,096 | 0.00000 | 0 | 6,779 | 0 | 6,779 | 110.15 | 746,707 | 755,803 | 0.07828 | 246,000 | 0 | 246,000 | 11,672 | 7,746 | 338,345 | \$402,807 | 760,570 | (4,767) | |
| 5 2022 | 331,285 | 7,500 | 331,285 | 0.03616 | 11,979 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 113.45 | 961,375 | 973,354 | 0.08180 | 307,500 | 0 | 307,500 | 15,246 | 7,829 | 401,296 | \$441,400 | 865,771 | 107,583 | |
| 6 2023 | 331,285 | 7,500 | 331,285 | 0.03780 | 12,523 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 116.85 | 990,187 | 1,002,710 | 0.08548 | 307,500 | 0 | 307,500 | 15,932 | 7,914 | 303,039 | \$406,070 | 732,955 | 269,755 | |
| 7 2024 | 331,285 | 7,500 | 331,285 | 0.03996 | 13,238 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 120.36 | 1,019,931 | 1,033,169 | 0.08933 | 307,500 | 0 | 307,500 | 16,650 | 7,999 | 303,039 | \$411,064 | 738,752 | 294,417 | |
| 8 2025 | 331,285 | 7,500 | 331,285 | 0.04202 | 13,921 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 123.97 | 1,050,522 | 1,064,443 | 0.09335 | 307,500 | 0 | 307,500 | 17,399 | 8,086 | 303,039 | \$416,132 | 744,656 | 319,787 | |
| 9 2026 | 331,285 | 7,500 | 331,285 | 0.04383 | 14,520 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 127.69 | 1,082,045 | 1,096,565 | 0.09755 | 307,500 | 0 | 307,500 | 18,182 | 8,173 | 303,039 | \$421,277 | 750,671 | 345,894 | |
| 10 2027 | 331,285 | 7,500 | 331,285 | 0.04514 | 14,954 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 131.52 | 1,114,500 | 1,129,454 | 0.10194 | 307,500 | 0 | 307,500 | 19,000 | 8,261 | 303,039 | \$426,499 | 756,799 | 372,655 | |
| 11 2028 | 331,285 | 7,500 | 331,285 | 0.04649 | 15,401 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 135.47 | 1,147,973 | 1,163,374 | 0.10652 | 307,500 | 0 | 307,500 | 19,854 | 8,351 | 303,039 | \$431,801 | 763,044 | 400,330 | |
| 12 2029 | 331,285 | 7,500 | 331,285 | 0.04788 | 15,862 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 139.53 | 1,182,377 | 1,198,239 | 0.11132 | 307,500 | 0 | 307,500 | 20,748 | 8,441 | 303,039 | \$437,184 | 769,411 | 428,828 | |
| 13 2030 | 331,285 | 7,500 | 331,285 | 0.04932 | 16,339 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 143.72 | 1,217,883 | 1,234,222 | 0.11633 | 307,500 | 0 | 307,500 | 21,682 | 8,532 | 303,039 | \$442,649 | 775,901 | 458,321 | |
| 14 2031 | 331,285 | 7,500 | 331,285 | 0.05080 | 16,829 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 148.03 | 1,254,406 | 1,271,235 | 0.12156 | 307,500 | 0 | 307,500 | 22,657 | 8,624 | 303,039 | \$448,198 | 782,518 | 488,717 | |
| 15 2032 | 331,285 | 7,500 | 331,285 | 0.05232 | 17,333 | 0.00000 | 0 | 8,474 | 0 | 8,474 | 152.47 | 1,292,031 | 1,309,364 | 0.12703 | 307,500 | 0 | 307,500 | 23,676 | 8,717 | 303,039 | \$453,833 | 789,265 | 520,099 | |
| 16 2033 | 0 | 0 | 0 | 0.05389 | 0 | 0.00000 | 0 | 0 | 0 | 0 | 157.04 | 0 | 0 | 0.13275 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 17 2034 | 0 | 0 | 0 | 0.05551 | 0 | 0.00000 | 0 | 0 | 0 | 0 | 161.75 | 0 | 0 | 0.13872 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 18 2035 | 0 | 0 | 0 | 0.05718 | 0 | 0.00000 | 0 | 0 | 0 | 0 | 166.61 | 0 | 0 | 0.14496 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 19 2036 | 0 | 0 | 0 | 0.05890 | 0 | 0.00000 | 0 | 0 | 0 | 0 | 171.80 | 0 | 0 | 0.15149 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 20 2037 | 0 | 0 | 0 | 0.06067 | 0 | 0.00000 | 0 | 0 | 0 | 0 | 176.75 | 0 | 0 | 0.15830 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Total = | | | 4,306,705 | | | | | | | | 110,161 | | \$14,310,891 | | | | 3,997,500 | | | | \$10,982,129 | \$3,328,862 | \$6,853,681 | |
| | | | | | | | | | | | | | NPV = | \$8,239,693 | | | | | | | | \$6,853,681 | 1,386,212 | |
| Total NPV = | | | | \$1,386,212 | | | | | | | | | | | | | | | | | | | | |
| Benefit/Cost Ratio = | | | | 1.20 | | | | | | | | | | | | | | | | | | | | |

