APPENDIX C

Minnkota Power Cooperative Inc

Wholesale Power Rate

Minnkota Power
COOPERATIVE

A Touchstone Energy® Cooperative

2019-2020

Minnkota Wholesale Power Rate Schedule

April 1, 2019 to April 1, 2020

Minnkota Power Cooperative, Inc.
April 4, 2019

MINNKOTA POWER COOPERATIVE, INC.
GRAND FORKS, NORTH DAKOTA

WHOLESALE POWER RATE FOR CLASS A MEMBERS
FOR THE PERIOD
APRIL 1, 2019 TO APRIL 1, 2020
SUBJECT TO THE APPROVAL OF THE
RURAL UTILITIES SERVICE

I. Firm Power and/or Interruptible Energy Services

A. Rate Schedule:

1. Energy Charge: $0.03742 (37.42 mills) per kWh

1A. Energy Surcharge: $0.004 (4 mills) per kWh

2. Demand Charge:

a. Winter
$87.36 per kW per year ($7.28/kW/month) of winter billing demand, plus

b. Summer
$87.36 per kW per year ($7.28/kW/month) of summer billing demand

3. Transmission Charge:

a. Demand
$47.04 per kW per year ($3.92/kW/month) of transmission demand, plus

b. Energy
$0.00487 (4.87 mills) per kWh on: 1) all energy metered at the substation delivery points, and 2) all energy produced by a synchronously connected generator larger than 500 kW that operates for more than 1,000 hours per year nominally which is owned by the Class A member or their customers. Minnkota reserves the right to require special metering and assess a

transmission charge on loads that otherwise would not pay an adequate transmission charge.

4. Substation Charge:

a. Fixed
$17,136 per substation per year ($1,428/substation/month), plus

b. Variable
$8.16 per kW per year ($0.68 /kW/month) of the highest kW demand registered at each substation during 2018.

The Energy Charge, Energy Surcharge and Transmission Energy Charges are billed monthly based on actual usage. The Demand Charge, Transmission Demand Charge and Substation Charge are payable in twelve equal monthly payments.

B. Determination of Billing Demand:

1. Metered Demand Adjustments

a. WAPA Customers Adjustment. The following loads receive fixed WAPA power deliveries and will have 85% of their winter and summer Contract Rate of Delivery (CROD), adjusted for losses, credited toward their hourly coincident metered demands with each hour's resultant metered demand to be not less than zero:

	Winter Credit kW	Summer Credit kW	Supplying System
Hope Municipal	479	329	Nodak
Sharon Municipal	240	118	Nodak
ND Mill	3,256	3,188	Nodak

b. Power Factor Adjustment. Class A Members shall at all times take and use power in such a manner that the power factor shall be as near 100 percent as practical. At the option of Minnkota when the power factor at any delivery point during any hour is less than 95 percent leading or lagging, the metered demands (winter, summer, transmission and substation variable) for said delivery point used for billing purposes shall be increased by the ratio:

$$\frac{.95}{\text{The lowest hourly power factor (lead or lag) recorded in the current billing month.}}$$

c. Vickaryous Substation Adjustment. It has been agreed by Minnkota and Roseau Electric Cooperative to not operate demand response/load management during winter billing peaks at Vickaryous. Consequently, the winter metered demands at Vickaryous will be reduced by 33% to represent past winter demand response/load management activity that will no longer be exercised during billing peaks.

2. Winter Method. After adjustment of winter metered demands in accordance with Section I, above, and Sections II, V and VI, each Class A Member's April 1, 2019, to April 1, 2020 winter billing demand shall be the 2018/2019 adjusted winter coincidental metered peak demand.

The 2018/2019 winter coincidental metered peak demand shall be comprised of the average of three 3 consecutive hour coincidental demands occurring at the time of the Joint System highest system peak load taken on up to three separate days, if possible, and occurring between December 1 and the following April 1. Said peak coincidental demands are to be taken or determined from data recorded with full demand response/load management applied according to the then applicable Ripple Control Operating Guide, except that interruption of the loads in Category I (short-term interruptible loads) and not cycled Category II (medium-term interruptible loads) are delayed 75 and 45 minutes respectively into the billing period.

3. Summer Method. After adjustment of summer metered demands in accordance with Section I, above, and Sections II, V and VI, each Class A Member's April 1, 2019, to April 1, 2020, summer billing demand shall be the 2018 adjusted summer coincidental metered peak demand.

The 2018 summer coincidental metered peak demand shall be comprised of the average of all hours of coincidental demands occurring at the time of the Joint System highest system peak load periods and occurring between June 1 and the following October 1 when full demand response/load management is applied according to the then applicable Ripple Control Operating Guide.

4. Billing Demand Tables. Application of the above adjustments and calculations results in the following tables of billing demands.

FINAL WINTER DEMAND DATA

(April 1, 2019 to April 1, 2020)

COOPERATIVE	2018/2019 Winter Metered Peak(1)	Demand Waivers	Billing Demand
BELTRAMI	71,951	(13,783)	58,168
CASS	187,192	(20,950)	166,242
CAVALIER	5,113	0	5,113
CLEARWATER-POLK	13,337	(207)	13,130
NODAK *	133,165	(1,895)	131,270
NORTH STAR	17,140	(39)	17,101
PKM	17,360	0	17,360
RED LAKE	21,287	(325)	20,962
RED RIVER	17,360	0	17,360
ROSEAU	17,848	0	17,848
WILD RICE	46,616	(181)	46,435
TOTALS	548,368	(37,380)	510,988

(1) Billing Demand Times: 01/29/2019 6:00-9:00 PM
01/30/2019 7:00-10:00 AM
01/30/2019 6:00-9:00 PM

*Nodak's billing demand does not reflect the monthly average kW demand billed to American Crystal Sugar's Drayton and Hillsboro plants

FINAL SUMMER DEMAND DATA
(April 1, 2019 to April 1, 2020)

COOPERATIVE	Summer 2018 Metered Peak (Average of 5 Hours)	Demand Waivers	Billing Demand
BELTRAMI	61,016	(29)	60,987
CASS	171,958	(454)	171,504
CAVALIER	3,515	0	3,515
CLEARWATER-POLK	8,761	(5)	8,756
NODAK*	125,164	0	125,164
NORTH STAR	11,832	0	11,832
PKM	14,797	0	14,797
RED LAKE	17,840	0	17,840
RED RIVER	16,660	(215)	16,445
ROSEAU	15,292	(526)	14,766
WILD RICE	36,169	(70)	36,099
TOTALS	483,004	(1,299)	481,705

*Nodak's billing demand does not reflect the monthly average kW demand billed to American Crystal Sugar's Drayton and Hillsboro plants

C. Determination of Number of Transmission kW for Transmission Charge:

The Transmission Charge is based upon the average of the 2018/2019 winter metered demand with the adjustments below:

a. WAPA Customers Adjustment. Same as paragraph I B 1 a.

b. Power Factor Adjustment. Same as paragraph I B 1 b.

c. Vickaryous Substation Adjustment. Same as paragraph I B 1 c.

d. Customer Generation Accreditation. Same as paragraph IV B.

e. Inadvertent Demand Adjustment. Same as paragraph V C.

f. Incremental Pricing Plan (IPP) Adjustment. Same as paragraph VI E.

and the average of 12 monthly peak loads (12 CP) recorded at the time of the Joint System's monthly peak load during the immediate previous calendar year. In the case where member systems supply supplemental power to WAPA customers (ND State Mill and the municipals of Hope and Sharon) the 12 CP applies only to the supplemental load being supplied by the member system.

Application of the above adjustments results in the following table of transmission kW used to calculate the Transmission Demand Charge:

FINAL TRANSMISSION DEMAND DATA
(April 1, 2019 to April 1, 2020)

COOPERATIVE	2018/2019 Metered Winter Peak (1)	Demand Waivers	Adjusted Winter Peak	2018 12 CP	Average of Adjusted Winter Peak & 12 CP
BELTRAMI	71,951	(143)	71,808	77,764	74,786
CASS	187,192	(20,950)	166,242	204,123	185,183
CAVALIER	5,113	0	5,113	4,174	4,644
CLEARWATER-POLK	13,337	(207)	13,130	14,664	13,897
NODAK *	133,165	(1,265)	131,900	153,158	142,529
NORTH STAR	17,140	(39)	17,101	18,399	17,750
PKM	17,360	0	17,360	18,796	18,078
RED LAKE	21,287	0	21,287	20,826	21,057
RED RIVER	17,360	0	17,360	21,100	19,230
ROSEAU	17,848	0	17,848	24,464	21,156
WILD RICE	46,616	(181)	46,435	47,554	46,994
TOTALS	548,368	(22,785)	525,583	605,022	565,304

(1) Billing Demand Times: 01/29/2019 6:00-9:00 PM
01/30/2019 7:00-10:00 AM
01/30/2019 6:00-9:00 PM

* Nodak's billing demand does not reflect the monthly average kW demand billed to American Crystal Sugar's Drayton and Hillsboro plants

D. Determination of Number of Substations for Substation Charge:

With only those exceptions specifically approved by the Board of Directors, each metering point having one delivery voltage shall be considered one substation.

With only those exceptions specifically approved by the Board of Directors, Class A Members shall pay the monthly charge on substation delivery points completed after March 20, 1984, for not less than 100 months. Any new substations added will be included in the rate calculations in the billing month immediately successive to the month in which the substation is available for service.

Fixed Charge

A fixed charge will be assessed for each substation delivery point. Any combination of Minnkota Class A Members, Northern Municipal Power Agency (NMPA) Systems, WAPA customers or others may combine their loads at a location to share substation charges. In this instance, the fixed charge will be prorated among the users in proportion to their annual kWh usage the previous year. During the initial year of a new joint substation, an equitable proration of the substation charge will be made from the best information available.

The following metering points are considered as only a partial substation when calculating the fixed substation charge.

- The metering point at the Concrete Early Warning Station (CMEWS) shall not be considered a substation.
- The metering points of the American Crystal Sugar Company at Brunsdale and Drayton, North Dakota, shall not be considered a substation.
- The metering points at both the Cass Lake South and Cass Lake North pumping stations near Cass Lake, Minnesota, shall not be considered a substation.
- The metering point at the Wilton pumping station located near Wilton, Minnesota, shall not be considered a substation.
- The metering point at the Joliette pumping station located near Joliette, North Dakota, shall not be considered a substation.
- The metering point at the Potlatch wood products plant located near Rosby, Minnesota, shall be considered ½ of a substation.
- The metering point at the Northwoods wood products plant located near Solway, Minnesota, shall be considered ½ of a substation.
- The metering point at the Crookston pumping station located near Crookston, Minnesota, shall be considered ½ of a substation.

- The metering point at the Bartlett pumping station located near Bartlett, North Dakota, shall be considered ½ of a substation.

- The metering point at the McMahon pumping station located near Larimore, North Dakota, shall not be considered a substation.

- The metering point of the Pembina Hills Substation near Walhalla, North Dakota, shall be considered ½ of a substation.

- The metering point at the Brooks pumping station located near Brooks, Minnesota, shall be considered ½ of a substation.

- The metering point at the Steen Substation at the Grand Forks Air Force Base shall be considered two substations.

- The metering point at Simplot in Grand Forks, North Dakota, shall not be considered a substation.

- The metering point at the Cominco Substation near Leal, North Dakota that has two distribution transformers shall be considered one substation.

- The metering point at the Walum Substation near Walum, North Dakota, shall not be considered a substation.

- The metering point at the Master BKR40 in Grand Forks, North Dakota, shall be considered ¼ of a substation.

- The metering point at Master HGLC in Grand Forks, North Dakota, shall not be considered a substation.

Variable Charge

The variable cost substation charge is based upon the highest 2018 (calendar year) kW peak load at each delivery point. In the case where member systems supply supplemental power to WAPA customers (ND Mill and the municipals of Hope and Sharon), the variable substation charge is based upon the highest monthly load in the 2018 calendar year remaining after the WAPA fixed monthly demand delivery, divided by the appropriate loss multiplier, has been subtracted. Substation peaks created by load switching at Minnkota's request for equipment maintenance and/or change-outs will be waived. Application of the 2018 peak loads results in the following table of substation demands used to calculate the variable charge:

FINAL SUBSTATION DATA
(April 1, 2019 to April 1, 2020)

COOPERATIVE	2018 Peak Substation kW Demand	Adjustments		Net Substation kW Demand
BELTRAMI	114,569	(14,319)	a.	100,250
CASS	293,285	(7,705)	b.	285,580
CAVALIER	9,802	(2,555)	c.	7,247
CLEARWATER-POLK	24,545	0		24,545
NODAK	270,220	(41,517)	d.	228,703
NORTH STAR	30,163	0		30,163
PKM	30,878	0		30,878
RED LAKE	30,021	0		30,021
RED RIVER	39,507	0		39,507
ROSEAU	38,494	0		38,494
WILD RICE	75,633	0		75,633
TOTALS	957,117	(66,096)		891,021

a. Enbridge Pipeline owns both Cass Lake substations and the Wilton substation
b. Fargo Landfill is a generator and not a load plus credit for Barnes Co. wind farm, adjustments due to Minnkota switching
c. Credit for Langdon wind farm
d. Crystal Sugar leases the Brunsdale and owns the Drayton substations, Enbridge owns the Joliette substation, NSP provides facilities to the Simplot load, the Air Force owns the Concrete PAR substation, the Pembina Hills substation is considered .50 of a substation, the Steen substation is considered as two substations, there is no substation at Walum and credit for Luverne wind farm

Substation	kW
Brunsdale	(19,163)
Concrete PAR	(6,308)
Drayton	(8,094)
Joliette	(4,067)
Luverne wind	(1,314)
MASTER HGLC	(7,299)
Pembina Hills	(168)
Simplot	(10)
Steen 2	(1,213)
Walum	(212)
Steen	6,331
Total	(41,517)

II. Cogeneration Facility Rate Schedule

All Cogeneration Facilities are required to be on the Cogeneration Facility Rate Schedule.

A. Definitions:

1. Cogeneration Facility – defined as a facility which produces electric energy and steam or other forms of useful energy (such as heat) which are used for industrial, commercial,

heating or cooling purposes and which comply with the efficiency and/or fuel source standards of the United States Federal Energy Regulatory Commission (FERC) Order No. 70.

2. Cogeneration Facility Standby Service – defined as electric capacity and energy provided by Minnkota to Class A Members for resale to consumers operating Cogeneration Facilities and is available for use only to maintain normal operation of said consumer's manufacturing or production facility during periods of emergency outage or emergency restriction of said consumer's electric generating facilities. The use of standby service for other than emergencies may be allowed on a case-by-case basis with prior approval by Minnkota.

3. Monthly Average Demand – defined as demand calculated by averaging each hourly kW demand of purchased energy within the calendar month.

B. Applicability:

Cogeneration Facility Standby Service will be made available by Minnkota to:

1. Class A Member cooperatives for resale to consumer owner/operators of Cogeneration Facilities.

2. Consumer owner/operators of Cogeneration Facilities with permission of appropriate Class A Member cooperative.

The obligation of consumers to take or pay for firm electric service shall take precedence over use of said Cogeneration Facility Standby Service.

C. Cogeneration Facility Rate Schedule for Purchased Power:

1. Monthly Charge:	Calculated on a case-by-case basis to cover losses, fixed costs, operating and maintenance costs, etc. for transmission and substation assets when those assets are primarily used for standby service purposes.
2. Energy Charge:	$0.03742 (37.42 mills) per kWh for energy delivered to the Facility.
3. Energy Surcharge:	$.004 (4 mills) per kWh delivered to the Facility.
4. Power Demand Charge:	$174.72 per kW per year ($14.56 per kW per month) of power demand based on the monthly average demand on purchased energy.
5. Transmission Demand Charge:	$47.04 per kW per year ($3.92 per kW per month) of transmission demand based on the monthly average demand on purchased energy.

6. Transmission Energy Charge: $0.00487 (4.87 mills) per kWh of delivered energy to the Facility.

7. Substation Demand Charge: $8.16 per kW per year ($0.68 per kW per month) of substation demand based on the highest kW demand register at the substation during 2018.

8. Substation Fixed Charge: $17,136 per substation per year ($1,428 per month)

The Energy Charge, Energy Surcharge, Power Demand Charge, Transmission Demand Charge, and Transmission Energy Charge are billed monthly based on actual usage. The Substation Demand and Fixed Charges are payable in 12 equal monthly payments.

D. Cogeneration Facility Standby Service Charge:

The required charge of standby service provided to the Member Cooperative/Facility by Minnkota shall be based on the Facility's generator(s) nameplate kW output. However, on a case-by-case basis and upon mutual agreement between Minnkota and the Member Cooperative/Facility, the generator(s) nameplate kW output may be adjusted lower if the generator(s) is consistently operated at a level below the nameplate kW output. Any adjustment to the kW output of the generator(s) will be reviewed annually before wholesale rates are determined /approved by the Minnkota's Board for the next billing year – currently set from April 1st to April 1st.

The Facility's generator(s) shall be metered by a time synchronized, continuous operation, one-hour or less interval demand recorder and will be metered on a 15 minute basis.

All energy delivered to the Facility, whether firm power above the generator(s) kW output or standby service provided by Minnkota, will be charged based on the Cogeneration Facility Rate Schedule for Purchased Power as outlined above.

An additional charge will be assessed and billed to the Member Cooperative/Facility for each standby service kWh delivered to the Facility (measured on an hourly basis) below 15% of the Facility's generator(s) nameplate kW output. The charge will be the incremental difference between the actual hourly MISO market rate for purchased energy and Minnkota's Cogeneration Facility Energy Charge. If the incremental difference is negative for that hour, no Standby Service Charge will be charged to the Member Cooperative/Facility for kWh delivered to the Facility below 15% of the generator(s) nameplate kW output.

Also, if the Facility's generator(s) nameplate kW output has been lowered upon mutual agreement, an additional charge will be billed to the Member Cooperative/Facility for each kWh generated, on an hourly basis, above 10% of the mutually agreed upon generator(s) nameplate kW output. A charge of $0.02 (20 mills) per kWh will be billed for each kWh generated above 10% of the generator(s) adjusted kW output.

E. Minnkota's Payment for Surplus Energy:

Minnkota will pay a negotiated rate for cogenerated electric energy that is in excess of the electric load required for operation of the Facility.

F. Demand Waiver Credit to Member Cooperative:

Since the Cogeneration Facility Rate Schedule for purchased power charges the Generation Demand Charge and Transmission Demand Charge based on the monthly average demand on purchased energy, Minnkota will zero out the measured winter demand, summer demand and transmission demand that the Member Cooperative would normally pay during the billing year for the Cogeneration Facility.

G. Capacity Credit: See Section IV MISO (Midcontinent Independent System Operator) Generation Accreditation & Capacity Credit for a possible capacity credit.

III. Distributed Generation (DG)

A. Applicability:

This section of the rate schedule defines how Minnkota will pay for energy generated by distributed generation (DG) and delivered to Minnkota.

B. Definitions:

1. Distributed generation (DG) – defined as small generation facilities (usually 10 MW or less) powered by fossil fuels or renewable energy sources that are grid-connected and located close to the electric load they serve.

2. Renewable energy source – defined as wind, solar, small hydro, biomass, geothermal, hydrogen, or recycled energy systems producing electricity from unused waste heat.

3. Net metered – defined as a retail electric account that has installed a renewable distributed generation (DG) facility with a nameplate less than 40 kW behind the utility's electric meter (load-side) that serves all or part of the entire account's domestic energy use when operating. At times, the DG generates kWh energy in excess of the electric energy required for domestic use causing the meter to literally run backwards. The account is charged or credited the net difference between energy consumption and generation at the retail rate.

4. Net billed – defined as a retail electric account that has installed a renewable distributed generation (DG) facility with a nameplate less than 40 kW behind the utility's electric meter (load-side) that serves all or part of the entire account's domestic energy use when operating. The meter records all kWh energy delivered to the account by the member cooperative and separately records the kWh energy produced by the DG facility not consumed by the account's load at the time the DG energy is generated – defined as excess kWh energy. The account is charged for the kWh energy delivered from the member cooperative at the retail

rate and is given a credit/payment for excess kWh energy generated by the DG facility at the retail rate.

5. Self-supply – defined as a retail electric account that has installed a distributed generation (DG) facility with a nameplate 40 kW and greater behind the utility's electric meter (load-side) that serves all or part of the entire account's domestic energy use when operating. The meter records all kWh energy delivered to the account by the member cooperative and separately records the kWh energy produced by the DG facility and not consumed by the account's load at the time the DG energy is generated – defined as excess kWh energy. The account is charged for the kWh energy delivered from the member cooperative at the retail rate and is given a credit/payment for excess kWh energy generated from the DG facility at Minnkota's avoided cost.

6. Excess renewable energy – defined as kWh energy generated by a retail electric account's renewable distributed generation (DG) facility in excess of the electric energy consumed by the account's own domestic energy use at the account's location.

C. Reimbursement / Payment Distributed Generation (DG) Energy:

Category #1: Less than 40 kW Net Metered/Net Billed Renewable Distributed Generation (DG) Facility.

A. Requires an appropriate agreement with Minnkota consistent with applicable law and/or regulation.

B. Minnkota will reimburse the member cooperative for "excess renewable energy" produced from a renewable distributed generation facility with nameplate capacity less than 40 kW.
   - After the calendar year, Minnkota will request individual distributed generation facility's monthly energy usage and energy generated data from the member cooperative.
   - Reimbursement payment for "excess renewable energy" will be the difference between the member cooperative's average rate per kWh for the customer class and Minnkota's average wholesale rate per kWh for the member cooperative.

Category #2: Distributed Generation (DG) Facility.

A. Includes all DG facilities that do not qualify for Category #1 above.

B. Contract: Requires a Purchase Power Agreement (PPA) with Minnkota.

C. Energy Rate: Minnkota will pay the generation facility for kWh generated and delivered to Minnkota. The distributed generation energy rate is Minnkota's avoided cost which is currently based on the wholesale energy market conditions and is the 2019 Budgeted off-system sales rate. The distributed generation energy rate is set for the 2019/2020 Wholesale Power Rate Schedule and is subject to change on an annual basis.

Distributed Generation Energy Rate: $0.0190 per kWh

Adjustment to the distributed generation energy rate may be done on a case-by-case basis depending on the value the energy provides Minnkota. The criteria considered include but are not inclusive to: the ability/limits to dispatch the generator(s), on-peak kWh production versus off-peak kWh production, the generator(s) capacity factor, Minnkota's needs for capacity and energy, etc. The adjustment will be a defined amount per kWh in the PPA and will be in addition to the stated distributed generation energy rate.

A renewable distributed generation facility with a nameplate of 40 kW to 100 kW can request a "time-of-day purchase rate" from Minnkota under Minnesota Rule § 7835.3500 – Time-of-Day Purchase Rate. The time-of-day purchase rate will be based on Minnkota's avoided cost.

D. Capacity Credit: See Section IV MISO (Midcontinent Independent System Operator) Generation Accreditation & Capacity Credit for a possible capacity credit.

E. Standby Service Charge: Minnkota will charge DG facilities, through the member cooperative, that self-supply their electric account with a nameplate over 100 kW a standby service charge. The charge varies with the type of DG facility.

IV. MISO (Midcontinent Independent System Operator) Generation Accreditation & Capacity Credit

A. Qualifications:

1. Accreditation is done on a case-by-case basis upon request and a generation facility must meet the following criteria to be accredited and to receive a capacity credit:

   a. Individual generator(s) shall be 500 kW or larger.

   b. Generation must be connected synchronously to Minnkota's transmission system and/or cooperative's distribution system.

   c. Annually perform a test of the generation at maximum output and submit the results to Minnkota.

   d. Provide Minnkota with generation performance data, upon request.

   e. Generator(s) must be capable of operating a minimum of four consecutive hours and a minimum of five annual events.
      - Generation facility is responsible for any penalty charged by MISO if its generator(s) does not operate at the set performance level.

   f. Maintain generator(s) in a condition that meets good utility practice.

g. The generator(s) must be dispatchable and Minnkota retains the right to dispatch the generator(s) as needed.

h. Enter into a contractual agreement with the distribution cooperative and/or Minnkota.

i. Other MISO qualifications that maybe assessed to a specific generator(s).

2. The distribution cooperative must allow the customer and Minnkota to utilize its distribution facilities to facilitate the transfer of power from the generator(s) to and from Minnkota.

3. Requires a contract agreement with Minnkota.

B. Capacity Credit:

1. Generation facility not supplying their load needs: Minnkota will pay the generation facility $21.00 per kW per year ($1.75 per kW per month) for MISO accredited generation.

2. Generation facility supplying their load needs: Minnkota will pay the generation facility $21.00 per kW per year ($1.75 per kW per month) for MISO accredited generation that is in excess of 115% of the customer's one-hour kW peak load.

3. The capacity credit is reviewed annually and is subject to change on an annual basis.

V. Inadvertent Demand Adjustment (IDA)

This program is an option for generator Incremental Pricing Plan (IPP) accounts to offset possible financial losses caused by the malfunction of load management facilities during billing periods. The program can mitigate the impact of large unanticipated inadvertent wholesale power demand billings on the Class A Member's system and/or its larger commercial and industrial consumers which are metered with recording demand meters.

A. Qualifications

1. Each load must meet the following criteria:

a. It must have an adequately installed and properly maintained directly connected automatic load control system.

b. It must be metered by a time synchronized, continuous operation, one hour or less interval, demand recorder.

B. Rate Schedule

1. The Class A Member must pay Minnkota for the kW level of each selected qualified load that could increase the Class A Member's seasonal billing demand should load

management fail to curtail the insured load(s). In the case of multiple generators at the same site, the individual load associated with each generator must be qualified separately.

Season	Rate	Payment Due Date
Summer 2019	$2.18/kW	May 15, 2019
Winter 2019/2020	$2.77/kW	November 15, 2019

2. The Class A Member shall supply the name of each qualified load and the estimated kW demand of each load along with the payment in accordance with the rate schedule above.

C. Metered Demand Credit

1. Upon acceptable demonstration by the Class A Member of the magnitude of kW of qualified load that failed to be controlled, Minnkota will subtract from the Class A Member's affected hourly metered seasonal coincidental demands used for summer, winter and transmission billing demand calculations a kW amount equal to 1.08 x 0.667 times any portion of the qualified load which inadvertently and unintentionally became a demand obligation through human error or failure of load control equipment located at the load site.

VI. Incremental Pricing Plan (IPP)

This program is available to Class A Members with commercial customers, irrigation customers or Heating Demand Waiver (HDW) generators that may choose to pay a supplemental payment in lieu of load control or generation during certain load control events.

A. Qualifications

1. Each commercial load, irrigation load or HDW generator must be metered by a time synchronized, continuous operation, one-hour or less interval demand recorder.

2. Individual commercial and irrigation loads that participate must be placed into the double order specific to the Incremental Pricing Plan (IPP) as documented in the Ripple Operating Guide.

3. Each HDW generator must be capable of being MISO accredited as Minnkota generation in both the summer and winter seasons. The HDW generators would be run under Minnkota's control and discretion similar to other Minnkota MISO accredited generation.

B. Control/Operational Criteria

1. The commercial and irrigation double orders specific to the Incremental Pricing Plan will not be controlled unless:

a. Load control is required because Minnkota is reaching a capacity limit.

b. Minnkota is buying energy and the wholesale market price for that purchased energy would lead to an average purchased energy price greater than the pre-determined average for that season.

c. Load control is required for performance measurement used in MISO capacity accreditation.

2. The HDW generators will be considered in the HDW yellow zone, when a supplemental energy payment can be made in lieu of operation, for the same number of hours as the seasonal average control hours of the dual fuel furnaces.

3. Minnkota will, during HDW yellow zone time periods, purchase energy from the wholesale market in a quantity equal to the lower of the total generation accredited capability or the HDW customer load. The energy quantity will be agreed to prior to the start of a winter season. Energy will be purchased at an average winter season price that will be equal to the IPP commercial customer price.

C. Data Reporting

1. Each Class A Member participating in this program will report the hourly coincidental metered demand data and energy data for each qualifying commercial and irrigation customer for all load control hours normally scheduled for that load as follows:

Season	Demand Data	Supplemental Energy Data
Winter	3/10/2019	5/1/2019
Summer	11/15/2019	11/15/2019

D. Rate Schedule

1. The Class A Member must pay Minnkota a supplemental charge of up to 9.5¢/kWh for commercial loads and 12¢/kWh for irrigation loads for kWh recorded on the hourly coincidental meter(s) during all load control events normally scheduled for the qualifying commercial and irrigation customer(s). The recorded kWh will start at the beginning of the clock quarter hour after activation begins and ending at the beginning of the clock quarter hour before the activation ends.

2. The Class A member must pay Minnkota a supplemental charge of up to 9.5¢/kWh for the quantity of kWh calculated as the HDW yellow zone periods (same number of hours as the seasonal average of the dual fuel furnaces) times the lower of the total generation accredited capability or the HDW customer load calculated as if the program continued to exist.

E. Metered Demand Credit

1. Minnkota will credit each Class A Member's hourly winter and summer coincidental billing demand based on the hourly metered demand supplied in Paragraph C above except for the hours when control is required for capacity limitation, to avoid higher cost energy purchases or Schedule L certification as defined in Paragraph B above.

2. Minnkota will credit each Class A Member's hourly winter coincidental billing demand for HDW generation by the lesser of:

    a. The effective MISO accredited generation level of the generator(s), or

    b. The total load attributable to the Class A Member's demand waiver customers who would have been eligible for the Demand Waiver Program had that program continued to exist.

F. HDW Generator Fuel Pricing

1. Minnkota will pay each Class A Member when Minnkota operates the HDW generation for its own purpose at a rate of the actual fuel cost plus 25%.

VII. General

A. Feasibility of New or Expanded Substation Delivery Points:

1. If normal revenue expected to be derived from a new or expanded dedicated substation delivery point for a large commercial/industrial load is projected to not adequately cover ownership and operating costs over a reasonable length of time, Minnkota, on a case-by-case basis, may require a minimum substation and demand charge, a contribution in aid of construction, minimum annual revenue requirement or other special arrangement to assure an adequate return on the facility investment.

2. A request for a new substation delivery point that does not meet Minnkota's need/justification standards (example: requested before Minnkota would normally construct such substation delivery point) may be constructed under the general provisions that include:

    a. Minnkota would design, construct, own and maintain the facility.

    b. To assure an adequate return of facility investment, the member cooperative(s) and Minnkota will enter into an appropriate agreement of one of the following options:
        1. Contribution in aid of construction.
        2. Minimum annual revenue requirement.
            - The cost of the new facilities would be amortized over 33 years at the then current borrowing rate. This value becomes the minimum annual

revenue requirement and is divided by 12 to become the minimum monthly revenue requirement.

- Beginning the first month following energization and each month thereafter, Minnkota will bill the requesting distribution cooperative for the difference between the minimum monthly revenue requirement and the then current monthly fixed substation charge until such time the new facilities meet the Minnkota need/justification standards.
- Minnkota will determine the load level that would meet the Minnkota need/justification standards prior to construction of the requested facilities.

3. Other special arrangement.

B. Service Conditions:

Minnkota reserves the right to require Class A Members to correct any condition on its system or on the systems of its members which causes a hazard to Minnkota's facilities and personnel, or to the quality of service provided by Minnkota to others. All motors, appliances or equipment connected to the Class A Member's systems must be so designed, installed and operated as not to cause undue disturbance to others nor to handicap Minnkota in maintaining proper system conditions. The Minnkota Generation & Transmission & End Use Interconnection Requirements will be applied to determine acceptable system impacts.

VIII. Infinity Renewable Energy Program

This program provides Minnkota member cooperatives the source to purchase renewable energy for resale to their member-owners. In most cases that will be done through the purchase of renewable energy credits (RECs) or green tags. The RECs will be sold on a per kWh basis and are M-RETS (Midwest Renewable Energy Tracking System) certified. Once sold, the RECs are retired in M-RETS, which means they cannot be used or claimed again.

The purchase of renewable energy kWh is on a monthly basis and is billed to the participating member cooperative one month in the arrears. At the end of each month, the member cooperative is responsible for calculating the actual quantity of renewable energy kWh they sold to their member-owners. The member cooperative must submit the quantity of kWh they need to purchase from Minnkota to cover the renewable energy kWh sold to their member-owners by the 10th of the following month. The charge for those kWh will be on the member cooperative's next monthly power bill.

A. Wind Energy: The renewable energy kWh will be priced and reported by the member cooperative in three categories.

Category #1: Accounts with renewable energy kWh purchases less than 1,000,000 kWh per calendar year.

Wind Renewable Energy Charge: $0.003 per kWh

Category #2: Accounts with renewable energy kWh purchases of 1,000,000 kWh and greater per calendar year.

Wind Renewable Energy Charge: Renewable energy kWh is priced quarterly and is based on the average daily prices from the previous Quarter, plus 10%. The updated renewable energy kWh price will be calculated and sent out by the 5th day of the new Quarter. There is a floor price of $0.0015 per kWh and the quarterly renewable energy kWh will not be priced below the floor price.

Category #3: On a case-by-case basis, member cooperatives with commercial/industrial loads with substantial volumes of monthly renewable energy kWh purchases can request special pricing for that energy from Minnkota.

B. Solar Energy: Solar energy pricing will be addressed on a case-by-case basis when a member cooperative's member-owner has interest in purchasing solar energy.

C. Other Renewable Energy: At this time, the pricing of any other source of renewable energy will be addressed on a case-by-case basis when a member cooperative's member-owner has interest in purchasing such renewable energy.

APPENDIX D

Form EIA-861

US Department of Energy Energy Information Administration Form EIA-861	ANNUAL ELECTRIC POWER INDUSTRY REPORT	Form Approved OMB No. 1905-0129 Approved Expires 03/31/2020

SCHEDULE 1. IDENTIFICATION

SURVEY CONTACTS: Persons to contact with question about this form

RESPONSE DUE DATE: Please submit by April 30th following the close of calendar year

Contact Kay Schraeder
Title: Accountant
Phone: (701) 795-4266 FAX: (701) 795-4215 Email: kschraeder@minnkota.com

REPORT FOR: Minnkota Power Coop, Inc 12658
REPORTING PERIOD: 2018

Supervisor Craig Rustad
Title: Accounting Manager
Phone: (701) 795-4261 FAX: (701) 795-4215 Email: crustad@minnkota.com

Logged By / Date:
Logged In: ☐ Receipt Date (mm/dd/yyyy):

1	Legal Name of Industry Participant	Minnkota Power Coop, Inc	**Submission Status/Date:**	Submitted	04/04/2019
2	Current Address of Principal Business Office	5301 32nd Avenue South Grand Forks ND 58201			
3	Preparer's Legal Name Operator (if different than line 1)				
4	Current Address of Preparer's Office (if different than line 2)				
5	Respondent Type (Check One)	☐ Federal ☐ Political Subdivision ☐ Municipal Marketing Authority ☒ Cooperative ☐ Independent Power Producer or Qualifying Facility	☐ State ☐ Municipal ☐ Investor-Owned ☐ Retail Power Marketer (or Energy Service Provider) ☐ Community Choice Aggregator	☐ Transmission ☐ Behind the Meter ☐ Wholesale Power Marketer ☐ DSM Administrator	

For questions or additional information about the Form EIA-861 contact the Survey Manager: Fax: (202) 287 - 1938 Email: EIA-861@eia.gov
Stephen Scott Phone: (202) 586-5140 Email: stephen.scott@eia.gov

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REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 2. PART A. GENERAL INFORMATION

LINE NO.				
1	Regional North American Electric Reliability Council (Not applicable for power marketers)	[ ] TRE (formerly ERCOT) [ ] FRCC [x] MRO	[ ] NPCC [ ] RFC (formerly ECAR, MAIN. MAAC) [ ] SERC	[ ] SPP [ ] WECC
2	Name of RTO or ISO	[ ] California ISO [ ] Electric Reliability Council of Texas [ ] PJM Interconnection [ ] New York ISO	[ ] Southwest Power Pool [X] Midwest ISO [ ] ISO New England [ ] None	
3	(For EIA Use Only) Identify the North American Electric Reliability Council where you are physically located	MRO		
4	Did Your Company Operate Generating Plants(s)?	[x] Yes	[ ] No	
5	Identify The Activities Your Company Was Engaged In During The Year (Check appropriate activities)	[x] Generation from company owned plant [x] Transmission [x] Buying transmission services on other electrical system [ ] Distribution using owned/leased electric wires	[ ] Buying distribution on other electrical system [x] Wholesale power marketing [ ] Retail power marketing [ ] Bundled Services (electricity plus other services such as gas, water, etc. in addition to electric service))	
6	Highest Hourly Electrical Peak System Demand	Summer (Megawatts) 654.3 Prior Year 651.3 Winter (Megawatts) 875.5 Prior Year 884.3		
7	Did Your Company Operate Alternative-Fueled Vehicles During the Year?	[x] Yes	[ ] No	
	Does Your Company Plan to Operate Such Vehicles During the Coming Year?	[x] Yes	[ ] No	
	If "Yes", Please Provide Additional Contact Information	Name: Lowell Stave Title: VP & COO Telephone: 701 - 795 - 4212 Fax: 701 - 795 - 4215 Email: lstave@minnkota.com		

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REPORT PERIOD ENDING: 2018

SCHEDULE 2. PART B. ENERGY SOURCES AND DISPOSITION

	SOURCE OF ENERGY	MEGAWATTHOURS		DISPOSITION OF ENERGY	MEGAWATTHOURS
1	Net Generation	1,478,725	11	Sales to Ultimate Consumers	
2	Purchases from Electricity Suppliers	5,561,220	12	Sales For Resale	6,870,635
3	Exchanged Received (In)		13	Energy Furnished Without Charge	41,349
4	Exchanged Delivered (Out)	28,233	14	Energy Consumed By Respondent Without Charge	74
5	Exchanged Net	-28,233			
6	Wheeled Received (In)	22,658			
7	Wheeled Delivered (Out)	21,176	15	Total Energy Losses (positive number)	101,136
8	Wheeled Net	1,482			
9	Transmission by Others Losses (Negative Number)				
10	Total Sources (sum of lines 1, 2, 5, 8 & 9)	7,013,194	16	Total Disposition (sum of lines 11, 12, 13, 14, & 15)	7,013,194

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 2. PART C. ELECTRIC OPERATING REVENUE

LINE NO.	TYPE OF OPERATING REVENUE		(THOUSAND DOLLARS to the nearest 0.1)
1	Electrical Operating Revenue From Sales to Ultimate Customers (Schedule 4: Parts A, B, and D)	$	
2	Revenue From Unbundled (Delivery) Customers (Schedule 4: Part C)	$	
3	Electric Operating Revenue from Sales for Resale	$	394,155.4
4	Electric Credits/Other Adjustments	$	
5	Revenue from Transmission	$	2,774.0
6	Other Electric Operating Revenue	$	9,467.4
7	Total Electric Operating Revenue (sum of lines 1, 2, 3, 4, 5 and 6)	$	406,396.8

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REPORT FOR: Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

SCHEDULE 3. PART A.
DISTRIBUTION SYSTEM RELIABILITY DATA

INSTRUCTIONS: For the purpose of this schedule, a distribution circuit is any circuit with a voltage of 34kV or below that emanate from a substation and that serves end use customers.

State/Territory

1	Total Number of Distribution Circuits	
2	Number of Distribution Circuits that employ voltage/VAR optimization (VVO)	

REPORT FOR: Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

SCHEDULE 3. PART B.
DISTRIBUTION SYSTEM RELIABILITY DATA

Who is required to complete this schedule?

This schedule collects System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI) statistics. If your organization does not compute these indexes, answer 'no' to Question 1 and then skip to Schedule 4A. You do not have to complete any other part of this schedule 3B or 3C.

Should you complete Part B or Part C?

If your organization computes the SAIFI and SAIDI indexes and determines Major Event Days using the IEEE 1366-2003 or the IEEE 1366-2012 standard, answer 'YES' to Questions 1 and 2, and complete Part B. Then skip to Schedule 4A. (You do not complete Schedule 3, Part C.)

If your organization does not use the IEEE 1366-2003 or the IEEE 1366-2012 standard but calculates SAIDI and SAIFI indexes via other method, answer 'yes' to question 1 and 'no' to question 2 and complete Part C. Then go to Schedule 4A.

1 Do you calculate SAIDI and SAIFI by any method? If Yes, go to Question 2. If No, go to Schedule 4, Part A. ☐ Yes ☐ No

2 Do you calculate SAIDI and SAIFI and determine Major Event Days using the IEEE1366-2003 standard or IEEEE-2012 standard? If Yes, complete Part B. If No, go to complete Part C. ☐ Yes ☐ No

Part B: SAIDI and SAIFI in accordance with IEEE 1366-2003 standard or IEEE 1366-2012 standard

	State
3a. SAIDI value including Major Event days	
3b. SAIDI value excluding Major Event days	
4 SAIDI value including Major Event days minus loss of supply	
5a. SAIFI value including Major Event days	
5b. SAIFI value excluding Major Event days	
6. SAIFI value including Major Event days minus loss of supply	
7. Total number of customers used in these calculations	
8. What is the highest voltage that you consider part of the distribution system, as opposed to the supply system? (kV)	
9. Do you receive information about a customer outage in advance of a customer reporting it?	☐ Yes ☐ No

Thank You for completing this part. Skip Part C and go directly to Schedule 4 Part A.

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Part C: SAIDI and SAIFI calculated by other methods

	State
10a. SAIDI value including Major Events	
10b. SAIDI value excluding Major Events	
11a. SAIFI value including Major Events	
11b. SAIFI value excluding Major Events	
12. Total number of customers used in these calculations	
13. Do you include inactive accounts?	☐ Yes ☐ No
14. How do you define momentary interruptions	☐ Less than 1 min. ☐ Less than 5 min. ☐ Other
15. What is the highest voltage that you consider part of the distribution system, as opposed to the supply system?	kv
16. Is information about customer outages recorded automatically?	☐ Yes ☐ No

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REPORT PERIOD ENDING: 2018

SCHEDULE 4. PART A. SALES TO ULTIMATE CUSTOMERS. FULL SERVICE - ENERGY AND DELIVERY SERVICE (BUNDLED)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State **Balancing Authority**					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Are your rates decoupled?	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?	[N] automatic	[N] automatic	[N] automatic	[N] automatic	
	[N] proceeding	[N] proceeding	[N] proceeding	[N] proceeding	
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Are your rates decoupled?					
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?					
Cents/Kwh					

Total

Revenue (thousand dollars)

Megawatthours

Number of Customers

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REPORT PERIOD ENDING: 2018

SCHEDULE 4. PART B. SALES TO ULTIMATE CUSTOMERS. ENERGY – ONLY SERVICE (WITHOUT DELIVERY SERVICE)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State **Balancing Authority**					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
Total					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 4. PART C. SALES TO ULTIMATE CUSTOMERS. DELIVERY – ONLY SERVICE (AND OTHER RELATED CHARGES)

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State	**Balancing Authority**				
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					

Total
Revenue (thousand dollars)
Megawatthours
Number of Customers

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REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 4. PART D. BUNDLED SERVICE BY RETAIL ENERGY PROVIDERS AND POWER MARKETERS

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANSPORTATION (d)	TOTAL (e)
State **Balancing Authority**					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
State					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					
Cents/Kwh					
Total					
Revenue (thousand dollars)					
Megawatthours					
Number of Customers					

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORTING PERIOD ENDING: 2018

SCHEDULE 5. MERGERS and/or ACQUISITIONS

Mergers and/or acquisitions during the reporting month

If Yes, Provide:

Date of Merger or Acquisition

Company merged with or acquired

Name of new parent company

Address

City

State, Zip

New Contact Name

Telephone No.

Email address

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SCHEDULE 6. PART A. ENERGY EFFICIENCY PROGRAMS
Adjusted Gross Energy and Demand Savings -- Energy Efficiency

If you have a non utility DSM administrator that reports your DSM activity for you please select them from the list

State/Territory **Balancing Authority**

	RESIDENTIAL (a)	COMMERCIAL (b)	INDUSTRIAL (c)	TRANS (d)	Total (e)
Reporting Year Incremental Annual Savings					
1 Energy Savings (MWh)					
2 Peak Demand Savings (MW)					
Increment Life Cycle Savings					
3 Energy Savings (MWh)					
4 Peake Demand Savings (MW)					
Reporting Year Incremental Costs					
5 Customer Incentives					
6 All other costs					
Incremental Life Sycle Costs					
7 Customer Incentives					
8 All other costs					
Weighted Average Life for Portfolio (Years) - Use Spreadsheet to Calculate					
9 Weighted Average Life					

Please provide website address to your energy efficiency program reports:

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 6. PART A. ENERGY EFFICIENCY PROGRAMS

DMS Administration only. List all utilities that you provide service for.

State	Utility Name

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

Schedule 6. Part B. Yearly Energy and Demand Savings - Demand Response

Reporting Year Savings

State/Territory	Balancing Authority	(a) Residential	(b) Commercial	(c) Industrial	(d) Transportation	(e) Total
1	Number of Customers Enrolled					
2	Energy Savings (Mwh)					
3	Potential Peak Demand Savings (MW)					
4	Actual Peak Demand Savings (MW)					

Schedule 6. Part B. Program Cost -- Demand Response (Thousand Dollars)

Reporting Year Costs

5	Customer Incentives	
6	All other costs	
7	If you have a demand side management (DMS) program for grid-interactive water heaters (as defined by DOE), how many grid interactive water heaters were added to your program this year?	

REPORT FOR: Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

SCHEDULE 6. PART C. DYNAMIC PRICING PROGRAMS
Number of Customers

INSTRUCTIONS: Report the number of customers participating in dynamic pricing programs, e.g. Time-of-Use-Pricing, Real-Time-Pricing, Variable Peak Pricing, Critical Peak Pricing Programs.

State/Territory **Balancing Authority**

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)	Total (e)
1	Number of Customers enrolled in dynamic pricing programs, by customer class					

Types of Dynamic Pricing Programs

INSTRUCTIONS: For each customer class, mark the types of dynamic pricing programs in which the customers are participating.

		Residential (a)	Commercial (b)	Industrial (c)	Transportatio (d)
2	Time-of-Use Pricing	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
3	Real-Time Pricing	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
4	Variable Peak Pricing	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
5	Critical Peak Pricing	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
6	Critical Peak Rebate	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No

REPORT FOR: Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

SCHEDULE 6. PART D. ADVANCED METERING

Only customers from schedule 4A and 4C need to be reported on this schedule.
AMR- data transmitted one-way, to the utility.
AMI- data transmitted in both directions, to the utility and customer

State **Balancing Authority**

	Residential (a)	Commercial (b)	Industrial (c)	Transportation (d)	Total (e)
1 Number of AMR Meters					
2 Number of AMI Meters					
3 Number of AMI Meters with home area network (HAN) gateway enabled					
4 Number of non AMR/AMI Meters					
5 Total Number of Meters (All Types), line 1+2+4					
6 Energy Served Through AMI					
7 Number of Customers able to access daily energy usage through a webportal or other electronic means					
8 Number of customers with direct load control					

REPORT FOR: Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

SCHEDULE 7. PART A. NET METERING

Net Metering programs allow customers to sell excess power they generated back to the electrical grid to offset consumption. Provide the information about programs by State balancing authority, customer class, and technology for all net metering applications.

State	Balancing Authority	Residential (a)	Commercial (b)	Industrial (c)	Transportation (d)	Total (e)
Photovoltaic	Net Metering Installed Capacity (MW)					
	Net Metering Installations					
	Storage Installed Capacity (MW)					
	Storage Installations					
	Virtual NM Installed Capacity (1 MW and greater)					
	Virtual NM Customers (1 MW and greater)					
	Virtual NM Installed Capacity (less than 1MW)					
	Virtual NM Customers (less than 1MW)					
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)					
Wind	Installed Net Metering Capacity (MW)					
	Number of Net Metering Customers					
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)					
Other	Installed Net Metering Capacity (MW)					
	Number of Net Metering Customers					
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)					
Total	Installed Net Metering Capacity (MW)					
	Number of Net Metering Customers					
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)					

Grand Total All States	**Net Metering Installed Capacity (MW)**	
	Net Metering Installations/customers	
	If Available, Enter the Electric Energy Sold Back to the Utility (MWh)	

REPORT FOR Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

SCHEDULE 7. PART B. NON NET-METERED DISTRIBUTED GENERATORS

If your company owns and/or operates a distribution system, please report information on known distributed generation (grid connected/synchronized) capacity on the system. Such capacity must be utility or customer-owned

NUMBER AND CAPACITY

State	**Balancing Authority**	< 1MW

1. Number of generators	3. Capacity that consists of backup-only units
2. Total combined capacity (MW)	4. Capacity owned by respondent

Capacity by Technology and Sector (MW)

	Residential	**Commercial**	**Industrial**	**Transportation**	**Direct Connected**	**Total**
5. Internal combustion						
6. Combustion turbine(s)						
7. Steam turbine(s)						
8. Fuel Cell(s)						
9. Hydroelectric						
10, Photovoltaic						
11. Storage						
12. Wind turbine(s)						
13. Other						
14. Total						

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 8. DISTRIBUTION SYSTEM INFORMATION

If your company owns a distribution system, please identify the names of the counties (parish, etc.) by State in which the electric wire/equipment are located.