| Worksheet Calculations | |
|---|---|
| (A) = Average Summer/Winter kWh /Participant Saved (17) x Number of Participants (19) for Project Life (15), adjusted for line losses | (K) = Average Summer/Winter kWh /Participant Saved (17) x Number of Participants (19) for Project Life (15) |
| (B) = Avg. System Marginal Energy Cost (2), escalated | (L) = [(J) + (K)] x 1-Inverse of Tax Rate (21) |
| (C) = (C) x (D) | (M) = Program Admin Costs (13) |
| (D) = System Variable O&M Savings (6), escalated | (N) = Incentive/Participant (20) x Number of Participants (19) |
| (E) = (C) x (F) | (O) = (L) + (M) + (N) |
| (F) = Average Summer/Winter kW /Participant Saved (16) x Number of Participants (19) for Project Life (15), adjusted for line losses | (P) = (I) - (O) |
| (G) = System Peak Shaving Demand Cost (5), escalated + Escalated System Peak x Reserve Capacity | |
| (H) = (F) + (G) | |
| (I) = (C) + (E) + (H) | |
| (J) = Electric Margin (4), escalated | |

**Table 2
Utility Test**

Project: **Air Conditioning Cycling Program**
 Program Years: **2018-2022**

| Year | Benefits | | | | Costs | | Annual Benefits Less Costs (G) |
|-----------------------------|--------------------|-------------------|---------------------|-------------------|-------------------------|-------------------------|--------------------------------|
| | Energy Savings (A) | O & M Savings (B) | Demand Savings (C) | Total Savings (D) | Total Project Costs (E) | Total Project Costs (F) | |
| 2018 | \$1,979 | \$0 | \$170,856 | \$172,835 | \$545,567 | \$545,567 | (\$372,732) |
| 2019 | 4,193 | 0 | 351,846 | 356,039 | 543,248 | 543,248 | (187,209) |
| 2020 | 6,502 | 0 | 543,683 | 550,185 | 646,723 | 646,723 | (96,538) |
| 2021 | 9,096 | 0 | 746,707 | 755,803 | 748,898 | 748,898 | 6,905 |
| 2022 | 11,979 | 0 | 961,375 | 973,354 | 850,525 | 850,525 | 122,829 |
| 2023 | 12,523 | 0 | 990,187 | 1,002,710 | 717,023 | 717,023 | 285,687 |
| 2024 | 13,238 | 0 | 1,019,931 | 1,033,169 | 722,102 | 722,102 | 311,067 |
| 2025 | 13,921 | 0 | 1,050,522 | 1,064,443 | 727,257 | 727,257 | 337,186 |
| 2026 | 14,520 | 0 | 1,082,045 | 1,096,565 | 732,489 | 732,489 | 364,076 |
| 2027 | 14,954 | 0 | 1,114,500 | 1,129,454 | 737,799 | 737,799 | 391,655 |
| 2028 | 15,401 | 0 | 1,147,973 | 1,163,374 | 743,190 | 743,190 | 420,184 |
| 2029 | 15,862 | 0 | 1,182,377 | 1,198,239 | 748,663 | 748,663 | 449,576 |
| 2030 | 16,339 | 0 | 1,217,883 | 1,234,222 | 754,219 | 754,219 | 480,003 |
| 2031 | 16,829 | 0 | 1,254,406 | 1,271,235 | 759,861 | 759,861 | 511,374 |
| 2032 | 17,333 | 0 | 1,292,031 | 1,309,364 | 765,589 | 765,589 | 543,775 |
| 2033 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2035 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2036 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2037 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total = | | | \$14,310,991 | | \$10,743,153 | | \$3,567,838 |
| NPV = | | | \$8,239,893 | | \$6,718,142 | | 1,521,751 |
| Total NPV = | | | \$1,521,751 | | | | |
| Benefit/Cost Ratio = | | | 1.23 | | | | |