LINE NO.	STATE (US Postal Abbreviation) (a)	COUNTY (Parish, Etc.) (b)	LINE NO.	STATE (US Postal Abbreviation) (a)	COUNTY (Parish, Etc.) (b)
1	-				

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

SCHEDULE 9. COMMENTS

SCHEDULE (a)	PART (b)	LINE NO. (c)	COLUMN (d)	NOTES (e)

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2018

EIA861 ERROR LOG

Part	State	BA ID	Error No.	Error Description/Override Comment	Type	Override

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART A - FINANCIAL

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION A. STATEMENT OF OPERATIONS

ITEM	YEAR-TO-DATE			THIS MONTH
	LAST YEAR (a)	THIS YEAR (b)	BUDGET (c)	(d)
1. Electric Energy Revenues	375,499,608	394,155,404		
2. Income From Leased Property (Net)				
3. Other Operating Revenue and Income	9,395,108	12,241,410		
4. Total Operation Revenues & Patronage Capital *(1 thru 3)*	384,894,716	406,396,814		
5. Operating Expense – Production - Excluding Fuel	15,076,783	14,340,135		
6. Operating Expense – Production - Fuel	33,163,022	29,824,545		
7. Operating Expense – Other Power Supply	231,152,393	235,120,762		
8. Operating Expense – Transmission	11,226,480	11,799,063		
9. Operating Expense – RTO/ISO				
10. Operating Expense – Distribution	5,737,629	6,809,782		
11. Operating Expense – Customer Accounts				
12. Operating Expense – Customer Service & Information				
13. Operating Expense – Sales	0			
14. Operating Expense – Administrative & General	14,515,390	15,681,617		
15. Total Operation Expense *(5 thru 14)*	310,871,697	313,575,904		
16. Maintenance Expense – Production	10,082,259	21,012,490		
17. Maintenance Expense – Transmission	5,514,231	5,137,598		
18. Maintenance Expense – RTO/ISO				
19. Maintenance Expense – Distribution	1,555,258	1,630,149		
20. Maintenance Expense – General Plant	1,285,040	1,692,265		
21. Total Maintenance Expense *(16 thru 20)*	18,436,788	29,472,502		
22. Depreciation and Amortization Expense	25,965,079	28,591,237		
23. Taxes				
24. Interest on Long-Term Debt	31,816,398	32,801,707		
25. Interest Charged to Construction – Credit	(1,503,802)	(711,621)		
26. Other Interest Expense	406,520	232,786		
27. Asset Retirement Obligations				
28. Other Deductions				
29. Total Cost Of Electric Service *(15 + 21 thru 28)*	385,992,680	403,962,515		
30. Operating Margins *(4 less 29)*	(1,097,964)	2,434,299		
31. Interest Income	6,785,041	6,729,804		
32. Allowance For Funds Used During Construction				
33. Income (Loss) from Equity Investments				
34. Other Non-operating Income (Net)	3,021,910	22,338		
35. Generation & Transmission Capital Credits				
36. Other Capital Credits and Patronage Dividends	941,013	912,559		
37. Extraordinary Items				
38. Net Patronage Capital Or Margins *(30 thru 37)*	9,650,000	10,099,000		

Transm. 2,774,017
Other 9,467,393

Transmission Revenue

Acct 456000	1,242,736
456002	1,478,133
457011	53,148
	2,774,017

reUNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART C - SOURCES AND DISTRIBUTION OF ENERGY

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SOURCES OF ENERGY (a)	NO. OF PLANTS (b)	CAPACITY (kW) (c)	NET ENERGY RECIEVED BY SYSTEM (MWh) (d)	COST ($) (e)
Generated in Own Plant (*Details on Parts D, E, F IC, F CC, and G*)				
1. Fossil Steam	1	256,200	1,473,717	88,361,759
2. Nuclear	0	0	0	0
3. Hydro	0	0	0	0
4. Combined Cycle	0	0	0	0
5. Internal Combustion	0	0	0	0
6. Other	0	0	5,008	194,729
7. Total in Own Plant (*1 thru 6*)	1	256,200	1,478,725	88,556,488
Purchased Power				
8. Total Purchased Power			5,561,220	235,120,762
Interchanged Power				
9. Received Into System (Gross)			0	0
10. Delivered Out of System (Gross)			28,233	0
11. Net Interchange (*9 - 10*)			(28,233)	0
Transmission For or By Others - (Wheeling)				
12. Received Into System			22,658	0
13. Delivered Out of System			21,176	0
14. Net Energy Wheeled (*12 - 13*)			1,482	0
15. Total Energy Available for Sale (*7 + 8 + 11 + 14*)			7,013,194	
Distribution of Energy				
16. Total Sales			6,870,635	
17. Energy Furnished to Others Without Charge			41,349	
18. Energy Used by Borrower *(Excluding Station Use)*			74	
19. Total Energy Accounted For (*16 thru 18*)			6,912,058	
Losses				
20. Energy Losses - MWh (*15 - 19*)			101,136	
21. Energy Losses - Percentage ((*20 / 15*) * *100*)			1.44 %	

Inputs/Outputs Actual
Inputs/Outputs Budget
Revenue
Purchased Power
PPA
Budget vs. Actual Qtr
Enter Values
Qtr

MPC Revenue & Purchased Power Budget s
Dept. No. 1110, 1150, 1600 & 3600
Monthly Allocation
2018

Budget Description	Account No.	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
Exempt Sales														
WAPA Allocation		17,223	14,656	14,320	12,822	12,189	11,577	12,757	13,065	12,583	13,005	13,055	16,182	163,234
Coyote - MPC Share		89,909	76,015	70,483	81,591	77,575	67,140	83,224	83,581	72,502	63,610	64,233	76,118	905,979
NMPA Sales		45,668	41,010	38,658	34,924	34,096	35,154	37,605	36,961	32,158	35,956	39,444	41,068	452,702
MISO - Non Firm Rate		$24.63	$21.12	$18.67	$19.38	$20.73	$19.18	$20.53	$19.18	$18.54	$29.32	$26.01	$24.00	
Exempt MW		61464.00	49661.00	46145.00	59289.00	55668.00	43563.00	58376.00	59685.00	52927.00	40659.00	37844.00	51232.00	
Exempt $$		$ 1,513,647.03	$ 1,048,884.85	$ 861,329.20	$ 1,149,154.11	$ 1,154,020.97	$ 835,340.93	$ 1,198,630.44	$1,144,763.07	$ 981,110.77	$1,192,178.62	$ 984,265.72	$1,229,564.76	
ENERGY SOURCES & USES - ACTUAL KWH														
Inputs Source - kWh														
Young 1		171,070,440	152,659,830	170,477,510	162,292,190	109,172,880	152,337,970	154,736,160	149,708,940	33,845,130	0	94,100,990	123,314,940	1,473,716,980
Young 2		230,277,626	214,989,488	193,825,350	240,734,704	248,147,590	214,478,967	232,759,014	244,431,777	228,230,501	145,059,673	238,101,688	249,201,535	2,680,237,913
Coyote		89,908,500	76,014,530	70,482,740	81,591,060	77,574,720	67,139,550	83,224,020	83,581,150	72,501,780	63,609,580	64,233,180	76,118,190	905,979,000
Langdon Wind Farm (#1 & 2)		58,084,395	52,776,037	40,674,520	43,156,531	40,261,531	33,203,644	31,758,420	29,599,557	34,113,167	40,033,581	31,319,761	45,272,042	481,255,186
Ashtabula Wind Farm		54,708,814	50,745,776	44,254,730	48,407,605	35,848,413	37,297,573	25,445,190	24,773,124	40,507,246	45,570,318	32,193,159	40,553,397	480,305,345
Ashtabula Wind Farm II		24,453,894	22,804,672	20,386,808	22,110,847	16,246,807	16,802,214	11,742,522	10,886,868	18,587,059	20,451,129	14,596,816	18,770,553	217,840,189
Oliver III Wind Farm		44,999,342	41,562,242	35,563,264	42,084,895	31,689,168	29,392,166	24,212,513	26,770,662	35,766,272	40,601,750	32,752,568	40,305,953	425,700,785
Fargo Landfill		513,143	460,121	500,462	430,880	7,692	0	0	0	0	0	0	0	1,912,298
White Earth										426,544	115,013	82,516	110,994	735,067
Infinity Wind		618,264	623,132	405,939	460,979	367,985	306,929	304,406	325,109	457,670	504,978	197,609	435,040	5,008,040
Diesels		0	0	0	0	0	0	0	0	0	0	0	0	0
Municipals		3,113	0	6,918	5,820	2,381	0	5,214	7,135	9,312	2,371	0	4,947	47,211
American Crystal - Hillsboro & Drayton		0	0	0	0	0	0	0	5,972	0	3,511	0	0	9,483
WAPA - Firm		64,978,000	54,657,000	52,651,000	41,585,000	32,353,000	31,041,000	35,445,000	35,438,000	35,148,000	41,380,000	48,274,000	59,312,000	532,262,000
Manitoba Hydro		1,270,546	1,163,760	855,610	634,971	399,961	448,519	497,659	442,481	449,929	644,432	829,929	993,388	8,631,183
Pool Purchases		0	0	0	0	0	0	0	0	0	0	0	0	0
MISO		2,741,246	2,212,783	21,044,132	7,987,456	10,088,583	12,143,176	11,349,206	11,320,560	16,601,002	132,866,048	48,940,127	1,590,221	278,884,540
MISO - Misc.		10,046	10,046	10,046	10,046	10,046	10,046	10,046	10,046	10,046	0	20,092	10,046	120,552
Total		744,637,370	670,679,418	651,139,018	691,494,984	602,170,757	594,601,754	611,489,370	617,301,381	516,653,657	530,842,383	605,642,435	655,993,245	7,492,645,772
Output - Uses - kWh														
Member Cooperatives		438,829,425	396,424,327	354,842,332	317,391,998	282,149,384	283,113,966	299,831,314	299,340,080	269,604,632	343,339,102	409,078,756	420,248,333	4,114,193,649
NMPA		45,668,155	41,010,183	38,658,238	34,923,546	34,095,895	35,154,460	37,605,026	36,961,089	32,158,067	35,955,925	39,443,803	41,067,508	452,701,895
MISO wMP Station Service		203,101,244	184,237,347	138,261,799	144,484,083	105,856,880	95,391,315	83,014,626	89,166,835	73,051,563	42,231,439	49,477,512	154,953,417	1,363,228,061
Class C Pool - Young 1 Sale to OTP														0
Class C Pool - Other		37,450,000	33,600,000	101,755,000	179,883,000	164,929,000	167,133,000	175,714,000	177,124,000	132,038,000	91,042,000	95,345,000	37,200,000	1,393,213,000
NextEra Sale														0
Oliver III SS - BEPC														0
Office Use		10,399	63,924	Per conversation betwe										74,323
Misc. - Mine & Station Service		4,254,054	3,798,168	4,346,430	3,251,104	2,440,223	3,119,398	3,186,069	2,959,490	2,666,044	4,723,430	3,299,628	3,305,107	41,349,145
State Mill, Hope & Sharon (WAPA)		2,304,646	2,260,990	2,452,295	2,179,318	2,168,947	1,954,106	2,035,348	2,222,169	2,166,747	2,369,638	2,317,357	2,319,671	26,751,232
Total		731,617,923	661,394,939	640,316,094	682,113,048	591,640,329	585,866,245	601,386,383	607,773,663	511,685,053	519,661,534	598,962,056	659,094,036	7,391,511,305
Losses (Difference)		13,019,447	9,284,478	10,822,924	9,381,935	10,530,428	8,735,509	10,102,987	9,527,718	4,968,604	11,180,849	6,680,379	(3,100,791)	101,134,467
Loss Percent		1.7%	1.4%	1.7%	1.4%	1.7%	1.5%	1.7%	1.5%	1.0%	2.1%	1.1%	-0.5%	1.3%
System Peak		675,454	837,944	694,326	706,863	598,957	610,054	619,181	654,252	572,678	640,254	787,324	805,332	8,402,619

Summer

APPENDIX E

RUS Form 12

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018 (Prepared with Audited Dat

BORROWER NAME: Minnkota Power Cooperative, Inc.

This information is analyzed and used to determine the submitter's financial situation and feasibility for loans and guarantees. You are required by contract and applicable regulations to provide the information. The information provided is subject to the Freedom of Information Act (5 U.S.C. 552)

CERTIFICATION

We recognize that statements contained herein concern a matter within the jurisdiction of an agency of the United States and the making of a false, fictitious or fraudulent statement may render the maker subject to prosecution under Title 18, United States Code Section 1001.

We hereby certify that the entries in this report are in accordance with the accounts and other records of the system and reflect the status of the system to the best of our knowledge and belief.

ALL INSURANCE REQUIRED BY PART 1788 OF 7 CFR CHAPTER XVII, RUS, WAS IN FORCE DURING THE REPORTING PERIOD AND RENEWALS HAVE BEEN OBTAINED FOR ALL POLICIES DURING THE PERIOD COVERED BY THIS REPORT PURSUANT TO PART 1718 OF 7 CFR CHAPTER XVII

(check one of the following)

[X] All of the obligations under the RUS loan documents have been fulfilled in all material respects.

[ ] There has been a default in the fulfillment of the obligations under the RUS loan documents. Said default(s) is/are specifically described in Part A Section C of this report.

Robert McLennan

3/14/2019
DATE

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART A - FINANCIAL

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION A. STATEMENT OF OPERATIONS

ITEM	YEAR-TO-DATE			THIS MONTH
	LAST YEAR (*a*)	THIS YEAR (*b*)	BUDGET (*c*)	(*d*)
1. Electric Energy Revenues	375,499,608	394,155,404		
2. Income From Leased Property (Net)				
3. Other Operating Revenue and Income	9,395,108	12,241,410		
4. Total Operation Revenues & Patronage Capital *(1 thru 3)*	384,894,716	406,396,814		
5. Operating Expense – Production - Excluding Fuel	15,076,783	14,340,135		
6. Operating Expense – Production - Fuel	33,163,022	29,824,545		
7. Operating Expense – Other Power Supply	231,152,393	235,120,762		
8. Operating Expense – Transmission	11,226,480	11,799,063		
9. Operating Expense – RTO/ISO				
10. Operating Expense – Distribution	5,737,629	6,809,782		
11. Operating Expense – Customer Accounts				
12. Operating Expense – Customer Service & Information				
13. Operating Expense – Sales	0			
14. Operating Expense – Administrative & General	14,515,390	15,681,617		
15. Total Operation Expense *(5 thru 14)*	310,871,697	313,575,904		
16. Maintenance Expense – Production	10,082,259	21,012,490		
17. Maintenance Expense – Transmission	5,514,231	5,137,598		
18. Maintenance Expense – RTO/ISO				
19. Maintenance Expense – Distribution	1,555,258	1,630,149		
20. Maintenance Expense – General Plant	1,285,040	1,692,265		
21. Total Maintenance Expense *(16 thru 20)*	18,436,788	29,472,502		
22. Depreciation and Amortization Expense	25,965,079	28,591,237		
23. Taxes				
24. Interest on Long-Term Debt	31,816,398	32,801,707		
25. Interest Charged to Construction – Credit	(1,503,802)	(711,621)		
26. Other Interest Expense	406,520	232,786		
27. Asset Retirement Obligations				
28. Other Deductions				
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30. Operating Margins *(4 less 29)*	(1,097,964)	2,434,299		
31. Interest Income	6,785,041	6,729,804		
32. Allowance For Funds Used During Construction				
33. Income (Loss) from Equity Investments				
34. Other Non-operating Income (Net)	3,021,910	22,338		
35. Generation & Transmission Capital Credits				
36. Other Capital Credits and Patronage Dividends	941,013	912,559		
37. Extraordinary Items				
38. Net Patronage Capital Or Margins (*30 thru 37*)	9,650,000	10,099,000		

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART A - FINANCIAL

INSTRUCTIONS – See help in the online application.

BORROWER DESIGNATION
ND0020

PERIOD ENDED
December, 2018

SECTION B. BALANCE SHEET

ASSETS AND OTHER DEBITS			LIABILITIES AND OTHER CREDITS		
1.	Total Utility Plant in Service	1,216,248,682	33.	Memberships	1,136
2.	Construction Work in Progress	36,041,371	34.	Patronage Capital	
3.	**Total Utility Plant (*1 + 2*)**	1,252,290,053		a. Assigned and Assignable	25,308,978
4.	Accum. Provision for Depreciation and Amortization	287,587,483		b. Retired This year	0
5.	**Net Utility Plant (*3 - 4*)**	964,702,570		c. Retired Prior years	6,765,700
				d. Net Patronage Capital (*a - b - c*)	18,543,278
6.	Non-Utility Property (Net)	0	35.	Operating Margins - Prior Years	0
7.	Investments in Subsidiary Companies	0	36.	Operating Margin - Current Year	2,434,299
8.	Invest. in Assoc. Org. - Patronage Capital	44,180	37.	Non-Operating Margins	7,664,701
9.	Invest. in Assoc. Org. - Other - General Funds	0	38.	Other Margins and Equities	121,553,393
10.	Invest. in Assoc. Org. - Other - Nongeneral Funds	0	**39.**	**Total Margins & Equities (*33 +34d thru 38*)**	150,196,807
11.	Investments in Economic Development Projects	0			
12.	Other Investments	7,352,690	40.	Long-Term Debt - RUS (Net)	33,926
13.	Special Funds	0	41.	Long-Term Debt - FFB - RUS Guaranteed	765,594,316
14.	**Total Other Property And Investments (*6 thru 13*)**	7,396,870	42.	Long-Term Debt - Other - RUS Guaranteed	0
			43.	Long-Term Debt - Other (Net)	119,820,858
15.	Cash - General Funds	165,974	44.	Long-Term Debt - RUS - Econ. Devel. (Net)	0
16.	Cash - Construction Funds - Trustee	100	45.	Payments – Unapplied	108,295,879
17.	Special Deposits	0	**46.**	**Total Long-Term Debt (*40 thru 44 - 45*)**	777,153,221
18.	Temporary Investments	60,037	47.	Obligations Under Capital Leases Noncurrent	170,134
19.	Notes Receivable (Net)	0	48.	Accumulated Operating Provisions and Asset Retirement Obligations	5,504,184
20.	Accounts Receivable - Sales of Energy (Net)	35,072,407	**49.**	**Total Other NonCurrent Liabilities (*47 + 48*)**	5,674,318
21.	Accounts Receivable - Other (Net)	15,739,328			
22.	Fuel Stock	4,116,920	50.	Notes Payable	16,574,700
23.	Renewable Energy Credits	0	51.	Accounts Payable	39,568,200
24.	Materials and Supplies - Other	25,705,188	52.	Current Maturities Long-Term Debt	25,006,520
25.	Prepayments	6,116,460	53.	Current Maturities Long-Term Debt - Rural Devel.	0
26.	Other Current and Accrued Assets	0	54.	Current Maturities Capital Leases	52,863
27.	**Total Current And Accrued Assets (*15 thru 26*)**	86,976,414	55.	Taxes Accrued	3,755,982
			56.	Interest Accrued	1,041,411
28.	Unamortized Debt Discount & Extraordinary Property Losses	0	57.	Other Current and Accrued Liabilities	5,323,513
29.	Regulatory Assets	0	**58.**	**Total Current & Accrued Liabilities (*50 thru 57*)**	91,323,189
30.	Other Deferred Debits	1,722,096	59.	Deferred Credits	36,450,415
31.	Accumulated Deferred Income Taxes	0	60.	Accumulated Deferred Income Taxes	0
32.	**Total Assets and Other Debits (*5+14+27 thru 31*)**	1,060,797,950	**61.**	**Total Liabilities and Other Credits (*39 + 46 + 49 + 58 thru 60*)**	1,060,797,950

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

SECTION C. NOTES TO FINANCIAL STATEMENTS

Other Deferred Debits - Line 30

Deferred pension cost $1,722,096

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

SECTION C. CERTIFICATION LOAN DEFAULT NOTES

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

PART B SE - SALES OF ELECTRICITY

Sale No.	Name Of Company or Public Authority (a)	RUS Borrower Designation (b)	Statistical Classification (c)	Renewable Energy Program Name (d)	Primary Renewable Fuel Type (e)	Average Monthly Billing Demand (MW) (f)	Actual Average Monthly NCP Demand (g)	Actual Average Monthly CP Demand (h)
1	Ultimate Consumer(s)							
2	Beltrami Electric Coop, Inc		LF			54	87	78
3	Cass County Electric Coop, Inc (ND0011)	ND0011	LF			161	234	208
4	Cavalier Rural Elec Coop, Inc (ND0038)	ND0038	LF			5	8	5
5	Clearwater-Polk Elec Coop Inc		LF			12	17	15
6	Nodak Electric Coop, Inc (ND0019)	ND0019	LF			139	201	165
7	North Star Electric Coop, Inc (MN0095)	MN0095	LF			15	20	18
8	P K M Electric Coop, Inc (MN0087)	MN0087	LF			16	22	19
9	Red Lake Electric Coop, Inc (MN0075)	MN0075	LF			20	23	21
10	Red River Valley Coop Pwr Assn (MN0074)	MN0074	LF			17	25	21
11	Roseau Electric Coop, Inc		LF			17	28	25
12	Wild Rice Electric Coop, Inc (MN0082)	MN0082	LF			41	53	49
13	Midwest Independent Transmission System Operator, Inc. (IN)		AD					
14	Minnesota Power & Light Co		OS					
15	Basin Electric Power Coop (ND0045)	ND0045	OS					
16	NextEra Energy Power Marketing LLC (FL)		OS					
17	*Miscellaneous		OS					
UC	Total for Ultimate Consumer(s)							
Dist	Total for Distribution Borrowers					414	586	506
G&T	Total for G&T Borrowers					0	0	0
Other	Total for Other					83	132	118
Total	Grand Total					497	718	624

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

PART B SE - SALES OF ELECTRICITY

Sale No	Electricity Sold (MWh) (i)	Revenue Demand Charges (j)	Revenue Energy Charges (k)	Revenue Other Charges (l)	Revenue Total (j + k + l) (m)
1					
2	516,679	13,585,230	23,917,059	562,704	38,064,993
3	1,314,627	37,192,040	60,854,094	3,203,394	101,249,528
4	34,533	978,234	1,598,524	180,186	2,756,944
5	98,347	2,384,906	4,552,485	260,760	7,198,151
6	1,189,348	31,176,635	55,054,928	1,519,552	87,751,115
7	117,725	3,246,847	5,449,491	390,660	9,086,998
8	127,252	3,338,961	5,890,496	453,549	9,683,006
9	133,343	4,175,102	6,172,432	386,559	10,734,093
10	130,557	3,790,658	6,043,492	512,783	10,346,933
11	158,903	3,836,577	7,355,613	491,238	11,683,428
12	292,880	8,772,375	13,557,399	904,991	23,234,765
13	1,277,771		28,184,670		28,184,670
14	453,804	1,800,000	18,437,556		20,237,556
15	955,266		35,341,711		35,341,711
16	69,600		1,813,200		1,813,200
17				(3,211,687)	(3,211,687)
UC					
Dist	3,340,265	92,670,852	154,620,856	7,551,674	254,843,382
G&T	0	0	0	0	0
Other	3,530,370	21,606,713	119,602,294	(1,896,985)	139,312,022
Total	6,870,635	114,277,565	274,223,150	5,654,689	394,155,404

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

PART B SE - SALES OF ELECTRICITY

Sale No	Comments
1	
2	
3	
4	
5	
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9	
10	
11	
12	
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14	
15	
16	
17	Revenue deferred
UC	

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

PART B PP - PURCHASED POWER

Purchase No. (a)	Name Of Company or Public Authority (b)	RUS Borrower Designation (c)	Statistical Classification (d)	Renewable Energy Program Name (e)	Primary Renewable Fuel Type (f)	Average Monthly Billing Demand (MW) (g)	Actual Average Monthly NCP Demand (h)	Actual Average Monthly CP Demand ()
1	Manitoba Hydro		OS					
2	Northern Municipal Power Agncy		LF					
3	Square Butte Elec Cooperative (ND0048)	ND0048	LF					
4	Minnesota Power & Light Co		LF					
5	Western Area Power Admin		RQ			86,801		
6	Midwest Independent Transmission System Operator, Inc. (IN)		OS					
7	*Miscellaneous		OS					
8	*Miscellaneous		OS					
9	*Miscellaneous		OS					
10	*Miscellaneous		OS					
11	*Miscellaneous		OS					
12	*Miscellaneous		OS					
13	*Miscellaneous		OS					
14	*Miscellaneous		OS					
15	*Miscellaneous		OS					
16	*Miscellaneous		OS					
17	*Miscellaneous		OS					
18	*Miscellaneous		OS					
19	*Miscellaneous		OS					
20	*Miscellaneous		OS					
Dist	Total for Distribution Borrowers					0	0	0
G&T	Total for G&T Borrowers					0	0	0
Other	Total for Other					86,801	0	0
Total	Grand Total					86,801	0	0

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

PART B PP - PURCHASED POWER

Purchase No	Electricity Purchased (MWh) (i)	Electricity Received (MWh) (j)	Electricity Delivered (MWh) (k)	Demand Charges (l)	Energy Charges (m)	Other Charges (n)	Total (l + m + n) (o)
1	8,632					577,700	577,700
2	453,279					24,816,916	24,816,916
3	1,717,619					81,313,979	81,313,979
4	962,622					45,409,081	45,409,081
5	532,262			5,433,813	6,554,603	(21,388)	11,967,028
6	279,004					8,669,753	8,669,753
7	10					382	382
8	1,605,098					61,799,411	61,799,411
9	1,912					89,344	89,344
10	736					18,377	18,377
11						21,544	21,544
12	46					71,649	71,649
13						253,730	253,730
14						9,608	9,608
15						7,337	7,337
16						2,847	2,847
17						2,068	2,068
18						1,213	1,213
19						55,643	55,643
20						33,152	33,152
Dist	0	0	0	0	0	0	0
G&T	1,717,619	0	0	0	0	81,313,979	81,313,979
Other	3,843,601	0	0	5,433,813	6,554,603	141,818,367	153,806,783
Total	5,561,220	0	0	5,433,813	6,554,603	223,132,346	235,120,762

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

PART B PP - PURCHASED POWER

Purchase No	Comments
1	
2	
3	
4	
5	
6	
7	
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9	
10	
11	
12	
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16	
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UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application	PERIOD ENDED December, 2018

PART C RE - RENEWABLE GENERATING PLANT SUMMARY

Plant Name (a)	Prime Mover (b)	Primary Renewable Fuel Type (c)	Renewable Fuel (%) (d)	Capacity (kW) (e)	Net Generation (MWh) (f)	Capacity Factor (%) (g)
Infinity- Valley City	Large Wind	Wind	100.00	900.0	2166.0	27.50
Infinity- Petersburg	Large Wind	Wind	100.00	900.0	2842.0	36.00
Total:				1800.0	5008.0	

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application	PERIOD ENDED December, 2018

PART C RE - RENEWABLE GENERATING PLANT SUMMARY

Plant Name (a)	Number of Employees (h)	Total O&M Cost (mils/Net kWh) (i)	Power Cost (mils/Net kWh) (j)	Total Investment ($1,000) (k)	Percentage Ownership (%) (l)	RUS Funding ($1,000) (m)
Infinity- Valley City	0	22	45	1,006	100	0
Infinity- Petersburg	0	17	34	1,006	100	0
Total:	0	39	79	2,012		0

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application	PERIOD ENDED December, 2018

PART C RE - RENEWABLE GENERATING PLANT SUMMARY

Plant Name	Comments
Infinity- Valley City	
Infinity- Petersburg	

reUNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART C - SOURCES AND DISTRIBUTION OF ENERGY

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SOURCES OF ENERGY (*a*)	NO. OF PLANTS (*b*)	CAPACITY (kW) (*c*)	NET ENERGY RECIEVED BY SYSTEM (MWh) (*d*)	COST ($) (*e*)
Generated in Own Plant (*Details on Parts D, E, F IC, F CC, and G*)				
1. Fossil Steam	1	256,200	1,473,717	88,361,759
2. Nuclear	0	0	0	0
3. Hydro	0	0	0	0
4. Combined Cycle	0	0	0	0
5. Internal Combustion	0	0	0	0
6. Other	0	0	5,008	194,729
7. Total in Own Plant (*1 thru 6*)	1	256,200	1,478,725	88,556,488
Purchased Power				
8. Total Purchased Power			5,561,220	235,120,762
Interchanged Power				
9. Received Into System (Gross)			0	0
10. Delivered Out of System (Gross)			28,233	0
11. Net Interchange (*9 - 10*)			(28,233)	0
Transmission For or By Others - (Wheeling)				
12. Received Into System			22,658	0
13. Delivered Out of System			21,176	0
14. Net Energy Wheeled (*12 - 13*)			1,482	0
15. Total Energy Available for Sale (*7 + 8 + 11 + 14*)			7,013,194	
Distribution of Energy				
16. Total Sales			6,870,635	
17. Energy Furnished to Others Without Charge			41,349	
18. Energy Used by Borrower *(Excluding Station Use)*			74	
19. Total Energy Accounted For (*16 thru 18*)			6,912,058	
Losses				
20. Energy Losses - MWh (*15 - 19*)			101,136	
21. Energy Losses - Percentage ((*20 / 15*) * *100*)			1.44 %	

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART D - STEAM PLANT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PLANT: Milton R. Young #1

PERIOD ENDED: December, 2018

SECTION A. BOILERS/TURBINES

NO.	UNIT NO. (a)	TIMES STARTED (b)	FUEL CONSUMPTION: COAL (1000 Lbs.) (c)	OIL (1000 Gals.) (d)	GAS (1000 C.F.) (e)	OTHER (f)	TOTAL (g)	OPERATING HOURS: IN SERVICE (h)	ON STANDBY (i)	OUT OF SERVICE: SCHED. (j)	OUT OF SERVICE: UNSCH. (k)
1.	1	10	2,641.00	669.00				6,686		1,059	1,015
2.											
3.											
4.											
5.											
6.	**Total**	10	2,641	669.00	0.00	0.00		6,686	0	1,059	1,015
7.	Average BTU		6,586	140,000.00							
8.	Total BTU (10^6)		17,394.00	93,660			111,054				
9.	Total Del. Cost ($)		28,442,661	1,381,884.00							

SECTION A. BOILERS/TURBINES (*Continued*)

NO.	UNIT NO. (l)	SIZE (kW) (m)	GROSS GEN. (MWh) (n)	BTU PER kWh (o)
1.	1	256,200	1,646,839.00	
2.				
3.				
4.				
5.				
6.	**Total**	256,200	1,646,839.00	67
7.	Station Service (MWh)		173,122.00	
8.	Net Generation (MWh)		1,473,717.00	75.36
9.	Station Service (%)		10.51	

SECTION B. LABOR REPORT

NO.	ITEM	VALUE
1.	No. Employees Full-Time (Include Superintendent)	69
2.	No. Employees Part-Time	4
3.	**Total Employee Hours Worked**	138,713
4.	Operating Plant Payroll ($)	2,945,685
5.	Maintenance Plant Payroll ($)	2,243,221
6.	Other Accts. Plant Payroll ($)	1,465,179
7.	**Total Plant Payroll ($)**	6,654,085

SEC. C. FACTORS & MAX. DEMAND

NO.	ITEM	VALUE
1.	Load Factor (%)	66.78%
2.	Plant Factor (%)	73.38%
3.	Running Plant Capacity Factor (%)	96.14%
4.	15 Minute Gross Max. Demand (kW)	281,500
5.	Indicated Gross Max. Demand (kW)	

SECTION D. COST OF NET ENERGY GENERATED

NO.	PRODUCTION EXPENSE	ACCOUNT NUMBER	AMOUNT ($) (a)	MILLS/NET kWh (b)	$/$10^6$ BTU (c)
1.	Operation, Supervision and Engineering	500	1,130,746		
2.	Fuel, Coal	501.1	28,442,661		
3.	Fuel, Oil	501.2	1,381,884		
4.	Fuel, Gas	501.3			
5.	Fuel, Other	501.4			
6.	**Fuel SubTotal (*2 thru 5*)**	501	29,824,545	20.24	
7.	Steam Expenses	502	6,709,966		
8.	Electric Expenses	505	305,405		
9.	Miscellaneous Steam Power Expenses	506	5,120,275		
10.	Allowances	509			
11.	Rents	507			
12.	**Non-Fuel SubTotal (*1 + 7 thru 11*)**		13,266,392	9.00	
13.	**Operation Expense (*6 + 12*)**		43,090,937	29.24	
14.	Maintenance, Supervision and Engineering	510	1,474,730		
15.	Maintenance of Structures	511	347,387		
16.	Maintenance of Boiler Plant	512	13,772,289		
17.	Maintenance of Electric Plant	513	5,910,615		
18.	Maintenance of Miscellaneous Plant	514	323,664		
19.	**Maintenance Expense (*14 thru 18*)**		21,828,685	14.81	
20.	**Total Production Expense (*13 + 19*)**		64,919,622	44.05	
21.	Depreciation	403.1, 411.10	12,581,105		
22.	Interest	427	10,861,032		
23.	**Total Fixed Cost (*21 + 22*)**		23,442,137	15.91	
24.	**Power Cost (*20 + 23*)**		88,361,759	59.96	

Remarks

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART E - HYDRO PLANT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION

PLANT

PERIOD ENDED

SECTION A. HYDRO GENERATING UNITS

NO.	UNIT NO. (*a*)	SIZE (kW) (*b*)	GROSS GENERATION (MWh) (*c*)	OPERATING HOURS			
				IN SERVICE (*d*)	ON STANDBY (*e*)	OUT OF SERVICE	
						SCHEDULED (*f*)	UNSCHEDULED (*g*)
1.							
2.							
3.							
4.							
5.							
6.	**Total**						

7.	Station Service (MWh)		**HYDRAULIC DATA**		
8.	Net Generation (MWh)		**ITEM**	**(*a*) MAXIMUM**	**(*b*) MINIMUM**
9.	Station Service % of Gross		1. Pool Elevation (ft.)		
10.	Energy for Pumped Storage (MWh)		2. Tail Race Elevation (ft.)		
11.	**Net Generation after Pumped Storage (MWh)**		Water Spilled ☐ Yes ☐ No		

SECTION B. LABOR REPORT

NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full-Time (Include Superintendent)		5.	Maintenance Plant Payroll ($)	
2.	No. Employees Part Time		6.	Other Accounts Plant Payroll ($)	
3.	**Total Employee Hours Worked**		**7.**	**Total Plant Payroll ($)**	
4.	Operating Plant Payroll ($)				

SECTION C. FACTORS & MAXIMUM DEMAND

NO.	ITEM	VALUE
1.	Load Factor (%)	
2.	Plant Factor (%)	
3.	Running Plant Capacity Factor (%)	
4.	15 Min. Gross Max. Demand (kW)	
5.	Indicated Gross Max. Demand (kW)	

SECTION D. COST OF NET ENERGY GENERATED

NO.	PRODUCTION EXPENSE	ACCOUNT NUMBER	AMOUNT ($) (*a*)	MILLS/NET kWh (*b*)
1.	Operation, Supervision and Engineering	535		
2.	Water for Power	536		
3.	Energy for Pumped Storage	536.1		
4.	Hydraulic Expense	537		
5.	Electric Expense	538		
6.	Miscellaneous Hydraulic Power Generation Expense	539		
7.	Rents	540		
8.	**Operation Expense (*1 thru 7*)**			
9.	Maintenance, Supervision and Engineering	541		
10.	Maintenance of Structures	542		
11.	Maintenance of Reservoirs, Dams and Waterways	543		
12.	Maintenance of Electric Plant	544		
13.	Maintenance of Miscellaneous Hydraulic Plant	545		
14.	**Maintenance Expense (*9 thru 13*)**			
15.	**Total Production Expense (*8 + 14*)**			
16.	Depreciation	403.3, 411.10		
17.	Interest	427		
18.	**Total Fixed Cost (*16 + 17*)**			
19.	**Power Cost (*15 + 18*)**			

Remarks (including Unscheduled Outages)

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART F IC - INTERNAL COMBUSTION PLANT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION

PLANT

PERIOD ENDED

SECTION A. INTERNAL COMBUSTION GENERATING UNITS

NO.	UNIT NO. (*a*)	SIZE (kW) (*b*)	FUEL CONSUMPTION				OPERATING HOURS					
			OIL (1000 Gals.) (*c*)	GAS (1000 C.F.) (*d*)	OTHER (e)	TOTAL (*f*)	IN SERVICE (*g*)	ON STANDBY (*h*)	OUT OF SERVICE SCHED. (*i*)	OUT OF SERVICE UNSCH. (*j*)	GROSS GENER.(MWh) (*k*)	BTU PER kWh (*l*)
1.												
2.												
3.												
4.												
5.												
6.	**Total**											
7.	Average BTU						Station Service (MWh)					
8.	Total BTU (10^6)						Net Generation (MWh)					
9.	Total Del. Cost ($)						Station Service % of Gross					

SECTION B. LABOR REPORT

NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full Time (Include Superintendent)		5.	Maintenance Plant Payroll ($)	
2.	No. Employees Part Time		6.	Other Accounts Plant Payroll ($)	
3.	**Total Employee Hours Worked**		**7.**	**Total Plant Payroll ($)**	
4.	Operating Plant Payroll ($)				

SECTION C. FACTORS & MAXIMUM DEMAND

NO.	ITEM	VALUE
1.	Load Factor (%)	
2.	Plant Factor (%)	
3.	Running Plant Capacity Factor (%)	
4.	15 Min. Gross Max. Demand (kW)	
5.	Indicated Gross Max. Demand (kW)	

SECTION D. COST OF NET ENERGY GENERATED

NO.	PRODUCTION EXPENSE	ACCOUNT NUMBER	AMOUNT ($) (*a*)	MILLS/NET (kWh) (*b*)	$/$10^6$ BTU (*c*)
1.	Operation, Supervision and Engineering	546			
2.	Fuel, Oil	547.1			
3.	Fuel, Gas	547.2			
4.	Fuel, Other	547.3			
5.	Energy for Compressed Air	547.4			
6.	**Fuel SubTotal (*2 thru 5*)**	547			
7.	Generation Expenses	548			
8.	Miscellaneous Other Power Generation Expenses	549			
9.	Rents	550			
10.	**Non-Fuel SubTotal (*1 + 7 thru 9*)**				
11.	**Operation Expense (*6 + 10*)**				
12.	Maintenance, Supervision and Engineering	551			
13.	Maintenance of Structures	552			
14.	Maintenance of Generating and Electric Plant	553			
15.	Maintenance of Miscellaneous Other Power Generating Plant	554			
16.	**Maintenance Expense (*12 thru 15*)**				
17.	**Total Production Expense (*11 + 16*)**				
18.	Depreciation	403.4, 411.10			
19.	Interest	427			
20.	**Total Fixed Cost (*18 + 19*)**				
21.	**Power Cost (*17 + 20*)**				

Remarks (including Unscheduled Outages)

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART F CC - COMBINED CYCLE PLANT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION

PLANT

PERIOD ENDED

SECTION A. COMBINED CYCLE GENERATING UNITS

NO.	UNIT NO. (*a*)	SIZE (kW) (*b*)	FUEL CONSUMPTION OIL (1000 Gals.) (*c*)	GAS (1000 CF) (*d*)	OTHER (*e*)	TOTAL (*f*)	OPERATING HOURS IN SERVICE (*g*)	ON STANDBY (*h*)	OUT OF SERVICE SCHED. (*i*)	OUT OF SERVICE UNSC. (*j*)	GROSS GENER. (MWh) (*k*)	BTU PER kWh (*l*)
1.												
2.												
3.												
4.												
5.												
6.	**Total**											
7.	Average BTU						Station Service (MWh)					
8.	Total BTU (10^6)						Net Generation (MWh)					
9.	Total Del. Cost ($)						Station Service % Of Gross					

SECTION B. LABOR REPORT

NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full Time (Include. Superintendent)		5.	Maintenance Plant Payroll ($)	
2.	No. Employees Part Time			Other Accounts Plant Payroll ($)	
3.	**Total Employee Hours Worked**				
4.	Operating Plant Payroll ($)			**Total Plant Payroll ($)**	

SECTION C. FACTORS & MAXIMUM DEMAND

NO.	ITEM	VALUE
1.	Load Factor (%)	
2.	Plant Factor (%)	
3.	Running Plant Capacity Factor (%)	
4.	15 Min. Gross Max. Demand (kW)	
5.	Indicated Gross Max. Demand (kW)	

SECTION D. COST OF NET ENERGY GENERATED

NO.	PRODUCTION EXPENSE	ACCOUNT NUMBER	AMOUNT ($) (*a*)	MILLS/NET kWh (*b*)	$/$10^6$ BTU (*c*)
1.	Operation, Supervision and Engineering	500			
2.	Fuel, Oil	547.1			
3.	Fuel, Gas	547.2			
4.	Fuel, Other	547.3			
5.	Energy for Compressed Air	547.4			
6.	**Fuel SubTotal (*2 thru 5*)**				
7.	Generation Expenses	548			
8.	Miscellaneous Other Power Generation Expenses	549			
9.	Rents	507			
10.	Steam Expenses	502			
11.	Electric Expenses	505			
12.	Miscellaneous Steam Power Expenses	506			
13.	Allowances	509			
14.	**Non-Fuel SubTotal (*1 + 7 thru 13*)**				
15.	**Operating Expense (*6 + 14*)**				
16.	Maintenance, Supervision and Engineering	551, 510			
17.	Maintenance of Structures	552, 511			
18.	Maintenance of Generating and Electric Plant	553, 513			
19.	Maintenance of Miscellaneous Other Power Generating Plant	554, 514			
20.	**Maintenance Expense (*16 thru 19*)**				
21.	**Total Production Expense (*15 + 20*)**				
22.	Depreciation	403.4, 403.1. 411.10			
23.	Interest	427			
24.	**Total Fixed Cost (*22 + 23*)**				
25.	**Power Cost (*21 + 24*)**				

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART G - NUCLEAR PLANT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION

PLANT

PERIOD ENDED

SECTION A. BOILERS AND GENERATING UNITS

NO.	UNIT NO. (*a*)	TIMES STARTED (*b*)	SIZE (kW) (*c*)	GROSS GENERATION (MWh) (*d*)	OPERATING HOURS			
					IN SERVICE (*e*)	ON STANDBY (*f*)	OUT OF SERVICE SCHEDULED (*g*)	OUT OF SERVICE UNSCHEDULED (*h*)
1.								
2.								
3.								
4.								
5.								
6.	**Total**							
7.	Station Service (MWh)							
8.	Net Generation (MWh)							
9.	Station Service % Of Gross							

SECTION B. LABOR REPORT

NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full Time (Include. Superintendent)		5.	Maintenance Plant Payroll ($)	
2.	No. Employees Part Time		6.	Other Accounts Plant Payroll ($)	
3.	**Total Employee Hours Worked**		**7.**	**Total Plant Payroll ($)**	
4.	Operating Plant Payroll ($)				

SECTION C. FACTORS & MAXIMUM DEMAND

NO.	ITEM	VALUE
1.	Load Factor (%)	
2.	Plant Factor (%)	
3.	Running Plant Capacity Factor (%)	
4.	15 Min. Gross Max. Demand (kW)	
5.	Indicated Gross Max. Demand (kW)	

SECTION D. COST OF NET ENERGY GENERATED

NO.	PRODUCTION EXPENSE	ACCOUNT NUMBER	AMOUNT ($) (*a*)	MILLS/NET kWh (*b*)
1.	Operation, Supervision and Engineering	517		
2.	Fuel	518.1		
3.	Less Fuel Acquisition Adjustment	518.2		
4.	**Net Fuel Expense (*2 - 3*)**			
5.	Coolants and Water	519		
6.	Steam Expenses	520		
7.	Steam From Other Sources	521		
8.	Electric Expenses	523		
9.	Miscellaneous Nuclear Power Expense	524		
10.	Rents	525		
11.	**Operation Expense (*1 + 4 thru 10*)**			
12.	Maintenance, Supervision and Engineering	528		
13.	Maintenance of Structures	529		
14.	Maintenance of Reactor Plant Equipment	530		
15.	Maintenance of Electric Plant	531		
16.	Maintenance of Miscellaneous Nuclear Plant	532		
17.	**Maintenance Expense (*12 thru 16*)**			
18.	Reactor Credits			
19.	**Total Production Expense (*11 + 17 - 18*)**			
20.	Depreciation	403.2, 411.10		
21.	Interest	427		
22.	**Total Fixed Cost (*20 + 21*)**			
23.	Less Plant Acquisition Adjustment	406		
24.	**Power Cost (19 + 22 - 23)**			

Remarks (including Unscheduled Outages)

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART H - ANNUAL SUPPLEMENT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION A. UTILITY PLANT

	ITEM	BALANCE BEGINNING OF YEAR (*a*)	ADDITIONS (*b*)	RETIREMENTS (*c*)	ADJUSTMENTS AND TRANSFERS (*d*)	BALANCE END OF YEAR (*e*)
1.	Total Intangible Plant (301 thru 303)	0				0
2.	Total Steam Production Plant (*310 thru 317*)	390,091,625	13,306,504			403,398,129
3.	Total Nuclear Production Plant (*320 thru 326*)	0				0
4.	Total Hydro Production Plant (*330 thru 337*)	0				0
5.	Total Other Production Plant (*340 thru 347*)	2,011,953				2,011,953
6.	**Total Production Plant (*2 thru 5*)**	392,103,578	13,306,504			405,410,082
7.	Land and Land Rights (*350*)	25,555,566	39,496			25,595,062
8.	Structures and Improvements (*352*)	0				0
9.	Station Equipment (*353*)	109,507,420	8,521,773	1,371,773		116,657,420
10.	Other Transmission Plant (*354 thru 359.1*)	457,450,700	12,922,943	3,170,261		467,203,382
11.	**Total Transmission Plant (*7 thru 10*)**	592,513,686	21,484,212	4,542,034		609,455,864
12.	Land and Land Rights (*360*)	0				0
13.	Structures and Improvements (*361*)	0				0
14.	Station Equipment (*362*)	83,197,052	8,004,166	1,682,622		89,518,596
15.	Other Distribution Plant (*363 thru 374*)	0				0
16.	**Total Distribution Plant (*12 thru 15*)**	83,197,052	8,004,166	1,682,622		89,518,596
17.	RTO/ISO Plant (380 thru 386)					
18.	Total General Plant (*389 thru 399.1*)	121,864,194	5,989,103	15,989,157		111,864,140
19.	**Electric Plant in Service (*1 + 6 + 11 + 16 thru 18*)**	1,189,678,510	48,783,985	22,213,813		1,216,248,682
20.	Electric Plant Purchased or Sold (*102*)	0				0
21.	Electric Plant Leased to Others (*104*)	0				0
22.	Electric Plant Held for Future Use (*105*)	0				0
23.	Completed Construction Not Classified (*106*)	0				0
24.	Acquisition Adjustments (*114*)	0				0
25.	Other Utility Plant (*118*)	0				0
26.	Nuclear Fuel Assemblies (*120.1 thru 120.4*)	0				0
27.	**Total Utility Plant in Service (*19 thru 26*)**	1,189,678,510	48,783,985	22,213,813		1,216,248,682
28.	Construction Work in Progress (*107*)	27,606,476			8,434,895	36,041,371
29.	**Total Utility Plant (*27 + 28*)**	1,217,284,986	48,783,985	22,213,813	8,434,895	1,252,290,053

SECTION B. ACCUMULATED PROVISION FOR DEPRECIATION AND AMORTIZATION - UTILITY PLANT

	ITEM	COMP. RATE (%) (a)	BALANCE BEGINNING OF YEAR (*b*)	ANNUAL ACCRUALS (*c*)	RETIREMENTS LESS NET SALVAGE (*d*)	ADJUSTMENTS AND TRANSFERS (*e*)	BALANCE END OF YEAR (*f*)
1.	Depr. of Steam Prod. Plant (108.1)		110,588,624	12,221,045			122,809,669
2.	Depr. of Nuclear Prod. Plant (108.2)		0				0
3.	Depr. of Hydraulic Prod. Plant (108.3)		0				0
4.	Depr. of Other Prod. Plant (108.4)		1,541,740	100,597			1,642,337
5.	Depr. of Transmission Plant (108.5)		99,757,274	11,407,300	2,183,110		108,981,464
6.	Depr. of Distribution Plant (108.6)		21,228,922	2,130,772	249,457		23,110,237
7.	Depr. of General Plant (108.7)		36,726,313	5,055,205	10,737,742		31,043,776
8.	Retirement Work in Progress (108.8)		0				0
9.	**Total Depr. for Elec. Plant in Serv. (*1 thru 8*)**		269,842,873				287,587,483
10.	Depr. of Plant Leased to Others (109)		0				0
11.	Depr. of Plant Held for Future Use (110)		0				0
12.	Amort. of Elec. Plant in Service (111)		0				0
13.	Amort. of Leased Plant (112)		0				0
14.	Amort. of Plant Held for Future Use		0				0
15.	Amort. of Acquisition Adj. (115)		0				0
16.	Depr. & Amort. Other Plant (119)		0				0
17.	Amort. of Nuclear Fuel (120.5)		0				0
18.	**Total Prov. for Depr. & Amort. (*9 thru 17*)**		269,842,873	30,914,919	13,170,309		287,587,483

UNITED STATES DEPARTMENT OF AGRICULTURE
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FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
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INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION B. ACCUMULATED PROVISION FOR DEPRECIATION AND AMORTIZATION - UTILITY PLANT (*Continued*)

19. Amount of Annual Accrual Charged to Expense	20. Amount of Annual Accrual Charged to Other Accounts	21. Book Cost of Property Retired
$ 30,914,919	$	$ 19,590,428
22. Removal Cost of Property Retired	**23. Salvage Material from Property Retired**	**24. Renewal and Replacement Cost**
$ 398,019	$ 6,901,434	$

SECTION C. NON-UTILITY PLANT

ITEM	BALANCE BEGINNING OF YEAR (*a*)	ADDITIONS (*b*)	RETIREMENTS (*c*)	ADJUSTMENTS AND TRANSFERS (*d*)	BALANCE END OF YEAR (*e*)
1. NonUtility Property (121)					
2. Provision For Depr. & Amort. (122)					

SECTION D. DEMAND AND ENERGY AT POWER SOURCES

MONTH	PEAK DEMAND (MW) (*a*)	MONTHLY PEAKS			ENERGY OUTPUT (MWh) (*e*)
		DATE (*b*)	TIME (*c*)	TYPE OF READING (*d*)	
1. January	876	01/15/2018	14	Coincident	492,039
2. February	838	02/12/2018	8	Coincident	452,307
3. March	694	03/07/2018	8	Coincident	400,785
4. April	707	04/06/2018	7	Coincident	358,570
5. May	599	05/29/2018	18	Coincident	322,376
6. June	610	06/27/2018	18	Coincident	324,466
7. July	619	07/11/2018	16	Coincident	344,212
8. August	654	08/12/2018	18	Coincident	341,061
9. September	573	09/16/2018	18	Coincident	307,632
10. October	640	10/31/2018	18	Coincident	389,489
11. November	787	11/13/2018	9	Coincident	456,770
12. December	805	12/31/2018	20	Coincident	458,764
13. Annual Peak	876			**Annual Total**	4,648,471

SECTION E. DEMAND AND ENERGY AT DELIVERY POINTS

MONTH	DELIVERED TO RUS BORROWERS		DELIVERED TO OTHERS		TOTAL DELIVERED	
	DEMAND (MW) (*a*)	ENERGY (MWh) (b)	DEMAND (MW) (*c*)	ENERGY (MWh) (*d*)	DEMAND (MW) (*e*)	ENERGY (MWh) (*f*)
1. January	722	409,318	54	270,105	776	679,423
2. February	689	368,788	56	245,488	745	614,276
3. March	579	330,790	45	264,101	624	594,891
4. April	588	296,326	45	345,451	633	641,777
5. May	497	265,730	28	287,100	525	552,830
6. June	506	267,286	26	278,353	532	545,639
7. July	510	283,166	28	275,394	538	558,560
8. August	549	282,167	32	283,464	581	565,631
9. September	478	254,195	26	220,499	504	474,694
10. October	533	322,501	37	154,111	570	476,612
11. November	656	383,239	47	170,662	703	553,901
12. December	701	393,437	47	218,964	748	612,401
13. Peak or Total	722	3,856,943	56	3,013,692	776	6,870,635

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FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT	PERIOD ENDED December, 2018

INSTRUCTIONS - Reporting of investments is required by 7 CFR 1717, Subpart N. Investment categories reported on this Part correspond to Balance Sheet items in Part A Section B. Identify all investments in Rural Development with an 'X' in column (e). Both 'Included' and 'Excluded' Investments must be reported. See help in the online application.