| Worksheet Calculations | |
|---------------------------------|--|
| (A) = Table 1 (C) | |
| (B) = Table 1 (E) | |
| (C) = Table 1 (H) | |
| (D) = Table 1 (I) | |
| (E) = Table 1 (M) + Table 1 (N) | |
| (F) = (E) | |
| (G) = (D) - (F) | |

**Table 3
Societal Cost Test**

Project: **Air Conditioning Cycling Program**
 Program Years: **2018-2022**

| Year | Benefits | | | | | Costs | | | Annual Benefits Less Costs (I) |
|----------------|--------------------------|----------------------------|---------------------------|--|---------------------------|---------------------------|--|---------------------------|--------------------------------|
| | Total Energy Savings (A) | Variable O & M Savings (B) | System Demand Savings (C) | Avoided Environmental Damage Costs (D) | Annual Total Decrease (E) | Utility Project Costs (F) | Participants' Costs Net of Rebates (G) | Annual Total Increase (H) | |
| 2018 | \$1,979 | \$0 | \$170,856 | \$54,652 | \$227,487 | \$545,567 | \$15,000 | \$560,567 | (\$333,080) |
| 2019 | 4,193 | 0 | 351,846 | 115,961 | 472,000 | 543,248 | (42,750) | 500,498 | (28,498) |
| 2020 | 6,502 | 0 | 543,683 | 184,569 | 734,754 | 646,723 | (100,433) | 546,290 | 188,464 |
| 2021 | 9,096 | 0 | 746,707 | 261,154 | 1,016,957 | 748,898 | (158,045) | 590,853 | 426,104 |
| 2022 | 11,979 | 0 | 961,375 | 346,414 | 1,319,768 | 850,525 | (215,587) | 634,938 | 684,830 |
| 2023 | 12,523 | 0 | 990,187 | 367,567 | 1,370,277 | 717,023 | (297,468) | 419,555 | 950,722 |
| 2024 | 13,238 | 0 | 1,019,931 | 390,095 | 1,423,264 | 722,102 | (297,468) | 424,634 | 998,630 |
| 2025 | 13,921 | 0 | 1,050,522 | 413,960 | 1,478,403 | 727,257 | (297,468) | 429,789 | 1,048,614 |
| 2026 | 14,520 | 0 | 1,082,045 | 439,246 | 1,535,811 | 732,489 | (297,468) | 435,021 | 1,100,790 |
| 2027 | 14,954 | 0 | 1,114,500 | 465,993 | 1,595,447 | 737,799 | (297,468) | 440,331 | 1,155,116 |
| 2028 | 15,401 | 0 | 1,147,973 | 494,387 | 1,657,761 | 743,190 | (297,468) | 445,722 | 1,212,039 |
| 2029 | 15,862 | 0 | 1,182,377 | 524,480 | 1,722,719 | 748,663 | (297,468) | 451,195 | 1,271,524 |
| 2030 | 16,339 | 0 | 1,217,883 | 556,436 | 1,790,658 | 754,219 | (297,468) | 456,751 | 1,333,907 |
| 2031 | 16,829 | 0 | 1,254,406 | 590,317 | 1,861,552 | 759,861 | (297,468) | 462,393 | 1,399,159 |
| 2032 | 17,333 | 0 | 1,292,031 | 626,264 | 1,935,628 | 765,589 | (297,468) | 468,121 | 1,467,507 |
| 2033 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2035 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2036 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2037 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total = | | | | | \$20,142,486 | | | \$7,266,658 | \$12,875,828 |
| | | | | | NPV = \$16,175,408 | | | \$6,132,441 | 10,042,967 |