SECTION F. INVESTMENTS, LOAN GUARANTEES AND LOANS
SUB SECTION I. INVESTMENTS

No	Description (a)	Included ($) (b)	Excluded ($) (c)	Income Or Loss ($) (d)	Rural Development (e)
2	**Investments in Associated Organizations**				
	Beltrami Electric Cooperative, Inc.	1,976			
	Cass County Electric Cooperative, Inc.	7,329			
	Cavalier Rural Electric Cooperative, Inc.	2,681			
	Clearwater-Polk Electric Cooperative, Inc.	1,926			
	Nodak Electric Cooperative, Inc.	20,267			
	North Star Electric Cooperative, Inc.	1,339			
	PKM Electric Cooperative, Inc.	1,856			
	Red Lake Electric Cooperative, Inc.	1,698			
	Red River Valley Cooperative Power Association	2,202			
	Roseau Electric Cooperative, Inc.	2,389			
	Wild Rice Electric Cooperative, Inc.	417			
	Lignite Electric Cooperative	100			
	Totals	44,180			
4	**Other Investments**				
	Capital Electric Coop	6,345			
	Cenex (CHS)	9,205			
	CoBank	7,121,464			
	Dakota Valley	1,148			
	Dairyland Power Coop.	10			
	Federated Rural Electric	60,356			
	Garden Valley Telephone	22,117			
	Lake States Forestry Corp.	100			
	National Rural Utilities CFC	6,444			
	Northern Plains Electric	1,928			
	Paul Bunyan Rural Telephone	3,300			
	Polar Communications Corp.	3,705			
	Red River Communications	3,719			
	RESCO - Rural Electric Coop.	26,319			
	Roughrider Electric Cooperative (Oliver-Mercer)	7,866			
	Touchstone Energy	1,515			
	Tri-Energy Cooperative	526			
	United Telephone Mutual Aid Corporation	85			
	Verendrye Electric Cooperative	294			
	West River Mutual Aid Telephone	76,244			
	Totals	7,352,690			
6	**Cash - General**				
	Petty Cash	4,000			
	General Checking and Savings	150,474			
	Land and Easement Fund	11,500			
	Totals	165,974			
8	**Temporary Investments**				
	Temporary Investments	60,037			
	Totals	60,037			
9	**Accounts and Notes Receivable - NET**				
	Accounts Receivable	15,739,328			
	Totals	15,739,328			
11	**TOTAL INVESTMENTS (1 thru 10)**	23,362,209			

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT**	BORROWER DESIGNATION ND0020 PERIOD ENDED December, 2018

INSTRUCTIONS - Reporting of investments is required by 7 CFR 1717, Subpart N. Investment categories reported on this Part correspond to Balance Sheet items in Part A Section B. Identify all investments in Rural Development with an 'X' in column (e). Both 'Included' and 'Excluded' Investments must be reported. See help in the online application.

SECTION F. INVESTMENTS, LOAN GUARANTEES AND LOANS
SUB SECTION II. LOAN GUARANTEES

No	Organization (a)	Maturity Date (b)	Original Amount ($) (c)	Loan Balance ($) (d)	Rural Development (e)
	TOTAL				
	TOTAL (Included Loan Guarantees Only)				

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT**	BORROWER DESIGNATION ND0020 PERIOD ENDED December, 2018

INSTRUCTIONS - Reporting of investments is required by 7 CFR 1717, Subpart N. Investment categories reported on this Part correspond to Balance Sheet items in Part A Section B. Identify all investments in Rural Development with an "X" in column (e). Both "Included" and "Excluded" Investments must be reported. See help in the online application.

SECTION F. INVESTMENTS, LOAN GUARANTEES AND LOANS
SUB SECTION III. RATIO

RATIO OF INVESTMENTS AND LOAN GUARANTEES TO UTILITY PLANT [Total of Included Investments (Sub Section I, 11b) and Loan Guarantees - Loan Balance (Sub Section II, 5d) to Total Utility Plant (Part A, Section B, Line 3 of this report)]	1.87 %

SECTION F. INVESTMENTS, LOAN GUARANTEES AND LOANS
SUB SECTION IV. LOAN

No	Organization (a)	Maturity Date (b)	Original Amount ($) (c)	Loan Balance ($) (d)	Rural Development (e)
	TOTAL				

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INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION G. MATERIALS AND SUPPLIES INVENTORY

ITEM	BALANCE BEGINNING OF YEAR (*a*)	PURCHASED & SALVAGED (*b*)	USED & SOLD (*c*)	BALANCE END OF YEAR (*d*)
1. Coal	3,645,986	28,776,999	29,111,493	3,311,492
2. Other Fuel	1,237,703	4,883,687	5,315,962	805,428
3. Production Plant Parts and Supplies	9,013,816	1,934,399	1,490,353	9,457,862
4. Station Transformers and Equipment	10,466,903	4,638,211	4,347,703	10,757,411
5. Line Materials and Supplies	3,988,606	6,595,328	5,322,841	5,261,093
6. Other Materials and Supplies	259,199	203,258	233,635	228,822
7. Total (*1 thru 6*)	28,612,213	47,031,882	45,821,987	29,822,108

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **OPERATING REPORT- ANNUAL SUPPLEMENT**	BORROWER DESIGNATION ND0020 PERIOD ENDED December, 2018
INSTRUCTIONS - See help in the online application.	This data will be used to review your financial situation. Your response is required (7 U.S.C. 901 et. seq.) and may be confidential

SECTION H. LONG-TERM DEBT AND DEBT SERVICE REQUIREMENTS

No	Item	Balance End Of Year (a)	Interest (Billed This Year) (b)	Principal (Billed This Year) (c)	Total (Billed This Year) (d)
1	RUS (Excludes RUS - Economic Development Loans)	623,388	48,683	560,793	609,476
2	National Rural Utilities Cooperative Finance Corporation				
3	CoBank, ACB	97,779,516	4,673,012	3,206,559	7,879,571
4	Federal Financing Bank	786,195,405	26,708,301	18,705,208	45,413,509
5	RUS - Economic Development Loans				
6	Payments Unapplied	108,295,879			
7	Principal Payments Received from Ultimate Recipients of IRP Loans				
8	Principal Payments Received from Ultimate Recipients of REDL Loans				
9	Principal Payments Received from Ultimate Recipients of EE Loans				
10	Lincoln National Life Insurance Company	23,720,000	1,134,254	345,000	1,479,254
11	Accrued Pension	2,137,317			
12	Digital Press Lease	222,991	12,515	50,218	62,733
	TOTAL	802,382,738	32,576,765	22,867,778	55,444,543

UNITED STATES DEPARTMENT OF AGRICULTURE
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FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART H - ANNUAL SUPPLEMENT

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION I. ANNUAL MEETING AND BOARD DATA

1. Date of Last Annual Meeting	2. Total Number of Members	3. Number of Members Present at Meeting	4. Was Quorum Present?
4/6/2018	31	18	Yes

5. Number of Members Voting by Proxy or Mail	6. Total Number of Board Members	7. Total Amount of Fees and Expenses for Board Members	8. Does Manager Have Written Contract?
0	12	$ 265,283	No

SECTION J. MAN-HOUR AND PAYROLL STATISTICS

1. Number of Full Time Employees	386	4. Payroll Expensed	36,079,970
2. Man-Hours Worked - Regular Time	817,789	5. Payroll Capitalized	6,227,504
3. Man-Hours Worked – Overtime	49,645	6. Payroll Other	

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE **FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT**	BORROWER DESIGNATION ND0020
INSTRUCTIONS - See help in the online application.	PERIOD ENDED December, 2018

SECTION K. LONG-TERM LEASES

No	Name Of Lessor (a)	Type Of Property (b)	Rental This Year (c)
1	Farm Credit Leasing	10- 2 Mwh Diesel Engines	163,414
	TOTAL		163,414

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INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION
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SECTION L. RENEWABLE ENERGY CREDITS

ITEM	BALANCE BEGINNING OF YEAR (*a*)	ADDITIONS (*b*)	RETIREMENTS (*c*)	ADJUSTMENTS AND TRANSFER	BALANCE END OF YEAR (*e*)
1. Renewable Energy Credits					

UNITED STATES DEPARTMENT OF AGRICULTURE
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FINANCIAL AND OPERATING REPORT
ELECTRIC POWER SUPPLY
PART I - LINES AND STATIONS

INSTRUCTIONS - See help in the online application.

BORROWER DESIGNATION: ND0020

PERIOD ENDED: December, 2018

SECTION A. EXPENSES AND COSTS

ITEM	ACCOUNT NUMBER	LINES (*a*)	STATIONS (*b*)
Transmission Operation			
1. Supervision and Engineering	560	1,594,535	
2. Load Dispatching	561	5,399,349	
3. Station Expenses	562		581,318
4. Overhead Line Expenses	563	2,787,757	
5. Underground Line Expenses	564		
6. Miscellaneous Expenses	566	907,433	
7. Subtotal (*1 thru 6*)		10,689,074	581,318
8. Transmission of Electricity by Others	565	2,301,954	
9. Rents	567	5,787	
10. Total Transmission Operation (*7 thru 9*)		12,996,815	581,318
Transmission Maintenance			
11. Supervision and Engineering	568		
12. Structures	569		
13. Station Equipment	570		1,343,624
14. Overhead Lines	571	3,793,974	
15. Underground Lines	572		
16. Miscellaneous Transmission Plant	573		
17. Total Transmission Maintenance (*11 thru 16*)		3,793,974	1,343,624
18. Total Transmission Expense (*10 + 17*)		16,790,789	1,924,942
19. RTO/ISO Expense – Operation	575.1-575.8		
20. RTO/ISO Expense – Maintenance	576.1-576.5		
21. Total RTO/ISO Expense (*19 + 20*)			
22. Distribution Expense - Operation	580-589		5,030,711
23. Distribution Expense - Maintenance	590-598		1,630,149
24. Total Distribution Expense (*22 + 23*)			6,660,860
25. Total Operation And Maintenance (*18 + 21 + 24*)		16,790,789	8,585,802
Fixed Costs			
26. Depreciation – Transmission	403.5	8,618,837	2,788,463
27. Depreciation – Distribution	403.6		2,130,771
28. Interest – Transmission	427	13,655,435	4,417,961
29. Interest – Distribution	427		3,375,931
30. Total Transmission (*18 + 26 + 28*)		39,065,061	9,131,366
31. Total Distribution (*24 + 27 + 29*)			12,167,562
32. Total Lines And Stations (*21 + 30 + 31*)		39,065,061	21,298,928

SECTION B. FACILITIES IN SERVICE

TRANSMISSION LINES		SUBSTATIONS	
VOLTAGE (kV)	MILES	TYPE	CAPACITY(kVA)
1. 230 KV	443.93	13. Distribution Lines	
2. 69 KV	2,129.36		
3. 41 KV	29.13	**14. Total (*12 + 13*)**	3,350.08
4. 345 KV	464.25		
5. 115 KV	283.41	15. Stepup at Generating Plants	256,000
6.			
7.		16. Transmission	2,352,700
8.			
9.		17. Distribution	1,311,983
10.			
11.		**18. Total (*15 thru 17*)**	3,920,683
12. Total (*1 thru 11*)	3,350.08		

SECTION C. LABOR AND MATERIAL SUMMARY

1. Number of Employees: 90

ITEM	LINES	STATIONS
2. Oper. Labor	4,758,317	1,867,648
3. Maint. Labor	1,195,396	2,069,930
4. Oper. Material	67,137	98,064
5. Maint. Material	162,053	325,616

SECTION D. OUTAGES

1. Total	
2. Avg. No. of Distribution Consumers Served	
3. Avg. No. of Hours Out Per Consumer	

APPENDIX F

Minnesota Electric Utility Information

Reporting-Forecast Section

MINNESOTA ELECTRIC UTILITY INFORMATION REPORTING - FORECAST SECTION (Continued)

7610.0310 Item G. LOAD AND GENERATION CAPACITY(Express in MW)

			Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13	Column 14
			SEASONAL MAXIMUM DEMAND	SCHEDULE L. PURCHASE AT THE TIME OF SEASONAL SYSTEM DEMAND	SEASONAL SYSTEM DEMAND	ANNUAL SYSTEM DEMAND	SEASONAL FIRM PURCHASES (TOTAL)	SEASONAL FIRM SALES (TOTAL)	SEASONAL ADJUSTED NET DEMAND (3 - 5 + 6)	ANNUAL ADJUSTED NET DEMAND (4 - 5 + 6)	NET GENERATING CAPABILITY	PARTICIPATION PURCHASES (TOTAL)	PARTICIPATION SALES (TOTAL)	ADJUSTED NET CAPABILITY (9 + 10 - 11)	NET RESERVE CAPACITY OBLIGATION	TOTAL FIRM CAPACITY OBLIGATION (7 + 13)
Past Year	2017	Summer	645	80	540	540	77	300	763	763	1185	15	300	900		763
		Winter	861	311	548	548	103	300	745	745	1226	15	300	941		745
Present Year	2018	Summer	649	81	611	611	77	250	784	784	1333	15	250	1098		784
		Winter	1004	314	590	590	103	250	737	737	1268	15	250	1033		737
1st Forecast Year	2019	Summer	627	82	593	593	77	150	666	666	1233	15	150	1098		666
		Winter	1015	317	601	601	103	150	648	648	1238	15	150	1103		648
2nd Forecast Year	2020	Summer	636	82	605	605	77	150	678	678	1233	15	150	1098		678
		Winter	1028	320	613	613	103	150	660	660	1268	15	150	1133		660
3rd Forecast Year	2021	Summer	644	83	617	617	77	100	640	640	1183	15	100	1098		640
		Winter	1040	324	626	626	103	100	623	623	1218	15	100	1133		623
4th Forecast Year	2022	Summer	653	84	629	629	77	100	652	652	1183	15	100	1098		652
		Winter	1055	327	638	638	103	0	535	535	1218	15	0	1233		535
5th Forecast Year	2023	Summer	662	85	642	642	77	0	565	565	1083	15	0	1098		565
		Winter	1068	330	651	651	103	0	548	548	1218	15	0	1233		548
6th Forecast Year	2024	Summer	671	86	655	655	77	0	578	578	1083	15	0	1098		578
		Winter	1081	333	664	664	103	0	561	561	1218	15	0	1233		561
7th Forecast Year	2025	Summer	678	87	668	668	77	0	591	591	1083	15	0	1098		591
		Winter	1093	337	677	677	103	0	574	574	1218	15	0	1233		574
8th Forecast Year	2026	Summer	687	87	681	681	77	0	604	604	1083	15	0	1098		604
		Winter	1105	340	691	691	103	0	588	588	1218	15	0	1233		588
9th Forecast Year	2027	Summer	693	88	695	695	77	0	618	618	1083	15	0	1098		618
		Winter	1114	344	705	705	103	0	602	602	1218	15	0	1233		602
10th Forecast Year	2028	Summer	699	89	709	709	77	0	632	632	1083	15	0	1098		632
		Winter	1123	347	719	719	103	0	616	616	1218	15	0	1233		616
11th Forecast Year	2029	Summer	705	90	723	723	77	0	646	646	1083	15	0	1098		646
		Winter	1132	350	733	733	103	0	630	630	1218	15	0	1233		630
12th Forecast Year	2030	Summer	711	91	737	737	77	0	660	660	1083	15	0	1098		660
		Winter	1141	354	748	748	103	0	645	645	1218	15	0	1233		645
13th Forecast Year	2031	Summer	719	92	752	752	77	0	675	675	1083	15	0	1098		675
		Winter	1152	357	763	763	103	0	660	660	1218	15	0	1233		660
14th Forecast Year	2032	Summer	726	93	767	767	77	0	527	627	1083	15	0	1020		527
		Winter	1163	361	778	778	103	0	597	597	1218	15	0	1020		597

COMMENTS

MINNESOTA ELECTRIC UTI

7610.0310 Item G. LOAD AND GENERAT

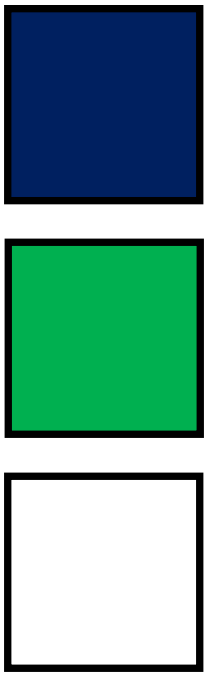
			Column 15
			SURPLUS (+) OR DEFICIT (-) CAPACITY (12 - 14)
Past Year	2017	Summer	137
		Winter	196
Present Year	2018	Summer	314
		Winter	296
1st Forecast Year	2019	Summer	432
		Winter	455
2nd Forecast Year	2020	Summer	420
		Winter	473
3rd Forecast Year	2021	Summer	458
		Winter	510
4th Forecast Year	2022	Summer	446
		Winter	698
5th Forecast Year	2023	Summer	533
		Winter	685
6th Forecast Year	2024	Summer	520
		Winter	672
7th Forecast Year	2025	Summer	507
		Winter	659
8th Forecast Year	2026	Summer	494
		Winter	645
9th Forecast Year	2027	Summer	480
		Winter	631
10th Forecast Year	2028	Summer	466
		Winter	617
11th Forecast Year	2029	Summer	452
		Winter	603
12th Forecast Year	2030	Summer	438
		Winter	588
13th Forecast Year	2031	Summer	423
		Winter	573
14th Forecast Year	2032	Summer	493
		Winter	423

COMMENTS

APPENDIX G

Minnkota Power Cooperative's

2017 Load Forecast Study



2017 Electric Load Forecast Study

December 2017

Prepared by:

Clearspring Energy Advisors LLC

1050 Regent St., Suite L3
Madison, WI 53715
608.442.8668
www.clearspringenergy.com

2017 Electric Load Forecast

Minnkota Power Cooperative, Inc.

Grand Forks, ND

Prepared By:

Clearspring Energy Advisors, LLC
1050 Regent St., Suite L3
Madison, WI 53715
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Presented By:

Joshua P. Hoyt
Principal Consultant

Minnkota Power Cooperative, Inc.
2017 Electric Load Forecast Study

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EXECUTIVE SUMMARY

Minnkota Power Cooperative, Inc.
2017 Electric Load Forecast

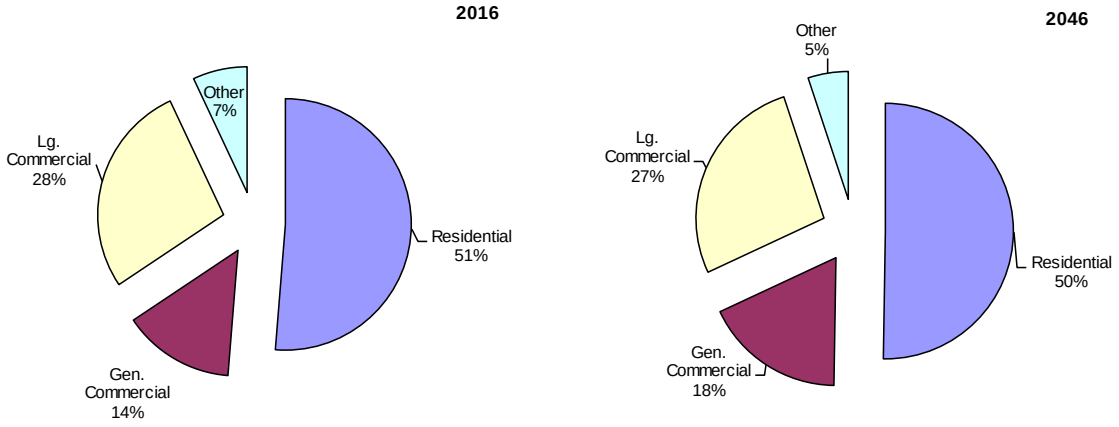
Executive Summary

Overview

The 2017 Electric Load Forecast Study (Load Forecast) is a thirty year (2017 through 2046) forecast of energy requirements and peak demands for Minnkota Power Cooperative, Inc. (Minnkota). Minnkota is an electric generation and transmission cooperative headquartered in Grand Forks, North Dakota. Minnkota provides electric power and services to eleven member distribution cooperatives (member systems) located in northwestern Minnesota and eastern North Dakota. Minnkota also has a joint operating agreement with the Northern Municipal Power Agency (NMPA). Together Minnkota and NMPA are referred to the Joint System in this report. Most of the member systems' loads are residential, but commercial loads also offer significant growth potential.

The Load Forecast is developed as part of Minnkota's Load Forecast process that regularly updates reports for Minnkota and 11 associated member systems (previously referred to as Power Requirements Studies). The Minnkota Load Forecast will be derived as the sum of projections for individual member systems, establishing a critical link between all forecasts produced. The last Load Forecast report for Minnkota was developed in 2015.

Member System Forecast Summary
Minnkota Power Cooperative, Inc.

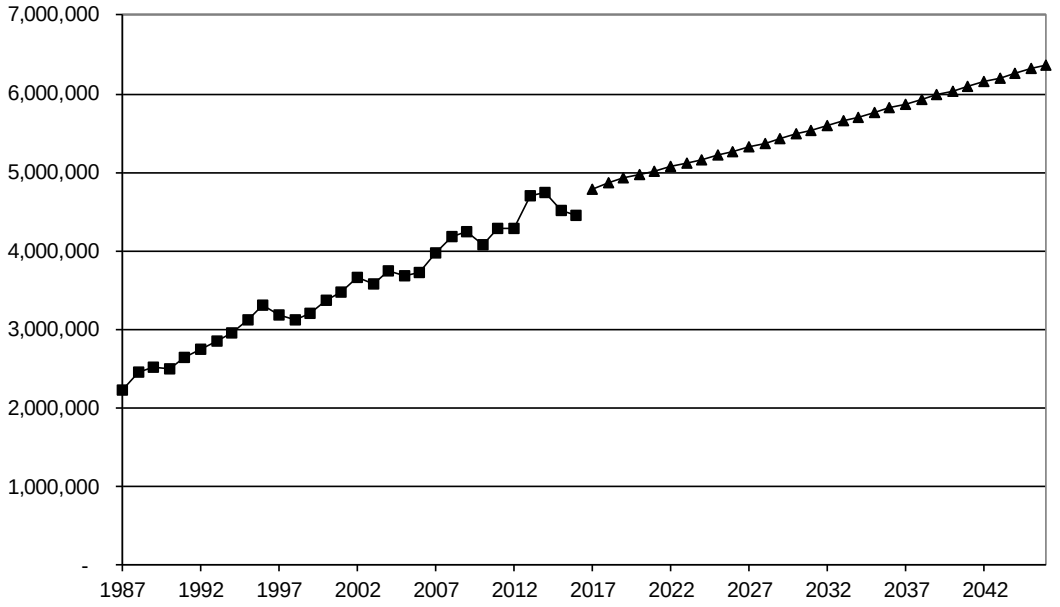


The forecasting process relies heavily on internal system data, third-party demographic and economic data, and insight from cooperative staff that are most familiar with the customers and trends in their service territory. An emphasis has been placed on strong coordination between Minnkota, the member cooperatives, NMPA, and the consultant involved in preparing this study to ensure accurate and useful load forecast results. This coordination includes formal data requests and a review session to discuss the preliminary forecast results and to recommend any changes needed.

Forecasts

The key growth factors that will shape the growth in Minnkota's customer base include local population, household and employment expansion. Total energy requirements are the sum of the individual member systems' requirements plus own-use, losses, and sales to NMPA. Energy requirements for Minnkota member systems are expected to grow at 1.1 percent per year over the 2017-2046 forecast period and total Joint System energy requirements are expected to increase at 1.0 percent per year during that same period (2017-2046). The following tables present the member system projections by consumer class and the summary of Joint System total energy requirements.

Joint System Energy Requirements
MWh



Energy Requirements Forecast By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Req.
1987	224,635	327,527	36,595	47,618	475,148	60,200	76,679	88,281	102,080	90,386	144,632	1,673,781
1988	249,381	363,595	38,371	51,992	525,134	67,836	80,472	94,567	109,253	101,721	156,625	1,838,947
1989	265,586	381,327	38,927	53,707	534,439	73,484	84,660	100,445	111,204	112,350	163,944	1,920,073
1990	261,208	366,763	38,102	50,705	521,233	74,196	80,157	94,288	105,893	110,762	157,016	1,860,324
1991	294,866	399,608	39,514	54,506	561,108	80,702	85,779	100,922	112,398	120,133	169,255	2,018,791
1992	306,013	391,512	40,335	53,646	558,385	81,325	88,381	98,440	109,170	121,723	169,069	2,017,999
1993	322,062	431,930	40,907	57,789	594,490	86,892	94,150	106,161	118,693	128,905	178,889	2,160,868
1994	333,536	464,539	40,085	59,361	598,372	89,084	99,786	106,544	119,141	134,473	183,371	2,228,292
1995	352,961	502,471	40,696	61,879	628,078	93,675	103,413	110,693	122,331	145,104	191,045	2,352,345
1996	378,510	550,901	41,070	65,726	640,632	100,078	110,497	116,287	126,950	154,416	203,643	2,488,710
1997	384,747	553,030	37,193	66,044	619,448	100,839	102,688	114,331	121,708	152,173	203,932	2,456,133
1998	377,632	537,927	32,600	62,827	590,096	95,999	97,756	104,594	112,298	144,035	192,202	2,347,968
1999	395,283	572,812	33,954	66,447	610,216	104,452	104,877	108,974	115,022	154,154	206,982	2,473,174
2000	411,569	610,225	32,379	68,638	623,603	109,263	93,411	112,993	117,016	160,945	213,413	2,553,456
2001	427,237	654,036	33,298	70,067	678,700	112,640	90,959	118,076	121,228	164,235	221,547	2,692,024
2002	458,920	707,947	37,225	75,737	706,885	122,854	97,837	125,412	126,812	170,860	235,243	2,865,734
2003	453,842	718,517	35,829	76,592	704,943	122,528	95,717	122,986	125,015	169,222	235,659	2,860,849
2004	464,628	741,507	38,786	77,027	720,035	127,225	102,226	123,199	125,647	171,558	238,601	2,930,437
2005	469,637	795,002	35,828	77,629	725,239	123,366	98,303	124,619	128,778	170,226	249,309	2,997,936
2006	484,203	836,459	33,225	77,409	771,270	120,936	93,702	122,779	124,575	164,782	251,542	3,080,882
2007	491,058	896,303	36,903	80,381	835,138	124,873	105,739	129,957	132,558	170,049	266,340	3,269,300
2008	511,081	972,275	40,891	85,984	864,134	130,098	109,149	141,707	141,008	179,033	284,861	3,460,221
2009	497,782	1,002,960	42,534	85,582	884,214	127,792	115,458	142,641	150,658	172,853	296,487	3,518,961
2010	473,732	988,915	41,023	79,963	885,889	117,026	112,104	137,927	145,475	165,930	277,685	3,425,669
2011	469,236	1,048,624	38,035	79,437	1,005,555	118,973	116,056	140,139	134,258	172,200	279,597	3,602,110
2012	445,003	1,038,524	35,121	74,203	1,041,905	112,942	120,755	130,225	125,972	171,310	260,075	3,556,036
2013	497,995	1,158,278	41,672	85,886	1,107,255	124,125	139,396	137,902	143,073	178,622	295,995	3,910,200
2014	497,514	1,203,267	43,974	83,929	1,162,606	134,202	136,342	146,388	145,830	181,422	304,864	4,040,337
2015	483,671	1,180,667	35,912	75,807	1,113,854	116,772	129,540	133,337	131,478	167,127	277,430	3,845,597
2016	486,896	1,194,861	35,474	74,311	1,089,083	111,115	130,776	131,245	128,833	158,870	270,692	3,812,156
2017	516,088	1,303,894	38,816	76,635	1,196,307	111,865	134,056	132,829	129,188	153,938	288,267	4,081,884
2018	521,254	1,317,787	38,654	114,239	1,215,486	113,247	134,036	133,417	130,363	156,839	291,051	4,166,373
2019	523,642	1,339,590	38,520	114,532	1,225,401	113,862	134,202	134,374	132,263	160,080	293,989	4,210,455
2020	525,946	1,366,648	38,405	114,792	1,238,124	114,369	134,292	135,193	133,074	160,018	295,837	4,256,700
2021	528,206	1,392,984	38,311	115,046	1,247,545	114,883	134,440	135,851	133,893	159,957	297,155	4,298,271
2022	530,160	1,420,608	38,233	115,229	1,256,429	115,523	134,521	138,527	135,652	159,918	297,940	4,342,739
2023	531,987	1,449,638	38,179	115,375	1,267,831	116,019	134,600	139,068	136,308	160,018	298,484	4,387,507
2024	533,769	1,482,851	38,152	115,516	1,276,189	116,361	134,676	139,573	136,983	160,117	299,058	4,433,245
2025	535,656	1,514,066	38,142	115,645	1,284,398	116,598	134,721	140,001	138,719	160,226	299,625	4,477,797
2026	539,725	1,550,659	38,142	115,771	1,295,650	116,868	134,817	140,337	139,403	160,340	301,288	4,533,001
2027	541,777	1,586,531	38,156	115,894	1,303,784	117,227	134,897	140,660	140,090	160,332	301,848	4,581,194
2028	543,901	1,620,038	38,180	116,008	1,311,870	117,506	135,029	141,009	141,844	160,459	302,364	4,628,208
2029	546,078	1,654,256	38,221	116,135	1,322,991	117,765	135,119	141,285	142,495	160,575	302,777	4,677,695
2030	548,301	1,696,382	38,260	116,256	1,331,044	118,102	135,278	141,517	143,108	160,831	303,142	4,732,220
2031	550,564	1,731,543	38,232	116,390	1,338,975	118,594	135,287	141,939	143,703	160,942	303,535	4,779,704
2032	552,849	1,771,928	38,202	116,519	1,349,926	119,024	135,307	144,457	145,310	161,038	303,878	4,838,437
2033	555,150	1,810,282	38,183	116,645	1,357,834	119,308	135,331	144,876	145,833	161,151	304,111	4,888,704
2034	557,463	1,851,663	38,157	116,763	1,365,723	119,684	135,381	145,294	146,349	161,233	304,238	4,941,950
2035	559,776	1,889,104	38,153	116,877	1,376,927	119,988	135,419	145,659	146,857	161,303	304,404	4,994,467
2036	564,185	1,935,245	38,145	116,993	1,384,864	120,413	135,438	146,059	148,434	161,384	304,689	5,055,850
2037	566,502	1,973,106	38,132	117,112	1,392,821	120,735	135,461	146,472	148,974	161,428	304,941	5,105,683
2038	568,812	2,011,174	38,129	117,215	1,403,899	121,138	135,452	146,885	149,514	161,459	305,119	5,158,795
2039	571,116	2,053,305	38,116	117,308	1,411,690	121,605	135,461	147,309	150,040	161,478	305,316	5,212,742
2040	573,419	2,091,979	38,106	117,384	1,419,783	121,921	135,459	147,758	150,547	161,482	305,477	5,263,316
2041	575,711	2,131,070	38,098	117,450	1,431,029	122,287	135,432	148,176	151,060	161,346	305,642	5,317,302
2042	577,995	2,174,383	38,089	117,511	1,438,966	122,584	135,427	148,557	151,587	161,323	305,770	5,372,193
2043	580,276	2,208,808	38,082	117,557	1,447,226	122,910	135,372	148,968	152,100	161,161	306,022	5,418,482
2044	582,545	2,249,404	38,080	117,602	1,458,372	123,217	135,395	149,343	152,613	161,086	306,297	5,473,955
2045	584,803	2,284,174	38,081	117,637	1,466,435	123,472	135,324	149,711	153,111	160,894	306,575	5,520,217
2046	587,052	2,325,097	38,079	117,667	1,474,563	123,779	135,296	150,102	153,600	160,680	306,798	5,572,713
Average Annual Growth Rates												
1987-2016	2.7%	4.6%	-0.1%	1.5%	2.9%	2.1%	1.9%	1.4%	0.8%	2.0%	2.2%	2.9%
2001-2016	0.9%	4.1%	0.4%	0.4%	3.2%	-0.1%	2.5%	0.7%	0.4%	-0.2%	1.3%	2.3%
2006-2016	0.1%	3.6%	0.7%	-0.4%	3.5%	-0.8%	3.4%	0.7%	0.3%	-0.4%	0.7%	2.2%
2011-2016	0.7%	2.6%	-1.4%	-1.3%	1.6%	-1.4%	2.4%	-1.3%	-0.8%	-1.6%	-0.6%	1.1%
2016-2021	1.6%	3.1%	1.6%	9.1%	2.8%	0.7%	0.6%	0.7%	0.8%	0.1%	1.9%	2.4%
2016-2026	1.0%	2.6%	0.7%	4.5%	1.8%	0.5%	0.3%	0.7%	0.8%	0.1%	1.1%	1.7%
2016-2036	0.7%	2.4%	0.4%	2.3%	1.2%	0.4%	0.2%	0.5%	0.7%	0.1%	0.6%	1.4%
2016-2046	0.6%	2.2%	0.2%	1.5%	1.0%	0.4%	0.1%	0.4%	0.6%	0.0%	0.4%	1.3%
2017-2046	0.4%	2.0%	-0.1%	1.5%	0.7%	0.3%	0.0%	0.4%	0.6%	0.1%	0.2%	1.1%

Wholesale Sales To Member Systems and NMPA (MWh)

Joint System /1

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	CAFS /2	Minnkota Sales	NMPA	Joint System Sales
1987	224,635	327,527	36,595	47,618	475,148	60,200	76,679	88,281	102,080	90,386	144,632	14,233	1,688,014	329,707	2,017,721
1988	249,381	363,595	38,371	51,992	525,134	67,836	80,472	94,567	109,253	101,721	156,625	14,641	1,853,588	357,429	2,211,017
1989	265,586	381,327	38,927	53,707	534,439	73,484	84,660	100,445	111,204	112,350	163,944	15,669	1,935,742	372,491	2,308,233
1990	261,208	366,763	38,102	50,705	521,233	74,196	80,157	94,288	105,893	110,762	157,016	16,063	1,876,387	363,032	2,239,419
1991	294,866	399,608	39,514	54,506	561,108	80,702	85,779	100,922	112,398	120,133	169,255	21,494	2,040,285	382,175	2,422,460
1992	306,013	391,512	40,335	53,646	558,385	81,325	88,381	98,440	109,170	121,723	169,069	47,384	2,065,383	372,754	2,438,137
1993	322,062	431,930	40,907	57,789	594,490	86,892	94,150	106,161	118,693	128,905	178,889	48,628	2,209,496	391,546	2,601,042
1994	333,536	464,539	40,085	59,361	598,372	89,084	99,786	106,544	119,141	134,473	183,371	50,341	2,278,633	407,465	2,686,098
1995	352,961	502,471	40,696	61,879	628,078	93,675	103,413	110,693	122,331	145,104	191,045	48,367	2,400,712	428,635	2,829,347
1996	378,510	550,901	41,070	65,726	640,632	100,078	110,497	116,287	126,950	154,416	203,643	47,402	2,536,112	446,082	2,982,194
1997	384,747	553,030	37,193	66,044	619,448	100,839	102,688	114,331	121,708	152,173	203,932	40,285	2,496,418	432,825	2,929,243
1998	377,632	537,927	32,600	62,827	590,096	95,999	97,756	104,594	112,298	144,035	192,202	31,101	2,379,069	427,437	2,806,506
1999	395,283	572,812	33,954	66,447	610,216	104,452	104,877	108,974	115,022	154,154	206,982	34,466	2,507,640	442,374	2,950,014
2000	411,569	610,225	32,379	68,638	623,603	109,263	93,411	112,993	117,016	160,945	213,413	36,080	2,589,536	445,121	3,034,657
2001	427,237	654,036	33,298	70,067	678,700	112,640	90,959	118,076	121,228	164,235	221,547	40,286	2,732,310	459,957	3,192,267
2002	458,920	707,947	37,225	75,737	706,885	122,854	97,837	125,412	126,812	170,860	235,243	41,806	2,907,540	472,905	3,380,445
2003	453,842	718,517	35,829	76,592	704,943	122,528	95,717	122,986	125,015	169,222	235,659	39,307	2,900,156	473,809	3,373,965
2004	464,628	741,507	38,786	77,027	720,035	127,225	102,226	123,199	125,647	171,558	238,601	38,706	2,969,144	473,797	3,442,941
2005	469,637	795,002	35,828	77,629	725,239	123,366	98,303	124,619	128,778	170,226	249,309	35,335	3,033,272	479,640	3,512,912
2006	484,203	836,459	33,225	77,409	771,270	120,936	93,702	122,779	124,575	164,782	251,542	-	3,080,882	485,217	3,566,099
2007	491,058	896,303	36,903	80,381	835,138	124,873	105,739	129,957	132,558	170,049	266,340	-	3,269,300	493,233	3,762,533
2008	511,081	972,275	40,891	85,984	864,134	130,098	109,149	141,707	141,008	179,033	284,861	-	3,460,221	486,562	3,946,783
2009	497,782	1,002,960	42,534	85,582	884,214	127,792	115,458	142,641	150,658	172,853	296,487	-	3,518,961	474,666	3,993,628
2010	473,732	988,915	41,023	79,963	885,889	117,026	112,104	137,927	145,475	165,930	277,685	-	3,425,669	461,427	3,887,096
2011	469,236	1,048,624	38,035	79,437	1,005,555	118,973	116,056	140,139	134,258	172,200	279,597	-	3,602,110	459,785	4,061,895
2012	445,003	1,038,524	35,121	74,203	1,041,905	112,942	120,755	130,225	125,972	171,310	260,075	-	3,556,036	450,875	4,006,911
2013	497,995	1,158,278	41,672	85,886	1,107,255	124,125	139,396	137,902	143,073	178,622	295,995	-	3,910,200	492,647	4,402,846
2014	497,514	1,203,267	43,974	83,929	1,162,606	134,202	136,342	146,388	145,830	181,422	304,864	-	4,040,337	471,111	4,511,448
2015	483,671	1,180,667	35,912	75,807	1,113,854	116,772	129,540	133,337	131,478	167,127	277,430	-	3,845,597	456,823	4,302,420
2016	486,896	1,194,861	35,474	74,311	1,089,083	111,115	130,776	131,245	128,833	158,870	270,692	-	3,812,156	448,447	4,260,603
2017	516,088	1,303,894	38,816	76,635	1,196,307	111,865	134,056	132,829	129,188	153,938	288,267	-	4,081,884	455,717	4,537,601
2018	521,254	1,317,787	38,654	114,239	1,215,486	113,247	134,036	133,417	130,363	156,839	291,051	-	4,166,373	459,191	4,625,564
2019	523,642	1,339,590	38,520	114,532	1,225,401	113,862	134,202	134,374	132,263	160,080	293,989	-	4,210,455	465,150	4,675,606
2020	525,946	1,366,648	38,405	114,792	1,238,124	114,369	134,292	135,193	133,074	160,018	295,837	-	4,256,700	467,709	4,724,409
2021	528,206	1,392,984	38,311	115,046	1,247,545	114,883	134,440	135,851	133,893	159,957	297,155	-	4,298,271	470,057	4,768,327
2022	530,160	1,420,608	38,233	115,229	1,256,429	115,523	134,521	138,527	135,652	159,918	297,940	-	4,342,739	471,724	4,814,464
2023	531,987	1,449,638	38,179	115,375	1,267,831	116,019	134,600	139,068	136,308	160,018	298,484	-	4,387,507	473,020	4,860,527
2024	533,769	1,482,851	38,152	115,516	1,276,189	116,361	134,676	139,573	136,983	160,117	299,058	-	4,433,245	474,034	4,907,278
2025	535,656	1,514,066	38,142	115,645	1,284,398	116,598	134,721	140,001	138,719	160,226	299,625	-	4,477,797	474,819	4,952,616
2026	539,725	1,550,659	38,142	115,771	1,295,650	116,868	134,817	140,337	139,403	160,340	301,288	-	4,533,001	475,421	5,008,421
2027	541,777	1,586,531	38,156	115,894	1,303,784	117,227	134,897	140,660	140,090	160,332	301,848	-	4,581,194	475,948	5,057,142
2028	543,901	1,620,038	38,180	116,008	1,311,870	117,506	135,029	141,009	141,844	160,459	302,364	-	4,628,208	476,349	5,104,557
2029	546,078	1,654,256	38,221	116,135	1,322,991	117,765	135,119	141,285	142,495	160,575	302,777	-	4,677,695	476,544	5,154,239
2030	548,301	1,696,382	38,260	116,256	1,331,044	118,102	135,278	141,517	143,108	160,831	303,142	-	4,732,220	476,492	5,208,713
2031	550,564	1,731,543	38,232	116,390	1,338,975	118,594	135,287	141,939	143,703	160,942	303,535	-	4,779,704	476,236	5,255,940
2032	552,849	1,771,928	38,202	116,519	1,349,926	119,024	135,307	144,457	145,310	161,038	303,878	-	4,838,437	475,794	5,314,231
2033	555,150	1,810,282	38,183	116,645	1,357,834	119,308	135,331	144,876	145,833	161,151	304,111	-	4,888,704	475,234	5,363,938
2034	557,463	1,851,663	38,157	116,763	1,365,723	119,684	135,381	145,294	146,349	161,233	304,238	-	4,941,950	474,530	5,416,480
2035	559,776	1,889,104	38,153	116,877	1,376,927	119,988	135,419	145,659	146,857	161,303	304,404	-	4,994,467	473,662	5,468,129
2036	564,185	1,935,245	38,145	116,993	1,384,864	120,413	135,438	146,059	148,434	161,384	304,689	-	5,055,850	472,807	5,528,657
2037	566,502	1,973,106	38,132	117,112	1,392,821	120,735	135,461	146,472	148,974	161,428	304,941	-	5,105,683	472,163	5,577,846
2038	568,812	2,011,174	38,129	117,215	1,403,899	121,138	135,452	146,885	149,514	161,459	305,119	-	5,158,795	471,706	5,630,500
2039	571,116	2,053,305	38,116	117,308	1,411,690	121,605	135,461	147,309	150,040	161,478	305,316	-	5,212,742	471,301	5,684,044
2040	573,419	2,091,979	38,106	117,384	1,419,783	121,921	135,459	147,758	150,547	161,482	305,477	-	5,263,316	471,094	5,734,409
2041	575,711	2,131,070	38,098	117,450	1,431,029	122,287	135,432	148,176	151,060	161,346	305,642	-	5,317,302	471,014	5,788,316
2042	577,995	2,174,383	38,089	117,511	1,438,966	122,584	135,427	148,557	151,587	161,323	305,770	-	5,372,193	471,167	5,843,360
2043	580,276	2,208,808	38,082	117,557	1,447,226	122,910	135,372	148,968	152,100	161,161	306,022	-	5,418,482	471,402	5,889,884
2044	582,545	2,249,404	38,080	117,602	1,458,372	123,217	135,395	149,343	152,613	161,086	306,297	-	5,473,955	471,700	5,945,654
2045	584,803	2,284,174	38,081	117,637	1,466,435	123,472	135,324	149,711	153,111	160,894	306,575	-	5,520,217	471,981	5,992,198
2046	587,052	2,325,097	38,079	117,667	1,474,563	123,779	135,296	150,102	153,600	160,680	306,798	-	5,572,713	472,237	6,044,950
Average Annual Growth Rates															
1987-2016	2.7%	4.6%	-0.1%	1.5%	2.9%	2.1%	1.9%	1.4%	0.8%	2.0%	2.2%	-100.0%	2.8%	1.1%	2.6%
2001-2016	0.9%	4.1%	0.4%	0.4%	3.2%	-0.1%	2.5%	0.7%	0.4%	-0.2%	1.3%	-100.0%	2.2%	-0.2%	1.9%
2006-2016	0.1%	3.6%	0.7%	-0.4%	3.5%	-0.8%	3.4%	0.7%	0.3%	-0.4%	0.7%	--	2.2%	-0.8%	1.8%
2011-2016	0.7%	2.6%	-1.4%	-1.3%	1.6%	-1.4%	2.4%	-1.3%	-0.8%	-1.6%	-0.6%	--	1.1%	-0.5%	1.0%
2016-2021	1.6%	3.1%	1.6%	9.1%	2.8%	0.7%	0.6%	0.7%	0.8%	0.1%	1.9%	--	2.4%	0.9%	2.3%
2016-2026	1.0%	2.6%	0.7%	4.5%	1.8%	0.5%	0.3%	0.7%	0.8%	0.1%	1.1%	--	1.7%	0.6%	1.6%
2016-2036	0.7%	2.4%	0.4%	2.3%	1.2%	0.4%	0.2%	0.5%	0.7%	0.1%	0.6%	--	1.4%	0.3%	1.3%
2016-2046	0.6%	2.2%	0.2%	1.5%	1.0%	0.4%	0.1%	0.4%	0.6%	0.0%	0.4%	--	1.3%	0.2%	1.2%
2017-2046	0.4%	2.0%	-0.1%	1.5%	0.7%	0.3%	0.0%	0.4%	0.6%	0.1%	0.2%	--	1.1%	0.1%	1.0%

/1 Excludes Minnkota own-use and losses

/2 Transferred to Nodak starting in 2006

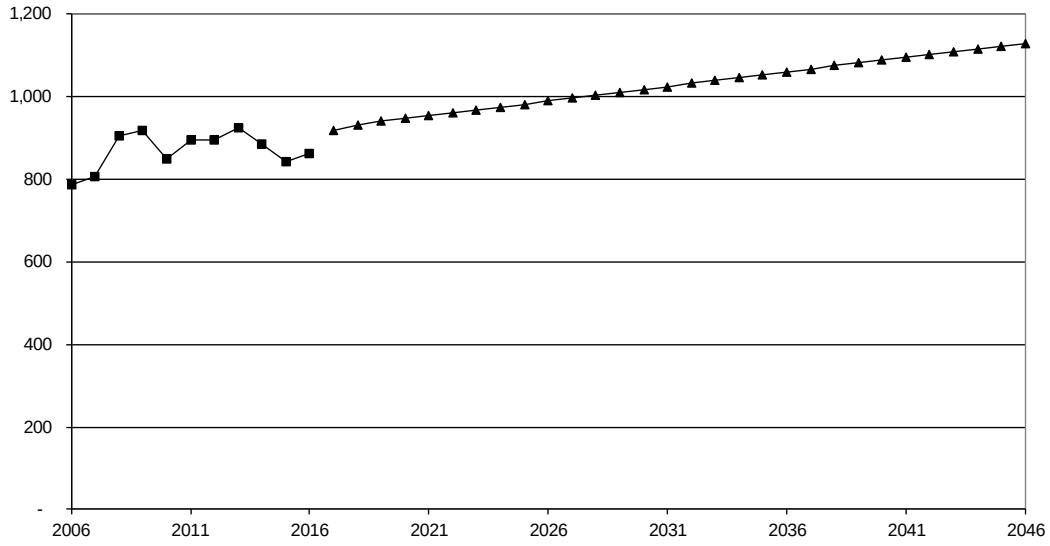
Joint System Energy Requirements
MWh

Year	Total Member Energy Requirements	Minnkota Losses	CAFS	Minnkota Total Requirements	NMPA Energy Requirements	Joint System Energy Requirements
1987	1,673,781	205,761	14,233	1,893,775	*329,707*	2,223,482
1988	1,838,947	246,728	14,641	2,100,316	*357,429*	2,457,745
1989	1,920,073	203,001	15,669	2,138,743	*372,491*	2,511,234
1990	1,860,324	257,656	16,063	2,134,043	*363,032*	2,497,075
1991	2,018,791	216,791	21,494	2,257,076	*382,175*	2,639,251
1992	2,017,999	315,258	47,384	2,380,641	*372,754*	2,753,395
1993	2,160,868	257,865	48,628	2,467,361	*391,546*	2,858,907
1994	2,228,292	268,455	50,341	2,547,088	*407,465*	2,954,553
1995	2,352,345	300,501	48,367	2,701,213	428,635	3,129,848
1996	2,488,710	335,722	47,402	2,871,834	446,082	3,317,916
1997	2,456,133	253,987	40,285	2,750,405	432,825	3,183,230
1998	2,347,968	322,015	31,101	2,701,084	427,437	3,128,521
1999	2,473,174	247,734	34,466	2,755,374	442,374	3,197,748
2000	2,553,456	348,169	36,080	2,937,705	445,121	3,382,826
2001	2,692,024	287,930	40,286	3,020,240	459,957	3,480,197
2002	2,865,734	274,732	41,806	3,182,272	472,905	3,655,177
2003	2,860,849	206,161	39,307	3,106,317	473,809	3,580,126
2004	2,930,437	301,596	38,706	3,270,740	473,797	3,744,537
2005	2,997,936	169,501 /1	35,335 /2	3,202,773	479,640	3,682,413
2006	3,080,882	162,899	-	3,243,781	485,217	3,728,998
2007	3,269,300	210,402	-	3,479,702	493,233	3,972,935
2008	3,460,221	239,589	-	3,699,810	486,562	4,186,372
2009	3,518,961	260,094	-	3,779,055	474,666	4,253,722
2010	3,425,669	199,285	-	3,624,954	461,427	4,086,381
2011	3,602,110	232,827	-	3,834,937	459,785	4,294,722
2012	3,556,036	281,871	-	3,837,907	450,875	4,288,782
2013	3,910,200	290,944	-	4,201,144	492,647	4,693,790
2014	4,040,337	234,010	-	4,274,347	471,111	4,745,458
2015	3,845,597	215,327	-	4,060,924	456,823	4,517,747
2016	3,812,156	190,905	-	4,003,061	448,447	4,451,508
2017	4,081,884	237,570	-	4,319,454	455,717	4,775,171
2018	4,166,373	242,487	-	4,408,860	459,191	4,868,051
2019	4,210,455	245,053	-	4,455,508	465,150	4,920,659
2020	4,256,700	247,744	-	4,504,444	467,709	4,972,154
2021	4,298,271	250,164	-	4,548,435	470,057	5,018,491
2022	4,342,739	252,752	-	4,595,491	471,724	5,067,216
2023	4,387,507	255,358	-	4,642,865	473,020	5,115,885
2024	4,433,245	258,020	-	4,691,264	474,034	5,165,298
2025	4,477,797	260,613	-	4,738,409	474,819	5,213,228
2026	4,533,001	263,825	-	4,796,826	475,421	5,272,247
2027	4,581,194	266,630	-	4,847,825	475,948	5,323,772
2028	4,628,208	269,367	-	4,897,575	476,349	5,373,923
2029	4,677,695	272,247	-	4,949,942	476,544	5,426,486
2030	4,732,220	275,420	-	5,007,641	476,492	5,484,133
2031	4,779,704	278,184	-	5,057,888	476,236	5,534,124
2032	4,838,437	281,602	-	5,120,039	475,794	5,595,833
2033	4,888,704	284,528	-	5,173,232	475,234	5,648,466
2034	4,941,950	287,627	-	5,229,577	474,530	5,704,106
2035	4,994,467	290,683	-	5,285,151	473,662	5,758,813
2036	5,055,850	294,256	-	5,350,106	472,807	5,822,912
2037	5,105,683	297,156	-	5,402,840	472,163	5,875,002
2038	5,158,795	300,247	-	5,459,042	471,706	5,930,748
2039	5,212,742	303,387	-	5,516,129	471,301	5,987,431
2040	5,263,316	306,331	-	5,569,646	471,094	6,040,740
2041	5,317,302	309,473	-	5,626,775	471,014	6,097,789
2042	5,372,193	312,667	-	5,684,861	471,167	6,156,027
2043	5,418,482	315,361	-	5,733,843	471,402	6,205,245
2044	5,473,955	318,590	-	5,792,545	471,700	6,264,244
2045	5,520,217	321,282	-	5,841,499	471,981	6,313,480
2046	5,572,713	324,338	-	5,897,050	472,237	6,369,288
Average Annual Growth Rates						
1987-2016	2.9%	-0.3%	-100.0%	2.6%	1.1%	2.4%
2001-2016	2.3%	-2.7%	-100.0%	1.9%	-0.2%	1.7%
2006-2016	2.2%	1.6%	--	2.1%	-0.8%	1.8%
2011-2016	1.1%	-3.9%	--	0.9%	-0.5%	0.7%
2016-2021	2.4%	5.6%	--	2.6%	0.9%	2.4%
2016-2026	1.7%	3.3%	--	1.8%	0.6%	1.7%
2016-2036	1.4%	2.2%	--	1.5%	0.3%	1.4%
2016-2046	1.3%	1.8%	--	1.3%	0.2%	1.2%
2017-2046	1.1%	1.1%	--	1.1%	0.1%	1.0%

/1 Losses reduced due to calculation adjustment - future loss % set at 5.5%
/2 Transferred to Nodak starting in 2006

The annual winter peak demands have been projected for the Joint System using the forecast developed from the individual member systems' and NMPA forecasts. The annual winter peak is expected to grow at an annual rate of 0.7 percent over the forecast horizon. The base forecast for the Joint System winter peak demand is summarized below.

Joint System Peak Demand (Winter)
MW



Uncertainty Analysis

This study includes analyses of forecast uncertainty based on extreme economic and weather conditions. Planning studies should reflect the base projection but should also consider the range of extreme economic and weather scenarios. Planning ranges have been developed using Monte Carlo simulation (shown in Section 4.4) that reflects the most probable ranges drawn from the economic and weather ranges. For 2046, the planning range outlook varies from the base forecast of total Joint System energy requirements by approximately +15 to -10 percent.

Joint System Peak Demand
MW

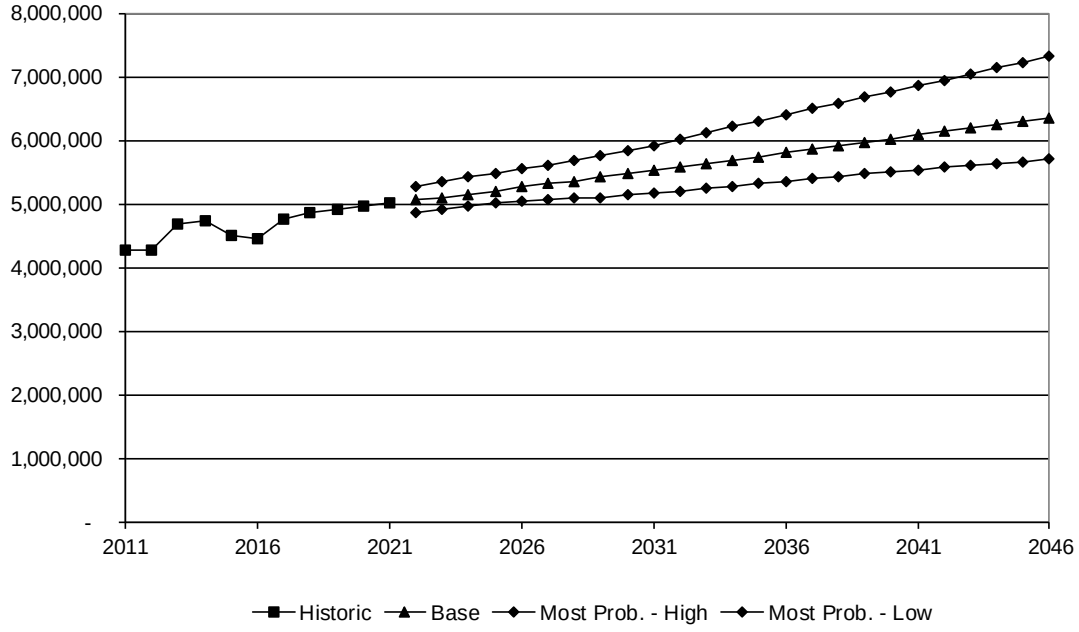
Year	Winter Peak Demand	Summer Peak Demand	Annual Peak Demand	Load Factor %
1999	709	414	709	51%
2000	691	413	691	56%
2001	696	437	696	57%
2002	711	461	711	59%
2003	699	514	699	58%
2004	792	447	792	54%
2005	788	482	788	53%
2006	786	505	786	54%
2007	806	521	806	56%
2008	906	512	906	53%
2009	917	506	917	53%
2010	851	574	851	55%
2011	897	574	897	55%
2012	895	597	895	55%
2013	926	603	926	58%
2014	885	598	885	61%
2015	843	630	843	61%
2016	862	614	862	59%
2017	919	601	919	59%
2018	933	610	933	60%
2019	941	616	941	60%
2020	948	622	948	60%
2021	955	627	955	60%
2022	962	632	962	60%
2023	969	638	969	60%
2024	975	643	975	60%
2025	982	649	982	61%
2026	990	655	990	61%
2027	997	661	997	61%
2028	1,003	666	1,003	61%
2029	1,010	672	1,010	61%
2030	1,018	678	1,018	61%
2031	1,024	684	1,024	62%
2032	1,033	690	1,033	62%
2033	1,039	696	1,039	62%
2034	1,046	702	1,046	62%
2035	1,053	708	1,053	62%
2036	1,061	714	1,061	63%
2037	1,068	720	1,068	63%
2038	1,075	726	1,075	63%
2039	1,082	732	1,082	63%
2040	1,088	737	1,088	63%
2041	1,096	743	1,096	64%
2042	1,103	749	1,103	64%
2043	1,109	755	1,109	64%
2044	1,116	761	1,116	64%
2045	1,122	766	1,122	64%
2046	1,129	772	1,129	64%

Average Annual Growth Rates			
2001-2016	1.4%	2.3%	1.4%
2006-2016	0.9%	2.0%	0.9%
2011-2016	-0.8%	1.4%	-0.8%
2016-2021	2.1%	0.4%	2.1%
2016-2026	1.4%	0.6%	1.4%
2016-2036	1.0%	0.8%	1.0%
2016-2046	0.9%	0.8%	0.9%
2017-2046	0.7%	0.9%	0.7%

Old Approach: Based on MAPP Form 3 Peak with WAPA allocations
Current Method (2014 on): MPC Sum (aggregation of MPC billing meters)

Joint System Forecast - Most Probable Ranges

MWh



SECTION 1

LOAD FORECAST STUDY PROCESS

Section 1
Load Forecast Study Process

1.1 Forecast Study Purpose

The Minnkota Power Cooperative Inc. (Minnkota) load forecast is produced as part of an ongoing resource planning program. The RUS Electric Load Forecast Study (Load Forecast) is a thirty year (2017-2046) forecast of energy requirements and seasonal peak demands based on historical data through 2016. The last Load Forecast report for Minnkota was published in 2015. This report includes the data used to develop new projections; discussions of the analytic procedures used; and presentations of the range of projections derived for the Minnkota system. The load forecast provides Minnkota with a tool to aid in planning for future electric demand and energy requirements. The primary purposes of this Load Forecast are to:

1. Identify factors that significantly influenced Minnkota's system loads in the past.
2. Develop valid estimates for future electric loads by class and total system over a thirty-year projection period.
3. Assess the range of future loads that could reasonably materialize.

1.2 Forecast Uses

This Load Forecast is designed to meet a wide range of needs for Minnkota. The range of projections developed in this study is intended for the following uses:

- System Expansion and Replacement Planning
- Financial Forecasting
- Rate Design and Development
- Marketing
- Demand-Side Management Planning
- General Utility Planning

1.3 Forecast Study Scope

This Load Forecast has been prepared in compliance with United States Department of Agriculture - Rural Utilities Service (RUS) guidelines as specified in 7 CFR, Part 1710, *"General and Pre-loan Policies and Procedures Common to Insured and Guaranteed*

Electric Loans" as published in the Federal register. The specific requirements are contained in Section 1710.203, *"Requirements to Prepare a Load Forecast"*. The basic requirements that must be addressed in either the RUS approved Work Plan or forecast report are:

- A discussion of the scope of the forecast.
- A discussion of the borrower personnel, consultants, data and other resources used in the preparation of the forecast.
- A discussion of the procedures used to collect, validate, process and update the data used in the study.
- Documentation of the analysis and modeling of the borrower's electric system loads and other pertinent information used in the forecast.
- An analysis of the borrower's past, present, and future electric system loads of the borrower's RE Act beneficiaries and others.
- A discussion and analysis of the following alternate growth scenarios:
    - Most-probable economic assumptions with normal weather.
    - Most-probable economic assumptions with severe weather.
    - Most-probable economic assumptions with mild weather.
    - Normal weather with pessimistic macroeconomic assumptions.
    - Normal weather with optimistic macroeconomic assumptions.
- Ten years of system data from RUS Form 7 or equivalent. These can be found in the respective member reports.
- A discussion and documentation of the coordination activities between the power supply borrower and its RUS borrower members and the borrower and RUS.
- The borrower's general manager's recommendation to the board of directors on adoption of the forecast and;
- Approval of the forecast by the borrower's board of directors.

1.4 Forecast Study Coordination

Minnkota views load forecasting as an ongoing effort that relies heavily on effective communication and coordination between member system management and staff,

Minnkota management and staff, NMPA staff, and the consultant, Clearspring Energy Advisors, LLC. The focal points of the coordination effort include the following:

1. Clearspring Energy prepared an initial data request for Minnkota member systems to complete. As part of that data request, member systems provided historic RUS Form 7 data on customers, energy and peak demand monthly through 2016.

2. Clearspring Energy obtained third party and system data and combined them in the forecast databases. The third party data includes weather data from the Midwestern Regional Climate Center, energy price data from the Energy Information Administration and economic and demographic data from Woods and Poole Economics.

3. Member systems provided Clearspring Energy with a copy of their most recent financial forecast or price projection. A price forecast based on this financial forecast was then used as an input to development of class sales projections.

4. Clearspring Energy developed the projection models for consumers and use per consumer for each of the customer classes. These preliminary projections were then provided to the member systems and Minnkota for review and comment. A description of these models and methods are presented in Appendix B.

5. The member system Managers and staff and NMPA staff reviewed the results and provided feedback to Clearspring Energy. Phone calls to managers were made to discuss revisions to the forecasts. A copy of the manager responses to the review is provided in the respective reports.

6. Based on inputs from discussions with member system staff, Clearspring Energy modified the preliminary projections as appropriate and prepared the final reports documenting methods, assumptions and results.

1.5 Forecast Study Methodology

One of the primary assumptions of forecasting is that the past is generally the best predictor of the future. There are three key statistical methods of using the past to predict the future: univariate, multivariate, and qualitative. All methods were considered in order to determine which was most appropriate for this forecast. Greater weight was given to multivariate forecasting, or regression analysis, which is one of the most widely used methods of modeling time series data. It is the primary technique used to develop the forecasts for this forecast. Multivariate regression, or econometric modeling, uses the strong relationship between an independent variable (i.e. the number of households in the service area) to explain the change in the dependent variable (i.e. the number of

residential customers). This type of forecasting is accurate in the intermediate-to-long run, although its accuracy depends to a certain extent on the dependent variable being considered and the accuracy of the forecasts of the independent variables.

In the cases where development of a model was not practical, trending or judgment was used. Trend forecasts rely on analyzing past values or growth trends of a variable to extrapolate them forward in time. Qualitative or judgmental methods were used to where quantitative conclusions could not be formed logically or when expected changes in the future values deviated from past experience.

Econometric modeling, as used in this forecast, involves three major steps to the development of a model: 1) data collection, 2) equation specification, and 3) equation estimation and validation. These steps are discussed below.

1.5.1 Data Collection

One of the most crucial steps in the development of an econometric forecast is data collection. The availability of data is a major consideration in the selection of variables for use in developing forecasting models. The data used in this study is described in Section 2, "System Background." Economic and demographic forecasts were obtained from reputable third party providers using official U.S. Census Bureau and Department of Commerce data. This service facilitates the database process and makes available annual county level projections of important local economic and demographic variables.

1.5.2 Equation Specification

Equation specification involves the selection of the appropriate dependent variable, as shown in the long-term forecast section; identification of explanatory (independent) variables which are likely to influence the dependent variable, such as those listed in Table 2.2, and selection of an appropriate mathematical form for the equations. The equations are shown at the top of all tables for which models were developed.

The general form of the multiple regression model is a linear model given by:

$$\text{Linear: } Y = a + b_0X_0 + b_1X_1 + \ldots b_nX_n + e$$

Where Y is the dependent variable and X are the independent or explanatory variables. See Appendix B for a complete description of the terms referred to in linear models. This model can be interpreted to mean that a numerical change in the explanatory variable results in a relative numerical change in the dependent variable. The coefficient of the explanatory variable indicates the size of the relative change. The sign of the coefficient is an indication of the type of relationship, positive or negative.

A second form of a regression model, also used in this forecast, is a model in the logarithmic linear form, shown here:

$$\text{Logarithmic: } \ln(Y) = a + b_0 \ln(X_0) + b_1 \ln(X_1) + \ldots.. b_n \ln(X_n) + e$$

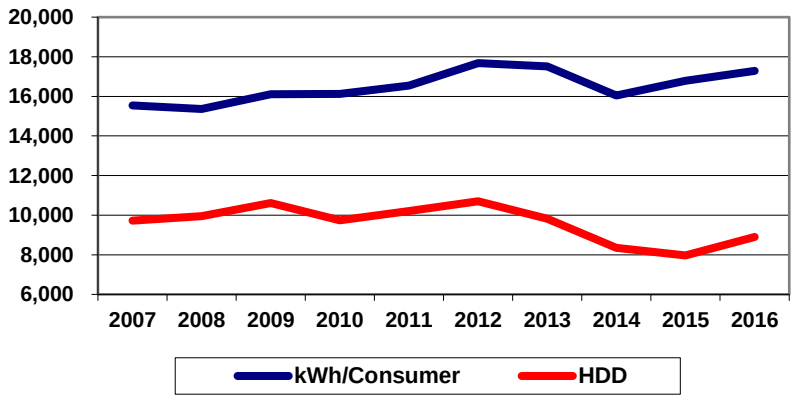
The logarithmic form can be interpreted to mean that a percentage change in an explanatory variable results in a corresponding percentage change in the dependent variable. Thus, if b_0 is 0.5, a 1.0 percent change in X_0 will result in a change of approximately 0.5 percent in Y. For example, if income increases (the independent variable), the amount of electricity purchased (the dependent variable) will also increase but not necessarily by the same amount.

1.5.3 Equation Estimation and Validation

The final step in modeling is equation estimation and validation. The regression model quantifies the relationship between the selected variables. An example of the type of a typical relationship desirable when developing a model is shown in Figure 1.1.

Figure 1.1

Sample Econometric Relationship



This graph illustrates a representative historical relationship between energy sales per consumer and heating degree-days. The econometric model specified that includes this variable would show the direct relationship between how cold the climate is and the corresponding need for heating equipment to be used more or less during the heating season.

Several econometric equations involving different combinations of explanatory variables and mathematical forms were tested for each consumer class. The coefficients of each equation were estimated using a multiple regression computer program that employs the method of ordinary least squares. Each of the resulting equations was subjected to a series of statistical tests from which a preferred equation was selected. In addition, the plausibility of the forecast relative to historical and expected experience was also evaluated. The major statistical tests are described in Appendix B.

1.6 Forecast Study Resources

1.6.1 Staffing Resources

Preparation of the Minnkota Load Forecast is an integrated effort with significant input from member systems' management and staff, Minnkota management and staff, NMPA staff, and the consultant. Overall responsibility for the load forecast program at Minnkota is assigned to the Vice President – Member Services. The Rates, Load and Planning Manager provided direct study coordination. In most cases, the member system manager has directly coordinated the data contributions to the load forecast or assigned a coordinator. Direct inputs from the member systems include:

1. Results from their most recent financial forecast or retail price projection
2. Information regarding the availability of alternate fuels in the service area
3. Information regarding penetration of major appliances
4. Information regarding key elements that shape growth in their service territory
5. Historic data from RUS Form 7 and on-peak and off-peak sales and revenue
6. Individual large load sales and revenue data and surveys
7. Reactions to the preliminary forecasts provided by Clearspring Energy
8. Responses to specific Clearspring Energy data requests.

Minnkota provided the following:

1. 2015 and 2016 Form 12 data.
2. Minnkota monthly peak demand data through 2016.
3. Historical and projected Minnkota wholesale power costs.
4. Responses to specific data requests.

The primary analytic and reporting responsibilities for this forecast have been assigned to Clearspring Energy Advisors, LLC (Clearspring Energy). Clearspring Energy staff with the heaviest involvement in the Minnkota forecast includes the Project Manager, Senior Analyst and Project Assistant.

1.6.2 Data Resources

The following external data sources were used for preparation of this forecast.

1. Woods and Poole Economics, Inc. Complete Economic and Demographic Data Series (CEDDS), 2017.
2. Midwestern Regional Climate Center online database for select Minnesota and North Dakota weather stations.
3. U.S. Department of Energy. Annual Energy Outlook, 2017.
4. U.S. Department of Energy. *"Monthly Energy Review"*, various issues.
5. Minnkota Residential Surveys, 1988, 1990, 1993, 1996, 1999, 2005, 2010 and 2015.

1.6.3 Technical / Computing Resources

The database development and analyses for this forecast have been generated on PC compatible computers with a minimum of 8 gigabytes of RAM and 100 gigabytes of hard-disk capacity. Commercial software packages used in preparation of this study include Excel 2013; EViews, Version 8; and Word 2013. Excel is used extensively for spreadsheet analysis, graphics and as a pre-processor for regression analyses. Data is commonly entered into Excel spreadsheets where necessary calculations and transformations are performed prior to transfer to EViews. Excel is also used for generation of the majority of the forecast report graphics and as a template for the required RUS forms. EViews software is used for regression analyses and development of the forecasts based on the selected regression equations. Word has been used as the word processor for the complete forecast report.

SECTION 2

SYSTEM BACKGROUND

Section 2
System Background

2.1 Service Territory

The following sections detail the geographic location and characteristics of Minnkota and the member systems' service territories. Each member system is a 95 percent requirements energy purchaser of Minnkota. Each member has the option of purchasing up to 5 percent of energy resources from another supplier.

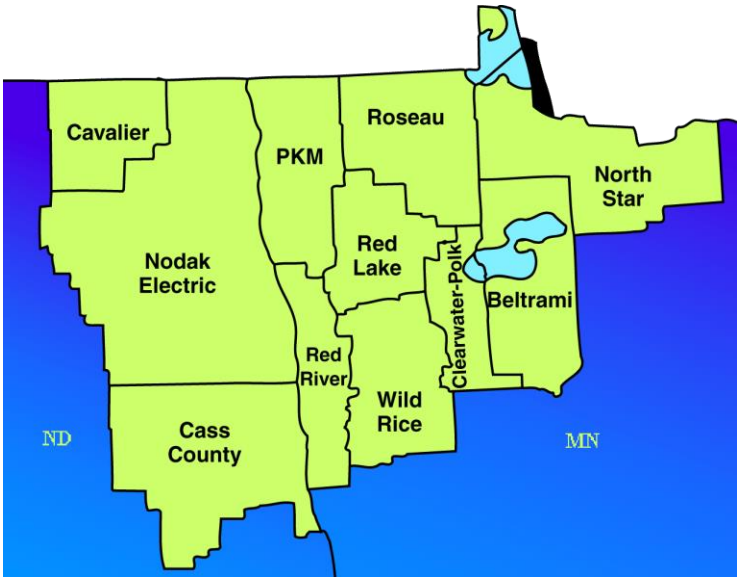
2.1.1 Location

Minnkota is headquartered in Grand Forks, North Dakota and provides power to eleven member systems located in eastern North Dakota and northwest Minnesota. Minnkota also serves one direct customer, the Northern Municipal Power Agency (NMPA), with which Minnkota has a joint operating agreement. Together Minnkota and NMPA are referred to as the Joint System in this report.

Minnkota serves the member systems through more than 2,900 miles of transmission lines covering approximately 34,500 square miles. Each member system's location is shown in Figure 2.1.

Figure 2.1

Minnkota Member Systems Service Territory



The individual cooperative members of Minnkota are:

Cooperative	RUS Designation
Minnkota Power Cooperative, Inc. Grand Forks, ND	North Dakota-20-Minnkota
Beltrami Electric Cooperative, Inc. Bemidji, MN	Minnesota-96-Beltrami
Cass County Electric Cooperative, Inc. Fargo, ND	North Dakota-11-Cass
Cavalier Rural Electric Cooperative, Inc. Langdon, ND	North Dakota-38-Cavalier
Clearwater-Polk Electric Cooperative, Inc. Bagley, MN	Minnesota-101-Clearwater
Nodak Electric Cooperative, Inc. Grand Forks, ND	North Dakota-19-Grand Forks
North Star Electric Cooperative, Inc. Baudette, MN	Minnesota-95-Lake of the Woods
PKM Electric Cooperative, Inc. Warren, MN	Minnesota-87-Marshall
Red Lake Electric Cooperative, Inc. Red Lake Falls, MN	Minnesota-75-Red Lake
Red River Valley Electric Cooperative, Inc. Halstad, MN	Minnesota-74-Norman
Roseau Electric Cooperative, Inc. Roseau, MN	Minnesota-97-Roseau
Wild Rice Electric Cooperative, Inc. Mahnomen, MN	Minnesota-82-Becker

2.1.2 Geography

The portions of North Dakota and Minnesota that Minnkota's member systems serve are considered prairie. Small areas of dense forest and numerous lakes break up the prairie. These lakes create a tourist industry, which is characterized by seasonal hunting, camping and water sports activities. Area lakes are also notable for world-class fishing.

Farming is very important to the area economy, especially the fertile Red River Valley. Typical crops include: wheat, sugar beets, potatoes and beans. Many of Minnkota's member system's large commercial class consumers are food processors for either local agricultural cooperatives or multinational agricultural product companies.

2.1.3 Climate

Weather affects total energy requirements and peak demands due to electric use primarily for space heating and occasional space cooling. Energy use of other appliances such as water heaters, dehumidifiers, refrigerators and freezers also varies with weather. Data from various Minnesota and North Dakota weather stations were used in the forecast. Weather data is presented in Table 2.1.

2.1.4 Power Supply and Delivery

The vast majority of the power Minnkota generates is sold to members with a small portion allocated to its non-member, NMPA. Most of Minnkota's energy comes from its lignite-fired generating plants. The plants are located next to coal fields thus eliminating the need to transport coal by train. Electrical power is delivered through a 69 kV transmission system to the member cooperatives through substations serviced by Minnkota.

Minnkota regularly evaluates alternatives to traditional fossil-fuel power production as part of its resource planning activities. Currently, Minnkota has long-term Purchase Power Agreements in place for 457 MW of wind capacity from the Langdon Wind Energy Center (217.5 MW), Ashtabula Wind Energy Center (139.5 MW) and the Oliver III Wind Project (100 MW). The Langdon and Ashtabula projects began operation in 2008-2009 and are currently under agreements ranging from 25-30 years. The Oliver III project began operation in 2017 and is currently under a 35-year agreement. These wind farms are in addition to two 1 MW wind projects Minnkota owns and operates under its Infinity Wind program. Minnkota continues to evaluate renewable and alternative energy options as part of its on-going resource planning process.

2.1.5 Conservation and Load Management

Minnkota has been actively involved in load management and conservation since the mid-1970's. In 1977, Minnkota installed a load management program using a 220 hertz ripple injection system to control loads. Minnkota's load management system has proven to be

very acceptable and economical for consumers. In addition, the member systems are involved in a variety of programs and promotional campaigns to promote cost-effective energy saving activities. These discussions are presented in the individual member system reports.

The Minnesota legislature enacted the Minnesota Conservation Investment Program (CIP) which requires utilities to invest a portion of revenues in energy efficiency and conservation programs. Typical programs include rebates for the purchase of energy efficient appliances, such as furnaces, water heaters, lighting, etc. The purpose of the statute is to give consumers an incentive to conserve energy through behavioral changes or purchasing energy efficient appliances. This statute will impact the eight Minnesota member systems. Minnkota has designed a set of programs to help its members systems institute a number of energy efficiency improvements to fulfill the CIP obligations. This is discussed further in Section 4.5.

2.1.6 Economic and Demographic Trends

Minnkota's service area economy has historically relied on agriculture. Much of the area is highly productive fertile farming area, part of which contains the Red River Valley basin. As traditional rural areas open up to development, employment from sectors such as retail and service become more important. Retail and service employment has grown faster than total employment in the past decade. Table 2.1 presents several important economic and demographic factors that have contributed to this growth. The data presented are weighted for Minnkota's service territory.

Total population in Minnkota's service area is expected to grow 0.9 percent per year over the projection horizon as shown in Table 2.1. This is stronger growth than has been seen in the previous thirty years which grew at an average annual growth rate of around 0.6 percent. Employment growth, which has been growing at an annual rate of 1.6 percent over the past thirty years, is expected to be similar over the next thirty years. Employment is expected to grow at an average annual growth rate of 1.2 percent. Per capita income is expected to grow at an annual rate of 1.2 percent per year. The lingering effects of the Great Recession are expected to have an impact on the long-term Minnkota growth trends at least in the near term.

Table 2.1

Economic, Demographic And Weather Forecasts

Minnkota Power Cooperative, Inc.

Year	Population	Persons Per Household	Total Employment	Income Per Capita (09$)	Retail Sales (M09$)	LP Gas Price (09$/gal)	Heating Degree Days	Cooling Degree Days	Central Air Condition. Sat. %	Electric Space Heat Sat. %
1987	210,474	2.73	114,702	$22,415	$2,241	$1.13	8,307	470	47%	24%
1988	211,604	2.70	116,768	$21,462	$2,340	$1.08	9,648	669	47%	28%
1989	211,773	2.68	118,918	$22,458	$2,396	$0.97	10,410	514	48%	33%
1990	212,204	2.67	121,848	$23,394	$2,420	$1.20	9,027	452	48%	39%
1991	213,221	2.66	124,651	$22,756	$2,373	$1.03	9,261	548	49%	40%
1992	215,334	2.64	127,216	$24,166	$2,459	$0.93	9,407	188	50%	41%
1993	217,086	2.63	130,071	$23,167	$2,579	$1.04	10,002	241	52%	42%
1994	219,416	2.63	135,055	$24,428	$2,762	$0.97	9,374	294	53%	43%
1995	221,189	2.62	139,386	$24,796	$2,860	$0.96	9,964	524	54%	44%
1996	222,396	2.58	142,360	$26,730	$2,982	$1.12	10,960	408	55%	46%
1997	223,073	2.57	144,353	$26,347	$3,065	$1.09	9,742	381	55%	44%
1998	222,147	2.55	147,236	$28,486	$3,140	$0.93	8,411	416	56%	43%
1999	222,330	2.54	148,312	$28,912	$3,327	$0.91	8,577	321	56%	41%
2000	222,809	2.52	150,491	$30,724	$3,429	$1.21	9,285	337	55%	42%
2001	223,113	2.46	151,264	$30,569	$3,420	$1.32	8,954	484	55%	43%
2002	223,889	2.46	151,622	$31,280	$3,425	$1.09	9,540	510	54%	43%
2003	225,340	2.43	152,044	$33,121	$3,500	$1.24	9,511	433	54%	44%
2004	228,502	2.43	154,901	$32,708	$3,660	$1.38	9,725	196	53%	45%
2005	229,595	2.42	157,514	$32,901	$3,762	$1.58	9,060	415	53%	46%
2006	231,138	2.42	159,680	$33,409	$3,842	$1.70	8,623	503	55%	45%
2007	232,177	2.41	162,677	$35,024	$3,857	$1.83	9,426	482	57%	44%
2008	234,139	2.41	163,558	$37,865	$3,818	$2.11	10,482	268	59%	44%
2009	235,756	2.41	162,056	$35,942	$3,657	$1.76	9,961	231	61%	43%
2010	237,571	2.42	161,794	$37,355	$3,900	$2.03	8,933	430	63%	42%
2011	239,330	2.40	164,591	$38,882	$4,186	$2.12	9,188	473	64%	42%
2012	241,862	2.40	168,425	$41,888	$4,444	$1.85	8,175	541	64%	42%
2013	245,784	2.42	171,214	$41,506	$4,587	$1.77	10,083	459	65%	42%
2014	248,218	2.42	174,464	$41,427	$4,719	$2.25	10,008	358	66%	42%
2015	250,750	2.42	176,518	$42,027	$4,817	$1.50	8,502	471	67%	42%
2016	253,041	2.39	179,476	$42,661	$4,926	$1.35	8,105	414	68%	41%
2017	255,545	2.38	182,381	$43,356	$5,025	$1.36	9,215	406	68%	41%
2018	258,080	2.37	185,199	$44,052	$5,119	$1.45	9,215	406	69%	41%
2019	260,645	2.36	187,943	$44,756	$5,213	$1.45	9,215	406	69%	41%
2020	263,241	2.35	190,682	$45,479	$5,306	$1.45	9,215	406	69%	41%
2021	265,864	2.34	193,411	$46,196	$5,397	$1.45	9,215	406	70%	41%
2022	268,514	2.34	196,142	$46,929	$5,487	$1.48	9,215	406	70%	40%
2023	271,188	2.34	198,875	$47,657	$5,577	$1.50	9,215	406	70%	40%
2024	273,894	2.34	201,592	$48,373	$5,668	$1.50	9,215	406	71%	40%
2025	276,616	2.34	204,287	$49,104	$5,760	$1.50	9,215	406	71%	40%
2026	279,352	2.34	206,983	$49,819	$5,853	$1.50	9,215	406	71%	40%
2027	282,105	2.34	209,639	$50,511	$5,946	$1.52	9,215	406	71%	40%
2028	284,864	2.35	212,287	$51,192	$6,039	$1.52	9,215	406	71%	39%
2029	287,636	2.35	214,905	$51,862	$6,133	$1.52	9,215	406	72%	39%
2030	290,421	2.35	217,503	$52,509	$6,229	$1.54	9,215	406	72%	39%
2031	293,172	2.36	220,072	$53,112	$6,324	$1.57	9,215	406	72%	39%
2032	295,895	2.36	222,610	$53,700	$6,421	$1.59	9,215	406	72%	39%
2033	298,593	2.36	225,119	$54,288	$6,519	$1.59	9,215	406	72%	39%
2034	301,263	2.37	227,596	$54,888	$6,618	$1.61	9,215	406	72%	38%
2035	303,910	2.37	230,049	$55,522	$6,719	$1.62	9,215	406	73%	38%
2036	306,534	2.38	232,482	$56,149	$6,822	$1.64	9,215	406	73%	38%
2037	309,135	2.38	234,891	$56,739	$6,927	$1.65	9,215	406	73%	38%
2038	311,720	2.38	237,297	$57,304	$7,035	$1.68	9,215	406	73%	38%
2039	314,285	2.38	239,680	$57,864	$7,145	$1.71	9,215	406	73%	38%
2040	316,835	2.38	242,037	$58,441	$7,259	$1.72	9,215	406	73%	37%
2041	319,405	2.38	244,417	$59,024	$7,374	$1.74	9,215	406	73%	37%
2042	321,995	2.38	246,820	$59,614	$7,491	$1.75	9,215	406	73%	37%
2043	324,607	2.38	249,247	$60,209	$7,610	$1.76	9,215	406	74%	37%
2044	327,240	2.38	251,698	$60,810	$7,731	$1.77	9,215	406	74%	37%
2045	329,894	2.38	254,173	$61,417	$7,854	$1.78	9,215	406	74%	37%
2046	332,570	2.37	256,672	$62,030	$7,979	$1.79	9,215	406	74%	37%
Average Annual Growth Rates										
1987-2016	0.6%	-0.4%	1.6%	2.2%	2.8%	0.6%	-0.1%	-0.4%	1.3%	1.9%
2001-2016	0.8%	-0.2%	1.1%	2.2%	2.5%	0.1%	-0.7%	-1.0%	1.4%	-0.2%
2006-2016	0.9%	-0.1%	1.2%	2.5%	2.5%	-2.3%	-0.6%	-1.9%	2.2%	-0.9%
2011-2016	1.1%	0.0%	1.7%	1.9%	3.3%	-8.7%	-2.5%	-2.6%	1.3%	-0.3%
2016-2021	1.0%	-0.4%	1.5%	1.6%	1.8%	1.4%	2.6%	-0.4%	0.5%	-0.4%
2016-2026	1.0%	-0.2%	1.4%	1.6%	1.7%	1.1%	1.3%	-0.2%	0.4%	-0.4%
2016-2036	1.0%	0.0%	1.3%	1.4%	1.6%	1.0%	0.6%	-0.1%	0.3%	-0.4%
2016-2046	0.9%	0.0%	1.2%	1.3%	1.6%	1.0%	0.4%	-0.1%	0.3%	-0.4%
2017-2046	0.9%	0.0%	1.2%	1.2%	1.6%	1.0%	0.0%	0.0%	0.3%	-0.4%

Economic and demographic data is weighted for service territory

2.2 Forecast Database

A properly maintained database is one of the keys to the efficient completion of a forecast. This section describes the databases supporting the study and provides general descriptions of the most critical data.

2.2.1 Form 7 Data

Sales, revenue and consumer data by class and monthly peak data are compiled on a regular basis on RUS Form 7 by member system staff. The historic annual data from 1987 through 2016 for the member systems are the basis for the projection models used in the residential and small commercial classes. The historical data is included in Appendix C.

2.2.2 Demographic and Economic Database

Table 2.2 presents the definitions of the historic demographic and economic data used in the econometric analysis of residential use per consumer, general commercial sales and consumers.

Unless specifically noted, all data is taken from Woods and Poole economics, *"Complete Economic and Demographic Data Source" (CEDDS)*, 2017. The data originates from government agencies such as the Bureau of Labor Statistics, Department of Commerce and the U.S. Census Bureau. Woods & Poole makes adjustments to this data to arrive at county-level annual projections. Woods & Poole can be contacted at the following address:

Woods & Poole Economics, Inc.
1794 Columbia Road, NW
Washington, DC 20009
202.332.7111

County data, unless otherwise specified, was weighted by each cooperative's estimate of the percentage of residential customers served by the cooperative as compared to the total number of residential customers in each of the counties in the cooperative's service area.

Table 2.2

Variables Considered in Econometric Models
Minnkota Power Cooperative, Inc.

Variable:	Description of Variable:
RESCON	Number of residential customers
SCCON	Number of small commercial customers
RESPRI09	Average revenue per kWh for residential customers ($2009)
SCPRI09	Average commercial revenue per kWh ($2009)
SHSAT	Electric space heat saturation percent – service territory
ACSAT	Air conditioning saturation percent – service territory
PCE09	Personal Consumption Expenditure Deflator, 2009 = 100
LPG09	Propane gas price ($2009/gal)
NGAS09	Natural gas price ($2009/Mcf)
NO2OIL	No. 2 Fuel Oil price ($2009/gal)
HDD	Heating degree days
CDD	Cooling degree days
POP	Total population
HH	Total number of households
PPHH	Persons per household
TEMP	Total employment
CEMP	Construction employment
REMP	Retail employment
SEMP	Service employment
MEMP	Manufacturing employment
FEMP	Farm employment
RSLS	Real retail sales (millions of 2009$)
TPI09	Real total personal income (millions of 2009$)
PCI09	Real per capita income ($2009)
MHI09	Real income per household ($2009)
GRP09	Gross Regional Product (millions of 2009$)

2.2.3 Climate Data

Historical weather data was gathered from the Midwestern Climate Center's (www.mcc.sws.uiuc.edu) on-line retrieval system. The web site allows access to thousands of local weather stations across the southern United States. Whenever possible, local weather stations that would accurately reflect the climate history of each cooperative were used. If a station was not available in the service area, the nearest station with complete data was used.

2.2.4 Real Electricity Prices

Forecasts of the member systems' real electricity prices for the residential and commercial classes were developed using the following steps:

1. Historical average retail electricity prices were calculated by dividing the total class revenue by the total class kWh sales.
2. Minnkota provided the historical and projected average wholesale power cost.
3. Historical average purchased power costs were calculated by dividing the cost of purchases by total kWh purchased. Purchased power cost projections were based on the percent increase in Minnkota's average wholesale rates.
4. The historical retail markup was calculated as the difference between the average revenue per kWh less the purchased power costs. The projected retail mark-up was escalated at the inflation rate for most systems.
5. Projected average retail electricity prices were calculated as the sum of the purchased power cost and retail markup.
6. The historical and projected electricity prices were converted to real (inflation-adjusted) terms by dividing the nominal prices by the price deflator for Personal Consumption Expenditures (PCE).
7. The forecasts were reviewed with member system staff and adjusted as necessary.

2.2.5 Real Alternate Fuel Prices

The decision over the preferred fuel source that end-users make when purchasing appliances is driven to some extent by the relative fuel price to electricity prices. In most cases, there is at least one major alternative to electricity such as natural gas, propane or wood. Propane has traditionally been the alternate fuel of choice, and has been confirmed

by the residential survey data. Because of this, propane was evaluated for its impact on the residential and commercial classes for most of the Members. However, natural gas is more prevalent in Cass County and Nodak's territories and was thus used in their projections.

The projected prices were calculated by analyzing the growth rates of national drivers such as U.S. wellhead natural gas price and crude oil prices. The historical and projected price for propane is shown in Table 2.1.

2.2.6 Major Appliance Saturations

An important variable to consider is the saturation levels of electric appliances. Historic saturation information comes from market research surveys conducted in 1988, 1990, 1993, 1996, 1999, 2005, 2010 and 2015. The intervening years have been interpolated. Survey results indicate the percentage of appliance units by age and by type of unit for the service area.

The methodology for air conditioning saturations was developed based on the split between new and existing homes. Residential customers were split into new and existing homes. Based on data collected from the survey, the percentage of new homes with central air conditioning (traditional or heat pump) was applied to the number of new residential customers. A retrofit of existing homes percentage was developed based on survey data and applied to the existing residential customers. No age replacement was utilized as the assumption was that once a customer had air conditioning, they would replace it with a new unit if the appliance failed. Table 2.1 presents the historic and projected air conditioning saturation percentages at the Minnkota level.

The forecast for electric space heat saturation levels required assumptions regarding the number of new households in the service area, the preference for electric space heating systems and the replacement of existing electric units. The projection of the number of households in the counties served by the member cooperative was used to estimate the number of new households in the service area. The preference for electric space heating systems was determined from the survey responses regarding first choice of energy source. The preference was used to estimate the number of new households with electric space heating units.

The next step involved determining the number of existing households that would replace space heating units. The households with existing electric units were split into four groups: those with units 0-5 years old, 6-10 years old, 11-15 years old and over 16 years. Of units sixteen years or older, 25% were expected to be replaced within five years, while 50% were expected to be replaced within ten years. For units 11-15 years old, 25% were expected to be replaced by ten years. Units less than ten years old were not expected to be replaced during the study period. The preference for electric space heating systems was used to estimate the replacement rates for existing units. Projected saturation levels were obtained by dividing the sum of new and existing households with electric space heating systems by the total number of households in the service area. Table 2.1 presents the above mentioned saturation forecasts for Minnkota.

SECTION 3

SYSTEM FORECASTS

Section 3
System Forecasts

3.1 Background

Economic forecasting typically takes one of two forms. The first is based on the assumption that the historic relationship between the explanatory or forecast variable and the exogenous factors that impact it will remain the same. Econometric models and growth rate analysis often follow this form. The second form is more speculative and based on the concept that the historic relationship has changed and the future will diverge from the past. This is typified by judgment forecasts.

The underlying hypothesis of this study is that the cooperative's future energy sales growth, in general, is likely to be determined by the same factors that have influenced the growth in the past. The forecasts of consumers and electricity sales were developed based on the weather, economic, and demographic factors identified which affect the customer classes of the cooperative's system:

The following customer classes for the member cooperatives have been projected in this study:

- Residential
- Seasonal
- Irrigation
- Small Commercial
- Large Commercial
- Street and Highway Lighting
- Public Authority
- Resale – RUS
- Resale – Other

The sum of these classes makes up the retail sales for the member cooperatives. When added together with the member cooperatives' own energy use and unaccounted for energy (typically losses) the result is the total energy required by each cooperative from

Minnkota. Both energy and demand are projected for this study. These forecasts are discussed in the following sections.

3.1.1 Selected Forecast Methods

As discussed in Section 1.5, econometric forecasting methods are particularly suited to capture the growth in energy sales for the member systems since these models can directly reflect:

- The influence of electric prices on usage
- Customer preferences for competing fuel sources as a function of relative prices
- The impact of variations in weather on usage
- The influence of consumer well-being on appliance acquisitions and subsequent electric usage

Econometric models also provide annual forecasts that can readily be tracked and updated and provide an effective methodology for evaluating alternate forecast scenarios. In recognition of these strengths, econometric methods have been chosen to forecast energy sales and customers for most of the Minnkota member systems. Tables that summarize the econometric models are included in the corresponding member system reports. Where econometric models were impractical and for the smaller classes, trending and judgment were used to forecast customers and energy.

3.2 Energy Forecasts – Retail Customer Classes

3.2.1 Residential Class Forecast

This class accounted for about 51 percent of member system energy sales in 2016. Energy sales to the residential sector grew at an average annual rate of 2.0 percent during the study period (1987-2016).

Residential Customers Forecast

Residential customer growth has been projected by analyzing the historic relationship between residential customers and area growth in the number of households. This method measures the relationship between the cooperative's residential customers and

unweighted county data in order to capture the subtle shifts that occur between counties over time. A growth index has been used to more accurately measure the relationship between residential customer growth and county growth.

The resulting county share index was multiplied by the forecast of total households in counties to obtain the projected number of residential customers. This forecast is shown in Table 3.1 for the years 2017 to 2046. It indicates the number of residential customers will grow 1.1 percent per year, from 121,685 to 169,365, during the 2017 to 2046 period. This compares to the 2.3 percent growth rate for the 1987 to 2016 period.

Residential Energy Sales Per Customer Forecast

Econometric models have been developed for residential energy sales per customer for each of the member systems. These models are presented in the respective member system reports. The equations relate residential energy sales per customer to a variety of variables such as, the real (2009$) residential price of electricity, the real price of propane or natural gas, heating degree-days, cooling-degree days, electric space heat saturations, central air conditioning saturations, persons per household and real average household income. The variables were converted to natural logs before computation.

To understand the mechanics of the models, refer again to Appendix B. The rationale for choosing these variables can be summarized as follows. One of the primary principals of economics is that the price of a commodity influences the quantity of that commodity demanded. Demand is also influenced by the prices of competing product choices. The heating and cooling degree-day variables capture the variability of sales due to temperature. Electric air conditioning and space heat saturations represent the use of electricity from major appliances in the service area. The inclusion of an income variable is designed to capture customer's appetites for more appliances, larger homes and sensitivity to price changes. With the projected increases in electric price, household income and appliance saturations largely offsetting each other, the member systems are expected to see residential energy sales per customer remain relatively flat to a slight decline through 2046. This projection is shown in Table 3.2 by member system.