Total NPV = \$10,042,967
 Benefit/Cost Ratio = 2.64

| Worksheet Calculations | |
|---|--|
| (A) = Table 1 (C) | |
| (B) = Table 1 (E) | |
| (C) = Table 1 (H) | |
| (D) = [(A) + (C)] x Environmental Damage Factor (7), escalated | |
| (E) = (A) + (B) + (C) + (D) | |
| (F) = Table 2 (E) | |
| (G) = [Direct Participant Costs (14) x Number of Participants (19)] - Table 1 (N) | |
| (H) = (F) + (G) | |
| (I) = (E) - (H) | |

**Table 4
Participant Test**

Project: Air Conditioning Cycling Program
 Program Years: 2018-2022

| Year | Benefits | | | | | | | | | | | | | | Costs | | | Annual Benefits Less Costs (P) |
|----------------------|-------------------------|------------------------|------------------------|------------------------------|------------------------------|----------------------------|-------------------------|-----------------------------|-----------------------------|------------------------|------------------------|-------------------------|-------------------------------|---------------------------|------------------------|-----------------------|------------------------|--------------------------------|
| | Incentives Received (A) | Summer Retail Rate (B) | Winter Retail Rate (C) | Summer Energy Reduction (D1) | Winter Energy Reduction (D2) | Total Energy Reduction (D) | Energy Savings Bill (E) | Summer Demand Reduction (F) | Winter Demand Reduction (G) | Summer Demand Rate (H) | Winter Demand Rate (I) | Demand Savings Bill (J) | Other Participant Savings (K) | Total Annual Benefits (L) | Direct Part. Costs (M) | Other Part. Costs (N) | Total Annual Costs (O) | |
| 2018 | \$150,000 | \$0.10339 | \$0.09121 | 61,500 | 0 | 61,500 | \$6,358 | 1,500 | 0 | \$0.000 | \$0.000 | \$0 | \$0 | \$156,358 | \$166,782 | \$0 | \$166,782 | (\$10,424) |
| 2019 | 212,700 | 0.10804 | 0.09531 | 123,000 | 0 | 123,000 | 13,289 | 3,000 | 0 | 0.000 | 0.000 | 0 | 0 | 225,989 | \$173,641 | 0 | 173,641 | 52,348 |
| 2020 | 275,481 | 0.11291 | 0.09960 | 184,500 | 0 | 184,500 | 20,832 | 4,500 | 0 | 0.000 | 0.000 | 0 | 0 | 296,313 | \$180,782 | 0 | 180,782 | 115,531 |
| 2021 | 338,345 | 0.11799 | 0.10408 | 246,000 | 0 | 246,000 | 29,026 | 6,000 | 0 | 0.000 | 0.000 | 0 | 0 | 367,371 | \$188,216 | 0 | 188,216 | 179,155 |
| 2022 | 401,296 | 0.12330 | 0.10877 | 307,500 | 0 | 307,500 | 37,915 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 439,211 | \$195,956 | 0 | 195,956 | 243,255 |