Table 3.1

Residential Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	9,435	9,989	1,499	2,650	11,853	3,120	3,545	4,448	3,856	4,082	8,400	62,877
1988	9,688	10,207	1,482	2,670	11,799	3,176	3,555	4,433	3,850	4,257	8,497	63,612
1989	9,918	10,782	1,473	2,683	11,801	3,257	3,531	4,430	3,845	4,388	8,569	64,675
1990	10,077	11,289	1,456	2,725	11,741	3,398	3,494	4,422	3,841	4,504	8,672	65,616
1991	10,283	11,761	1,440	2,750	11,718	3,508	3,478	4,425	3,826	4,600	8,761	66,550
1992	10,550	12,557	1,435	2,778	11,750	3,559	3,473	4,420	3,817	4,694	8,875	67,908
1993	10,874	13,359	1,437	2,822	11,847	3,606	3,482	4,444	3,848	4,734	9,051	69,503
1994	11,214	14,147	1,431	2,843	11,994	3,663	3,479	4,446	3,864	4,801	9,086	70,966
1995	11,599	14,881	1,426	2,890	12,026	3,702	3,478	4,465	3,891	4,932	9,243	72,532
1996	11,931	15,872	1,414	3,016	12,119	3,750	3,474	4,493	3,924	5,053	9,425	74,471
1997	12,256	16,144	1,400	3,213	12,323	3,799	3,453	4,496	3,960	5,131	9,589	75,765
1998	12,668	16,831	1,381	3,402	12,431	3,866	3,421	4,507	3,972	5,204	9,732	77,413
1999	13,074	17,593	1,365	3,497	12,342	3,941	3,407	4,518	3,994	5,250	9,902	78,883
2000	13,491	18,342	1,353	3,552	12,683	4,011	3,396	4,524	3,984	5,376	10,152	80,864
2001	14,003	19,243	1,347	3,608	15,134	4,074	3,370	4,532	4,021	5,343	10,368	85,045
2002	14,580	20,419	1,345	3,680	15,091	4,127	3,367	4,551	4,079	5,406	10,595	87,239
2003	15,140	21,723	1,345	3,749	15,395	4,174	3,365	4,586	4,135	5,475	10,865	89,950
2004	15,749	23,262	1,340	3,812	15,712	4,212	3,359	4,628	4,177	5,526	11,188	92,965
2005	16,162	25,144	1,337	3,889	15,910	4,251	3,378	4,644	4,142	5,570	11,446	95,873
2006	16,717	26,838	1,329	3,953	16,154	4,407	3,342	4,674	4,172	5,625	12,476	99,686
2007	17,208	28,118	1,332	4,003	16,345	4,505	3,340	4,710	4,181	5,662	12,842	102,246
2008	17,587	29,125	1,344	4,035	16,526	4,568	3,339	4,747	4,200	5,679	12,933	104,084
2009	18,617	29,920	1,346	4,052	16,696	4,628	3,331	4,792	4,183	5,664	12,965	106,193
2010	18,781	30,611	1,354	4,080	16,813	4,682	3,323	4,827	4,132	5,630	13,000	107,232
2011	18,827	31,854	1,367	4,094	16,910	4,746	3,334	4,835	4,134	5,636	13,039	108,776
2012	18,847	33,409	1,378	4,095	17,069	4,828	3,373	4,839	4,130	5,634	13,090	110,691
2013	18,917	34,190	1,387	4,087	17,456	4,889	3,425	4,872	4,159	5,645	13,090	112,116
2014	19,030	36,154	1,387	4,087	17,835	4,951	3,456	4,911	4,222	5,668	13,119	114,820
2015	19,144	38,816	1,375	4,101	18,377	5,012	3,491	4,947	4,278	5,687	13,176	118,404
2016	19,348	41,193	1,372	4,132	18,785	5,069	3,516	4,980	4,305	5,725	13,261	121,685
2017	19,598	42,908	1,373	4,171	19,150	5,122	3,546	5,026	3,952	5,678	13,293	123,817
2018	19,816	44,473	1,374	4,202	19,487	5,171	3,571	5,063	3,989	5,687	13,396	126,228
2019	20,012	45,888	1,375	4,229	19,809	5,213	3,592	5,095	4,022	5,694	13,483	128,411
2020	20,195	47,293	1,376	4,252	20,120	5,251	3,610	5,123	4,052	5,699	13,560	130,531
2021	20,367	48,688	1,377	4,274	20,425	5,287	3,626	5,149	4,079	5,704	13,629	132,605
2022	20,512	50,048	1,378	4,289	20,703	5,316	3,637	5,167	4,100	5,709	13,678	134,538
2023	20,642	51,373	1,379	4,301	20,970	5,342	3,646	5,181	4,119	5,714	13,716	136,383
2024	20,762	52,663	1,380	4,311	21,231	5,364	3,653	5,193	4,135	5,719	13,748	138,158
2025	20,882	53,918	1,381	4,319	21,486	5,385	3,658	5,203	4,150	5,724	13,773	139,878
2026	21,002	55,138	1,382	4,326	21,739	5,405	3,663	5,211	4,163	5,729	13,794	141,552
2027	21,122	56,323	1,383	4,332	21,989	5,425	3,668	5,218	4,175	5,734	13,812	143,180
2028	21,242	57,473	1,384	4,337	22,239	5,445	3,673	5,224	4,186	5,739	13,826	144,767
2029	21,362	58,588	1,385	4,342	22,489	5,465	3,678	5,228	4,196	5,744	13,836	146,311
2030	21,482	59,668	1,386	4,347	22,739	5,485	3,683	5,230	4,203	5,749	13,846	147,817
2031	21,602	60,713	1,387	4,352	22,989	5,505	3,688	5,231	4,210	5,754	13,856	149,286
2032	21,722	61,723	1,388	4,357	23,239	5,525	3,693	5,232	4,214	5,759	13,866	150,717
2033	21,842	62,698	1,389	4,362	23,489	5,545	3,698	5,233	4,219	5,764	13,876	152,114
2034	21,962	63,663	1,390	4,367	23,739	5,565	3,703	5,234	4,224	5,769	13,886	153,501
2035	22,082	64,618	1,391	4,372	23,989	5,585	3,708	5,235	4,229	5,774	13,896	154,878
2036	22,202	65,563	1,392	4,377	24,239	5,605	3,713	5,236	4,234	5,779	13,906	156,245
2037	22,322	66,498	1,393	4,382	24,489	5,625	3,718	5,237	4,239	5,784	13,916	157,602
2038	22,442	67,423	1,394	4,387	24,739	5,645	3,723	5,238	4,244	5,789	13,926	158,949
2039	22,562	68,338	1,395	4,392	24,989	5,665	3,728	5,239	4,249	5,794	13,936	160,286
2040	22,682	69,243	1,396	4,397	25,239	5,685	3,733	5,240	4,254	5,799	13,946	161,613
2041	22,802	70,138	1,397	4,402	25,489	5,705	3,738	5,241	4,259	5,804	13,956	162,930
2042	22,922	71,023	1,398	4,407	25,739	5,725	3,743	5,242	4,264	5,809	13,966	164,237
2043	23,042	71,898	1,399	4,412	25,989	5,745	3,748	5,243	4,269	5,814	13,976	165,534
2044	23,162	72,763	1,400	4,417	26,239	5,765	3,753	5,244	4,274	5,819	13,986	166,821
2045	23,282	73,618	1,401	4,422	26,489	5,785	3,758	5,245	4,279	5,824	13,996	168,098
2046	23,402	74,463	1,402	4,427	26,739	5,805	3,763	5,246	4,284	5,829	14,006	169,365
Average Annual Growth Rates												
1987-2016	2.5%	5.0%	-0.3%	1.5%	1.6%	1.7%	0.0%	0.4%	0.4%	1.2%	1.6%	2.3%
2001-2016	2.2%	5.2%	0.1%	0.9%	1.5%	1.5%	0.3%	0.6%	0.5%	0.5%	1.7%	2.4%
2006-2016	1.5%	4.4%	0.3%	0.4%	1.5%	1.4%	0.5%	0.6%	0.3%	0.2%	0.6%	2.0%
2011-2016	0.5%	5.3%	0.1%	0.2%	2.1%	1.3%	1.1%	0.6%	0.8%	0.3%	0.3%	2.3%
2016-2021	1.0%	3.4%	0.1%	0.7%	1.7%	0.8%	0.6%	0.7%	-1.1%	-0.1%	0.5%	1.7%
2016-2026	0.8%	3.0%	0.1%	0.5%	1.5%	0.6%	0.4%	0.5%	-0.3%	0.0%	0.4%	1.5%
2016-2036	0.7%	2.4%	0.1%	0.3%	1.3%	0.5%	0.3%	0.3%	-0.1%	0.0%	0.2%	1.3%
2016-2046	0.6%	2.0%	0.1%	0.2%	1.2%	0.5%	0.2%	0.2%	0.0%	0.1%	0.2%	1.1%
2017-2046	0.6%	1.9%	0.1%	0.2%	1.2%	0.4%	0.2%	0.1%	0.3%	0.1%	0.2%	1.1%

Table 3.2

Average Residential Energy Use Per Customer Forecasts By Member (kWh)
Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Minnkota Avg. Use
1987	13,737	19,326	18,618	14,047	19,551	11,718	17,914	16,735	20,101	17,345	14,085	16,869
1988	14,405	21,278	19,343	15,025	21,385	12,979	18,772	17,897	21,951	18,242	14,963	18,148
1989	14,958	21,039	19,907	15,569	21,831	13,690	19,065	18,578	22,583	18,998	15,416	18,560
1990	14,928	19,691	19,507	15,517	21,086	13,562	18,998	18,310	21,749	18,969	15,132	18,053
1991	15,539	20,637	20,522	15,569	22,188	14,005	19,610	18,734	22,656	19,370	15,672	18,755
1992	15,362	18,955	21,290	15,668	21,462	14,135	19,785	18,699	22,208	19,628	15,642	18,315
1993	16,109	20,244	21,235	16,217	22,550	14,849	20,824	19,589	23,119	20,358	16,094	19,181
1994	16,130	19,863	20,792	16,187	21,909	15,071	20,001	19,347	23,130	19,997	16,045	18,916
1995	16,543	20,636	20,937	16,601	22,415	15,834	20,838	19,647	23,275	20,322	16,497	19,418
1996	17,679	21,527	23,051	17,574	23,473	17,137	22,302	21,199	25,062	21,843	17,553	20,596
1997	17,519	20,096	22,995	16,633	21,689	16,645	21,424	20,858	24,026	21,620	16,767	19,665
1998	16,043	18,619	19,624	14,512	19,512	15,767	18,587	18,418	21,974	19,025	15,577	17,840
1999	16,784	18,729	20,821	15,673	20,232	16,707	19,649	19,025	20,972	20,971	15,858	18,400
2000	17,292	18,888	19,331	15,315	25,645	17,342	20,289	19,041	21,124	19,551	16,173	19,336
2001	17,627	18,786	22,542	15,986	20,908	17,808	21,039	21,601	22,237	20,043	16,723	19,097
2002	18,516	19,066	23,259	16,692	21,933	18,949	20,925	20,918	22,616	21,070	17,039	19,641
2003	17,709	18,014	22,098	16,324	21,527	18,379	20,744	20,200	21,992	20,420	16,781	18,965
2004	17,301	17,045	24,130	15,997	21,834	18,492	21,359	20,274	22,125	20,239	17,109	18,765
2005	17,199	17,104	22,471	15,710	21,427	17,730	20,347	20,407	22,629	19,866	16,933	18,537
2006	16,830	16,525	20,820	15,575	20,952	16,974	19,993	20,048	22,623	19,149	15,791	17,926
2007	17,037	16,980	22,236	15,774	21,653	16,847	22,882	20,760	22,649	19,560	16,286	18,406
2008	17,827	17,725	23,401	16,989	22,916	18,187	20,705	21,613	23,914	20,344	17,306	19,245
2009	17,079	17,943	24,608	17,327	24,136	17,976	24,170	22,385	25,766	20,172	17,408	19,585
2010	15,946	16,555	22,823	15,676	22,517	16,070	22,741	20,200	25,648	18,405	16,224	18,171
2011	16,177	16,488	20,798	16,088	22,519	16,139	22,029	20,529	22,966	18,495	16,570	18,105
2012	15,013	14,556	18,519	14,714	20,837	14,588	22,048	18,341	20,959	18,218	15,234	16,558
2013	17,053	16,561	24,168	16,096	23,737	16,193	23,715	20,203	23,589	18,615	17,167	18,634
2014	16,734	16,623	23,669	18,065	25,223	17,402	23,197	22,997	24,297	18,701	17,670	19,122
2015	15,040	14,133	18,291	14,737	20,573	14,488	18,981	18,422	20,257	16,770	15,585	16,195
2016	14,119	13,360	18,238	14,064	19,755	13,520	18,643	17,632	18,921	15,958	14,870	15,364
2017	14,983	14,391	20,475	14,784	21,246	13,740	19,732	18,330	20,426	15,363	16,079	16,330
2018	14,882	14,219	20,354	14,615	21,226	13,847	19,709	18,281	20,177	15,782	16,170	16,254
2019	14,839	14,059	20,251	14,579	21,207	13,835	19,716	18,318	20,108	16,301	16,238	16,203
2020	14,801	13,974	20,165	14,550	21,189	13,814	19,703	18,349	20,058	16,273	16,251	16,147
2021	14,767	13,800	20,086	14,530	21,172	13,804	19,683	18,358	20,025	16,246	16,261	16,060
2022	14,738	13,712	20,021	14,516	21,164	13,837	19,659	18,378	20,009	16,224	16,251	16,007
2023	14,714	13,647	19,973	14,508	21,148	13,856	19,629	18,408	20,006	16,226	16,233	15,962
2024	14,695	13,597	19,939	14,508	21,143	13,858	19,604	18,442	20,020	16,229	16,225	15,927
2025	14,680	13,559	19,915	14,514	21,137	13,848	19,578	18,465	20,048	16,233	16,234	15,899
2026	14,670	13,611	19,900	14,524	21,131	13,848	19,556	18,483	20,086	16,239	16,253	15,909
2027	14,662	13,587	19,894	14,539	21,127	13,864	19,529	18,505	20,134	16,226	16,275	15,891
2028	14,658	13,572	19,893	14,556	21,122	13,868	19,510	18,529	20,189	16,236	16,296	15,879
2029	14,656	13,563	19,899	14,575	21,118	13,868	19,486	18,555	20,249	16,245	16,315	15,870
2030	14,657	13,628	19,911	14,595	21,116	13,883	19,469	18,579	20,313	16,277	16,333	15,893
2031	14,658	13,625	19,873	14,617	21,108	13,925	19,423	18,638	20,380	16,286	16,345	15,889
2032	14,661	13,701	19,837	14,639	21,100	13,956	19,376	18,705	20,449	16,293	16,350	15,917
2033	14,664	13,693	19,803	14,660	21,092	13,963	19,340	18,770	20,517	16,303	16,349	15,911
2034	14,668	13,771	19,772	14,681	21,084	13,985	19,296	18,830	20,584	16,309	16,344	15,940
2035	14,671	13,779	19,745	14,701	21,087	13,995	19,254	18,886	20,654	16,313	16,346	15,942
2036	14,674	13,862	19,721	14,722	21,079	14,026	19,216	18,948	20,723	16,320	16,351	15,975
2037	14,678	13,860	19,696	14,744	21,072	14,039	19,174	19,008	20,795	16,320	16,356	15,972
2038	14,681	13,856	19,670	14,764	21,064	14,066	19,130	19,073	20,866	16,320	16,353	15,969
2039	14,684	13,860	19,643	14,781	21,046	14,103	19,090	19,140	20,930	16,319	16,349	15,967
2040	14,686	13,854	19,616	14,796	21,038	14,115	19,053	19,207	20,990	16,315	16,343	15,962
2041	14,688	13,849	19,592	14,808	21,029	14,136	19,010	19,273	21,047	16,290	16,339	15,956
2042	14,690	13,854	19,564	14,821	21,009	14,144	18,970	19,333	21,104	16,282	16,337	15,953
2043	14,691	13,777	19,540	14,831	20,999	14,158	18,927	19,393	21,156	16,254	16,342	15,916
2044	14,692	13,780	19,516	14,841	20,980	14,168	18,892	19,451	21,207	16,240	16,351	15,914
2045	14,693	13,702	19,493	14,850	20,959	14,170	18,850	19,508	21,256	16,208	16,361	15,874
2046	14,693	13,702	19,471	14,858	20,937	14,180	18,808	19,565	21,304	16,173	16,368	15,869
Average Annual Growth Rates												
1987-2016	0.1%	-1.3%	-0.1%	0.0%	0.0%	0.5%	0.1%	0.2%	-0.2%	-0.3%	0.2%	-0.3%
2001-2016	-1.5%	-2.2%	-1.4%	-0.9%	-0.4%	-1.8%	-0.8%	-1.3%	-1.1%	-1.5%	-0.8%	-1.4%
2006-2016	-1.7%	-2.1%	-1.3%	-1.0%	-0.6%	-2.2%	-0.7%	-1.3%	-1.8%	-1.8%	-0.6%	-1.5%
2011-2016	-2.7%	-4.1%	-2.6%	-2.7%	-2.6%	-3.5%	-3.3%	-3.0%	-3.8%	-2.9%	-2.1%	-3.2%
2016-2021	0.9%	0.6%	2.0%	0.7%	1.4%	0.4%	1.1%	0.8%	1.1%	0.4%	1.8%	0.9%
2016-2026	0.4%	0.2%	0.9%	0.3%	0.7%	0.2%	0.5%	0.5%	0.6%	0.2%	0.9%	0.3%
2016-2036	0.2%	0.2%	0.4%	0.2%	0.3%	0.2%	0.2%	0.4%	0.5%	0.1%	0.5%	0.2%
2016-2046	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.0%	0.3%	0.4%	0.0%	0.3%	0.1%
2017-2046	-0.1%	-0.2%	-0.2%	0.0%	-0.1%	0.1%	-0.2%	0.2%	0.1%	0.2%	0.1%	-0.1%

Residential Energy Sales Forecast

The total residential energy sales forecast is summarized in Table 3.3. The projected growth in the number of customers results in projected sales growth to this class. Growth in total energy sales to the residential class is expected to average 1.0 percent per year through 2046. This is slower than the average annual growth from 1987 to 2016. Total residential sales are forecast to reach 2,687,238 MWh by 2046.

3.2.2 Seasonal Class Forecast

Seasonal energy sales accounted for less than 1 percent of total cooperative energy sales in 2016. Sales projections for this class are based on discussions with cooperative staff. The forecasts for the member systems' seasonal energy sales are shown in Table 3.4. Solid growth is expected from this class over the forecast horizon. The primary drivers for this class are the wide variety of year-round recreational activities available.

3.2.3 Irrigation Class Forecast

The irrigation class has historically been one of the most volatile classes, primarily due to the sensitive relationship between crops, watering cycles and weather. The number of consumers in this class was 509 in 2016, while energy sales were 12,304 MWh. Member system sales were typically projected based on a five-year average of the 2012-2016 period. As shown in Table 3.5, sales are projected to grow 0.8 percent annually through 2046.

3.2.4 General Commercial Class Forecast

The definition for the commercial class differs somewhat from the Form 7 classification of small and large commercial accounts. Large commercial customers are identified as commercial accounts with over 1,000 kVA transformer capacity or one million kWh or more of annual usage. These accounts are subtracted from the total Form 7 small and large commercial data. The remaining commercial accounts represent the general commercial class. For Nodak, this threshold was set at 3 million kWh, due to the number of large accounts. Cass County has a three tier definition that separates the commercial class into small (below 1 million kWh), intermediate (1-3 million kWh) and large (3 million kWh and above). The large commercial accounts are projected individually based on input from cooperative staff.

Table 3.3

Residential Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	129,608	193,051	27,902	37,220	231,739	36,560	63,510	74,439	77,514	70,797	118,317	1,060,655
1988	139,556	217,181	28,664	40,110	252,333	41,214	66,729	79,330	84,503	77,655	127,142	1,154,418
1989	148,360	226,841	29,322	41,766	257,622	44,591	67,311	82,295	86,824	83,356	132,097	1,200,385
1990	150,423	222,286	28,393	42,288	247,559	46,080	66,368	80,969	83,528	85,426	131,223	1,184,543
1991	159,781	242,709	29,548	42,813	259,999	49,132	68,204	82,893	86,679	89,111	137,299	1,248,170
1992	162,065	238,020	30,547	43,526	252,176	50,306	68,719	82,653	84,775	92,129	138,814	1,243,731
1993	175,177	270,437	30,518	45,758	267,149	53,542	72,503	87,048	88,952	96,369	145,664	1,333,117
1994	180,876	281,000	29,757	46,022	262,771	55,196	69,575	86,012	89,366	95,995	145,791	1,342,363
1995	191,880	307,081	29,865	47,970	269,555	58,611	72,464	87,732	90,572	100,236	152,479	1,408,446
1996	210,930	341,683	32,600	52,998	284,473	64,259	77,473	95,239	98,354	110,376	165,430	1,533,815
1997	214,706	324,423	32,202	53,439	267,274	63,228	73,977	93,782	95,152	110,933	160,781	1,489,897
1998	203,230	313,374	27,098	49,363	242,554	60,955	63,578	83,002	87,277	99,008	151,598	1,381,037
1999	219,429	329,494	28,421	54,804	249,693	65,840	66,943	85,964	83,771	110,101	157,030	1,451,488
2000	233,277	346,448	26,162	54,399	325,244	69,563	68,908	86,133	84,150	105,115	164,192	1,563,590
2001	246,833	361,492	30,352	57,684	316,436	72,548	70,909	97,900	89,425	107,100	173,383	1,624,063
2002	269,964	389,301	31,291	61,417	330,991	78,204	70,450	95,202	92,244	113,892	180,521	1,713,478
2003	268,103	391,322	29,713	61,199	331,405	76,717	69,807	92,630	90,930	111,794	182,319	1,705,938
2004	272,471	396,508	32,322	60,983	343,061	77,889	71,744	93,826	92,422	111,847	191,413	1,744,487
2005	277,965	430,064	30,053	61,087	340,893	75,368	68,740	94,770	93,733	110,659	193,824	1,777,157
2006	281,355	443,491	27,670	61,567	338,450	74,813	66,811	93,700	94,373	107,702	197,008	1,786,942
2007	293,179	477,434	29,616	63,145	353,912	75,891	76,420	97,785	94,685	110,749	209,155	1,881,970
2008	313,521	516,254	31,461	68,541	378,711	83,076	69,141	102,602	100,444	115,542	223,807	2,003,099
2009	317,964	536,849	33,119	70,205	402,965	83,193	80,513	107,267	107,772	114,252	225,697	2,079,796
2010	299,478	506,755	30,891	63,961	378,562	75,244	75,575	97,500	105,972	103,613	210,916	1,948,468
2011	304,558	525,219	28,422	65,870	380,812	76,601	73,445	99,253	94,940	104,228	216,063	1,969,410
2012	282,954	486,314	25,509	60,252	355,659	70,423	74,364	88,748	86,561	102,644	199,424	1,832,850
2013	322,581	566,206	33,518	65,779	414,350	79,169	81,223	98,429	98,114	105,073	224,721	2,089,163
2014	318,457	600,988	32,835	73,829	449,839	86,149	80,175	112,950	102,588	105,991	231,816	2,195,616
2015	287,921	548,590	25,148	60,438	378,076	72,615	66,261	91,122	86,665	95,365	205,351	1,917,553
2016	273,176	550,341	25,013	58,118	371,093	68,538	65,539	87,806	81,455	91,351	197,193	1,869,624
2017	293,641	617,507	28,102	61,662	406,848	70,377	69,978	92,126	80,723	87,232	213,747	2,021,943
2018	294,908	632,378	27,956	61,413	413,632	71,598	70,383	92,563	80,485	89,747	216,615	2,051,678
2019	296,965	645,156	27,835	61,650	420,074	72,114	70,821	93,335	80,870	92,820	218,937	2,080,577
2020	298,902	660,849	27,737	61,869	426,329	72,542	71,129	94,002	81,265	92,741	220,361	2,107,728
2021	300,762	671,886	27,649	62,093	432,437	72,986	71,376	94,519	81,686	92,669	221,620	2,129,685
2022	302,309	686,254	27,580	62,256	438,167	73,562	71,509	94,957	82,044	92,627	222,285	2,153,549
2023	303,725	701,101	27,533	62,399	443,480	74,017	71,567	95,378	82,399	92,717	222,662	2,176,976
2024	305,091	716,033	27,506	62,544	448,878	74,339	71,606	95,772	82,786	92,813	223,065	2,200,433
2025	306,549	731,095	27,492	62,687	454,144	74,573	71,611	96,076	83,190	92,921	223,592	2,223,929
2026	308,088	750,477	27,492	62,832	459,365	74,848	71,628	96,321	83,617	93,038	224,208	2,251,914
2027	309,698	765,283	27,503	62,981	464,555	75,213	71,627	96,559	84,062	93,044	224,781	2,275,306
2028	311,369	780,006	27,522	63,125	469,734	75,509	71,656	96,804	84,520	93,183	225,300	2,298,727
2029	313,090	794,600	27,550	63,280	474,927	75,790	71,664	97,008	84,960	93,313	225,735	2,321,918
2030	314,851	813,155	27,587	63,440	480,155	76,149	71,700	97,175	85,380	93,580	226,134	2,349,307
2031	316,646	827,238	27,554	63,609	485,242	76,656	71,628	97,504	85,797	93,709	226,474	2,372,059
2032	318,462	845,687	27,524	63,779	490,327	77,106	71,552	97,873	86,183	93,832	226,700	2,399,025
2033	320,291	858,553	27,497	63,944	495,426	77,422	71,514	98,230	86,569	93,974	226,849	2,420,270
2034	322,126	876,694	27,474	64,107	500,510	77,827	71,450	98,565	86,958	94,087	226,951	2,446,749
2035	323,964	890,377	27,456	64,268	505,843	78,163	71,388	98,874	87,353	94,192	227,136	2,469,016
2036	325,801	908,861	27,441	64,433	510,932	78,615	71,345	99,218	87,751	94,315	227,373	2,496,086
2037	327,635	921,646	27,426	64,603	516,016	78,971	71,286	99,552	88,160	94,399	227,604	2,517,300
2038	329,465	934,233	27,410	64,764	521,100	79,402	71,218	99,911	88,563	94,480	227,723	2,538,269
2039	331,290	947,159	27,393	64,913	525,905	79,894	71,162	100,282	88,940	94,555	227,837	2,559,330
2040	333,108	959,273	27,374	65,053	530,963	80,245	71,120	100,653	89,300	94,615	227,918	2,579,623
2041	334,918	971,316	27,360	65,182	536,009	80,643	71,055	101,019	89,648	94,547	228,020	2,599,718
2042	336,721	983,937	27,341	65,313	540,749	80,976	71,002	101,349	89,996	94,586	228,152	2,620,122
2043	338,516	990,504	27,327	65,432	545,737	81,335	70,936	101,685	90,324	94,500	228,396	2,634,692
2044	340,303	1,002,650	27,313	65,548	550,486	81,678	70,898	102,009	90,648	94,504	228,680	2,654,717
2045	342,080	1,008,698	27,300	65,661	555,165	81,971	70,833	102,328	90,964	94,396	228,982	2,668,379
2046	343,843	1,020,319	27,288	65,772	559,840	82,313	70,770	102,645	91,276	94,273	229,238	2,687,578
Average Annual Growth Rates												
1987-2016	2.6%	3.7%	-0.4%	1.5%	1.6%	2.2%	0.1%	0.6%	0.2%	0.9%	1.8%	2.0%
2001-2016	0.7%	2.8%	-1.3%	0.1%	1.1%	-0.4%	-0.5%	-0.7%	-0.6%	-1.1%	0.9%	0.9%
2006-2016	-0.3%	2.2%	-1.0%	-0.6%	0.9%	-0.9%	-0.2%	-0.6%	-1.5%	-1.6%	0.0%	0.5%
2011-2016	-2.2%	0.9%	-2.5%	-2.5%	-0.5%	-2.2%	-2.3%	-2.4%	-3.0%	-2.6%	-1.8%	-1.0%
2016-2021	1.9%	4.1%	2.0%	1.3%	3.1%	1.3%	1.7%	1.5%	0.1%	0.3%	2.4%	2.6%
2016-2026	1.2%	3.2%	0.9%	0.8%	2.2%	0.9%	0.9%	0.9%	0.3%	0.2%	1.3%	1.9%
2016-2036	0.9%	2.5%	0.5%	0.5%	1.6%	0.7%	0.4%	0.6%	0.4%	0.2%	0.7%	1.5%
2016-2046	0.8%	2.1%	0.3%	0.4%	1.4%	0.6%	0.3%	0.5%	0.4%	0.1%	0.5%	1.2%
2017-2046	0.5%	1.7%	-0.1%	0.2%	1.1%	0.5%	0.0%	0.4%	0.4%	0.3%	0.2%	1.0%

Table 3.4

Seasonal Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	2,827	-	-	564	496	1,983	-	-	-	1,459	2,033	9,362
1988	2,850	-	-	657	555	2,128	-	-	-	1,725	2,024	9,939
1989	3,039	-	-	735	643	2,235	-	-	-	2,126	2,069	10,846
1990	3,249	-	-	782	665	2,166	-	-	-	2,358	2,133	11,352
1991	3,482	-	-	745	689	1,618	-	-	-	2,644	2,156	11,334
1992	3,681	-	-	806	786	1,771	-	-	-	2,729	2,197	11,970
1993	3,809	-	-	968	831	1,803	-	-	-	3,264	2,090	12,765
1994	3,725	-	-	1,017	727	1,803	-	-	-	2,920	2,025	12,217
1995	3,975	-	-	987	676	1,998	-	-	-	3,217	2,108	12,961
1996	4,003	-	-	1,286	714	1,904	-	-	-	4,460	2,115	14,483
1997	4,210	-	-	743	703	2,105	-	-	-	4,064	2,191	14,015
1998	4,028	-	-	308	828	2,129	-	-	-	3,754	2,166	13,213
1999	4,729	-	-	-	964	2,217	-	-	-	4,148	2,246	14,305
2000	4,463	-	-	-	997	2,212	-	-	-	4,592	2,279	14,542
2001	4,315	-	-	-	-	2,299	-	-	-	5,028	2,413	14,055
2002	4,325	-	-	-	685	2,415	-	-	-	5,390	2,485	15,300
2003	4,075	-	-	-	-	2,523	-	-	-	5,542	2,364	14,504
2004	3,652	-	-	-	-	2,568	-	-	-	5,584	2,474	14,277
2005	3,242	-	-	-	-	2,659	-	-	-	5,509	2,209	13,619
2006	2,574	-	-	-	-	2,404	-	-	-	5,577	3	10,558
2007	1,963	-	-	-	-	2,183	-	-	-	5,882	-	10,027
2008	1,840	-	-	-	-	2,052	-	-	-	6,180	-	10,072
2009	-	-	-	-	-	2,045	-	-	-	6,739	-	8,784
2010	-	-	-	-	-	1,900	-	-	-	6,110	-	8,010
2011	-	-	-	-	-	1,724	-	-	-	6,415	-	8,138
2012	-	-	-	-	-	1,586	-	-	-	6,469	-	8,056
2013	-	-	-	-	-	1,542	-	-	-	7,300	-	8,842
2014	-	-	-	-	-	1,327	-	-	-	7,648	-	8,975
2015	-	-	-	-	-	1,256	-	-	-	6,928	-	8,184
2016	-	-	-	-	-	1,173	-	-	-	6,862	-	8,035
2017	-	-	-	-	-	1,123	-	-	-	7,127	-	8,250
2018	-	-	-	-	-	1,089	-	-	-	7,180	-	8,269
2019	-	-	-	-	-	1,056	-	-	-	7,234	-	8,290
2020	-	-	-	-	-	1,023	-	-	-	7,288	-	8,311
2021	-	-	-	-	-	991	-	-	-	7,342	-	8,333
2022	-	-	-	-	-	959	-	-	-	7,397	-	8,356
2023	-	-	-	-	-	928	-	-	-	7,452	-	8,380
2024	-	-	-	-	-	898	-	-	-	7,507	-	8,404
2025	-	-	-	-	-	868	-	-	-	7,562	-	8,429
2026	-	-	-	-	-	838	-	-	-	7,617	-	8,455
2027	-	-	-	-	-	809	-	-	-	7,673	-	8,482
2028	-	-	-	-	-	780	-	-	-	7,729	-	8,509
2029	-	-	-	-	-	752	-	-	-	7,785	-	8,537
2030	-	-	-	-	-	725	-	-	-	7,841	-	8,566
2031	-	-	-	-	-	698	-	-	-	7,898	-	8,596
2032	-	-	-	-	-	671	-	-	-	7,955	-	8,626
2033	-	-	-	-	-	645	-	-	-	8,012	-	8,657
2034	-	-	-	-	-	619	-	-	-	8,069	-	8,688
2035	-	-	-	-	-	594	-	-	-	8,127	-	8,721
2036	-	-	-	-	-	569	-	-	-	8,184	-	8,754
2037	-	-	-	-	-	545	-	-	-	8,243	-	8,787
2038	-	-	-	-	-	521	-	-	-	8,301	-	8,821
2039	-	-	-	-	-	497	-	-	-	8,359	-	8,856
2040	-	-	-	-	-	474	-	-	-	8,418	-	8,892
2041	-	-	-	-	-	451	-	-	-	8,477	-	8,928
2042	-	-	-	-	-	429	-	-	-	8,536	-	8,965
2043	-	-	-	-	-	407	-	-	-	8,596	-	9,003
2044	-	-	-	-	-	386	-	-	-	8,655	-	9,041
2045	-	-	-	-	-	365	-	-	-	8,715	-	9,080
2046	-	-	-	-	-	344	-	-	-	8,775	-	9,119
Average Annual Growth Rates												
1987-2016	-100.0%	--	--	-100.0%	-100.0%	-1.8%	--	--	--	5.5%	-100.0%	-0.5%
2001-2016	-100.0%	--	--	--	--	-4.4%	--	--	--	2.1%	-100.0%	-3.7%
2006-2016	-100.0%	--	--	--	--	-6.9%	--	--	--	2.1%	-100.0%	-2.7%
2011-2016	--	--	--	--	--	-7.4%	--	--	--	1.4%	--	-0.3%
2016-2021	--	--	--	--	--	-3.3%	--	--	--	1.4%	--	0.7%
2016-2026	--	--	--	--	--	-3.3%	--	--	--	1.0%	--	0.5%
2016-2036	--	--	--	--	--	-3.6%	--	--	--	0.9%	--	0.4%
2016-2046	--	--	--	--	--	-4.0%	--	--	--	0.8%	--	0.4%
2017-2046	--	--	--	--	--	-4.0%	--	--	--	0.7%	--	0.3%

Table 3.5

Irrigation Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	118	6,891	-	642	1,082	-	90	-	120	-	355	9,299
1988	160	10,230	-	486	2,800	-	79	-	373	-	30	14,158
1989	114	6,649	-	399	2,697	-	80	-	300	-	181	10,420
1990	213	6,808	-	534	2,175	-	81	-	396	-	163	10,370
1991	160	6,575	-	595	3,311	-	92	240	253	-	75	11,301
1992	109	4,068	-	767	3,407	-	165	279	335	-	116	9,246
1993	74	2,415	-	475	1,232	-	120	291	262	-	79	4,947
1994	97	5,136	-	486	2,604	-	104	177	376	-	79	9,058
1995	140	5,323	-	345	3,216	-	53	136	464	-	201	9,879
1996	136	5,800	-	301	3,749	-	144	283	530	-	137	11,080
1997	241	4,209	-	391	3,578	-	178	192	519	-	62	9,371
1998	224	4,904	-	615	5,593	-	277	306	361	-	129	12,410
1999	227	3,925	-	337	4,349	-	317	361	329	-	100	9,945
2000	160	4,067	-	643	3,770	-	63	539	258	-	522	10,023
2001	216	4,633	-	351	2,128	-	346	279	414	-	195	8,563
2002	123	5,040	-	452	3,264	-	227	347	202	-	121	9,776
2003	130	6,223	-	610	5,019	-	243	344	461	-	168	13,198
2004	147	4,901	-	879	4,274	-	453	372	46	-	156	11,228
2005	134	2,900	-	684	3,910	-	164	247	67	-	312	8,417
2006	156	7,509	-	517	8,282	-	376	146	186	-	245	17,417
2007	212	5,237	-	828	4,622	-	458	391	143	-	161	12,052
2008	155	6,042	-	921	5,505	-	517	263	97	-	95	13,595
2009	78	4,644	-	587	5,423	-	439	235	121	-	145	11,672
2010	56	3,130	-	614	4,792	-	828	238	111	-	290	10,058
2011	51	1,929	-	407	3,488	-	616	218	30	-	342	7,081
2012	92	6,603	-	430	8,467	-	895	238	265	-	411	17,400
2013	51	7,479	-	597	7,686	-	654	223	155	-	475	17,319
2014	43	4,472	-	724	4,451	-	837	396	74	-	277	11,274
2015	90	5,434	-	791	5,671	-	1,238	330	86	-	435	14,074
2016	52	5,316	-	869	3,774	-	1,092	608	140	-	454	12,304
2017	72	6,052	-	730	6,945	-	836	498	118	-	617	15,866
2018	72	6,052	-	730	7,050	-	836	498	118	-	617	15,971
2019	72	6,082	-	730	7,156	-	836	519	118	-	637	16,148
2020	72	6,082	-	730	7,261	-	836	519	118	-	637	16,254
2021	72	6,111	-	730	7,367	-	836	519	118	-	637	16,389
2022	72	6,111	-	730	7,473	-	836	541	118	-	657	16,536
2023	72	6,141	-	730	7,578	-	836	541	118	-	677	16,692
2024	72	6,141	-	730	7,684	-	836	541	118	-	697	16,818
2025	72	6,171	-	730	7,790	-	836	562	118	-	717	16,995
2026	72	6,171	-	730	7,895	-	836	562	118	-	737	17,120
2027	72	6,201	-	730	8,001	-	836	562	118	-	757	17,276
2028	72	6,201	-	730	8,106	-	836	584	118	-	777	17,423
2029	72	6,231	-	730	8,212	-	836	584	118	-	797	17,578
2030	72	6,231	-	730	8,318	-	836	584	118	-	817	17,704
2031	72	6,261	-	730	8,423	-	836	605	118	-	837	17,881
2032	72	6,261	-	730	8,529	-	836	605	118	-	857	18,007
2033	72	6,291	-	730	8,634	-	836	605	118	-	877	18,162
2034	72	6,291	-	730	8,740	-	836	627	118	-	897	18,309
2035	72	6,321	-	730	8,846	-	836	627	118	-	917	18,465
2036	72	6,321	-	730	8,951	-	836	627	118	-	937	18,590
2037	72	6,351	-	730	9,057	-	836	648	118	-	957	18,767
2038	72	6,351	-	730	9,163	-	836	648	118	-	977	18,893
2039	72	6,381	-	730	9,268	-	836	648	118	-	997	19,048
2040	72	6,381	-	730	9,374	-	836	669	118	-	1,017	19,196
2041	72	6,410	-	730	9,479	-	836	669	118	-	1,037	19,351
2042	72	6,410	-	730	9,585	-	836	669	118	-	1,057	19,477
2043	72	6,440	-	730	9,691	-	836	691	118	-	1,077	19,654
2044	72	6,440	-	730	9,796	-	836	691	118	-	1,097	19,779
2045	72	6,470	-	730	9,902	-	836	691	118	-	1,117	19,935
2046	72	6,470	-	730	10,008	-	836	712	118	-	1,137	20,082
Average Annual Growth Rates												
1987-2016	-2.8%	-0.9%	--	1.1%	4.4%	--	9.0%	--	0.5%	--	0.9%	1.0%
2001-2016	-9.1%	0.9%	--	6.2%	3.9%	--	8.0%	5.3%	-7.0%	--	5.8%	2.4%
2006-2016	-10.4%	-3.4%	--	5.3%	-7.6%	--	11.3%	15.3%	-2.8%	--	6.4%	-3.4%
2011-2016	0.5%	22.5%	--	16.4%	1.6%	--	12.1%	22.8%	35.8%	--	5.8%	11.7%
2016-2021	6.6%	2.8%	--	-3.4%	14.3%	--	-5.2%	-3.1%	-3.3%	--	7.0%	5.9%
2016-2026	3.2%	1.5%	--	-1.7%	7.7%	--	-2.6%	-0.8%	-1.7%	--	5.0%	3.4%
2016-2036	1.6%	0.9%	--	-0.9%	4.4%	--	-1.3%	0.2%	-0.8%	--	3.7%	2.1%
2016-2046	1.1%	0.7%	--	-0.6%	3.3%	--	-0.9%	0.5%	-0.6%	--	3.1%	1.6%
2017-2046	0.0%	0.2%	--	0.0%	1.3%	--	0.0%	1.2%	0.0%	--	2.1%	0.8%

Minnkota members provided service to 9,360 general commercial customers in 2016. The largest contributors to this class include a diverse mix of retail, agriculture, small manufacturing, schools and offices. This class accounted for 7 percent of Minnkota's consumers and 14 percent of total energy sales in 2016. General commercial energy sales grew 2.2 percent during the 1987 to 2016 study period.

General Commercial Customers Forecast

The general commercial customer forecasts are shown in Table 3.6 by member system. Specific forecast models were developed for each member system, relating general commercial customer growth to a variety of economic and demographic variables. Detailed descriptions of the selected models and forecasts can be found in the individual forecast reports for each member system.

Given the forecasts of steadily increasing factors such as employment, population and income, general commercial customers are projected to grow throughout the forecast period at an average annual compound growth rate of 2.0 percent through 2046. This is slightly slower than the historical growth of 2.2 percent per year from 1987 through 2016.

General Commercial Energy Use Per Customer Forecast

The forecast for general commercial energy use per customer is shown in Table 3.7. Separate econometric models were developed for each member system. Refer to each member system forecast report for the detailed models. The models relate energy sales per customer to a variety of economic and demographic variables including weather, employment and price. All variables were converted to natural logs before computation. As shown in Table 3.7, general commercial energy use per customer is expected to grow at 0.6 percent per year through 2046.

General Commercial Energy Sales Forecast

The total general commercial energy sales forecast is summarized in Table 3.8. Steady growth in this class' energy sales is projected throughout the forecast period at a slower rate than what has been experienced historically (2.0 percent over the 2017-2046 period versus 2.2 percent over the 1987-2016 period). Growth in customers will be the primary driver for this class.

Table 3.6

General Commercial Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Clearwater-Cavalier	Clearwater-Polk	Clearwater-Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	544	1,213	51	125	1,389	380	185	242	322	160	339	4,949
1988	571	1,221	53	131	1,404	389	189	242	328	170	300	4,999
1989	604	1,244	57	132	1,425	408	191	242	331	174	298	5,106
1990	621	1,261	60	132	1,485	417	198	242	332	177	311	5,235
1991	638	1,365	63	133	1,494	437	207	239	335	184	318	5,413
1992	657	1,431	64	131	1,516	437	206	239	335	188	376	5,580
1993	671	1,506	61	131	1,555	441	211	243	342	195	421	5,776
1994	675	1,534	60	132	1,611	436	216	238	348	209	473	5,932
1995	697	1,579	60	134	1,709	436	219	239	354	224	499	6,151
1996	724	1,632	59	136	1,726	440	218	243	364	227	518	6,285
1997	754	1,668	61	134	1,750	445	219	248	375	231	540	6,424
1998	791	1,755	62	141	1,816	444	215	271	402	245	548	6,692
1999	822	1,848	65	150	1,975	450	216	276	409	253	566	7,029
2000	859	1,887	65	156	1,935	458	219	286	415	253	585	7,119
2001	896	1,992	63	168	513	468	222	297	426	254	589	5,888
2002	977	2,072	63	198	410	481	222	305	437	262	584	6,013
2003	1,057	2,401	64	237	356	493	225	315	443	266	592	6,448
2004	1,116	2,510	63	256	322	508	231	325	449	281	601	6,662
2005	1,163	2,674	63	267	327	516	240	335	448	285	573	6,890
2006	1,223	2,891	63	275	311	526	243	338	446	290	595	7,202
2007	1,306	2,969	66	285	302	539	247	344	467	292	609	7,425
2008	1,316	3,170	72	287	302	545	249	354	494	291	623	7,701
2009	1,312	3,325	70	284	307	537	254	355	497	302	644	7,888
2010	1,324	3,488	72	285	302	547	260	353	503	303	654	8,091
2011	1,358	3,611	73	283	290	554	265	347	496	299	664	8,239
2012	1,355	3,774	74	263	292	560	263	353	508	301	671	8,413
2013	1,345	3,910	79	253	233	562	255	345	526	303	690	8,502
2014	1,317	4,118	83	255	247	566	254	350	536	305	725	8,757
2015	1,296	4,385	94	242	260	579	249	352	533	308	752	9,051
2016	1,296	4,678	91	236	259	585	242	360	542	303	767	9,360
2017	1,298	4,773	93	238	267	589	236	362	551	304	777	9,488
2018	1,301	4,881	93	240	273	595	231	365	561	304	785	9,630
2019	1,306	4,996	93	241	279	601	228	367	569	305	794	9,778
2020	1,312	5,117	93	242	284	606	225	369	577	306	801	9,933
2021	1,319	5,244	93	244	288	612	224	371	584	306	808	10,092
2022	1,326	5,375	93	245	293	616	222	373	590	307	814	10,253
2023	1,333	5,511	93	245	297	620	221	374	595	307	819	10,417
2024	1,341	5,649	93	246	301	624	221	376	600	308	823	10,582
2025	1,348	5,790	93	246	305	628	221	377	604	308	827	10,748
2026	1,356	5,933	93	247	309	631	221	378	608	309	830	10,916
2027	1,364	6,078	93	247	313	634	220	379	612	309	833	11,084
2028	1,372	6,224	93	247	317	637	221	380	616	310	836	11,252
2029	1,380	6,371	93	248	321	640	221	381	619	310	838	11,420
2030	1,388	6,518	93	248	324	642	221	382	621	311	839	11,587
2031	1,396	6,665	93	248	328	645	221	382	624	311	841	11,754
2032	1,404	6,812	93	248	331	647	221	382	626	312	842	11,919
2033	1,412	6,959	94	248	335	649	222	383	627	312	843	12,084
2034	1,420	7,105	93	249	338	651	222	383	629	313	844	12,248
2035	1,429	7,250	94	249	342	654	222	383	630	313	845	12,410
2036	1,437	7,394	94	249	345	656	222	384	631	313	846	12,572
2037	1,445	7,538	94	249	349	658	223	384	632	314	847	12,732
2038	1,454	7,679	94	250	352	660	223	384	634	314	848	12,891
2039	1,462	7,820	93	250	356	662	223	384	636	315	849	13,049
2040	1,470	7,959	93	250	360	664	223	384	637	315	849	13,206
2041	1,479	8,096	93	250	364	666	223	384	640	316	850	13,361
2042	1,487	8,231	93	251	368	668	224	384	642	316	851	13,515
2043	1,496	8,365	93	251	372	670	224	384	645	317	851	13,668
2044	1,504	8,497	93	251	376	672	224	385	647	317	852	13,819
2045	1,513	8,626	93	251	381	674	224	385	650	317	853	13,967
2046	1,521	8,754	93	252	385	676	224	385	653	318	853	14,114
Average Annual Growth Rates												
1987-2016	3.0%	4.8%	2.0%	2.2%	-5.6%	1.5%	0.9%	1.4%	1.8%	2.2%	2.9%	2.2%
2001-2016	2.5%	5.9%	2.5%	2.3%	-4.4%	1.5%	0.6%	1.3%	1.6%	1.2%	1.8%	3.1%
2006-2016	0.6%	4.9%	3.8%	-1.5%	-1.8%	1.1%	0.0%	0.6%	2.0%	0.4%	2.6%	2.7%
2011-2016	-0.9%	5.3%	4.6%	-3.5%	-2.2%	1.1%	-1.8%	0.7%	1.8%	0.3%	2.9%	2.6%
2016-2021	0.4%	2.3%	0.3%	0.6%	2.2%	0.9%	-1.6%	0.6%	1.5%	0.2%	1.0%	1.5%
2016-2026	0.5%	2.4%	0.2%	0.4%	1.8%	0.8%	-0.9%	0.5%	1.2%	0.2%	0.8%	1.6%
2016-2036	0.5%	2.3%	0.1%	0.3%	1.4%	0.6%	-0.4%	0.3%	0.8%	0.2%	0.5%	1.5%
2016-2046	0.5%	2.1%	0.1%	0.2%	1.3%	0.5%	-0.3%	0.2%	0.6%	0.2%	0.4%	1.4%
2017-2046	0.5%	2.1%	0.0%	0.2%	1.3%	0.5%	-0.2%	0.2%	0.6%	0.2%	0.3%	1.4%