| 2023 | 303,039 | 0.12885 | 0.11366 | 307,500 | 0 | 307,500 | 39,621 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 342,660 | \$5,942 | 0 | 5,942 | 336,718 |
| 2024 | 303,039 | 0.13464 | 0.11878 | 307,500 | 0 | 307,500 | 41,402 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 344,441 | \$6,006 | 0 | 6,006 | 338,435 |
| 2025 | 303,039 | 0.14070 | 0.12412 | 307,500 | 0 | 307,500 | 43,265 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 346,304 | \$6,071 | 0 | 6,071 | 340,233 |
| 2026 | 303,039 | 0.14703 | 0.12971 | 307,500 | 0 | 307,500 | 45,212 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 348,251 | \$6,137 | 0 | 6,137 | 342,114 |
| 2027 | 303,039 | 0.15365 | 0.13554 | 307,500 | 0 | 307,500 | 47,247 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 350,286 | \$6,203 | 0 | 6,203 | 344,083 |
| 2028 | 303,039 | 0.16057 | 0.14164 | 307,500 | 0 | 307,500 | 49,375 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 352,414 | \$6,270 | 0 | 6,270 | 346,144 |
| 2029 | 303,039 | 0.16779 | 0.14802 | 307,500 | 0 | 307,500 | 51,595 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 354,634 | \$6,338 | 0 | 6,338 | 348,296 |
| 2030 | 303,039 | 0.17534 | 0.15468 | 307,500 | 0 | 307,500 | 53,917 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 356,956 | \$6,406 | 0 | 6,406 | 350,550 |
| 2031 | 303,039 | 0.18323 | 0.16164 | 307,500 | 0 | 307,500 | 56,343 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 359,382 | \$6,475 | 0 | 6,475 | 352,907 |
| 2032 | 303,039 | 0.19148 | 0.16891 | 307,500 | 0 | 307,500 | 58,880 | 7,500 | 0 | 0.000 | 0.000 | 0 | 0 | 361,919 | \$6,545 | 0 | 6,545 | 355,374 |
| 2033 | 0 | 0.20009 | 0.17651 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0 | 0 | 0 | \$0 | 0 | 0 | 0 |
| 2034 | 0 | 0.20910 | 0.18446 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0 | 0 | 0 | \$0 | 0 | 0 | 0 |
| 2035 | 0 | 0.21851 | 0.19276 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0 | 0 | 0 | \$0 | 0 | 0 | 0 |
| 2036 | 0 | 0.22834 | 0.20143 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0 | 0 | 0 | \$0 | 0 | 0 | 0 |
| 2037 | 0 | 0.23861 | 0.21049 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0 | 0 | 0 | \$0 | 0 | 0 | 0 |
| Total = | | | | 3,997,500 | 0 | | | 97,500 | 0 | | | | | \$5,002,489 | | | \$867,770 | \$4,034,719 |
| | | | | | | | | | | | | | | NPV = \$2,696,513 | | | \$779,930 | 1,916,583 |
| Total NPV = | | \$1,916,583 | | | | | | | | | | | | | | | | |
| Benefit/Cost Ratio = | | 3.46 | | | | | | | | | | | | | | | | |

| Worksheet Calculations | |
|---|--|
| (A) = Table 1 (N) | (I) = Retail Winter Demand Rate, escalated. |
| (B) = Retail Summer Rate, escalated. | (J) = (A) + (D) + (I) + (J) |
| (C) = Retail Winter Rate, escalated. | (K) = Number of Participants (20) x Other Participant Savings (14b), escalated |
| (D) = Table 1 (K) | (M) = Number of Participants (20) x Direct Participant Costs (14), escalated |
| (E) = [Retail Rate (B) or (C)] x (D) | (N) = Number of Participants (20) x Other Participants Costs (11a), escalated |
| (F) = Average Summer kW /Participant Saved (16) x Number of Participants (19) for Project Life (15) | (O) = (L) + (M) |
| (G) = Average Winter kW /Participant Saved (16) x Number of Participants (19) for Project Life (15) | (P) = (K) - (N) |
| (H) = Retail Summer Demand Rate, escalated. | |

Table 5
Total Resource Cost Test

Company: **Air Conditioning Cycling Program**
Project: **2018-2022**

| Year | Benefits | | | Costs | | | Benefits Less Costs (G) |
|---------|--------------------------|--------------------------|---------------------------|---------------------------|---------------------------------------|-----------------|-------------------------|
| | Total Energy Savings (A) | Total Demand Savings (B) | Total Annual Benefits (C) | Utility Program Costs (D) | Participants' Costs Net of Rebate (E) | Total Costs (F) | |
| 2018 | \$1,979 | \$170,856 | \$172,835 | \$545,597 | \$15,000 | \$560,597 | (\$387,732) |
| 2019 | 4,193 | 351,846 | 356,039 | 543,248 | (42,750) | 500,498 | (144,459) |
| 2020 | 6,502 | 543,683 | 550,185 | 646,723 | (100,433) | 546,290 | 3,895 |
| 2021 | 9,096 | 746,707 | 755,803 | 748,898 | (158,045) | 590,853 | 164,950 |
| 2022 | 11,979 | 961,375 | 973,354 | 850,525 | (215,587) | 634,938 | 338,416 |
| 2023 | 12,523 | 990,187 | 1,002,710 | 717,023 | (297,468) | 419,555 | 583,155 |
| 2024 | 13,238 | 1,019,931 | 1,033,169 | 722,102 | (297,468) | 424,634 | 608,535 |
| 2025 | 13,921 | 1,050,522 | 1,064,443 | 727,257 | (297,468) | 429,789 | 634,654 |
| 2026 | 14,520 | 1,082,045 | 1,096,565 | 732,489 | (297,468) | 435,021 | 661,544 |
| 2027 | 14,954 | 1,114,500 | 1,129,454 | 737,799 | (297,468) | 440,331 | 689,123 |
| 2028 | 15,401 | 1,147,973 | 1,163,374 | 743,190 | (297,468) | 445,722 | 717,652 |
| 2029 | 15,862 | 1,182,377 | 1,198,239 | 748,663 | (297,468) | 451,195 | 747,044 |
| 2030 | 16,339 | 1,217,883 | 1,234,222 | 754,219 | (297,468) | 456,751 | 777,471 |
| 2031 | 16,829 | 1,254,406 | 1,271,235 | 759,861 | (297,468) | 462,393 | 808,842 |
| 2032 | 17,333 | 1,292,031 | 1,309,364 | 765,589 | (297,468) | 468,121 | 841,243 |
| 2033 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2034 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2035 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2036 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2037 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total = | | \$14,310,991 | | | | \$7,266,658 | \$7,044,333 |
| NPV = | | \$8,239,893 | | | | \$4,760,402 | 3,479,491 |

Total NPV = \$3,479,491
Benefit/Cost Ratio = 1.73

| Worksheet Calculations |
|------------------------|
| (A) = Table 1 (C) |
| (B) = Table 1 (H) |
| (C) = (A) + (B) |
| (D) = Table 2 (E) |
| (E) = Table 3 (G) |
| (F) = (D) + (E) |
| (G) = (C) - (F) |

**ELECTRIC DEMAND SIDE MANAGEMENT (DSM) PROGRAMS
NORTH DAKOTA ELECTRIC COST-EFFECTIVENESS ANALYSIS**

Company: **Montana-Dakota Utilities Co.**
Project: **Air Conditioning Cycling Program**
Program Years: **2018-2022**