Table 3.7

Average General Commercial Energy Use Per Customer Forecasts By Member (kWh)
Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Minnkota Avg. Use
1987	43,011	89,538	16,243	35,319	58,609	32,070	28,774	31,590	49,653	36,830	32,933	55,933
1988	45,938	98,625	16,784	36,322	61,385	35,636	30,971	34,599	49,790	46,972	26,373	59,783
1989	46,407	98,637	22,235	34,531	59,444	37,136	30,427	35,859	47,414	49,799	26,596	59,372
1990	48,302	98,011	36,157	29,172	56,886	38,103	33,651	37,177	50,747	49,277	27,503	59,166
1991	49,825	94,030	23,580	28,874	61,736	41,350	37,361	42,226	51,803	47,415	28,187	60,714
1992	47,070	90,926	25,944	29,075	67,383	40,347	45,365	39,625	51,259	49,616	43,563	62,371
1993	52,001	91,991	29,776	32,166	71,699	40,330	41,123	44,629	55,923	52,291	40,512	64,854
1994	53,448	100,576	21,079	35,277	70,104	42,278	38,751	47,254	55,961	49,443	38,933	66,671
1995	56,047	106,345	22,030	35,027	75,696	42,488	54,358	49,274	54,816	58,569	37,994	70,903
1996	56,378	115,586	25,085	33,993	77,705	42,239	36,067	48,004	54,545	52,932	42,390	73,431
1997	56,144	113,806	24,388	38,291	77,634	41,535	38,532	48,141	51,830	52,368	39,828	72,615
1998	54,289	115,246	23,805	36,934	73,074	40,713	40,826	45,452	45,168	46,233	41,658	71,159
1999	52,525	116,745	28,580	35,878	70,914	41,619	53,840	45,091	46,377	50,295	42,028	71,761
2000	54,100	126,054	28,350	36,682	45,401	43,093	50,294	43,353	40,448	49,248	39,726	66,781
2001	53,051	129,623	27,876	35,856	206,692	42,696	49,534	43,727	39,721	49,661	38,223	87,552
2002	50,569	137,704	27,774	33,031	256,929	43,431	48,660	42,307	40,820	50,976	41,332	91,199
2003	50,190	122,074	31,645	28,830	328,681	43,083	50,893	42,227	36,790	49,430	42,508	88,795
2004	49,019	78,706	31,467	27,521	359,114	42,436	54,069	38,875	37,675	47,178	42,307	71,944
2005	44,684	76,178	30,832	28,092	353,153	41,519	52,312	41,301	39,436	46,634	47,795	70,639
2006	43,334	72,398	30,150	27,003	364,131	40,488	48,521	38,779	37,109	45,069	44,837	67,661
2007	40,761	80,157	42,279	25,940	369,766	39,699	60,951	40,245	41,890	44,071	48,874	70,773
2008	43,303	63,676	66,412	25,016	355,117	39,313	61,568	40,517	41,642	46,355	47,053	63,937
2009	43,136	62,547	67,718	23,395	346,300	39,178	60,948	42,188	49,071	46,883	56,328	64,490
2010	42,908	57,601	76,392	22,580	349,066	37,105	74,959	43,599	51,534	44,800	51,445	62,229
2011	43,242	54,281	76,426	22,851	339,185	37,066	74,398	42,812	37,993	44,005	43,345	58,390
2012	42,598	51,162	71,771	23,344	343,430	35,626	50,573	39,103	40,221	52,362	40,109	56,183
2013	47,212	53,295	76,502	26,449	447,494	38,514	82,853	45,014	51,450	51,309	48,492	61,565
2014	46,837	55,076	71,702	29,888	481,388	41,211	76,911	49,286	55,294	45,083	52,851	64,282
2015	44,543	47,089	57,905	28,136	410,992	35,447	74,055	42,268	44,443	48,678	45,796	56,392
2016	43,878	45,267	60,344	28,270	438,000	33,947	84,870	41,444	42,886	47,764	46,507	55,882
2017	45,014	46,100	61,449	28,307	444,468	32,589	84,234	41,856	43,665	48,025	46,663	56,785
2018	45,014	45,218	61,391	28,306	445,579	32,426	84,090	41,856	43,665	47,817	45,774	56,338
2019	45,014	45,005	61,337	28,276	446,693	32,264	84,103	41,856	43,665	47,617	45,789	56,266
2020	45,014	44,908	61,230	28,218	447,810	32,103	84,044	41,856	43,665	47,396	45,729	56,234
2021	45,014	44,917	61,226	28,137	448,930	31,942	84,228	41,856	43,665	47,163	45,304	56,221
2022	45,014	45,031	61,173	28,048	450,052	31,782	84,446	41,856	43,665	46,910	45,028	56,262
2023	45,014	45,232	61,119	27,931	451,177	31,623	84,835	41,856	43,665	46,663	44,877	56,354
2024	45,014	45,538	61,115	27,806	452,305	31,465	85,179	41,856	43,665	46,396	44,767	56,499
2025	45,014	45,935	61,066	27,656	453,436	31,308	85,467	41,856	43,665	46,120	44,535	56,685
2026	45,014	46,418	61,062	27,498	454,569	31,152	85,853	41,856	43,665	45,837	44,244	56,921
2027	45,014	46,974	61,062	27,318	455,706	30,996	86,202	41,856	43,665	45,534	44,007	57,204
2028	45,014	47,595	61,058	27,130	456,845	30,841	86,607	41,856	43,665	45,222	43,809	57,530
2029	45,014	48,273	61,108	26,952	457,987	30,687	86,902	41,856	43,665	44,903	43,618	57,890
2030	45,014	48,993	61,108	26,736	459,132	30,533	87,336	41,856	43,665	44,578	43,435	58,281
2031	45,014	49,757	61,157	26,529	460,280	30,380	87,616	41,856	43,665	44,246	43,364	58,710
2032	45,014	50,560	61,207	26,300	461,431	30,229	87,948	41,856	43,665	43,891	43,384	59,174
2033	45,014	51,382	61,261	26,081	462,584	30,077	88,137	41,856	43,665	43,530	43,383	59,653
2034	45,014	52,237	61,310	25,839	463,741	29,927	88,538	41,856	43,665	43,161	43,327	60,158
2035	45,014	53,117	61,364	25,590	464,900	29,777	88,872	41,856	43,665	42,786	43,220	60,681
2036	45,014	54,018	61,468	25,335	466,062	29,629	89,051	41,856	43,665	42,386	43,186	61,228
2037	45,014	54,950	61,523	25,072	467,227	29,480	89,317	41,856	43,665	41,997	43,124	61,801
2038	45,014	55,877	61,627	24,785	468,396	29,333	89,495	41,856	43,665	41,580	43,118	62,384
2039	45,014	56,818	61,733	24,508	469,567	29,186	89,702	41,856	43,665	41,145	43,139	62,986
2040	45,014	57,763	61,839	24,206	470,740	29,040	89,811	41,856	43,665	40,716	43,162	63,599
2041	45,014	58,707	61,945	23,913	471,917	28,895	89,927	41,856	43,665	40,263	43,165	64,221
2042	45,014	59,660	62,107	23,595	473,097	28,751	90,085	41,856	43,665	39,816	43,094	64,853
2043	45,014	60,611	62,215	23,268	474,280	28,607	90,100	41,856	43,665	39,344	43,027	65,491
2044	45,014	61,556	62,379	22,950	475,466	28,464	90,312	41,856	43,665	38,852	42,938	66,136
2045	45,014	62,501	62,544	22,607	476,654	28,322	90,268	41,856	43,665	38,363	42,832	66,783
2046	45,014	63,440	62,658	22,254	477,846	28,180	90,397	41,856	43,665	37,852	42,721	67,436
Average Annual Growth Rates												
1987-2016	0.1%	-2.3%	4.6%	-0.8%	7.2%	0.2%	3.8%	0.9%	-0.5%	0.9%	1.2%	0.0%
2001-2016	-1.3%	-6.8%	5.3%	-1.6%	5.1%	-1.5%	3.7%	-0.4%	0.5%	-0.3%	1.3%	-2.9%
2006-2016	0.1%	-4.6%	7.2%	0.5%	1.9%	-1.7%	5.8%	0.7%	1.5%	0.6%	0.4%	-1.9%
2011-2016	0.3%	-3.6%	-4.6%	4.3%	5.2%	-1.7%	2.7%	-0.6%	2.5%	1.7%	1.4%	-0.9%
2016-2021	0.5%	-0.2%	0.3%	-0.1%	0.5%	-1.2%	-0.2%	0.2%	0.4%	-0.3%	-0.5%	0.1%
2016-2026	0.3%	0.3%	0.1%	-0.3%	0.4%	-0.9%	0.1%	0.1%	0.2%	-0.4%	-0.5%	0.2%
2016-2036	0.1%	0.9%	0.1%	-0.5%	0.3%	-0.7%	0.2%	0.0%	0.1%	-0.6%	-0.4%	0.5%
2016-2046	0.1%	1.1%	0.1%	-0.8%	0.3%	-0.6%	0.2%	0.0%	0.1%	-0.8%	-0.3%	0.6%
2017-2046	0.0%	1.1%	0.1%	-0.8%	0.2%	-0.5%	0.2%	0.0%	0.0%	-0.8%	-0.3%	0.6%

Table 3.8

General Commercial Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	23,380	108,595	831	4,403	81,403	12,181	5,326	7,640	15,968	5,905	11,153	276,785
1988	26,242	120,463	890	4,764	86,184	13,874	5,856	8,376	16,310	8,005	7,914	298,878
1989	28,034	122,655	1,275	4,558	84,723	15,158	5,817	8,660	15,678	8,665	7,937	303,159
1990	30,011	123,617	2,157	3,860	84,452	15,870	6,660	8,997	16,823	8,718	8,540	309,705
1991	31,776	128,367	1,486	3,838	92,254	18,080	7,721	10,071	17,350	8,728	8,975	328,645
1992	30,917	130,146	1,652	3,797	102,170	17,638	9,357	9,467	17,172	9,328	16,365	348,007
1993	34,867	138,515	1,801	4,219	111,498	17,799	8,680	10,830	19,126	10,192	17,035	374,563
1994	36,073	154,275	1,258	4,657	112,955	18,430	8,367	11,266	19,465	10,338	18,432	395,514
1995	39,079	167,936	1,322	4,708	129,383	18,532	11,913	11,752	19,428	13,115	18,940	436,107
1996	40,813	188,589	1,480	4,609	134,125	18,588	7,848	11,665	19,836	11,994	21,937	461,484
1997	42,352	189,772	1,482	5,137	135,886	18,479	8,445	11,931	19,410	12,080	21,497	466,471
1998	42,947	202,285	1,476	5,202	132,715	18,090	8,791	12,329	18,158	11,331	22,835	476,158
1999	43,180	215,705	1,870	5,382	140,032	18,739	11,612	12,445	18,945	12,741	23,770	504,421
2000	46,477	237,842	1,855	5,735	87,831	19,747	11,006	12,413	16,783	12,439	23,253	475,382
2001	47,507	258,208	1,752	6,021	105,929	19,999	11,005	12,998	16,918	12,635	22,504	515,475
2002	49,418	285,323	1,743	6,551	105,341	20,905	10,823	12,921	17,852	13,360	24,138	548,374
2003	53,055	293,100	2,020	6,828	116,983	21,240	11,468	13,308	16,280	13,128	25,165	572,574
2004	54,685	197,553	1,996	7,057	115,754	21,550	12,472	12,618	16,907	13,261	25,441	479,293
2005	51,952	203,701	1,932	7,510	115,481	21,403	12,572	13,843	17,648	13,287	27,394	486,723
2006	52,994	209,303	1,904	7,435	113,123	21,300	11,799	13,107	16,551	13,078	26,697	487,291
2007	53,223	238,020	2,769	7,384	111,608	21,414	15,024	13,838	19,552	12,876	29,748	525,457
2008	56,994	201,831	4,759	7,180	107,216	21,406	15,300	14,340	20,564	13,505	29,310	492,404
2009	56,577	207,963	4,729	6,654	106,401	21,045	15,506	14,984	24,368	14,167	36,285	508,679
2010	56,803	200,887	5,532	6,443	105,563	20,309	19,452	15,372	25,935	13,574	33,654	503,524
2011	58,711	196,001	5,585	6,455	98,448	20,516	19,715	14,866	18,835	13,161	28,792	481,087
2012	57,717	193,060	5,293	6,149	100,310	19,933	13,301	13,820	20,415	15,770	26,903	472,671
2013	63,512	208,382	6,012	6,700	104,415	21,638	21,155	15,537	27,062	15,564	33,463	523,442
2014	61,703	226,797	5,969	7,612	118,983	23,332	19,555	17,234	29,638	13,758	38,308	562,887
2015	57,738	206,489	5,458	6,816	106,926	20,521	18,464	14,861	23,688	14,985	34,450	510,396
2016	56,848	211,765	5,516	6,677	113,515	19,873	20,546	14,920	23,223	14,473	35,679	523,033
2017	58,414	220,042	5,707	6,733	118,740	19,205	19,862	15,166	24,076	14,584	36,241	538,771
2018	58,580	220,702	5,704	6,784	121,755	19,306	19,439	15,263	24,484	14,554	35,953	542,525
2019	58,801	224,841	5,701	6,819	124,406	19,394	19,157	15,357	24,848	14,527	36,336	550,188
2020	59,065	229,809	5,693	6,841	126,993	19,469	18,934	15,446	25,181	14,489	36,625	558,546
2021	59,363	235,547	5,695	6,852	129,490	19,533	18,827	15,530	25,495	14,445	36,589	567,368
2022	59,681	242,063	5,692	6,859	131,838	19,583	18,770	15,607	25,754	14,394	36,634	576,874
2023	60,011	249,260	5,690	6,851	134,067	19,619	18,788	15,675	25,981	14,342	36,742	587,025
2024	60,347	257,248	5,692	6,836	136,225	19,643	18,820	15,735	26,193	14,283	36,854	597,877
2025	60,688	265,970	5,697	6,812	138,370	19,656	18,858	15,789	26,383	14,221	36,834	609,278
2026	61,035	275,407	5,697	6,784	140,537	19,659	18,932	15,836	26,563	14,156	36,741	621,345
2027	61,386	285,506	5,699	6,748	142,677	19,654	19,007	15,877	26,728	14,083	36,669	634,036
2028	61,742	296,224	5,701	6,710	144,780	19,643	19,104	15,913	26,882	14,008	36,610	647,316
2029	62,100	307,526	5,711	6,672	146,840	19,626	19,181	15,944	27,017	13,930	36,539	661,086
2030	62,462	319,321	5,710	6,624	148,856	19,606	19,295	15,969	27,137	13,850	36,461	675,292
2031	62,827	331,624	5,717	6,580	150,892	19,582	19,376	15,991	27,243	13,767	36,467	690,065
2032	63,193	344,414	5,719	6,529	152,886	19,555	19,470	16,008	27,329	13,676	36,541	705,320
2033	63,563	357,552	5,729	6,481	154,883	19,526	19,531	16,022	27,398	13,583	36,590	720,858
2034	63,933	371,134	5,729	6,427	156,874	19,495	19,642	16,034	27,457	13,488	36,588	736,803
2035	64,306	385,101	5,743	6,371	158,861	19,463	19,740	16,045	27,502	13,390	36,539	753,060
2036	64,680	399,431	5,751	6,313	160,888	19,429	19,801	16,053	27,548	13,284	36,549	769,727
2037	65,055	414,184	5,753	6,254	162,939	19,394	19,882	16,061	27,608	13,181	36,532	786,842
2038	65,432	429,103	5,767	6,188	165,044	19,358	19,941	16,067	27,676	13,069	36,560	804,205
2039	65,809	444,303	5,772	6,125	167,204	19,322	20,006	16,073	27,754	12,951	36,611	821,929
2040	66,187	459,714	5,781	6,055	169,407	19,285	20,046	16,078	27,833	12,834	36,661	839,882
2041	66,566	475,282	5,789	5,987	171,707	19,248	20,086	16,082	27,929	12,710	36,694	858,080
2042	66,946	491,079	5,799	5,913	174,070	19,210	20,134	16,086	28,038	12,586	36,663	876,525
2043	67,326	507,006	5,807	5,837	176,497	19,171	20,148	16,090	28,153	12,455	36,635	895,125
2044	67,707	523,025	5,819	5,763	178,989	19,133	20,207	16,094	28,272	12,317	36,587	913,913
2045	68,088	539,165	5,832	5,682	181,527	19,094	20,205	16,097	28,384	12,179	36,525	932,779
2046	68,470	555,367	5,842	5,598	184,131	19,055	20,242	16,100	28,492	12,034	36,458	951,790
Average Annual Growth Rates												
1987-2016	3.1%	2.3%	6.7%	1.4%	1.2%	1.7%	4.8%	2.3%	1.3%	3.1%	4.1%	2.2%
2001-2016	1.2%	-1.3%	7.9%	0.7%	0.5%	0.0%	4.2%	0.9%	2.1%	0.9%	3.1%	0.1%
2006-2016	0.7%	0.1%	11.2%	-1.1%	0.0%	-0.7%	5.7%	1.3%	3.4%	1.0%	2.9%	0.7%
2011-2016	-0.6%	1.6%	-0.2%	0.7%	2.9%	-0.6%	0.8%	0.1%	4.3%	1.9%	4.4%	1.7%
2016-2021	0.9%	2.2%	0.6%	0.5%	2.7%	-0.3%	-1.7%	0.8%	1.9%	0.0%	0.5%	1.6%
2016-2026	0.7%	2.7%	0.3%	0.2%	2.2%	-0.1%	-0.8%	0.6%	1.4%	-0.2%	0.3%	1.7%
2016-2036	0.6%	3.2%	0.2%	-0.3%	1.8%	-0.1%	-0.2%	0.4%	0.9%	-0.4%	0.1%	2.0%
2016-2046	0.6%	3.3%	0.2%	-0.6%	1.6%	-0.1%	0.0%	0.3%	0.7%	-0.6%	0.1%	2.0%
2017-2046	0.5%	3.2%	0.1%	-0.6%	1.5%	0.0%	0.1%	0.2%	0.6%	-0.7%	0.0%	2.0%

3.2.5 Large Commercial Class Forecast

Minnkota members served 250 customers that were classified as large (or intermediate) commercial for this forecast. This class includes a variety of larger loads including manufacturing, ethanol and biodiesel, pipeline pumping, agriculture and school loads. Each of these loads was projected independently based on input from cooperative management and staff. Sales to this class were 999,009 MWh in 2016 and were projected to grow to 1,437,009 MWh by 2046 due to expected growth and expansion opportunities within the existing customer base. The forecast for this class is shown in Table 3.9.

3.2.6 Public Street and Highway Lighting Class Forecast

Table 3.10 shows that the member systems served 649 customers with energy sales of 9,740 MWh to this class in 2016. This class was projected based upon input from each member system. Energy sales are expected to grow at 0.9 percent per year over the projection horizon.

3.2.7 Public Authorities Class Forecast

Sales to public authorities generally include various federal, state and local government consumers. In the case of the North Dakota member systems, this historically included a number of Minuteman missile sites. These sites have now been deactivated. Public authority energy sales accounted for 2 percent of total cooperative energy sales in 2016. Sales to this class were projected judgmentally based on input from cooperative staff. The forecasts for the member systems energy sales are shown in Table 3.11. Stable sales are expected from this class over the forecast horizon.

3.2.8 Sales for Resale – RUS Class Forecast

Table 3.12 shows that Beltrami Electric Cooperative, Inc. served one customer classified as Sales for Resale - RUS. This customer had energy sales of 13,863 MWh in 2016. Energy growth during 1987-2016 averaged 3.3 percent per year. The projection through 2046 was developed by leaving energy sales at 2016 levels based on staff discussions.

Table 3.9

Large Commercial Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	2,829	-	5,627	388	23,706	3,096	-	-	-	6,307	-	41,953
1988	3,011	-	5,640	1,075	38,596	3,774	-	-	-	6,979	-	59,075
1989	3,356	-	5,621	659	32,334	3,871	-	-	-	8,017	-	53,858
1990	3,488	-	5,546	585	50,006	3,842	-	-	-	10,163	-	73,630
1991	3,262	-	5,560	1,188	49,686	4,136	-	-	-	10,386	-	74,218
1992	4,521	-	5,544	357	53,852	5,552	-	-	-	10,818	-	80,645
1993	6,083	-	5,455	632	60,524	6,392	-	992	-	12,341	-	92,418
1994	7,030	-	5,527	1,866	69,817	6,169	-	1,388	-	16,889	-	108,686
1995	7,783	-	5,485	2,064	75,252	7,828	-	1,716	278	18,684	-	119,089
1996	8,144	-	3,080	1,944	69,027	8,969	1,600	1,814	1,236	20,272	-	116,086
1997	7,715	-	650	2,428	71,022	8,885	1,600	1,814	1,894	21,146	925	118,080
1998	7,349	-	412	2,870	87,915	9,449	1,600	1,703	2,274	22,177	2,255	138,005
1999	9,581	-	333	2,607	101,784	10,021	1,600	2,218	3,758	28,015	6,039	165,956
2000	10,423	-	60	2,379	114,411	10,445	1,600	4,085	4,910	31,997	6,341	186,653
2001	11,726	-	-	1,155	152,812	10,107	1,600	7,182	5,042	30,522	6,936	227,082
2002	13,420	-	-	1,232	162,420	11,308	1,600	8,908	5,052	30,288	6,733	240,961
2003	12,586	-	-	1,682	154,511	12,871	1,600	8,616	6,405	30,872	5,734	234,877
2004	11,704	106,949	-	2,465	159,945	14,061	1,600	8,170	6,485	32,343	7,129	350,852
2005	15,404	122,024	-	2,014	164,941	14,296	1,567	7,840	6,728	32,830	6,952	374,596
2006	15,929	139,437	-	2,177	217,093	13,796	1,696	8,629	6,143	30,707	6,304	441,912
2007	17,076	138,334	-	2,205	228,144	13,610	1,649	10,018	8,839	31,239	6,608	457,721
2008	17,446	206,402	-	2,194	230,137	14,416	1,785	10,707	9,070	34,732	8,106	534,995
2009	17,479	212,274	-	2,227	227,257	13,181	1,328	9,362	10,011	30,521	8,857	532,497
2010	18,877	231,095	-	2,289	264,788	11,566	1,635	10,615	9,467	35,037	8,871	594,240
2011	18,697	289,505	-	1,941	399,677	12,143	1,585	10,912	10,878	39,693	10,938	795,968
2012	18,126	309,451	-	1,892	451,585	13,045	11,157	10,937	9,796	41,430	13,316	880,735
2013	19,322	328,908	-	1,724	464,915	13,897	18,801	11,815	7,678	44,515	14,147	925,722
2014	19,133	351,198	63	1,911	484,022	14,678	19,127	12,380	7,175	46,731	14,614	971,031
2015	18,807	373,092	591	1,764	495,883	14,731	19,841	11,016	12,063	42,805	15,530	1,006,123
2016	18,754	382,702	580	1,803	478,172	14,272	21,704	10,597	15,773	38,737	15,916	999,009
2017	18,754	406,025	580	1,803	542,161	13,777	21,704	10,604	16,106	38,313	15,916	1,085,741
2018	22,254	403,825	580	36,803	551,040	13,781	21,704	10,611	17,039	38,551	15,916	1,132,103
2019	22,254	407,825	580	36,803	551,552	13,785	21,704	10,618	18,072	38,553	15,916	1,137,661
2020	22,254	413,187	580	36,803	555,065	13,790	21,704	10,625	18,106	38,556	15,916	1,146,585
2021	22,254	421,710	580	36,803	555,581	13,794	21,704	10,632	18,140	38,559	15,916	1,155,671
2022	22,254	427,398	580	36,803	556,099	13,799	21,704	12,639	19,174	38,562	15,916	1,164,926
2023	22,254	433,257	580	36,803	559,619	13,803	21,704	12,646	19,208	38,565	15,916	1,174,354
2024	22,254	442,292	580	36,803	560,141	13,808	21,704	12,653	19,242	38,568	15,916	1,183,961
2025	22,254	448,508	580	36,803	560,666	13,812	21,704	12,660	20,277	38,571	15,916	1,191,750
2026	24,254	454,911	580	36,803	564,193	13,817	21,704	12,667	20,312	38,574	16,916	1,204,729
2027	24,254	464,505	580	36,803	564,723	13,822	21,704	12,674	20,347	38,577	16,916	1,214,903
2028	24,254	471,298	580	36,803	565,255	13,826	21,704	12,681	21,382	38,579	16,916	1,223,277
2029	24,254	478,294	580	36,803	568,789	13,831	21,704	12,688	21,417	38,582	16,916	1,233,857
2030	24,254	488,500	580	36,803	569,325	13,836	21,704	12,695	21,453	38,585	16,916	1,244,650
2031	24,254	495,922	580	36,803	569,864	13,840	21,704	12,702	21,489	38,588	16,916	1,252,661
2032	24,254	503,567	580	36,803	573,405	13,845	21,704	14,709	22,525	38,591	16,916	1,266,898
2033	24,254	514,441	580	36,803	573,949	13,850	21,704	14,716	22,561	38,594	16,916	1,278,367
2034	24,254	522,552	580	36,803	574,495	13,854	21,704	14,723	22,598	38,597	16,916	1,287,075
2035	24,254	530,905	580	36,803	578,043	13,859	21,704	14,730	22,635	38,600	16,916	1,299,028
2036	26,254	542,510	580	36,803	578,594	13,864	21,704	14,737	23,671	38,603	16,916	1,314,235
2037	26,254	551,372	580	36,803	579,147	13,869	21,704	14,744	23,709	38,606	16,916	1,323,703
2038	26,254	560,501	580	36,803	582,703	13,874	21,704	14,751	23,746	38,609	16,916	1,336,439
2039	26,254	572,903	580	36,803	583,261	13,878	21,704	14,758	23,784	38,612	16,916	1,349,452
2040	26,254	582,587	580	36,803	583,821	13,883	21,704	14,765	23,821	38,615	16,916	1,359,750
2041	26,254	592,562	580	36,803	587,384	13,888	21,704	14,772	23,859	38,618	16,916	1,373,341
2042	26,254	605,836	580	36,803	587,950	13,893	21,704	14,780	23,898	38,621	16,916	1,387,234
2043	26,254	616,418	580	36,803	588,518	13,898	21,704	14,787	23,936	38,624	16,916	1,398,437
2044	26,254	627,318	580	36,803	592,089	13,903	21,704	14,794	23,975	38,627	16,916	1,412,962
2045	26,254	638,545	580	36,803	592,662	13,908	21,704	14,801	24,014	38,630	16,916	1,424,816
2046	26,254	650,109	580	36,803	593,237	13,913	21,704	14,808	24,053	38,633	16,916	1,437,009
Average Annual Growth Rates												
1987-2016	6.7%	--	-7.5%	5.4%	10.9%	5.4%	--	--	--	6.5%	--	11.6%
2001-2016	3.2%	--	--	3.0%	7.9%	2.3%	19.0%	2.6%	7.9%	1.6%	5.7%	10.4%
2006-2016	1.6%	10.6%	--	-1.9%	8.2%	0.3%	29.0%	2.1%	9.9%	2.4%	9.7%	8.5%
2011-2016	0.1%	5.7%	--	-1.5%	3.7%	3.3%	68.8%	-0.6%	7.7%	-0.5%	7.8%	4.6%
2016-2021	3.5%	2.0%	0.0%	82.8%	3.0%	-0.7%	0.0%	0.1%	2.8%	-0.1%	0.0%	3.0%
2016-2026	2.6%	1.7%	0.0%	35.2%	1.7%	-0.3%	0.0%	1.8%	2.6%	0.0%	0.6%	1.9%
2016-2036	1.7%	1.8%	0.0%	16.3%	1.0%	-0.1%	0.0%	1.7%	2.1%	0.0%	0.3%	1.4%
2016-2046	1.1%	1.8%	0.0%	10.6%	0.7%	-0.1%	0.0%	1.1%	1.4%	0.0%	0.2%	1.2%
2017-2046	1.2%	1.6%	0.0%	11.0%	0.3%	0.0%	0.0%	1.2%	1.4%	0.0%	0.2%	1.0%

Table 3.10

Street Lighting Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Clearwater-Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	354	1,022	-	-	447	159	-	26	112	34	364	2,517
1988	357	1,055	-	-	393	162	-	26	122	35	365	2,514
1989	351	1,164	-	-	356	142	-	25	118	36	343	2,536
1990	341	1,279	-	-	370	135	-	25	127	37	373	2,687
1991	359	1,413	-	-	476	125	-	27	123	40	434	2,997
1992	350	1,551	-	-	211	128	-	25	123	43	473	2,906
1993	331	1,639	-	-	263	127	-	25	123	47	604	3,160
1994	299	1,849	-	-	277	127	-	24	123	48	586	3,331
1995	326	2,045	-	-	284	125	-	24	122	49	548	3,524
1996	310	2,185	-	-	283	128	-	25	121	53	571	3,676
1997	300	2,317	-	-	287	127	-	25	114	65	587	3,821
1998	300	2,461	-	-	272	130	-	26	112	98	613	4,010
1999	299	2,641	-	-	401	132	-	26	146	98	640	4,383
2000	310	2,986	-	-	370	136	-	26	149	-	647	4,623
2001	308	3,480	-	-	186	137	-	28	150	93	661	5,042
2002	322	3,734	-	-	899	137	-	26	162	102	666	6,049
2003	330	4,105	-	-	-	153	-	24	170	103	622	5,508
2004	298	4,613	-	-	-	154	-	16	174	104	590	5,951
2005	338	5,186	-	-	-	152	-	12	54	104	622	6,468
2006	399	5,459	-	-	-	151	-	13	88	105	599	6,815
2007	370	5,834	-	-	-	158	-	13	183	88	576	7,222
2008	378	6,151	-	-	-	162	-	13	198	111	576	7,587
2009	366	6,645	-	-	-	158	-	12	203	113	569	8,066
2010	354	7,261	-	-	-	157	-	12	221	113	567	8,684
2011	376	7,834	-	-	-	158	-	11	198	114	556	9,247
2012	424	8,171	-	-	-	152	-	24	199	83	505	9,558
2013	449	8,354	-	-	-	147	-	25	195	71	498	9,739
2014	433	8,583	-	-	-	154	-	42	190	68	502	9,973
2015	200	8,759	-	-	-	147	-	53	178	69	489	9,895
2016	294	8,556	-	-	-	147	-	54	147	64	477	9,740
2017	293	8,632	-	-	-	147	-	54	146	63	475	9,810
2018	292	8,709	-	-	-	147	-	54	145	63	473	9,882
2019	294	8,800	-	-	-	147	-	57	144	63	470	9,975
2020	293	8,889	-	-	-	147	-	57	144	62	468	10,060
2021	291	8,976	-	-	-	147	-	57	143	62	466	10,141
2022	294	9,060	-	-	-	147	-	59	142	62	463	10,227
2023	292	9,141	-	-	-	147	-	59	142	62	461	10,303
2024	291	9,236	-	-	-	147	-	59	141	61	459	10,394
2025	293	9,329	-	-	-	147	-	62	140	61	456	10,489
2026	292	9,420	-	-	-	147	-	62	139	61	454	10,574
2027	290	9,507	-	-	-	147	-	62	139	60	452	10,657
2028	293	9,608	-	-	-	147	-	64	138	60	450	10,759
2029	291	9,706	-	-	-	147	-	64	137	60	447	10,853
2030	290	9,801	-	-	-	147	-	64	137	59	445	10,943
2031	292	9,894	-	-	-	147	-	67	136	59	443	11,037
2032	290	9,983	-	-	-	147	-	67	135	59	441	11,122
2033	289	10,085	-	-	-	147	-	67	135	59	438	11,219
2034	291	10,184	-	-	-	147	-	70	134	58	436	11,320
2035	290	10,280	-	-	-	147	-	70	133	58	434	11,412
2036	288	10,389	-	-	-	147	-	70	133	58	432	11,516
2037	291	10,494	-	-	-	147	-	72	132	57	430	11,622
2038	289	10,596	-	-	-	147	-	72	131	57	428	11,720
2039	288	10,695	-	-	-	147	-	72	131	57	425	11,814
2040	290	10,805	-	-	-	147	-	75	130	57	423	11,926
2041	288	10,912	-	-	-	147	-	75	129	56	421	12,029
2042	287	11,016	-	-	-	147	-	75	129	56	419	12,128
2043	289	11,131	-	-	-	147	-	77	128	56	417	12,245
2044	288	11,242	-	-	-	147	-	77	127	55	415	12,351
2045	286	11,350	-	-	-	147	-	77	127	55	413	12,455
2046	288	11,454	-	-	-	147	-	80	126	55	411	12,561
Average Annual Growth Rates												
1987-2016	-0.6%	7.6%	--	--	-100.0%	-0.3%	--	2.6%	0.9%	2.2%	0.9%	4.8%
2001-2016	-0.3%	6.2%	--	--	-100.0%	0.5%	--	4.5%	-0.2%	-2.5%	-2.1%	4.5%
2006-2016	-3.0%	4.6%	--	--	--	-0.3%	--	15.3%	5.2%	-4.9%	-2.2%	3.6%
2011-2016	-4.8%	1.8%	--	--	--	-1.5%	--	36.8%	-5.8%	-10.9%	-3.0%	1.0%
2016-2021	-0.2%	1.0%	--	--	--	0.0%	--	0.9%	-0.5%	-0.5%	-0.5%	0.8%
2016-2026	-0.1%	1.0%	--	--	--	0.0%	--	1.4%	-0.5%	-0.5%	-0.5%	0.8%
2016-2036	-0.1%	1.0%	--	--	--	0.0%	--	1.3%	-0.5%	-0.5%	-0.5%	0.8%
2016-2046	-0.1%	1.0%	--	--	--	0.0%	--	1.3%	-0.5%	-0.5%	-0.5%	0.9%
2017-2046	-0.1%	1.0%	--	--	--	0.0%	--	1.4%	-0.5%	-0.5%	-0.5%	0.9%

Table 3.11

Public Authority Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	-	1,830	279	-	107,885	-	-	-	-	-	-	109,994
1988	-	1,804	360	-	118,013	-	-	-	-	-	-	120,178
1989	-	1,835	348	-	120,601	-	-	-	-	-	-	122,784
1990	-	1,894	451	-	117,982	-	-	-	-	-	-	120,326
1991	-	1,893	529	-	122,672	-	-	-	-	-	-	125,094
1992	-	1,876	492	-	119,496	-	-	-	-	-	-	121,864
1993	-	1,843	488	-	119,234	-	-	-	-	-	-	121,565
1994	-	1,835	544	-	117,637	-	-	-	-	-	-	120,015
1995	-	1,844	554	-	118,400	-	-	-	-	-	-	120,798
1996	-	1,888	621	-	119,784	-	-	-	-	-	-	122,293
1997	-	1,649	658	-	104,800	-	-	-	-	-	-	107,107
1998	-	1,628	754	-	90,398	-	-	-	-	-	-	92,781
1999	-	833	656	-	85,480	-	-	-	-	-	-	86,970
2000	-	96	704	-	69,512	-	-	-	-	-	-	70,312
2001	-	-	752	-	66,341	-	-	-	-	-	-	67,092
2002	-	-	802	-	67,483	-	-	-	-	-	-	68,285
2003	-	-	806	-	66,070	-	-	-	-	-	-	66,876
2004	-	-	821	-	65,363	-	-	-	-	-	-	66,184
2005	-	-	776	-	63,326	-	-	-	-	-	-	64,102
2006	-	-	804	-	63,675	-	-	-	-	-	-	64,479
2007	-	-	832	-	105,248	-	-	-	-	-	-	106,080
2008	-	-	937	-	104,920	-	-	-	-	-	-	105,857
2009	-	-	909	-	102,995	-	-	-	-	-	-	103,905
2010	-	-	954	-	98,124	-	-	-	-	-	-	99,078
2011	-	-	965	-	89,686	-	-	-	-	-	-	90,651
2012	-	-	936	-	92,845	-	-	-	-	-	-	93,782
2013	-	-	1,023	-	97,546	-	-	-	-	-	-	98,569
2014	-	-	1,094	-	96,497	-	-	-	-	-	-	97,591
2015	-	-	1,284	-	92,527	-	-	-	-	-	-	93,811
2016	-	-	1,279	-	88,209	-	-	-	-	-	-	89,487
2017	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2018	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2019	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2020	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2021	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2022	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2023	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2024	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2025	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2026	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2027	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2028	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2029	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2030	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2031	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2032	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2033	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2034	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2035	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2036	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2037	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2038	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2039	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2040	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2041	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2042	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2043	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2044	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2045	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
2046	-	-	1,345	-	93,525	-	-	-	-	-	-	94,870
Average Annual Growth Rates												
1987-2016	--	-100.0%	5.4%	--	-0.7%	--	--	--	--	--	--	-0.7%
2001-2016	--	--	3.6%	--	1.9%	--	--	--	--	--	--	1.9%
2006-2016	--	--	4.7%	--	3.3%	--	--	--	--	--	--	3.3%
2011-2016	--	--	5.8%	--	-0.3%	--	--	--	--	--	--	-0.3%
2016-2021	--	--	1.0%	--	1.2%	--	--	--	--	--	--	1.2%
2016-2026	--	--	0.5%	--	0.6%	--	--	--	--	--	--	0.6%
2016-2036	--	--	0.3%	--	0.3%	--	--	--	--	--	--	0.3%
2016-2046	--	--	0.2%	--	0.2%	--	--	--	--	--	--	0.2%
2017-2046	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%

Table 3.12

Resale-RUS Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	5,389	-	-	-	-	-	-	-	-	-	-	5,389
1988	5,157	-	556	-	-	-	-	-	-	-	-	5,713
1989	5,387	-	-	-	-	-	-	-	-	-	-	5,387
1990	5,410	-	-	-	-	-	-	-	-	-	-	5,410
1991	5,103	-	-	-	-	-	-	-	-	-	-	5,103
1992	5,378	-	-	-	-	-	-	-	-	-	-	5,378
1993	5,651	-	-	-	-	-	-	-	-	-	-	5,651
1994	5,684	-	-	-	-	-	-	-	-	-	-	5,684
1995	5,792	-	-	-	-	-	-	-	-	-	-	5,792
1996	6,281	-	-	-	-	-	-	-	-	-	-	6,281
1997	6,526	-	-	-	-	-	-	-	-	-	-	6,526
1998	6,197	-	-	-	-	-	-	-	-	-	-	6,197
1999	6,515	-	-	-	-	-	-	-	-	-	-	6,515
2000	6,672	-	-	-	-	-	-	-	-	-	-	6,672
2001	6,775	-	-	-	-	-	-	-	-	-	-	6,775
2002	7,157	-	-	-	-	-	-	-	-	-	-	7,157
2003	7,279	-	-	-	-	-	-	-	-	-	-	7,279
2004	7,802	-	-	-	-	-	-	-	-	-	-	7,802
2005	7,696	-	-	-	-	-	-	-	-	-	-	7,696
2006	7,618	-	-	-	-	-	-	-	-	-	-	7,618
2007	8,012	-	-	-	-	-	-	-	-	-	-	8,012
2008	7,990	-	-	-	-	-	-	-	-	-	-	7,990
2009	8,119	-	-	-	-	-	-	-	-	-	-	8,119
2010	7,860	-	-	-	-	-	-	-	-	-	-	7,860
2011	7,931	-	-	-	-	-	-	-	-	-	-	7,931
2012	7,069	-	-	-	-	-	-	-	-	-	-	7,069
2013	8,316	-	-	-	-	-	-	-	-	-	-	8,316
2014	9,003	-	-	-	-	-	-	-	-	-	-	9,003
2015	8,461	-	-	-	-	-	-	-	-	-	-	8,461
2016	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2017	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2018	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2019	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2020	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2021	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2022	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2023	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2024	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2025	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2026	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2027	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2028	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2029	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2030	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2031	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2032	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2033	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2034	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2035	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2036	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2037	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2038	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2039	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2040	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2041	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2042	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2043	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2044	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2045	13,863	-	-	-	-	-	-	-	-	-	-	13,863
2046	13,863	-	-	-	-	-	-	-	-	-	-	13,863
Average Annual Growth Rates												
1987-2016	3.3%	--	--	--	--	--	--	--	--	--	--	3.3%
2001-2016	4.9%	--	--	--	--	--	--	--	--	--	--	4.9%
2006-2016	6.2%	--	--	--	--	--	--	--	--	--	--	6.2%
2011-2016	11.8%	--	--	--	--	--	--	--	--	--	--	11.8%
2016-2021	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2026	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2036	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2046	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2017-2046	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%

3.3.9 Sales for Resale – Others Forecast

This class is served by four member systems: Beltrami Electric Cooperative, Inc., PKM Electric Cooperative, Inc., Red Lake Electric Cooperative, Inc. and Nodak Electric Cooperative, Inc. Energy sales accounted for 4 percent of total cooperative energy sales in 2016. Sales to this class were projected judgmentally based on input from cooperative staff. The forecasts for the member systems energy sales are shown in Table 3.13. Little growth is expected from this class over the forecast horizon after the early years.

3.2.10 Controlled Load Energy Sales Forecast

Controlled load sales are the product of a load management mechanism whereby Minnkota has direct control of the customer's load and in some cases switches to an alternative fuel source during times of peak demand. In return the member systems offer their customers a lower electric price on those energy sales. This system was discussed in Section 2. The controlled load sales projection has been developed in coordination with cooperative staff and reflects their input on the level of penetration occurring and marketing plans related to controlled load programs. The projection is shown in Table 3.14. Controlled energy sales are projected to grow from 907,184 MWh in 2017 to 1,112,115 MWh in 2046. This represents a 1.0 percent average annual growth rate throughout the forecast period.

3.3 Energy Forecasts - Total Energy Required

3.3.1 Member System Energy Sales

Historic and projected total retail energy sales are summarized in Table 3.15 (by member), Table 3.16 (by class) and depicted graphically in Figure 3.1. Total Minnkota energy sales, calculated as the sum of the class energy forecasts described above, are projected to grow by 1.1 percent per year from 2017 to 2046. This compares to total system sales growth of 3.0 percent annually from 1987 to 2016. Sales are forecast to grow from 3,923,594 MWh in 2017 to 5,362,029 MWh in 2046.

Table 3.13

Resale-Other Energy Forecasts By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
1987	51,853	-	202	-	2,308	-	3,011	-	-	-	-	57,374
1988	59,028	-	160	-	3,201	-	3,137	-	-	-	-	65,526
1989	59,473	-	-	-	3,356	-	3,129	-	-	-	-	65,957
1990	58,606	-	-	-	2,721	-	3,463	-	-	-	-	64,789
1991	76,124	-	-	-	3,470	-	3,372	-	-	-	-	82,966
1992	85,571	-	-	-	2,840	-	3,382	-	-	-	-	91,793
1993	82,462	-	-	-	2,949	-	7,926	-	1,113	-	-	94,450
1994	83,059	-	-	-	3,132	-	13,997	-	1,298	-	-	101,487
1995	84,539	-	-	-	3,237	-	12,024	-	1,902	-	-	101,702
1996	90,693	-	-	-	3,552	-	16,846	-	1,937	-	-	113,028
1997	93,961	-	-	-	3,549	-	14,220	-	1,578	-	-	113,307
1998	98,149	-	-	-	2,881	-	17,391	-	1,611	-	-	120,033
1999	93,413	-	-	-	3,059	-	18,391	-	2,123	-	-	116,986
2000	93,006	-	-	-	2,948	-	5,732	-	2,533	-	-	104,220
2001	92,349	-	245	-	2,486	-	4,628	-	2,557	-	-	102,265
2002	95,340	-	262	-	3,090	-	5,691	-	2,946	-	-	107,328
2003	87,024	-	-	-	3,122	-	6,135	-	3,104	-	-	99,385
2004	90,803	-	-	-	3,632	-	6,840	-	2,130	-	-	103,406
2005	88,859	-	-	-	1,838	-	6,874	-	2,819	-	-	100,390
2006	98,405	-	-	-	3,507	-	6,818	-	-	-	-	108,731
2007	89,727	-	-	-	3,505	-	7,070	-	-	-	-	100,301
2008	84,218	-	-	-	3,807	-	6,405	2,908	-	-	-	97,338
2009	71,122	-	-	-	3,985	-	7,150	2,703	-	-	-	84,960
2010	66,213	-	-	-	3,418	-	12,194	5,952	-	-	-	87,777
2011	54,116	-	-	-	3,284	-	13,511	8,056	-	-	-	78,967
2012	55,908	-	-	-	3,333	-	15,001	8,930	-	-	-	83,171
2013	58,206	-	-	-	4,079	-	8,177	3,156	-	-	-	73,618
2014	69,873	-	-	-	4,226	-	12,727	6,921	-	-	-	93,747
2015	85,002	-	-	-	2,860	-	14,672	8,946	-	-	-	111,481
2016	107,704	-	-	-	2,716	-	14,334	10,289	-	-	-	135,043
2017	107,704	-	-	-	3,443	-	14,334	9,000	-	-	-	134,481
2018	107,704	-	-	-	3,443	-	14,334	9,023	-	-	-	134,503
2019	107,704	-	-	-	3,443	-	14,334	9,045	-	-	-	134,526
2020	107,704	-	-	-	3,443	-	14,334	9,068	-	-	-	134,548
2021	107,704	-	-	-	3,443	-	14,334	9,090	-	-	-	134,571
2022	107,704	-	-	-	3,443	-	14,334	9,113	-	-	-	134,594
2023	107,704	-	-	-	3,443	-	14,334	9,136	-	-	-	134,617
2024	107,704	-	-	-	3,443	-	14,334	9,159	-	-	-	134,639
2025	107,704	-	-	-	3,443	-	14,334	9,182	-	-	-	134,662
2026	107,704	-	-	-	3,443	-	14,334	9,205	-	-	-	134,685
2027	107,704	-	-	-	3,443	-	14,334	9,228	-	-	-	134,708
2028	107,704	-	-	-	3,443	-	14,334	9,251	-	-	-	134,731
2029	107,704	-	-	-	3,443	-	14,334	9,274	-	-	-	134,755
2030	107,704	-	-	-	3,443	-	14,334	9,297	-	-	-	134,778
2031	107,704	-	-	-	3,443	-	14,334	9,320	-	-	-	134,801
2032	107,704	-	-	-	3,443	-	14,334	9,343	-	-	-	134,824
2033	107,704	-	-	-	3,443	-	14,334	9,367	-	-	-	134,848
2034	107,704	-	-	-	3,443	-	14,334	9,390	-	-	-	134,871
2035	107,704	-	-	-	3,443	-	14,334	9,414	-	-	-	134,894
2036	107,704	-	-	-	3,443	-	14,334	9,437	-	-	-	134,918
2037	107,704	-	-	-	3,443	-	14,334	9,461	-	-	-	134,942
2038	107,704	-	-	-	3,443	-	14,334	9,485	-	-	-	134,965
2039	107,704	-	-	-	3,443	-	14,334	9,508	-	-	-	134,989
2040	107,704	-	-	-	3,443	-	14,334	9,532	-	-	-	135,013
2041	107,704	-	-	-	3,443	-	14,334	9,556	-	-	-	135,037
2042	107,704	-	-	-	3,443	-	14,334	9,580	-	-	-	135,060
2043	107,704	-	-	-	3,443	-	14,334	9,604	-	-	-	135,084
2044	107,704	-	-	-	3,443	-	14,334	9,628	-	-	-	135,108
2045	107,704	-	-	-	3,443	-	14,334	9,652	-	-	-	135,133
2046	107,704	-	-	-	3,443	-	14,334	9,676	-	-	-	135,157
Average Annual Growth Rates												
1987-2016	2.6%	--	-100.0%	--	0.6%	--	5.5%	--	--	--	--	3.0%
2001-2016	1.0%	--	-100.0%	--	0.6%	--	7.8%	--	-100.0%	--	--	1.9%
2006-2016	0.9%	--	--	--	-2.5%	--	7.7%	--	--	--	--	2.2%
2011-2016	14.8%	--	--	--	-3.7%	--	1.2%	5.0%	--	--	--	11.3%
2016-2021	0.0%	--	--	--	4.9%	--	0.0%	-2.4%	--	--	--	-0.1%
2016-2026	0.0%	--	--	--	2.4%	--	0.0%	-1.1%	--	--	--	0.0%
2016-2036	0.0%	--	--	--	1.2%	--	0.0%	-0.4%	--	--	--	0.0%
2016-2046	0.0%	--	--	--	0.8%	--	0.0%	-0.2%	--	--	--	0.0%
2017-2046	0.0%	--	--	--	0.0%	--	0.0%	0.2%	--	--	--	0.0%

Table 3.14

Controlled Load Energy Forecast

Minnkota Power Cooperative, Inc.

Year	Total Controlled MWh	Total Sales MWh	/1	Percent of Total %
2013	986,580	3,425,823		28.8%
2014	1,043,349	3,608,901		28.9%
2015	879,895	3,306,884		26.6%
2016	826,635	3,277,436		25.2%
2017	907,184	3,517,570		25.8%
2018	910,881	3,599,840		25.3%
2019	913,805	3,638,274		25.1%
2020	917,299	3,677,578		24.9%
2021	918,248	3,709,183		24.8%
2022	926,086	3,746,398		24.7%
2023	933,788	3,783,823		24.7%
2024	941,473	3,818,966		24.7%
2025	949,573	3,855,757		24.6%
2026	960,686	3,902,646		24.6%
2027	968,761	3,939,595		24.6%
2028	977,117	3,978,178		24.6%
2029	985,473	4,019,023		24.5%
2030	995,492	4,061,473		24.5%
2031	1,003,540	4,099,910		24.5%
2032	1,014,324	4,148,988		24.4%
2033	1,021,712	4,186,673		24.4%
2034	1,031,406	4,229,997		24.4%
2035	1,039,325	4,272,423		24.3%
2036	1,049,836	4,320,048		24.3%
2037	1,057,134	4,359,325		24.2%
2038	1,064,434	4,401,545		24.2%
2039	1,071,621	4,441,249		24.1%
2040	1,078,341	4,480,427		24.1%
2041	1,085,122	4,522,654		24.0%
2042	1,091,817	4,562,408		23.9%
2043	1,096,011	4,596,555		23.8%
2044	1,102,536	4,639,287		23.8%
2045	1,106,293	4,672,763		23.7%
2046	1,112,115	4,711,921		23.6%

Average Annual Growth Rates

2011-2016	#N/A	0.7%
2016-2021	2.1%	2.5%
2016-2026	1.5%	1.8%
2016-2036	1.2%	1.4%
2016-2046	1.0%	1.2%

/1 Does not add up to total sales - excludes some classes in the calculation
Excludes NMPA

Table 3.15

Retail Energy Forecasts By Member (MWh)
Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales	MWh From 2015 PRS
1987	216,358	311,389	34,841	43,218	449,065	53,980	71,936	82,105	93,714	84,502	132,222	1,573,329	
1988	236,361	350,734	36,270	47,092	502,074	61,153	75,800	87,731	101,309	94,398	137,476	1,730,399	
1989	248,114	359,144	36,565	48,117	502,331	65,996	76,336	90,980	102,921	102,201	142,626	1,775,332	
1990	251,741	355,885	36,547	48,049	505,930	68,093	76,571	89,991	100,874	106,702	142,431	1,782,813	
1991	280,044	380,957	37,123	49,179	532,557	73,092	79,390	93,231	104,406	110,910	148,940	1,889,830	
1992	292,592	375,661	38,235	49,253	534,939	75,395	81,623	92,424	102,404	115,047	157,966	1,915,539	
1993	308,453	414,848	38,263	52,052	563,681	79,663	89,229	99,185	109,575	122,213	165,473	2,042,636	
1994	316,843	444,094	37,086	54,047	569,920	81,725	92,042	98,867	110,629	126,190	166,913	2,098,355	
1995	333,513	484,230	37,226	56,074	600,004	87,093	96,455	101,360	112,766	135,300	174,277	2,218,297	
1996	361,310	540,146	37,781	61,138	615,707	93,850	103,911	109,026	122,015	147,154	190,188	2,382,226	
1997	370,010	522,370	34,992	62,138	587,098	92,825	98,421	107,745	118,666	148,287	186,044	2,328,596	
1998	362,423	524,653	29,740	58,358	563,157	90,753	91,637	97,366	109,793	136,368	179,597	2,243,845	
1999	377,374	552,599	31,279	63,129	585,762	96,948	98,863	101,014	109,072	155,103	189,825	2,360,969	
2000	394,788	591,439	28,780	63,156	605,084	102,103	87,309	103,195	108,783	154,143	197,234	2,436,016	
2001	410,029	627,814	33,100	65,210	646,317	105,090	88,487	118,386	114,507	155,378	206,093	2,570,412	
2002	440,069	683,399	34,097	69,652	674,172	112,970	88,790	117,405	118,458	163,033	214,663	2,716,708	
2003	432,582	694,750	32,539	70,319	677,109	113,504	89,253	114,924	117,351	161,438	216,371	2,720,139	
2004	441,562	710,524	35,139	71,385	692,030	116,222	93,109	115,003	118,164	163,140	227,203	2,783,480	
2005	445,591	763,874	32,760	71,295	690,390	113,877	89,917	116,713	121,048	162,389	231,313	2,839,168	
2006	459,432	805,200	30,378	71,696	744,130	112,464	87,500	115,596	117,341	157,169	230,856	2,931,762	
2007	463,761	864,858	33,218	73,562	807,038	113,256	100,621	122,045	123,401	160,834	246,248	3,108,844	
2008	482,541	936,679	37,158	78,835	830,296	121,112	93,147	130,833	130,373	170,070	261,894	3,272,937	
2009	471,704	968,376	38,757	79,673	849,026	119,622	104,936	134,563	142,476	165,792	271,553	3,346,478	
2010	449,641	949,129	37,377	73,307	855,247	109,176	109,684	129,688	141,705	158,448	254,298	3,267,699	
2011	444,440	1,020,488	34,973	74,674	975,395	111,142	108,872	133,317	124,881	163,610	256,690	3,448,481	
2012	422,289	1,003,599	31,739	68,723	1,012,198	105,138	114,717	122,696	117,236	166,396	240,559	3,405,291	
2013	472,438	1,119,328	40,553	74,800	1,092,991	116,395	130,011	129,184	133,204	172,523	273,305	3,754,731	
2014	478,646	1,192,037	39,961	84,075	1,158,017	125,640	132,421	149,924	139,665	174,196	285,517	3,960,098	
2015	458,220	1,142,364	32,480	69,809	1,081,944	109,269	120,477	126,328	122,680	160,151	256,256	3,679,977	3,904,000
2016	470,692	1,158,680	32,388	67,466	1,057,479	104,004	123,214	124,273	120,737	151,487	249,719	3,660,138	3,978,262
2017	492,741	1,258,257	35,734	70,927	1,171,661	104,629	126,713	127,448	121,169	147,319	266,996	3,923,594	4,101,429
2018	497,673	1,271,665	35,585	105,730	1,190,445	105,921	126,694	128,012	122,271	150,095	269,574	4,003,665	4,203,412
2019	499,953	1,292,704	35,461	106,001	1,200,156	106,497	126,851	128,931	124,053	153,197	272,295	4,046,099	4,260,018
2020	502,153	1,318,815	35,356	106,242	1,212,616	106,971	126,937	129,717	124,814	153,138	274,007	4,090,765	4,318,509
2021	504,310	1,344,230	35,269	106,477	1,221,843	107,452	127,076	130,347	125,582	153,079	275,228	4,130,892	4,380,545
2022	506,177	1,370,886	35,197	106,647	1,230,544	108,050	127,153	132,915	127,231	153,042	275,954	4,173,796	4,439,187
2023	507,921	1,398,901	35,148	106,781	1,241,711	108,514	127,228	133,434	127,847	153,137	276,458	4,217,080	4,503,948
2024	509,622	1,430,951	35,123	106,912	1,249,897	108,834	127,299	133,918	128,480	153,232	276,990	4,261,259	4,570,002
2025	511,424	1,461,074	35,114	107,032	1,257,937	109,055	127,342	134,330	130,108	153,336	277,515	4,304,265	4,634,798
2026	515,308	1,496,386	35,114	107,148	1,268,958	109,308	127,433	134,652	130,750	153,445	279,056	4,357,557	4,689,093
2027	517,268	1,531,002	35,127	107,261	1,276,923	109,644	127,508	134,961	131,394	153,438	279,574	4,404,100	4,746,895
2028	519,296	1,563,337	35,148	107,367	1,284,843	109,905	127,633	135,296	133,040	153,559	280,052	4,449,476	4,805,232
2029	521,374	1,596,357	35,186	107,485	1,295,735	110,147	127,718	135,561	133,649	153,670	280,434	4,497,317	4,852,785
2030	523,496	1,637,008	35,222	107,597	1,303,622	110,462	127,868	135,784	134,225	153,916	280,773	4,549,973	4,903,960
2031	525,658	1,670,939	35,196	107,721	1,311,389	110,923	127,877	136,189	134,782	154,021	281,137	4,595,832	4,958,169
2032	527,839	1,709,911	35,169	107,840	1,322,115	111,324	127,895	138,605	136,290	154,113	281,454	4,652,555	5,010,222
2033	530,036	1,746,922	35,151	107,957	1,329,860	111,590	127,918	139,007	136,781	154,222	281,671	4,701,114	5,061,231
2034	532,244	1,786,855	35,128	108,067	1,337,587	111,942	127,966	139,408	137,265	154,300	281,788	4,752,549	5,109,357
2035	534,453	1,822,985	35,124	108,172	1,348,560	112,226	128,002	139,759	137,741	154,367	281,942	4,803,329	5,162,617
2036	538,662	1,867,511	35,117	108,279	1,356,333	112,624	128,020	140,142	139,221	154,445	282,206	4,862,558	5,214,159
2037	540,874	1,904,047	35,104	108,389	1,364,127	112,925	128,041	140,538	139,727	154,487	282,439	4,910,697	5,260,990
2038	543,079	1,940,783	35,102	108,484	1,374,977	113,302	128,032	140,934	140,233	154,516	282,603	4,962,046	5,307,319
2039	545,280	1,981,439	35,089	108,570	1,382,606	113,739	128,041	141,341	140,727	154,534	282,786	5,014,152	5,362,091
2040	547,478	2,018,760	35,081	108,641	1,390,533	114,034	128,040	141,772	141,202	154,539	282,935	5,063,014	5,408,043
2041	549,666	2,056,483	35,073	108,702	1,401,547	114,377	128,014	142,173	141,684	154,408	283,088	5,115,216	5,454,029
2042	551,847	2,098,280	35,065	108,758	1,409,321	114,654	128,009	142,539	142,178	154,386	283,207	5,168,244	5,502,682
2043	554,025	2,131,500	35,058	108,801	1,417,410	114,959	127,957	142,933	142,659	154,231	283,440	5,212,974	5,547,939
2044	556,191	2,170,675	35,057	108,843	1,428,327	115,246	127,978	143,293	143,140	154,159	283,695	5,266,605	5,592,184
2045	558,347	2,204,228	35,057	108,876	1,436,223	115,485	127,911	143,646	143,607	153,976	283,952	5,311,308	
2046	560,495	2,243,719	35,055	108,903	1,444,184	115,772	127,885	144,021	144,065	153,771	284,159	5,362,029	
Average Annual Growth Rates													
1987-2016	2.7%	4.6%	-0.3%	1.5%	3.0%	2.3%	1.9%	1.4%	0.9%	2.0%	2.2%	3.0%	--
2001-2016	0.9%	4.2%	-0.1%	0.2%	3.3%	-0.1%	2.2%	0.3%	0.4%	-0.2%	1.3%	2.4%	--
2006-2016	0.2%	3.7%	0.6%	-0.6%	3.6%	-0.8%	3.5%	0.7%	0.3%	-0.4%	0.8%	2.2%	--
2011-2016	1.2%	2.6%	-1.5%	-2.0%	1.6%	-1.3%	2.5%	-1.4%	-0.7%	-1.5%	-0.5%	1.2%	--
2016-2021	1.4%	3.0%	1.7%	9.6%	2.9%	0.7%	0.6%	1.0%	0.8%	0.2%	2.0%	2.4%	1.9%
2016-2026	0.9%	2.6%	0.8%	4.7%	1.8%	0.5%	0.3%	0.8%	0.8%	0.1%	1.1%	1.8%	1.7%
2016-2036	0.7%	2.4%	0.4%	2.4%	1.3%	0.4%	0.2%	0.6%	0.7%	0.1%	0.6%	1.4%	1.4%
2016-2046	0.6%	2.2%	0.3%	1.6%	1.0%	0.4%	0.1%	0.5%	0.6%	0.0%	0.4%	1.3%	
2017-2046	0.4%	2.0%	-0.1%	1.5%	0.7%	0.3%	0.0%	0.4%	0.6%	0.1%	0.2%	1.1%	

Table 3.16

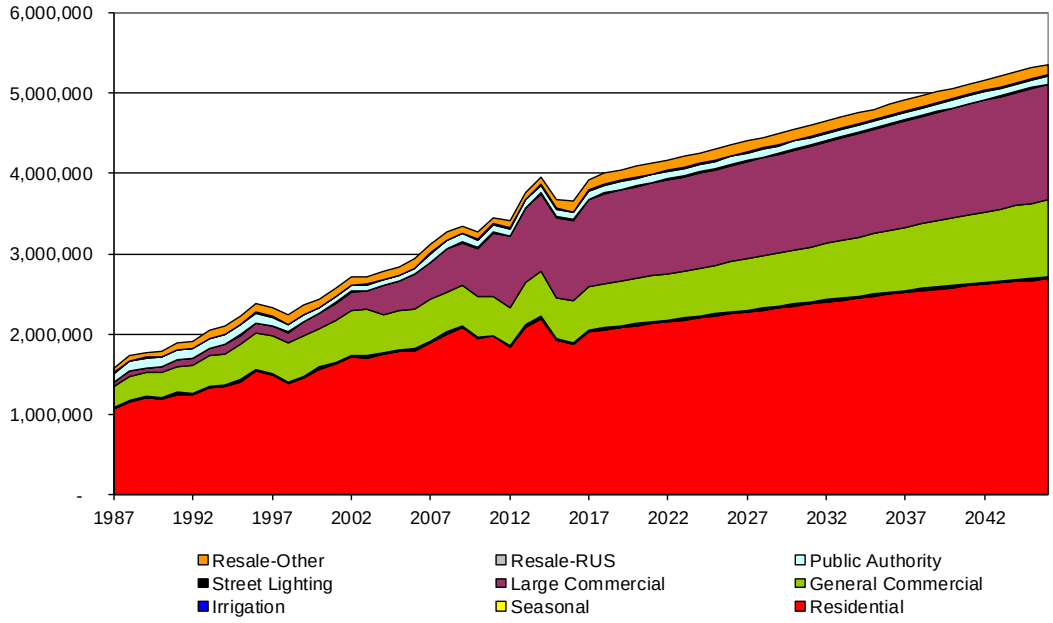
Retail Energy Forecasts By Class (MWh)

Minnkota Power Cooperative, Inc.

Year	Residential	Seasonal	Irrigation	General Commercial	Large Commercial	Street Lighting	Public Authority	Resale RUS	Resale Other	Total Member Sales	MWh From 2015 PRS
1987	1,060,655	9,362	9,299	276,785	41,953	2,517	109,994	5,389	57,374	1,573,329	
1988	1,154,418	9,939	14,158	298,878	59,075	2,514	120,178	5,713	65,526	1,730,399	
1989	1,200,385	10,846	10,420	303,159	53,858	2,536	122,784	5,387	65,957	1,775,332	
1990	1,184,543	11,352	10,370	309,705	73,630	2,687	120,326	5,410	64,789	1,782,813	
1991	1,248,170	11,334	11,301	328,645	74,218	2,997	125,094	5,103	82,966	1,889,830	
1992	1,243,731	11,970	9,246	348,007	80,645	2,906	121,864	5,378	91,793	1,915,539	
1993	1,333,117	12,765	4,947	374,563	92,418	3,160	121,565	5,651	94,450	2,042,636	
1994	1,342,363	12,217	9,058	395,514	108,686	3,331	120,015	5,684	101,487	2,098,355	
1995	1,408,446	12,961	9,879	436,107	119,089	3,524	120,798	5,792	101,702	2,218,297	
1996	1,533,815	14,483	11,080	461,484	116,086	3,676	122,293	6,281	113,028	2,382,226	
1997	1,489,897	14,015	9,371	466,471	118,080	3,821	107,107	6,526	113,307	2,328,596	
1998	1,381,037	13,213	12,410	476,158	138,005	4,010	92,781	6,197	120,033	2,243,845	
1999	1,451,488	14,305	9,945	504,421	165,956	4,383	86,970	6,515	116,986	2,360,969	
2000	1,563,590	14,542	10,023	475,382	186,653	4,623	70,312	6,672	104,220	2,436,016	
2001	1,624,063	14,055	8,563	515,475	227,082	5,042	67,092	6,775	102,265	2,570,412	
2002	1,713,478	15,300	9,776	548,374	240,961	6,049	68,285	7,157	107,328	2,716,708	
2003	1,705,938	14,504	13,198	572,574	234,877	5,508	66,876	7,279	99,385	2,720,139	
2004	1,744,487	14,277	11,228	479,293	350,852	5,951	66,184	7,802	103,406	2,783,480	
2005	1,777,157	13,619	8,417	486,723	374,596	6,468	64,102	7,696	100,390	2,839,168	
2006	1,786,942	10,558	17,417	487,291	441,912	6,815	64,479	7,618	108,731	2,931,762	
2007	1,881,970	10,027	12,052	525,457	457,721	7,222	106,080	8,012	100,301	3,108,844	
2008	2,003,099	10,072	13,595	492,404	534,995	7,587	105,857	7,990	97,338	3,272,937	
2009	2,079,796	8,784	11,672	508,679	532,497	8,066	103,905	8,119	84,960	3,346,478	
2010	1,948,468	8,010	10,058	503,524	594,240	8,684	99,078	7,860	87,777	3,267,699	
2011	1,969,410	8,138	7,081	481,087	795,968	9,247	90,651	7,931	78,967	3,448,481	
2012	1,832,850	8,056	17,400	472,671	880,735	9,558	93,782	7,069	83,171	3,405,291	
2013	2,089,163	8,842	17,319	523,442	925,722	9,739	98,569	8,316	73,618	3,754,731	
2014	2,195,616	8,975	11,274	562,887	971,031	9,973	97,591	9,003	93,747	3,960,098	
2015	1,917,553	8,184	14,074	510,396	1,006,123	9,895	93,811	8,461	111,481	3,679,977	3,904,000
2016	1,869,624	8,035	12,304	523,033	999,009	9,740	89,487	13,863	135,043	3,660,138	3,978,262
2017	2,021,943	8,250	15,866	538,771	1,085,741	9,810	94,870	13,863	134,481	3,923,594	4,101,429
2018	2,051,678	8,269	15,971	542,525	1,132,103	9,882	94,870	13,863	134,503	4,003,665	4,203,412
2019	2,080,577	8,290	16,148	550,188	1,137,661	9,975	94,870	13,863	134,526	4,046,099	4,260,018
2020	2,107,728	8,311	16,254	558,546	1,146,585	10,060	94,870	13,863	134,548	4,090,765	4,318,509
2021	2,129,685	8,333	16,389	567,368	1,155,671	10,141	94,870	13,863	134,571	4,130,892	4,380,545
2022	2,153,549	8,356	16,536	576,874	1,164,926	10,227	94,870	13,863	134,594	4,173,796	4,439,187
2023	2,176,976	8,380	16,692	587,025	1,174,354	10,303	94,870	13,863	134,617	4,217,080	4,503,948
2024	2,200,433	8,404	16,818	597,877	1,183,961	10,394	94,870	13,863	134,639	4,261,259	4,570,002
2025	2,223,929	8,429	16,995	609,278	1,191,750	10,489	94,870	13,863	134,662	4,304,265	4,634,798
2026	2,251,914	8,455	17,120	621,345	1,204,729	10,574	94,870	13,863	134,685	4,357,557	4,689,093
2027	2,275,306	8,482	17,276	634,036	1,214,903	10,657	94,870	13,863	134,708	4,404,100	4,746,895
2028	2,298,727	8,509	17,423	647,316	1,223,277	10,759	94,870	13,863	134,731	4,449,476	4,805,232
2029	2,321,918	8,537	17,578	661,086	1,233,857	10,853	94,870	13,863	134,755	4,497,317	4,852,785
2030	2,349,307	8,566	17,704	675,292	1,244,650	10,943	94,870	13,863	134,778	4,549,973	4,903,960
2031	2,372,059	8,596	17,881	690,065	1,252,661	11,037	94,870	13,863	134,801	4,595,832	4,958,169
2032	2,399,025	8,626	18,007	705,320	1,266,898	11,122	94,870	13,863	134,824	4,652,555	5,010,222
2033	2,420,270	8,657	18,162	720,858	1,278,367	11,219	94,870	13,863	134,848	4,701,114	5,061,231
2034	2,446,749	8,688	18,309	736,803	1,287,075	11,320	94,870	13,863	134,871	4,752,549	5,109,357
2035	2,469,016	8,721	18,465	753,060	1,299,028	11,412	94,870	13,863	134,894	4,803,329	5,162,617
2036	2,496,086	8,754	18,590	769,727	1,314,235	11,516	94,870	13,863	134,918	4,862,558	5,214,159
2037	2,517,300	8,787	18,767	786,842	1,323,703	11,622	94,870	13,863	134,942	4,910,697	5,260,990
2038	2,538,269	8,821	18,893	804,205	1,336,439	11,720	94,870	13,863	134,965	4,962,046	5,307,319
2039	2,559,330	8,856	19,048	821,929	1,349,452	11,814	94,870	13,863	134,989	5,014,152	5,362,091
2040	2,579,623	8,892	19,196	839,882	1,359,750	11,926	94,870	13,863	135,013	5,063,014	5,408,043
2041	2,599,718	8,928	19,351	858,080	1,373,341	12,029	94,870	13,863	135,037	5,115,216	5,454,029
2042	2,620,122	8,965	19,477	876,525	1,387,234	12,128	94,870	13,863	135,060	5,168,244	5,502,682
2043	2,634,692	9,003	19,654	895,125	1,398,437	12,245	94,870	13,863	135,084	5,212,974	5,547,939
2044	2,654,717	9,041	19,779	913,913	1,412,962	12,351	94,870	13,863	135,108	5,266,605	5,592,184
2045	2,668,379	9,080	19,935	932,779	1,424,816	12,455	94,870	13,863	135,133	5,311,308	
2046	2,687,578	9,119	20,082	951,790	1,437,009	12,561	94,870	13,863	135,157	5,362,029	
Average Annual Growth Rates											
1987-2016	2.0%	-0.5%	1.0%	2.2%	11.6%	4.8%	-0.7%	3.3%	3.0%	3.0%	--
2001-2016	0.9%	-3.7%	2.4%	0.1%	10.4%	4.5%	1.9%	4.9%	1.9%	2.4%	--
2006-2016	0.5%	-2.7%	-3.4%	0.7%	8.5%	3.6%	3.3%	6.2%	2.2%	2.2%	--
2011-2016	-1.0%	-0.3%	11.7%	1.7%	4.6%	1.0%	-0.3%	11.8%	11.3%	1.2%	--
2016-2021	2.6%	0.7%	5.9%	1.6%	3.0%	0.8%	1.2%	0.0%	-0.1%	2.4%	1.9%
2016-2026	1.9%	0.5%	3.4%	1.7%	1.9%	0.8%	0.6%	0.0%	0.0%	1.8%	1.7%
2016-2036	1.5%	0.4%	2.1%	2.0%	1.4%	0.8%	0.3%	0.0%	0.0%	1.4%	1.4%
2016-2046	1.2%	0.4%	1.6%	2.0%	1.2%	0.9%	0.2%	0.0%	0.0%	1.3%	
2017-2046	1.0%	0.3%	0.8%	2.0%	1.0%	0.9%	0.0%	0.0%	0.0%	1.1%	

Figure 3.1

Retail Energy Forecasts By Class (MWh)
Minnkota Power Cooperative, Inc.



Member systems' own use and losses are defined as the energy member system purchases from Minnkota less total retail sales to member system customers. They are typically projected based on the average own use and losses experienced during the 2012-2016 period.

Total member systems' energy requirements, calculated as the sum of total sales and own use and losses, are projected to increase from 4,081,884 MWh in 2017 to 5,572,713 MWh in 2046 as shown in Table 3.17. This reflects a compound growth rate of 1.1 percent per year from 2017 through 2046. The total member sales and member requirements forecasts are driven, to a large extent, by the residential class forecast. This class comprised approximately 51 percent of member system 2016 sales and is expected to decrease to 50 percent by 2046.

Table 3.17

Energy Requirements Forecast By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Req.
1987	224,635	327,527	36,595	47,618	475,148	60,200	76,679	88,281	102,080	90,386	144,632	1,673,781
1988	249,381	363,595	38,371	51,992	525,134	67,836	80,472	94,567	109,253	101,721	156,625	1,838,947
1989	265,586	381,327	38,927	53,707	534,439	73,484	84,660	100,445	111,204	112,350	163,944	1,920,073
1990	261,208	366,763	38,102	50,705	521,233	74,196	80,157	94,288	105,893	110,762	157,016	1,860,324
1991	294,866	399,608	39,514	54,506	561,108	80,702	85,779	100,922	112,398	120,133	169,255	2,018,791
1992	306,013	391,512	40,335	53,646	558,385	81,325	88,381	98,440	109,170	121,723	169,069	2,017,999
1993	322,062	431,930	40,907	57,789	594,490	86,892	94,150	106,161	118,693	128,905	178,889	2,160,868
1994	333,536	464,539	40,085	59,361	598,372	89,084	99,786	106,544	119,141	134,473	183,371	2,228,292
1995	352,961	502,471	40,696	61,879	628,078	93,675	103,413	110,693	122,331	145,104	191,045	2,352,345
1996	378,510	550,901	41,070	65,726	640,632	100,078	110,497	116,287	126,950	154,416	203,643	2,488,710
1997	384,747	553,030	37,193	66,044	619,448	100,839	102,688	114,331	121,708	152,173	203,932	2,456,133
1998	377,632	537,927	32,600	62,827	590,096	95,999	97,756	104,594	112,298	144,035	192,202	2,347,968
1999	395,283	572,812	33,954	66,447	610,216	104,452	104,877	108,974	115,022	154,154	206,982	2,473,174
2000	411,569	610,225	32,379	68,638	623,603	109,263	93,411	112,993	117,016	160,945	213,413	2,553,456
2001	427,237	654,036	33,298	70,067	678,700	112,640	90,959	118,076	121,228	164,235	221,547	2,692,024
2002	458,920	707,947	37,225	75,737	706,885	122,854	97,837	125,412	126,812	170,860	235,243	2,865,734
2003	453,842	718,517	35,829	76,592	704,943	122,528	95,717	122,986	125,015	169,222	235,659	2,860,849
2004	464,628	741,507	38,786	77,027	720,035	127,225	102,226	123,199	125,647	171,558	238,601	2,930,437
2005	469,637	795,002	35,828	77,629	725,239	123,366	98,303	124,619	128,778	170,226	249,309	2,997,936
2006	484,203	836,459	33,225	77,409	771,270	120,936	93,702	122,779	124,575	164,782	251,542	3,080,882
2007	491,058	896,303	36,903	80,381	835,138	124,873	105,739	129,957	132,558	170,049	266,340	3,269,300
2008	511,081	972,275	40,891	85,984	864,134	130,098	109,149	141,707	141,008	179,033	284,861	3,460,221
2009	497,782	1,002,960	42,534	85,582	884,214	127,792	115,458	142,641	150,658	172,853	296,487	3,518,961
2010	473,732	988,915	41,023	79,963	885,889	117,026	112,104	137,927	145,475	165,930	277,685	3,425,669
2011	469,236	1,048,624	38,035	79,437	1,005,555	118,973	116,056	140,139	134,258	172,200	279,597	3,602,110
2012	445,003	1,038,524	35,121	74,203	1,041,905	112,942	120,755	130,225	125,972	171,310	260,075	3,556,036
2013	497,995	1,158,278	41,672	85,886	1,107,255	124,125	139,396	137,902	143,073	178,622	295,995	3,910,200
2014	497,514	1,203,267	43,974	83,929	1,162,606	134,202	136,342	146,388	145,830	181,422	304,864	4,040,337
2015	483,671	1,180,667	35,912	75,807	1,113,854	116,772	129,540	133,337	131,478	167,127	277,430	3,845,597
2016	486,896	1,194,861	35,474	74,311	1,089,083	111,115	130,776	131,245	128,833	158,870	270,692	3,812,156
2017	516,088	1,303,894	38,816	76,635	1,196,307	111,865	134,056	132,829	129,188	153,938	288,267	4,081,884
2018	521,254	1,317,787	38,654	114,239	1,215,486	113,247	134,036	133,417	130,363	156,839	291,051	4,166,373
2019	523,642	1,339,590	38,520	114,532	1,225,401	113,862	134,202	134,374	132,263	160,080	293,989	4,210,455
2020	525,946	1,366,648	38,405	114,792	1,238,124	114,369	134,292	135,193	133,074	160,018	295,837	4,256,700
2021	528,206	1,392,984	38,311	115,046	1,247,545	114,883	134,440	135,851	133,893	159,957	297,155	4,298,271
2022	530,160	1,420,608	38,233	115,229	1,256,429	115,523	134,521	138,527	135,652	159,918	297,940	4,342,739
2023	531,987	1,449,638	38,179	115,375	1,267,831	116,019	134,600	139,068	136,308	160,018	298,484	4,387,507
2024	533,769	1,482,851	38,152	115,516	1,276,189	116,361	134,676	139,573	136,983	160,117	299,058	4,433,245
2025	535,656	1,514,066	38,142	115,645	1,284,398	116,598	134,721	140,001	138,719	160,226	299,625	4,477,797
2026	539,725	1,550,659	38,142	115,771	1,295,650	116,868	134,817	140,337	139,403	160,340	301,288	4,533,001
2027	541,777	1,586,531	38,156	115,894	1,303,784	117,227	134,897	140,660	140,090	160,332	301,848	4,581,194
2028	543,901	1,620,038	38,180	116,008	1,311,870	117,506	135,029	141,009	141,844	160,459	302,364	4,628,208
2029	546,078	1,654,256	38,221	116,135	1,322,991	117,765	135,119	141,285	142,495	160,575	302,777	4,677,695
2030	548,301	1,696,382	38,260	116,256	1,331,044	118,102	135,278	141,517	143,108	160,831	303,142	4,732,220
2031	550,564	1,731,543	38,232	116,390	1,338,975	118,594	135,287	141,939	143,703	160,942	303,535	4,779,704
2032	552,849	1,771,928	38,202	116,519	1,349,926	119,024	135,307	144,457	145,310	161,038	303,878	4,838,437
2033	555,150	1,810,282	38,183	116,645	1,357,834	119,308	135,331	144,876	145,833	161,151	304,111	4,888,704
2034	557,463	1,851,663	38,157	116,763	1,365,723	119,684	135,381	145,294	146,349	161,233	304,238	4,941,950
2035	559,776	1,889,104	38,153	116,877	1,376,927	119,988	135,419	145,659	146,857	161,303	304,404	4,994,467
2036	564,185	1,935,245	38,145	116,993	1,384,864	120,413	135,438	146,059	148,434	161,384	304,689	5,055,850
2037	566,502	1,973,106	38,132	117,112	1,392,821	120,735	135,461	146,472	148,974	161,428	304,941	5,105,683
2038	568,812	2,011,174	38,129	117,215	1,403,899	121,138	135,452	146,885	149,514	161,459	305,119	5,158,795
2039	571,116	2,053,305	38,116	117,308	1,411,690	121,605	135,461	147,309	150,040	161,478	305,316	5,212,742
2040	573,419	2,091,979	38,106	117,384	1,419,783	121,921	135,459	147,758	150,547	161,482	305,477	5,263,316
2041	575,711	2,131,070	38,098	117,450	1,431,029	122,287	135,432	148,176	151,060	161,346	305,642	5,317,302
2042	577,995	2,174,383	38,089	117,511	1,438,966	122,584	135,427	148,557	151,587	161,323	305,770	5,372,193
2043	580,276	2,208,808	38,082	117,557	1,447,226	122,910	135,372	148,968	152,100	161,161	306,022	5,418,482
2044	582,545	2,249,404	38,080	117,602	1,458,372	123,217	135,395	149,343	152,613	161,086	306,297	5,473,955
2045	584,803	2,284,174	38,081	117,637	1,466,435	123,472	135,324	149,711	153,111	160,894	306,575	5,520,217
2046	587,052	2,325,097	38,079	117,667	1,474,563	123,779	135,296	150,102	153,600	160,680	306,798	5,572,713
Average Annual Growth Rates												
1987-2016	2.7%	4.6%	-0.1%	1.5%	2.9%	2.1%	1.9%	1.4%	0.8%	2.0%	2.2%	2.9%
2001-2016	0.9%	4.1%	0.4%	0.4%	3.2%	-0.1%	2.5%	0.7%	0.4%	-0.2%	1.3%	2.3%
2006-2016	0.1%	3.6%	0.7%	-0.4%	3.5%	-0.8%	3.4%	0.7%	0.3%	-0.4%	0.7%	2.2%
2011-2016	0.7%	2.6%	-1.4%	-1.3%	1.6%	-1.4%	2.4%	-1.3%	-0.8%	-1.6%	-0.6%	1.1%
2016-2021	1.6%	3.1%	1.6%	9.1%	2.8%	0.7%	0.6%	0.7%	0.8%	0.1%	1.9%	2.4%
2016-2026	1.0%	2.6%	0.7%	4.5%	1.8%	0.5%	0.3%	0.7%	0.8%	0.1%	1.1%	1.7%
2016-2036	0.7%	2.4%	0.4%	2.3%	1.2%	0.4%	0.2%	0.5%	0.7%	0.1%	0.6%	1.4%
2016-2046	0.6%	2.2%	0.2%	1.5%	1.0%	0.4%	0.1%	0.4%	0.6%	0.0%	0.4%	1.3%
2017-2046	0.4%	2.0%	-0.1%	1.5%	0.7%	0.3%	0.0%	0.4%	0.6%	0.1%	0.2%	1.1%

Table 3.18 presents total customers by member, while Table 3.19 presents customers by revenue class. Total customers are projected to increase from 135,909 in 2017 to 186,319 in 2046. This represents an average annual growth rate of 1.1 percent per year from 2017 through 2046. This is the slower than the 2.1 percent per year experienced over the 1987 through 2016 period.

3.3.2 Northern Municipal Power Agency

Sales to the Northern Municipal Power Agency (NMPA) are presented in Table 3.20. Energy requirements forecasts for each municipal served by NMPA were developed individually by specifying an econometric model of total energy requirements. The models were typically driven by weather variables (such as heating and cooling degree days), demographic variables (such as household growth) and economic variables (such as income and employment). The individual models are presented in Appendix B.

Purchases are expected to increase at 0.1 percent per year over the forecast period of 2017-2046. This compares to the -0.5 percent rate observed over the historic period of 2011 through 2016.

3.3.3 Minnkota Transmission Losses

Minnkota transmission losses have been projected at 5.5 percent based on staff discussions and incorporate an adjustment in the calculation of losses starting in 2005.

3.3.4 Joint System Energy Requirements

Total Joint System energy requirements are calculated as the sum of total member system energy requirements plus Minnkota's losses and sales to NMPA. Requirements are projected to increase from 4,775,171 MWh in 2017 to 6,369,288 MWh in 2046. This reflects a compound growth rate of 1.0 percent per year from 2017 through 2046. Table 3.21 and Figure 3.2 present the forecasts of total energy requirements.

Table 3.18

Total Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Clearwater-Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	11,782	11,432	1,608	3,161	13,902	4,563	3,739	4,692	4,191	4,416	10,361	73,848
1988	12,097	11,661	1,594	3,196	13,873	4,670	3,751	4,677	4,190	4,609	10,428	74,746
1989	12,354	12,279	1,588	3,215	13,910	4,792	3,729	4,673	4,188	4,748	10,485	75,961
1990	12,578	12,815	1,574	3,266	13,923	4,956	3,698	4,666	4,187	4,872	10,554	77,088
1991	12,860	13,408	1,562	3,288	13,947	5,138	3,694	4,674	4,180	4,983	10,629	78,364
1992	13,197	14,291	1,557	3,326	14,025	5,248	3,690	4,673	4,175	5,089	10,783	80,056
1993	13,571	15,183	1,556	3,390	14,146	5,326	3,705	4,701	4,217	5,149	10,985	81,929
1994	13,955	16,017	1,549	3,427	14,329	5,408	3,707	4,699	4,241	5,242	11,064	83,637
1995	14,350	16,809	1,546	3,477	14,463	5,477	3,709	4,719	4,277	5,403	11,225	85,454
1996	14,735	17,866	1,531	3,513	14,569	5,531	3,710	4,751	4,318	5,540	11,391	87,455
1997	15,066	18,196	1,518	3,535	14,792	5,613	3,692	4,759	4,365	5,624	11,549	88,710
1998	15,517	18,987	1,500	3,591	14,963	5,707	3,655	4,793	4,404	5,723	11,698	90,537
1999	15,946	19,848	1,487	3,662	15,024	5,827	3,642	4,811	4,440	5,786	11,915	92,388
2000	16,354	20,646	1,455	3,724	15,262	5,942	3,632	4,827	4,436	5,943	12,167	94,388
2001	16,831	21,661	1,435	3,791	15,787	6,020	3,609	4,848	4,483	5,910	12,366	96,738
2002	17,362	22,931	1,434	3,892	15,684	6,110	3,604	4,875	4,551	5,988	12,553	98,983
2003	17,875	24,557	1,435	4,000	15,896	6,181	3,606	4,919	4,612	6,069	12,778	101,927
2004	18,389	26,282	1,429	4,086	16,195	6,248	3,606	4,971	4,660	6,150	13,016	105,031
2005	18,759	28,361	1,427	4,172	16,398	6,303	3,635	4,997	4,620	6,205	13,133	108,009
2006	19,214	30,289	1,417	4,245	16,633	6,323	3,603	5,030	4,648	6,281	13,300	110,982
2007	19,589	31,712	1,423	4,307	16,819	6,338	3,608	5,073	4,678	6,323	13,514	113,384
2008	19,835	32,947	1,443	4,342	17,003	6,338	3,612	5,121	4,726	6,346	13,620	115,333
2009	20,012	33,922	1,443	4,356	17,184	6,353	3,612	5,168	4,711	6,348	13,672	116,781
2010	20,190	34,799	1,453	4,386	17,304	6,370	3,611	5,200	4,667	6,318	13,718	118,015
2011	20,275	36,180	1,466	4,397	17,397	6,375	3,627	5,203	4,676	6,327	13,769	119,691
2012	20,297	37,916	1,476	4,374	17,566	6,397	3,666	5,218	4,683	6,332	13,828	121,753
2013	20,358	38,852	1,489	4,355	17,899	6,398	3,710	5,244	4,729	6,347	13,850	123,229
2014	20,444	41,032	1,496	4,357	18,299	6,388	3,740	5,291	4,801	6,378	13,919	126,145
2015	20,538	43,978	1,502	4,360	18,871	6,426	3,769	5,337	4,875	6,405	14,008	130,068
2016	20,747	46,653	1,496	4,386	19,286	6,458	3,783	5,389	4,910	6,444	14,114	133,666
2017	20,999	48,474	1,499	4,426	19,663	6,490	3,808	5,437	4,567	6,392	14,156	135,909
2018	21,222	50,158	1,500	4,460	20,011	6,529	3,828	5,477	4,614	6,403	14,267	138,468
2019	21,424	51,701	1,501	4,488	20,340	6,562	3,845	5,513	4,656	6,413	14,363	140,807
2020	21,613	53,240	1,502	4,513	20,661	6,591	3,861	5,543	4,693	6,421	14,447	143,084
2021	21,792	54,775	1,503	4,535	20,974	6,617	3,875	5,571	4,728	6,428	14,523	145,321
2022	21,945	56,279	1,504	4,551	21,260	6,636	3,885	5,594	4,756	6,436	14,579	147,425
2023	22,082	57,752	1,505	4,564	21,535	6,650	3,893	5,610	4,780	6,443	14,624	149,438
2024	22,209	59,195	1,506	4,575	21,802	6,662	3,899	5,623	4,801	6,451	14,661	151,383
2025	22,338	60,605	1,507	4,583	22,065	6,671	3,904	5,636	4,821	6,458	14,691	153,279
2026	22,466	61,981	1,508	4,591	22,325	6,679	3,909	5,646	4,838	6,466	14,718	155,126
2027	22,594	63,325	1,509	4,597	22,582	6,687	3,914	5,653	4,854	6,473	14,739	156,928
2028	22,723	64,635	1,510	4,602	22,840	6,695	3,919	5,662	4,870	6,481	14,756	158,694
2029	22,851	65,912	1,511	4,607	23,097	6,703	3,924	5,667	4,882	6,488	14,769	160,412
2030	22,979	67,154	1,512	4,612	23,353	6,710	3,929	5,670	4,893	6,496	14,782	162,091
2031	23,108	68,361	1,513	4,618	23,611	6,718	3,935	5,673	4,902	6,503	14,794	163,736
2032	23,236	69,532	1,514	4,623	23,867	6,725	3,940	5,676	4,909	6,511	14,807	165,340
2033	23,364	70,671	1,515	4,628	24,124	6,732	3,945	5,677	4,916	6,518	14,819	166,910
2034	23,494	71,797	1,516	4,633	24,380	6,739	3,950	5,680	4,922	6,526	14,831	168,470
2035	23,622	72,914	1,518	4,639	24,638	6,747	3,955	5,682	4,928	6,533	14,843	170,017
2036	23,751	74,020	1,518	4,644	24,894	6,754	3,961	5,683	4,935	6,541	14,855	171,555
2037	23,881	75,115	1,519	4,649	25,151	6,761	3,966	5,686	4,942	6,548	14,867	173,084
2038	24,009	76,198	1,520	4,654	25,407	6,768	3,971	5,687	4,948	6,555	14,878	174,597
2039	24,137	77,271	1,521	4,660	25,665	6,775	3,976	5,688	4,955	6,563	14,890	176,102
2040	24,267	78,332	1,522	4,665	25,922	6,782	3,982	5,691	4,962	6,570	14,902	177,597
2041	24,395	79,382	1,523	4,670	26,179	6,789	3,987	5,692	4,969	6,578	14,914	179,078
2042	24,524	80,421	1,524	4,675	26,436	6,796	3,992	5,694	4,976	6,585	14,925	180,548
2043	24,653	81,448	1,525	4,681	26,693	6,803	3,997	5,697	4,984	6,593	14,937	182,011
2044	24,782	82,463	1,526	4,686	26,950	6,810	4,002	5,698	4,992	6,600	14,949	183,458
2045	24,910	83,467	1,527	4,691	27,208	6,817	4,007	5,699	4,999	6,608	14,960	184,893
2046	25,040	84,458	1,528	4,696	27,465	6,824	4,012	5,702	5,007	6,615	14,972	186,319
Average Annual Growth Rates												
1987-2016	2.0%	5.0%	-0.2%	1.1%	1.1%	1.2%	0.0%	0.5%	0.5%	1.3%	1.1%	2.1%
2001-2016	1.4%	5.2%	0.3%	1.0%	1.3%	0.5%	0.3%	0.7%	0.6%	0.6%	0.9%	2.2%
2006-2016	0.8%	4.4%	0.5%	0.3%	1.5%	0.2%	0.5%	0.7%	0.6%	0.3%	0.6%	1.9%
2011-2016	0.5%	5.2%	0.4%	-0.1%	2.1%	0.3%	0.8%	0.7%	1.0%	0.4%	0.5%	2.2%
2016-2021	1.0%	3.3%	0.1%	0.7%	1.7%	0.5%	0.5%	0.7%	-0.8%	0.0%	0.6%	1.7%
2016-2026	0.8%	2.9%	0.1%	0.5%	1.5%	0.3%	0.3%	0.5%	-0.1%	0.0%	0.4%	1.5%
2016-2036	0.7%	2.3%	0.1%	0.3%	1.3%	0.2%	0.2%	0.3%	0.0%	0.1%	0.3%	1.3%
2016-2046	0.6%	2.0%	0.1%	0.2%	1.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.2%	1.1%
2017-2046	0.6%	1.9%	0.1%	0.2%	1.2%	0.2%	0.2%	0.2%	0.3%	0.1%	0.2%	1.1%

Table 3.19

Member Forecasts By Class

Minnkota Power Cooperative, Inc.

Year	Residential	Seasonal	Irrigation	General Commercial	Large Commercial	Street Lighting	Public Authority	Resale RUS	Resale Other	Total Members
1987	62,877	5,356	263	4,949	51	231	112	1	10	73,848
1988	63,612	5,469	262	4,999	50	229	112	2	10	74,746
1989	64,675	5,501	259	5,106	50	248	112	1	9	75,961
1990	65,616	5,525	273	5,235	52	265	112	1	9	77,088
1991	66,550	5,613	325	5,413	53	286	113	1	10	78,364
1992	67,908	5,714	374	5,580	55	301	113	1	10	80,056
1993	69,503	5,761	396	5,776	57	312	112	1	11	81,929
1994	70,966	5,828	404	5,932	58	325	112	1	11	83,637
1995	72,532	5,840	404	6,151	63	339	113	1	11	85,454
1996	74,471	5,746	414	6,285	64	352	111	1	11	87,455
1997	75,765	5,540	423	6,424	66	369	111	1	11	88,710
1998	77,413	5,422	433	6,692	71	383	111	1	11	90,537
1999	78,883	5,447	443	7,029	75	394	103	1	13	92,388
2000	80,864	5,443	388	7,119	57	417	87	1	12	94,388
2001	85,045	4,969	359	5,888	51	389	25	1	12	96,738
2002	87,239	4,892	361	6,013	53	387	26	1	11	98,983
2003	89,950	4,679	403	6,448	54	354	28	1	10	101,927
2004	92,965	4,457	422	6,662	102	385	28	1	10	105,031
2005	95,873	4,269	406	6,890	105	427	28	1	10	108,009
2006	99,686	3,081	410	7,202	119	448	26	1	10	110,982
2007	102,246	2,621	414	7,425	130	509	28	1	10	113,384
2008	104,084	2,409	421	7,701	143	534	29	1	11	115,333
2009	106,193	1,519	427	7,888	161	553	29	1	11	116,781
2010	107,232	1,475	430	8,091	176	569	29	1	11	118,015
2011	108,776	1,417	426	8,239	204	590	28	1	11	119,691
2012	110,691	1,355	434	8,413	212	610	27	1	11	121,753
2013	112,116	1,294	446	8,502	215	619	25	1	11	123,229
2014	114,820	1,224	462	8,757	219	625	26	1	11	126,145
2015	118,404	1,193	490	9,051	247	638	33	1	11	130,068
2016	121,685	1,168	509	9,360	250	649	34	1	10	133,666
2017	123,817	1,136	512	9,488	253	658	34	1	10	135,909
2018	126,228	1,123	515	9,630	259	667	34	1	10	138,468
2019	128,411	1,110	521	9,778	262	679	34	1	10	140,807
2020	130,531	1,097	524	9,933	265	689	34	1	10	143,084
2021	132,605	1,084	528	10,092	268	699	34	1	10	145,321
2022	134,538	1,071	533	10,253	273	711	34	1	10	147,425
2023	136,383	1,058	538	10,417	275	721	34	1	10	149,438
2024	138,158	1,045	542	10,582	278	732	34	1	10	151,383
2025	139,878	1,032	548	10,748	282	745	34	1	10	153,279
2026	141,552	1,019	552	10,916	286	756	34	1	10	155,126
2027	143,180	1,006	557	11,084	289	767	34	1	10	156,928
2028	144,767	993	562	11,252	293	781	34	1	10	158,694
2029	146,311	980	567	11,420	295	793	34	1	10	160,412
2030	147,817	967	571	11,587	298	805	34	1	10	162,091
2031	149,286	954	577	11,754	301	819	34	1	10	163,736
2032	150,717	941	581	11,919	305	831	34	1	10	165,340
2033	152,114	928	586	12,084	308	844	34	1	10	166,910
2034	153,501	915	591	12,248	310	859	34	1	10	168,470
2035	154,878	902	596	12,410	313	872	34	1	10	170,017
2036	156,245	889	600	12,572	318	886	34	1	10	171,555
2037	157,602	876	606	12,732	320	902	34	1	10	173,084
2038	158,949	863	610	12,891	322	916	34	1	10	174,597
2039	160,286	850	615	13,049	326	930	34	1	10	176,102
2040	161,613	837	620	13,206	328	947	34	1	10	177,597
2041	162,930	824	625	13,361	330	962	34	1	10	179,078
2042	164,237	811	629	13,515	333	977	34	1	10	180,548
2043	165,534	798	635	13,668	335	995	34	1	10	182,011
2044	166,821	785	639	13,819	337	1,011	34	1	10	183,458
2045	168,098	772	644	13,967	339	1,027	34	1	10	184,893
2046	169,365	759	649	14,114	341	1,045	34	1	10	186,319
Average Annual Growth Rates										
1987-2016	2.3%	-5.1%	2.3%	2.2%	5.6%	3.6%	-4.0%	0.0%	0.1%	2.1%
2001-2016	2.4%	-9.2%	2.4%	3.1%	11.2%	3.5%	2.1%	0.0%	-0.9%	2.2%
2006-2016	2.0%	-9.2%	2.2%	2.7%	7.7%	3.8%	2.8%	0.0%	0.0%	1.9%
2011-2016	2.3%	-3.8%	3.7%	2.6%	4.2%	1.9%	4.2%	0.0%	-1.9%	2.2%
2016-2021	1.7%	-1.5%	0.7%	1.5%	1.4%	1.5%	0.0%	0.0%	0.0%	1.7%
2016-2026	1.5%	-1.4%	0.8%	1.6%	1.4%	1.5%	0.0%	0.0%	0.0%	1.5%
2016-2036	1.3%	-1.4%	0.8%	1.5%	1.2%	1.6%	0.0%	0.0%	0.0%	1.3%
2016-2046	1.1%	-1.4%	0.8%	1.4%	1.0%	1.6%	0.0%	0.0%	0.0%	1.1%
2017-2046	1.1%	-1.4%	0.8%	1.4%	1.0%	1.6%	0.0%	0.0%	0.0%	1.1%

Table 3.20

NMPA Sales Summary
Northern Municipal Power Agency

Year	Retail MWh Sales	Losses	Percent %	NMPA Purchases
1992				*372,754*
1993				*391,546*
1994				*407,465*
1995	407,069	21,566	5.0%	428,635
1996	420,021	26,061	5.8%	446,082
1997	402,992	29,833	6.9%	432,825
1998	407,631	19,806	4.6%	427,437
1999	421,947	20,427	4.6%	442,374
2000	423,750	21,371	4.8%	445,121
2001	439,209	20,748	4.5%	459,957
2002	450,474	22,431	4.7%	472,905
2003	448,731	25,078	5.3%	473,809
2004	454,427	19,370	4.1%	473,797
2005	457,397	22,243	4.6%	479,640
2006	462,825	22,392	4.6%	485,217
2007	464,865	28,368	5.8%	493,233
2008	458,871	27,691	5.7%	486,562
2009	449,921	24,746	5.2%	474,666
2010	441,782	19,645	4.3%	461,427
2011	442,428	17,357	3.8%	459,785
2012	422,875	27,999	6.2%	450,875
2013	446,832	45,815	9.3%	492,647
2014	457,995	13,116	2.8%	471,111
2015	435,560	21,263	4.7%	456,823
2016	424,580	23,867	5.3%	448,447
2017	429,904	25,812	5.7%	455,717
2018	433,261	25,931	5.6%	459,191
2019	439,078	26,072	5.6%	465,150
2020	441,549	26,160	5.6%	467,709
2021	443,815	26,241	5.6%	470,057
2022	445,424	26,300	5.6%	471,724
2023	446,674	26,346	5.6%	473,020
2024	447,650	26,384	5.6%	474,034
2025	448,406	26,413	5.6%	474,819
2026	448,984	26,437	5.6%	475,421
2027	449,491	26,457	5.6%	475,948
2028	449,876	26,472	5.6%	476,349
2029	450,064	26,480	5.6%	476,544
2030	450,012	26,481	5.6%	476,492
2031	449,762	26,474	5.6%	476,236
2032	449,333	26,461	5.6%	475,794
2033	448,791	26,443	5.6%	475,234
2034	448,110	26,420	5.6%	474,530
2035	447,271	26,391	5.6%	473,662
2036	446,443	26,364	5.6%	472,807
2037	445,821	26,342	5.6%	472,163
2038	445,381	26,325	5.6%	471,706
2039	444,991	26,310	5.6%	471,301
2040	444,794	26,300	5.6%	471,094
2041	444,719	26,295	5.6%	471,014
2042	444,871	26,295	5.6%	471,167
2043	445,102	26,300	5.6%	471,402
2044	445,393	26,306	5.6%	471,700
2045	445,669	26,312	5.6%	471,981
2046	445,921	26,317	5.6%	472,237
Average Annual Growth Rates				
2001-2016	-0.2%	0.9%		-0.2%
2006-2016	-0.9%	0.6%		-0.8%
2011-2016	-0.8%	6.6%		-0.5%
2016-2021	0.9%	1.9%		0.9%
2016-2026	0.6%	1.0%		0.6%
2016-2036	0.3%	0.5%		0.3%
2016-2046	0.2%	0.3%		0.2%
2017-2046	0.1%	0.1%		0.1%