| Input Data | | First Year | Second Year | Third Year |
|--|-----------|------------|-------------|------------|
| 1) Retail Rate Summer (\$/kWh) = | \$0.09894 | | | |
| Retail Rate Winter (\$/kWh) = | \$0.08728 | | | |
| Retail Escalation Rate = | 4.50% | | | |
| 1a) Power Supply Cost Adjustment | \$0.00000 | | | |
| Fuel Escalation Rate = | 2.80% | | | |
| 2) Avg. System Marginal Energy Cost (\$/kWh) = | \$0.00000 | | | |
| Escalation Rate = | 3.00% | | | |
| 3) Retail Summer Demand Rate (\$/kW/season) = | \$0.00 | | | |
| 3a) Retail Winter Demand Rate (\$/kW/season) = | \$0.00 | | | |
| Escalation Rate = | 4.50% | | | |
| 4) Electric Margin (\$/kWh) = | \$0.06564 | | | |
| Escalation Rate = | 4.50% | | | |
| 5) System Peak Shaving Demand Cost (\$/kW/yr) | \$85.62 | | | |
| Reserve Capacity = | 14.3% | | | |
| Escalation Rate = | 3.00% | | | |
| 6) System Variable O&M (\$/kWh) = | \$0.00000 | | | |
| Escalation Rate = | 0.00% | | | |
| 7) Environmental Damage Factor = | 31% | | | |
| Escalation Rate = | 3.00% | | | |
| 8) Participant Discount Rate = | 9.69% | | | |
| 9) Utility Discount Rate = | 7.36% | | | |
| 10) Societal Discount Rate = | 2.68% | | | |
| 11) General Input Data Year = | 2017 | | | |
| 12) Project Analysis Year 1 = | 2018 | | | |
| Project Analysis Year 2 = | 2019 | | | |
| Project Analysis Year 3 = | 2020 | | | |
| 13) Utility Project Costs | | | | |
| Admin & Promotion Costs = | | \$7,500 | \$7,581 | \$7,663 |
| Incentive Costs = | | 90,000 | 92,700 | 95,481 |
| Direct Program Costs = | | 448,067 | 442,967 | 543,580 |
| Total Utility Project Costs = | | \$545,567 | \$543,248 | \$646,723 |
| 14) Direct Participant Costs (\$/Part.) = | | \$110 | \$110 | \$110 |
| Escalation Rate = | | 1.08% | 1.08% | 1.08% |
| 14a) Other Participant Costs (Annual \$/Part.) = | | \$0 | \$0 | \$0 |
| Escalation Rate = | | 0.00% | 0.00% | 0.00% |
| 14b) Other Participant Savings (Annual \$/Part.) = | | \$0 | \$0 | \$0 |
| Escalation Rate = | | 0% | 0% | 0% |
| 15) Project Life (Years) = | | 15 | 15 | 15 |
| 16) Avg Summer kW/part. Saved = | | 1,000 | 1,000 | 1,000 |
| 16a) Avg Winter kW/part Saved = | | 0.000 | 0.000 | 0.000 |
| 17) Avg. Summer kWh/Part. Saved = | | 41 | 41 | 41 |
| 17a) Avg. Winter kWh/Part. Saved = | | 0 | 0 | 0 |
| 18a) System Demand Line Loss Factor | | 12.9800% | 12.9800% | 12.9800% |
| 18b) System Energy Line Loss Factor | | 7.7350% | 7.7350% | 7.7350% |
| 19) Number of Participants = | | 1,500 | 1,545 | 1,591 |
| 20) Incentive/Participant = | | \$60 | \$60 | \$60 |
| 21) Effective Federal & State Income Tax Rate = | | | | 39.39% |
| 22) Annual Summer Kwh Saved | | 61,500 | 63,345 | 65,245 |
| Annual Winter Kwh Saved | | 0 | 0 | 0 |
| 23) Annual Summer KW Saved | | 1,500 | 1,545 | 1,591 |
| Annual Winter KW Saved | | 0 | 0 | 0 |

| Test Results | NPV | B/C |
|-------------------------------|--------------|------|
| Ratepayer Impact Measure Test | \$1,386,212 | 1.20 |
| Utility Cost Test | \$1,521,751 | 1.23 |
| Societal Test | \$10,042,967 | 2.64 |
| Participant Test | \$1,916,583 | 3.46 |
| Total Resource Cost Test | \$3,479,491 | 1.73 |

**Montana-Dakota Utilities Co.
 Electric Utility - North Dakota
 Peak Rewards Program Cost Recovery Mechanism
 Rate Proposed to be Effective January 2018**

Estimated Year 1 (2018) Program Costs \$717,423

North Dakota's % Based on Assumed Participation 75%

Total Costs to be Recovered \$538,067

| | <u>Allocated</u> <u>Program Costs 1/</u> | <u>Projected</u> <u>Kwh 2/</u> | <u>Proposed</u> <u>Cost/Kwh</u> |
|-----------------------------|---|-----------------------------------|------------------------------------|
| Residential & Small General | \$261,092 | 954,105,331 | \$0.00027 |
| Large General | 273,862 | 1,074,711,253 | 0.00025 |
| Lighting | 3,112 | 29,792,431 | 0.00010 |
| | <u><u>538,066</u></u> | <u><u>2,058,609,015</u></u> | |

1/ Class demand allocation from Case No. PU-16-666 (Embedded CCOS Factor No. 2):

| | | |
|-----------------------------|---------------------------|-----------------------------|
| Residential & Small General | 48.524146% | (Rates 10, 13, 20, 25 & 40) |
| Large General | 50.897438% | (Rates 30, 31, 32, 38 & 48) |
| Lighting | 0.578416% | (Rates 41 & 52) |
| | <u><u>100.000000%</u></u> | |

2/ Projected 2018 North Dakota electric sales, excluding contract sales.