Table 3.21

Joint System Energy Requirements

MWh

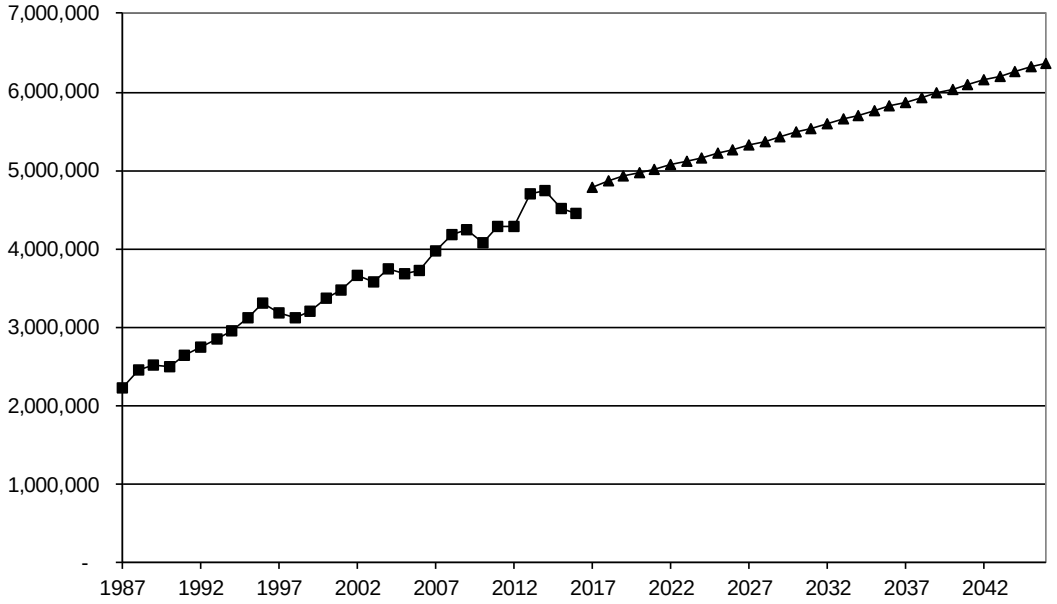
Year	Total Member Energy Requirements	Minnkota Losses	CAFS	Minnkota Total Requirements	NMPA Energy Requirements	Joint System Energy Requirements
1987	1,673,781	205,761	14,233	1,893,775	*329,707*	2,223,482
1988	1,838,947	246,728	14,641	2,100,316	*357,429*	2,457,745
1989	1,920,073	203,001	15,669	2,138,743	*372,491*	2,511,234
1990	1,860,324	257,656	16,063	2,134,043	*363,032*	2,497,075
1991	2,018,791	216,791	21,494	2,257,076	*382,175*	2,639,251
1992	2,017,999	315,258	47,384	2,380,641	*372,754*	2,753,395
1993	2,160,868	257,865	48,628	2,467,361	*391,546*	2,858,907
1994	2,228,292	268,455	50,341	2,547,088	*407,465*	2,954,553
1995	2,352,345	300,501	48,367	2,701,213	428,635	3,129,848
1996	2,488,710	335,722	47,402	2,871,834	446,082	3,317,916
1997	2,456,133	253,987	40,285	2,750,405	432,825	3,183,230
1998	2,347,968	322,015	31,101	2,701,084	427,437	3,128,521
1999	2,473,174	247,734	34,466	2,755,374	442,374	3,197,748
2000	2,553,456	348,169	36,080	2,937,705	445,121	3,382,826
2001	2,692,024	287,930	40,286	3,020,240	459,957	3,480,197
2002	2,865,734	274,732	41,806	3,182,272	472,905	3,655,177
2003	2,860,849	206,161	39,307	3,106,317	473,809	3,580,126
2004	2,930,437	301,596	38,706	3,270,740	473,797	3,744,537
2005	2,997,936	169,501 /1	35,335 /2	3,202,773	479,640	3,682,413
2006	3,080,882	162,899	-	3,243,781	485,217	3,728,998
2007	3,269,300	210,402	-	3,479,702	493,233	3,972,935
2008	3,460,221	239,589	-	3,699,810	486,562	4,186,372
2009	3,518,961	260,094	-	3,779,055	474,666	4,253,722
2010	3,425,669	199,285	-	3,624,954	461,427	4,086,381
2011	3,602,110	232,827	-	3,834,937	459,785	4,294,722
2012	3,556,036	281,871	-	3,837,907	450,875	4,288,782
2013	3,910,200	290,944	-	4,201,144	492,647	4,693,790
2014	4,040,337	234,010	-	4,274,347	471,111	4,745,458
2015	3,845,597	215,327	-	4,060,924	456,823	4,517,747
2016	3,812,156	190,905	-	4,003,061	448,447	4,451,508
2017	4,081,884	237,570	-	4,319,454	455,717	4,775,171
2018	4,166,373	242,487	-	4,408,860	459,191	4,868,051
2019	4,210,455	245,053	-	4,455,508	465,150	4,920,659
2020	4,256,700	247,744	-	4,504,444	467,709	4,972,154
2021	4,298,271	250,164	-	4,548,435	470,057	5,018,491
2022	4,342,739	252,752	-	4,595,491	471,724	5,067,216
2023	4,387,507	255,358	-	4,642,865	473,020	5,115,885
2024	4,433,245	258,020	-	4,691,264	474,034	5,165,298
2025	4,477,797	260,613	-	4,738,409	474,819	5,213,228
2026	4,533,001	263,825	-	4,796,826	475,421	5,272,247
2027	4,581,194	266,630	-	4,847,825	475,948	5,323,772
2028	4,628,208	269,367	-	4,897,575	476,349	5,373,923
2029	4,677,695	272,247	-	4,949,942	476,544	5,426,486
2030	4,732,220	275,420	-	5,007,641	476,492	5,484,133
2031	4,779,704	278,184	-	5,057,888	476,236	5,534,124
2032	4,838,437	281,602	-	5,120,039	475,794	5,595,833
2033	4,888,704	284,528	-	5,173,232	475,234	5,648,466
2034	4,941,950	287,627	-	5,229,577	474,530	5,704,106
2035	4,994,467	290,683	-	5,285,151	473,662	5,758,813
2036	5,055,850	294,256	-	5,350,106	472,807	5,822,912
2037	5,105,683	297,156	-	5,402,840	472,163	5,875,002
2038	5,158,795	300,247	-	5,459,042	471,706	5,930,748
2039	5,212,742	303,387	-	5,516,129	471,301	5,987,431
2040	5,263,316	306,331	-	5,569,646	471,094	6,040,740
2041	5,317,302	309,473	-	5,626,775	471,014	6,097,789
2042	5,372,193	312,667	-	5,684,861	471,167	6,156,027
2043	5,418,482	315,361	-	5,733,843	471,402	6,205,245
2044	5,473,955	318,590	-	5,792,545	471,700	6,264,244
2045	5,520,217	321,282	-	5,841,499	471,981	6,313,480
2046	5,572,713	324,338	-	5,897,050	472,237	6,369,288
Average Annual Growth Rates						
1987-2016	2.9%	-0.3%	-100.0%	2.6%	1.1%	2.4%
2001-2016	2.3%	-2.7%	-100.0%	1.9%	-0.2%	1.7%
2006-2016	2.2%	1.6%	--	2.1%	-0.8%	1.8%
2011-2016	1.1%	-3.9%	--	0.9%	-0.5%	0.7%
2016-2021	2.4%	5.6%	--	2.6%	0.9%	2.4%
2016-2026	1.7%	3.3%	--	1.8%	0.6%	1.7%
2016-2036	1.4%	2.2%	--	1.5%	0.3%	1.4%
2016-2046	1.3%	1.8%	--	1.3%	0.2%	1.2%
2017-2046	1.1%	1.1%	--	1.1%	0.1%	1.0%

/1 Losses reduced due to calculation adjustment - future loss % set at 5.5%

/2 Transferred to Nodak starting in 2006

Figure 3.2

Joint System Energy Requirements
MWh



3.4 Demand Forecasts – Joint System Seasonal Peaks

Demand, the instantaneous measurement on a system, tends to be volatile and heavily weather dependent. The demand measurements that are of particular importance are the Joint System winter and summer peak demands. The forecast for the winter and summer peak demands are based on the projected monthly peak demands developed for the individual member systems and NMPA using econometric modeling. The winter and summer peak demands presented here represent the expected peak demands for the Joint System.

Load factor has ranged from 53 percent to 61 percent in recent years based on the Joint System winter peak demands. As shown in Table 3.22, Joint System winter peak demand is projected to grow from 919 MW in 2017 to 1,129 MW by 2046. This is a 0.7 percent per year average annual increase during the forecast period of 2017-2046. The summer and winter peaks are expected to grow at roughly the same rate over the projection horizon.

Table 3.22

Joint System Peak Demand

MW

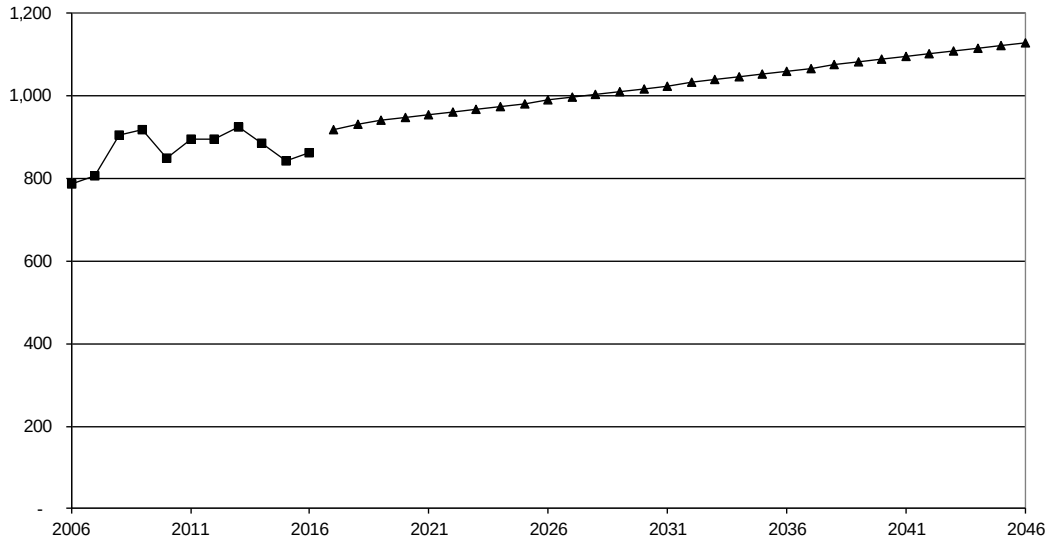
Year	Winter Peak Demand	Summer Peak Demand	Annual Peak Demand	Load Factor %
1999	709	414	709	51%
2000	691	413	691	56%
2001	696	437	696	57%
2002	711	461	711	59%
2003	699	514	699	58%
2004	792	447	792	54%
2005	788	482	788	53%
2006	786	505	786	54%
2007	806	521	806	56%
2008	906	512	906	53%
2009	917	506	917	53%
2010	851	574	851	55%
2011	897	574	897	55%
2012	895	597	895	55%
2013	926	603	926	58%
2014	885	598	885	61%
2015	843	630	843	61%
2016	862	614	862	59%
2017	919	601	919	59%
2018	933	610	933	60%
2019	941	616	941	60%
2020	948	622	948	60%
2021	955	627	955	60%
2022	962	632	962	60%
2023	969	638	969	60%
2024	975	643	975	60%
2025	982	649	982	61%
2026	990	655	990	61%
2027	997	661	997	61%
2028	1,003	666	1,003	61%
2029	1,010	672	1,010	61%
2030	1,018	678	1,018	61%
2031	1,024	684	1,024	62%
2032	1,033	690	1,033	62%
2033	1,039	696	1,039	62%
2034	1,046	702	1,046	62%
2035	1,053	708	1,053	62%
2036	1,061	714	1,061	63%
2037	1,068	720	1,068	63%
2038	1,075	726	1,075	63%
2039	1,082	732	1,082	63%
2040	1,088	737	1,088	63%
2041	1,096	743	1,096	64%
2042	1,103	749	1,103	64%
2043	1,109	755	1,109	64%
2044	1,116	761	1,116	64%
2045	1,122	766	1,122	64%
2046	1,129	772	1,129	64%

Average Annual Growth Rates			
2001-2016	1.4%	2.3%	1.4%
2006-2016	0.9%	2.0%	0.9%
2011-2016	-0.8%	1.4%	-0.8%
2016-2021	2.1%	0.4%	2.1%
2016-2026	1.4%	0.6%	1.4%
2016-2036	1.0%	0.8%	1.0%
2016-2046	0.9%	0.8%	0.9%
2017-2046	0.7%	0.9%	0.7%

Old Approach: Based on MAPP Form 3 Peak with WAPA allocations
Current Method (2014 on): MPC Sum (aggregation of MPC billing meters)

Figure 3.3

Joint System Peak Demand (Winter)
MW



SECTION 4

FORECAST UNCERTAINTY ANALYSIS

Section 4
Forecast Uncertainty Analysis

4.1 Background

While the projections summarized in previous sections should be viewed as the most probable outcome, it is important to remember that energy loads can be influenced by factors that are inherently difficult to predict, such as weather and the economy. Forecasting attempts to model reality and identify the primary drivers of growth and change. Each forecast has an inherent error tolerance between which actual observed outcomes are likely to fall. Therefore, it is important to develop flexible plans for meeting future energy needs based on a range of forecast outcomes.

The base projections summarized in Section 3 should be viewed as one of many possible future outcomes. This section develops several scenarios and recommended planning ranges for the Joint System total energy requirements and annual peak demand. The resulting ranges are the sum of the member system scenario ranges developed in the individual member system reports. The study includes scenario analyses that show how the forecasts change under assumed variations in future weather and economic growth paths. The alternate growth scenarios that have been explored are:

1. Severe weather with normal economic growth
2. Mild weather with normal economic growth
3. Rapid economic growth with normal weather
4. Slow economic growth with normal weather

These scenarios present extreme ranges of growth possibilities while the base forecast represents the most probable predictions of energy use and peak demands. The assumptions used to define the alternative scenarios are described in the following discussions.

4.2 Weather Scenarios

4.2.1 Methodology

Weather is one of the critical components to explain year-to-year variation in the Joint System electric load. Because of this, severe and mild weather scenarios were developed

for the forecast period. The severe and mild weather scenarios were based on the twenty-year long-term maximum and twenty-year long-term minimum annual cooling and heating degree-days, respectively.

4.2.2 Severe and Mild Weather Scenarios

Energy

Forecast models presented in Section 3 that were weather sensitive (i.e. had cooling or heating degree-days as an input) were revised using the severe and mild weather scenario inputs from the method described in Section 4.2. This includes the residential and small commercial equations in most cases. The remaining classes and customer forecasts were assumed to not be weather sensitive. The resulting severe and mild weather scenarios for total energy requirements are expected to diverge +/-5 percent over the base projection by 2046. This scenario is presented in Table 4.1 and Figure 4.1.

Demand

The severe and mild weather Joint System peak demand scenario was developed by applying the base case system load factor to the severe and mild weather energy requirements forecast described above. Table 4.2 and Figure 4.2 present the severe and mild weather peak demand scenarios. This forecast indicates that the Joint System peak demand would range from 1,025 to 1,221 MW by 2046, given the assumptions mentioned herein.

4.3 Economic Scenarios

4.3.1 Methodology

Forecast ranges for demographic and economic variables have been developed using the following method:

- A rolling five- or ten-year average annual growth rate is calculated for the historic economic or demographic series depending on the historic volatility of the series.
- The standard deviation of this series is calculated.
- The projected growth rate is perturbed by plus or minus one historic standard deviation.

Table 4.1

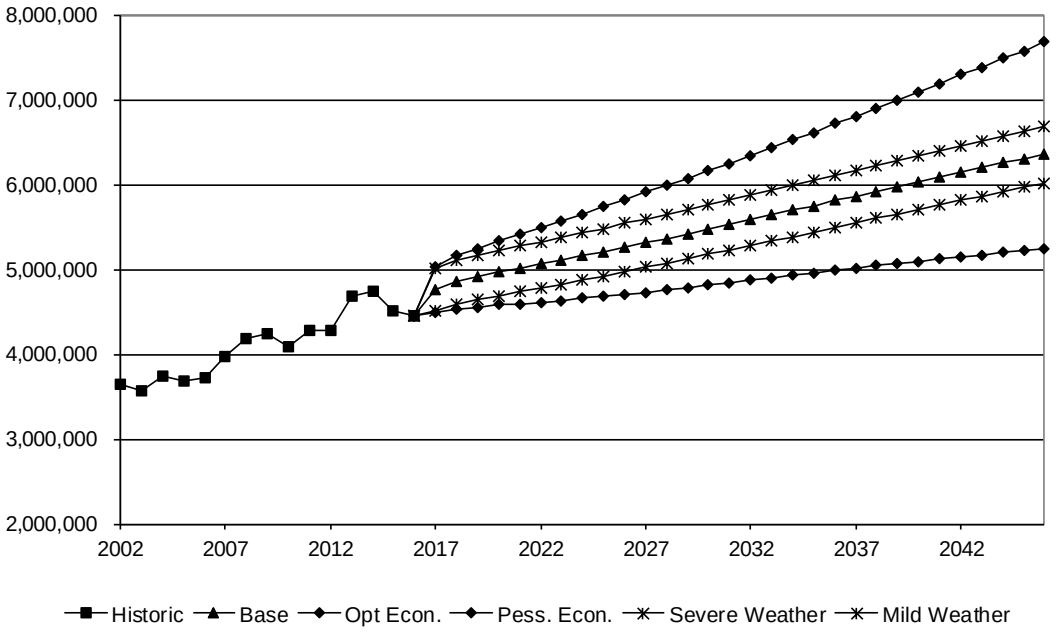
Joint System Energy Requirements Scenarios
MWh

Year	Base /1 Energy Requirements	Optimistic Economic	Pessimistic Economic	Extreme Weather	Mild Weather
1987	2,223,482				
1988	2,457,745				
1989	2,511,234				
1990	2,497,075				
1991	2,639,251				
1992	2,753,395				
1993	2,858,907				
1994	2,954,553				
1995	3,129,848				
1996	3,317,916				
1997	3,183,230				
1998	3,128,521				
1999	3,197,748				
2000	3,382,826				
2001	3,480,197				
2002	3,655,177				
2003	3,580,126				
2004	3,744,537				
2005	3,682,413				
2006	3,728,998				
2007	3,972,935				
2008	4,186,372				
2009	4,253,722				
2010	4,086,381				
2011	4,294,722				
2012	4,288,782				
2013	4,693,790				
2014	4,745,458				
2015	4,517,747				
2016	4,451,508	4,451,508	4,451,508	4,451,508	4,451,508
2017	4,775,171	5,045,706	4,495,198	5,026,544	4,510,437
2018	4,868,051	5,175,001	4,539,153	5,122,777	4,599,919
2019	4,920,659	5,257,351	4,563,382	5,178,407	4,649,426
2020	4,972,154	5,339,759	4,585,832	5,233,024	4,697,721
2021	5,018,491	5,417,818	4,602,902	5,281,534	4,741,820
2022	5,067,216	5,499,290	4,621,918	5,332,743	4,787,987
2023	5,115,885	5,581,642	4,640,509	5,384,083	4,833,913
2024	5,165,298	5,662,467	4,662,385	5,436,001	4,880,751
2025	5,213,228	5,742,269	4,682,873	5,486,463	4,926,076
2026	5,272,247	5,835,021	4,713,031	5,548,798	4,981,693
2027	5,323,772	5,920,021	4,736,497	5,602,814	5,030,651
2028	5,373,923	6,001,733	4,760,869	5,655,477	5,078,211
2029	5,426,486	6,086,096	4,787,700	5,710,694	5,128,040
2030	5,484,133	6,177,157	4,818,649	5,771,392	5,182,543
2031	5,534,124	6,259,595	4,843,251	5,823,788	5,230,046
2032	5,595,833	6,356,935	4,877,046	5,888,682	5,288,477
2033	5,648,466	6,443,838	4,903,404	5,943,545	5,338,799
2034	5,704,106	6,535,235	4,932,064	6,002,164	5,391,363
2035	5,758,813	6,626,235	4,959,606	6,059,378	5,443,480
2036	5,822,912	6,729,619	4,994,418	6,126,478	5,504,482
2037	5,875,002	6,819,105	5,019,411	6,180,792	5,554,266
2038	5,930,748	6,913,759	5,047,098	6,238,897	5,607,569
2039	5,987,431	7,010,435	5,075,296	6,297,799	5,661,948
2040	6,040,740	7,103,852	5,100,581	6,353,256	5,713,027
2041	6,097,789	7,202,580	5,128,633	6,412,604	5,767,695
2042	6,156,027	7,303,782	5,157,319	6,473,055	5,823,636
2043	6,205,245	7,393,908	5,179,073	6,523,649	5,871,409
2044	6,264,244	7,497,659	5,207,977	6,584,995	5,927,979
2045	6,313,480	7,589,314	5,229,401	6,635,530	5,975,849
2046	6,369,288	7,690,888	5,255,377	6,693,432	6,029,479
Average Annual Growth Rates					
1987-2016	2.4%				
2001-2016	1.7%				
2006-2016	1.8%				
2011-2016	0.7%				
2016-2021	2.4%	4.0%	0.7%	3.5%	1.3%
2016-2026	1.7%	2.7%	0.6%	2.2%	1.1%
2016-2036	1.4%	2.1%	0.6%	1.6%	1.1%
2016-2046	1.2%	1.8%	0.6%	1.4%	1.0%
2017-2046	1.0%	1.5%	0.5%	1.0%	1.0%
2046 Index	1.00	1.21	0.83	1.05	0.95

/1 Assumes normal weather and basecase economic assumptions

Figure 4.1

Joint System Energy Requirements Scenarios
MWh



These high and low growth rates were then used to forecast the independent variables. The scenarios with the new values for the independent variables were used in place of the original data within the econometric models of Section 3 to generate appropriate confidence intervals.

4.3.2 Optimistic and Pessimistic Economic Scenarios

To develop optimistic and pessimistic economic scenarios, the economic-related independent variables included in the models used to create the forecasts in Section 3 were altered to reflect a high rate of local economic growth. Where econometric models were not used to create consumer class energy models, judgmental methods were used to project a high growth rate for a particular consumer class. Optimistic growth rates for the residential and commercial classes were aggregated with any unaltered class forecasts and the system own use and losses forecasts to arrive at an optimistic and pessimistic total energy requirements forecast. The result is an upper and lower confidence limit for energy sales based on varying economic growth.

Table 4.2

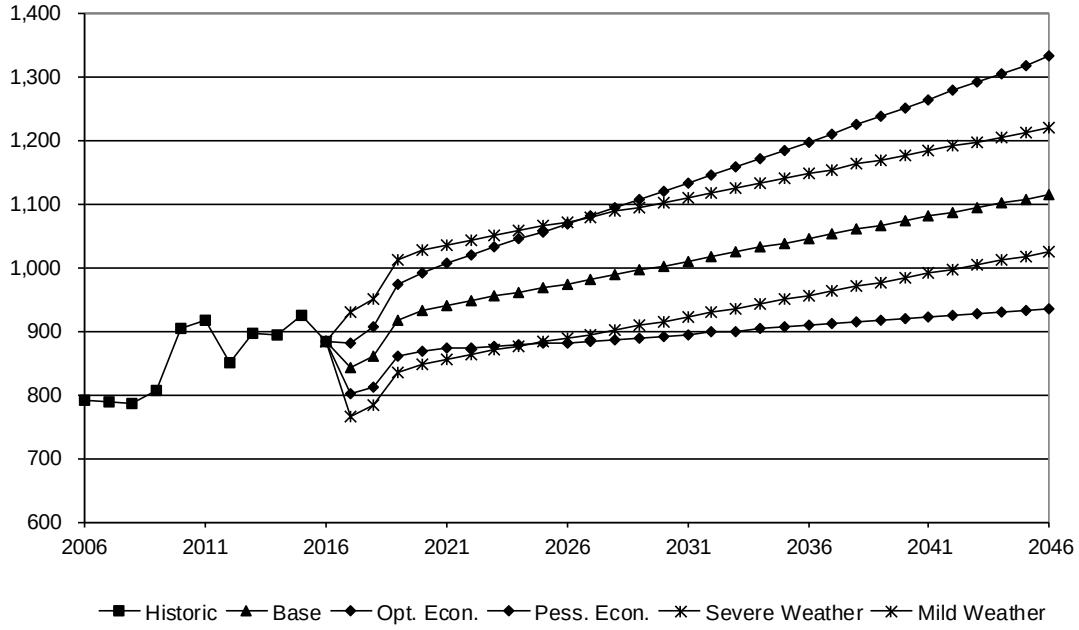
Joint System Peak Demand Scenarios

MW

Year	(Annual) Winter Peak	Optimistic Economic	Pessimistic Economic	Extreme Weather	Mild Weather	Summer Peak	Optimistic Economic	Pessimistic Economic	Extreme Weather	Mild Weather
1999	-					-				
2000	-					-				
2001	709					414				
2002	691					413				
2003	696					437				
2004	711					461				
2005	699					514				
2006	792					447				
2007	788					482				
2008	786					505				
2009	806					521				
2010	906					512				
2011	917					506				
2012	851					574				
2013	897					574				
2014	895					597				
2015	926					603				
2016	885	885	885	885	885	598	598	598	598	598
2017	843	883	802	930	767	630	659	599	695	573
2018	862	908	812	950	784	614	647	579	677	559
2019	919	973	862	1,013	836	601	636	563	662	547
2020	933	993	870	1,028	849	610	649	569	672	555
2021	941	1,007	873	1,037	857	616	659	571	678	561
2022	948	1,020	875	1,045	864	622	669	573	685	566
2023	955	1,033	876	1,052	870	627	678	575	690	571
2024	962	1,045	878	1,059	877	632	687	577	696	576
2025	969	1,057	880	1,066	883	638	696	580	702	581
2026	975	1,070	882	1,073	889	643	706	582	708	587
2027	982	1,082	884	1,080	896	649	715	584	714	592
2028	990	1,096	888	1,089	903	655	725	587	720	598
2029	997	1,108	890	1,096	910	661	735	590	727	603
2030	1,003	1,121	893	1,103	916	666	744	593	732	608
2031	1,010	1,133	895	1,111	923	672	754	595	739	614
2032	1,018	1,146	899	1,119	930	678	764	599	745	620
2033	1,024	1,159	901	1,125	936	684	773	601	751	625
2034	1,033	1,173	905	1,134	944	690	784	605	758	631
2035	1,039	1,185	907	1,141	950	696	794	607	764	636
2036	1,046	1,198	910	1,148	957	702	804	610	770	642
2037	1,053	1,211	912	1,155	964	708	814	613	776	648
2038	1,061	1,226	916	1,164	972	714	825	616	783	654
2039	1,068	1,239	918	1,170	978	720	835	619	789	659
2040	1,075	1,252	921	1,178	985	726	846	622	795	665
2041	1,082	1,266	923	1,185	991	732	856	625	801	671
2042	1,088	1,279	926	1,192	998	737	866	627	807	676
2043	1,096	1,293	928	1,199	1,005	743	877	630	814	682
2044	1,103	1,307	931	1,207	1,012	749	888	633	820	687
2045	1,109	1,320	933	1,213	1,018	755	898	635	825	692
2046	1,116	1,334	936	1,221	1,025	761	909	638	832	698
Average Annual Growth Rates										
1999-2016	--					--				
2006-2016	1.1%					2.9%				
2011-2016	-0.7%					3.4%				
2016-2021	1.2%	2.6%	-0.3%	3.2%	-0.6%	0.6%	2.0%	-0.9%	2.6%	-1.3%
2016-2026	1.0%	1.9%	0.0%	1.9%	0.0%	0.7%	1.7%	-0.3%	1.7%	-0.2%
2016-2036	0.8%	1.5%	0.1%	1.3%	0.4%	0.8%	1.5%	0.1%	1.3%	0.4%
2016-2046	0.8%	1.4%	0.2%	1.1%	0.5%	0.8%	1.4%	0.2%	1.1%	0.5%
2017-2046	1.0%	1.4%	0.5%	0.9%	1.0%	0.7%	1.1%	0.2%	0.6%	0.7%
2046 Index	1.00	1.20	0.84	1.09	0.92	1.00	1.20	0.84	1.09	0.92

Figure 4.2

Joint System Peak Demand Scenarios
MW



Energy

The energy sales projections were developed as the product of customers and average energy use. Economic and demographic inputs to both forecasts were altered to reflect optimistic and pessimistic growth scenarios. In the case of residential consumers, the population and number of household forecasts for each member system's service territory were varied to reflect higher and lower growth, as is the case in any area experiencing economic prosperity or decline.

Other changes made include the use of favorable (lower) and unfavorable (higher) electric prices, yielding higher or lower consumption and alternate fuel prices that discourage or encourage fuel switching. Space heat and air conditioning saturation forecasts were revised using higher household estimates. Other variable were adjusted for optimistic and pessimistic economic outlooks. The commercial classes were also adjusted for stronger economic growth. The remaining classes were not adjusted for the alternate growth scenario.

The result of the optimistic and pessimistic economic scenarios for energy requirements is shown in Table 4.1. This forecast indicates Joint System energy requirements could range -17 to +21 percent by 2046, given the assumptions mentioned above.

Demand

To develop the corresponding peak demand forecast, the base case system load factor was applied to the optimistic and pessimistic economic energy requirements forecasts described above. The result of the economic scenarios for peak demand is shown in Table 4.2. The forecasts indicate the Joint System peak demand would range 936 to 1,334 MW by 2046, given the assumptions mentioned herein.

4.4 Recommended Planning Ranges

4.4.1 Methodology

The ranges developed above provide a useful reference for differentiating between the inherent risk associated with weather related and economic and demographic forecast drivers. However, the Joint System will almost certainly see both weather and economic related factors in any given year. Furthermore, the likelihood of ten years of strong or weak economic growth is less likely than a few years of each given economic business cycles. As a result, recommended planning ranges have been developed to provide a risk management approach to bounding the base case forecast.

The method used employed Monte Carlo simulation to pick the most-probable high and low ranges in select years (2021, 2026, 2036 and 2046) based using the high and low economic and weather ranges developed above.

4.4.1 Planning Ranges

The resulting planning ranges scenarios for total energy requirements and peak demand are expected to deviate from the base projection by approximately -10 to +15 percent in 2046. This scenario is presented in Table 4.3 and Figure 4.3.

Table 4.3

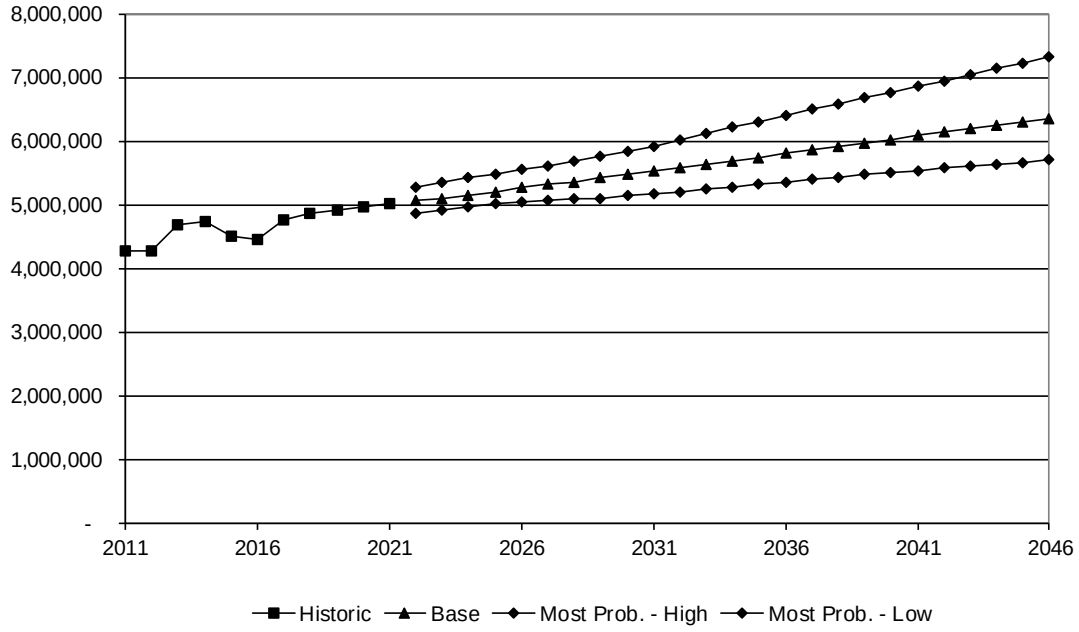
Joint System Forecast - Most Probable Ranges

Year	Base MWh	Most Prob. High	Most Prob. Low	Winter MW	Most Prob. High	Most Prob. Low	Summer MW	Most Prob. High	Most Prob. Low
1987	2,223,482								
1988	2,457,745								
1989	2,511,234								
1990	2,497,075								
1991	2,639,251								
1992	2,753,395								
1993	2,858,907								
1994	2,954,553								
1995	3,129,848								
1996	3,317,916								
1997	3,183,230								
1998	3,128,521								
1999	3,197,748								
2000	3,382,826								
2001	3,480,197			709			414		
2002	3,655,177			691			413		
2003	3,580,126			696			437		
2004	3,744,537			711			461		
2005	3,682,413			699			514		
2006	3,728,998			792			447		
2007	3,972,935			788			482		
2008	4,186,372			786			505		
2009	4,253,722			806			521		
2010	4,086,381			906			512		
2011	4,294,722			917			506		
2012	4,288,782			851			574		
2013	4,693,790			897			574		
2014	4,745,458			895			597		
2015	4,517,747			926			603		
2016	4,451,508	4,451,508	4,451,508	885	885	885	598	598	598
2017	4,775,171	4,933,324	4,622,356	843	887	800	630	665	597
2018	4,868,051	5,024,350	4,692,529	862	898	810	614	648	582
2019	4,920,659	5,086,455	4,735,279	919	962	866	601	632	568
2020	4,972,154	5,142,451	4,772,037	933	976	879	610	641	575
2021	5,018,491	5,216,679	4,825,376	941	984	886	616	648	582
2022	5,067,216	5,295,292	4,882,365	948	995	895	622	655	588
2023	5,115,885	5,364,245	4,930,061	955	1,005	903	627	661	594
2024	5,165,298	5,428,803	4,973,373	962	1,014	911	632	667	599
2025	5,213,228	5,497,555	5,020,187	969	1,022	918	638	673	604
2026	5,272,247	5,564,463	5,064,970	975	1,031	925	643	678	608
2027	5,323,772	5,630,138	5,081,734	982	1,039	928	649	685	611
2028	5,373,923	5,692,938	5,095,287	990	1,050	933	655	692	615
2029	5,426,486	5,762,211	5,113,999	997	1,058	936	661	699	618
2030	5,484,133	5,845,428	5,144,310	1,003	1,067	939	666	707	621
2031	5,534,124	5,927,329	5,172,603	1,010	1,078	944	672	716	626
2032	5,595,833	6,028,204	5,216,477	1,018	1,091	950	678	725	631
2033	5,648,466	6,125,736	5,256,383	1,024	1,103	956	684	735	636
2034	5,704,106	6,222,254	5,294,388	1,033	1,118	964	690	745	642
2035	5,758,813	6,317,853	5,330,609	1,039	1,130	969	696	755	647
2036	5,822,912	6,422,457	5,373,383	1,046	1,143	976	702	764	652
2037	5,875,002	6,511,941	5,409,667	1,053	1,154	978	708	774	655
2038	5,930,748	6,596,725	5,441,291	1,061	1,168	982	714	784	659
2039	5,987,431	6,689,581	5,478,808	1,068	1,179	984	720	794	662
2040	6,040,740	6,775,819	5,510,137	1,075	1,192	988	726	803	665
2041	6,097,789	6,867,397	5,545,060	1,082	1,204	990	732	813	669
2042	6,156,027	6,962,052	5,581,680	1,088	1,216	993	737	823	672
2043	6,205,245	7,051,320	5,613,213	1,096	1,229	996	743	833	675
2044	6,264,244	7,148,027	5,649,901	1,103	1,242	999	749	843	679
2045	6,313,480	7,238,954	5,681,251	1,109	1,254	1,001	755	853	682
2046	6,369,288	7,331,659	5,713,259	1,116	1,268	1,005	761	863	685
Average Annual Growth Rates									
1987-2016	2.4%			--			--		
2001-2016	1.7%			1.5%			2.5%		
2006-2016	1.8%			1.1%			2.9%		
2011-2016	0.7%			-0.7%			3.4%		
2016-2021	2.4%	3.2%	1.6%	1.2%	2.1%	0.0%	0.6%	1.6%	-0.5%
2016-2026	1.7%	2.3%	1.3%	1.0%	1.5%	0.4%	0.7%	1.3%	0.2%
2016-2036	1.4%	1.8%	0.9%	0.8%	1.3%	0.5%	0.8%	1.2%	0.4%
2016-2046	1.2%	1.7%	0.8%	0.8%	1.2%	0.4%	0.8%	1.2%	0.5%
2017-2046	1.0%	1.4%	0.7%	1.0%	1.2%	0.8%	0.7%	0.9%	0.5%
2046 Index	1.00	1.15	0.90	1.00	1.14	0.90	1.00	1.14	0.90

Figure 4.3

Joint System Forecast - Most Probable Ranges

MWh



4.5 Minnesota CIP Scenario

4.5.1 Background

The Minnesota Conservation Improvement Plan is mandated by state law, and it requires utilities to invest a portion of revenues into energy efficiency and conservation programs. All utilities must develop their own conservation improvement plan. The goals of the utility programs are to raise awareness of energy conservation, reduce utility bills, and increase the usage of energy efficient technologies and products. Typical CIP projects include rebate programs for the purchase of new energy efficient appliances and/or lighting, rebates for energy efficient farm equipment, building design assistance, and grants or low interest loans for energy efficiency improvements. The purpose of the programs is to give consumers an incentive to conserve energy through behavioral changes or purchasing energy efficient appliances. Table 4.4 presents the retail sales forecast (kWh) over the thirty-year period, and the kWh Minnkota members are required to save through their CIP plan (1.5% of the three-year moving average of retail kWh sales). North Dakota members are exempt from this requirement.

Table 4.4

Joint System Retail Energy Forecasts (kWh) - CIP Scenario

Joint System

Year	Base Retail Forecast	/1	CIP Requirement Forecast	/2	Adjusted Retail Forecast	/3
1996	2,802,247,475					
1997	2,731,587,512					
1998	2,651,475,812					
1999	2,782,916,217					
2000	2,859,765,949					
2001	3,009,621,442					
2002	3,167,181,696					
2003	3,168,870,245					
2004	3,237,906,864					
2005	3,296,564,808					
2006	3,394,586,881					
2007	3,573,708,570					
2008	3,731,808,337					
2009	3,796,398,726		3,261,266		3,799,659,992	
2010	3,709,481,446		11,866,950		3,721,348,396	
2011	3,890,908,441		20,470,321		3,911,378,762	
2012	3,828,166,152		29,628,718		3,857,794,870	
2013	4,201,562,774		38,547,846		4,240,110,620	
2014	4,418,093,782		49,534,178		4,467,627,960	
2015	4,115,537,129		61,444,137		4,176,981,266	
2016	4,084,718,289		75,137,568		4,159,855,857	
2017	4,353,498,635		76,848,478		4,430,347,113	
2018	4,436,925,153		78,604,559		4,515,529,712	
2019	4,485,176,934		80,407,041		4,565,583,975	
2020	4,532,313,682		82,257,192		4,614,570,874	
2021	4,574,707,834		84,156,314		4,658,864,148	
2022	4,619,220,090		86,105,744		4,705,325,834	
2023	4,663,753,701		88,106,860		4,751,860,560	
2024	4,708,908,829		90,161,074		4,799,069,904	
2025	4,752,671,459		92,269,843		4,844,941,302	
2026	4,806,540,509		94,434,660		4,900,975,170	
2027	4,853,590,692		96,657,064		4,950,247,755	
2028	4,899,352,362		98,938,634		4,998,290,996	
2029	4,947,380,774		101,280,995		5,048,661,769	
2030	4,999,984,575		103,685,818		5,103,670,394	
2031	5,045,593,987		106,154,822		5,151,748,808	
2032	5,101,888,425		108,689,770		5,210,578,195	
2033	5,149,905,460		111,292,481		5,261,197,941	
2034	5,200,658,902		113,964,820		5,314,623,722	
2035	5,250,600,220		116,708,708		5,367,308,928	
2036	5,309,001,016		119,526,119		5,428,527,135	
2037	5,356,518,002		122,419,082		5,478,937,084	
2038	5,407,427,016		125,389,685		5,532,816,700	
2039	5,459,143,292		128,440,073		5,587,583,365	
2040	5,507,807,849		131,572,454		5,639,380,303	
2041	5,559,934,517		134,789,098		5,694,723,615	
2042	5,613,115,630		138,092,337		5,751,207,966	
2043	5,658,075,593		141,484,572		5,799,560,165	
2044	5,711,998,419		144,968,270		5,856,966,689	
2045	5,756,977,198		148,545,969		5,905,523,167	
2046	5,807,949,925		152,220,280		5,960,170,206	
Average Annual Growth Rates						
2001-2016	2.5%		--		--	
2006-2016	1.9%		--		--	
2011-2016	1.0%		29.7%		1.2%	
2016-2021	2.3%		2.3%		2.3%	
2016-2026	1.6%		2.3%		1.7%	
2016-2036	1.3%		2.3%		1.3%	
2016-2046	1.2%		2.4%		1.2%	
2017-2046	1.0%		2.4%		1.0%	

/1 Base-case load forecast - joint system retail sales - excludes distribution and transmission losses - INCLUDES CIP savings

/2 CIP Requirement forecast - only MN co-ops adjusted

/3 Base retail forecast EXCLUDING estimated CIP kWh savings.

APPENDIX A

BOARD APPROVAL

MINNKOTA POWER COOPERATIVE, INC.
GRAND FORKS, NORTH DAKOTA

RESOLUTION NO. 3602

2017 LOAD FORECAST STUDY

BE IT RESOLVED that the Board of Directors of Minnkota Power Cooperative, Inc., does hereby approve the 2017 Load Forecast Study and the submittal of the study as required by the Rural Utilities Service.

SECRETARY'S CERTIFICATE

I, Jeffrey Folland, do hereby certify that I am the duly elected, qualified and acting secretary of Minnkota Power Cooperative, Inc. and the keeper of its records, and that the attached is a true and correct copy of a resolution duly adopted at a meeting of the Board of Directors of said Corporation duly convened and held in accordance with its bylaws, on the 30th day of November, 2017, at which a quorum was present and acting throughout, and I do further certify that said resolution is still in force and effect and has not been repealed.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Secretary and affixed the corporate seal of said Corporation this 30th day of November, 2017.

_____
Secretary

SEAL

APPENDIX B

FORECAST METHODOLOGY

Appendix B
Model Test Criteria

The models developed and discussed in Section 3 use econometric modeling as the forecasting technique of choice. All models were selected on the basis of theoretical and statistical validity as well as the reasonableness of the forecast results generated.

The statistical validity of the models is determined by several criteria. A simple but important criterion is that the coefficient of each explanatory variable has the correct sign. For example, energy sales will generally increase as a consumer's income increases or during periods of colder or hotter weather (i.e., theses variables should have positive coefficients). Conversely, energy sales generally decrease with increasing electricity prices (i.e., the coefficient of this variable should be negative).

Another important criterion is the fact that each explanatory variable should have a significant influence on the dependent variable. The statistical significance of an explanatory variable is measured by the t-statistic. The specific value of a particular t-statistic required for statistical significance depends on both the degrees of freedom (the number of data points less the number of variables) of the equations and desired level of confidence in the estimated coefficients. In general, however, the t-statistic should have a magnitude of at least 2.0 for a 95 percent level of confidence, and at least 1.5 for a 90 percent level of confidence.

Another important test is how the equation explains the historical variation in the dependent variable. Measures of this include the adjusted R-squared and the F-statistic. An adjusted R-squared value of 1 indicates that all of the variation is explained, whereas an adjusted R-squared value of zero indicates that none of the variation is explained. Generally, an equation with an adjusted R-squared greater than 0.80 is considered to be statistically adequate in explaining historical variation in the dependent variable, assuming the other validity measures described here are achieved.

The value of the F-statistic necessary for a statistically valid equation varies, like that of the t-statistic, with the number of degrees of freedom and the desired level of confidence.

In general, however, for equations of the type used in this analysis, the F-statistic should be at least 4.0 for a 95 percent level of confidence in the statistical validity of the equation.

Another validity criterion examines the equation residuals (the difference between the actual historical and estimated historical values). In a good equation, the residuals are randomly distributed and of approximately constant magnitude. This indicates that there is no pattern in the data that has not been explained by the equation. The Durbin-Watson statistic can be used to check the randomness of residuals. A Durbin-Watson statistic near 2.0 is generally indicative of random residuals.

The models developed must also pass a test of reasonableness. Models must make intuitive sense and the forecasts that result must be plausible given reasonable assumptions of growth factors.

For more detailed discussions of the methods described above, please consult, “Introductory Econometrics With Applications,” Ramanathan, 1992, Dryden Press – HBJ.

Dependent Variable: BAUDETTE_MWH+BAUDETTECIP
Method: Least Squares
Date: 07/24/17 Time: 16:00
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10316.98	3976.491	2.594492	0.0183
TEMPW	1.885337	0.671925	2.805876	0.0117
D01ON_REV	2483.070	245.2720	10.12374	0.0000
D10ON	-548.1470	312.4932	-1.754109	0.0964

R-squared	0.855227	Mean dependent var	22781.00
Adjusted R-squared	0.831098	S.D. dependent var	1018.364
S.E. of regression	418.5242	Akaike info criterion	15.07431
Sum squared resid	3152925.	Schwarz criterion	15.27268
Log likelihood	-161.8174	Hannan-Quinn criter.	15.12104
F-statistic	35.44412	Durbin-Watson stat	1.339231
Prob(F-statistic)	0.000000		

Dependent Variable: FOSSTON_MWH+FOSSTONCIP
Method: Least Squares
Date: 07/24/17 Time: 15:14
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-38778.60	11244.48	-3.448677	0.0029
HDD	0.828025	0.309367	2.676516	0.0154
HHW	18.54018	3.025315	6.128345	0.0000
D10ON_REV	-2272.931	949.1220	-2.394772	0.0277

R-squared	0.780668	Mean dependent var	34587.00
Adjusted R-squared	0.744112	S.D. dependent var	2230.314
S.E. of regression	1128.212	Akaike info criterion	17.05762
Sum squared resid	22911532	Schwarz criterion	17.25599
Log likelihood	-183.6338	Hannan-Quinn criter.	17.10435
F-statistic	21.35575	Durbin-Watson stat	1.440779
Prob(F-statistic)	0.000004		

Dependent Variable: GRAFTON_MWH
Method: Least Squares
Date: 07/25/17 Time: 14:22
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	47165.98	30192.48	1.562176	0.1367
HDD	1.271545	0.628591	2.022849	0.0591
HHW	0.776998	1.756843	0.442270	0.6639
D97	-13900.05	2150.278	-6.464302	0.0000
D08ON	-13321.75	1218.246	-10.93519	0.0000

R-squared	0.931392	Mean dependent var	66280.59
Adjusted R-squared	0.915249	S.D. dependent var	7026.632
S.E. of regression	2045.591	Akaike info criterion	18.28148
Sum squared resid	71135553	Schwarz criterion	18.52944
Log likelihood	-196.0963	Hannan-Quinn criter.	18.33989
F-statistic	57.69637	Durbin-Watson stat	0.908700
Prob(F-statistic)	0.000000		

Dependent Variable: HALSTAD+HALSTADCIP
Method: Least Squares
Date: 07/25/17 Time: 12:47
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3570.201	763.5127	4.676020	0.0002
HDD	0.480657	0.071778	6.696486	0.0000
TPI09W	6.433689	1.230853	5.227018	0.0000

R-squared	0.760462	Mean dependent var	9452.091
Adjusted R-squared	0.735247	S.D. dependent var	512.1567
S.E. of regression	263.5258	Akaike info criterion	14.11230
Sum squared resid	1319471.	Schwarz criterion	14.26108
Log likelihood	-152.2353	Hannan-Quinn criter.	14.14735
F-statistic	30.15962	Durbin-Watson stat	1.160699
Prob(F-statistic)	0.000001		

Dependent Variable: PARKRVR_MWH
Method: Least Squares
Date: 07/24/17 Time: 16:29
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3486.086	2897.573	1.203105	0.2454
HDD	0.925925	0.199878	4.632462	0.0002
CDD	2.763155	1.149946	2.402856	0.0280
CEMPW	1.744024	0.789498	2.209030	0.0412
FEMPW	2.577770	1.158761	2.224592	0.0399

R-squared	0.718313	Mean dependent var	20478.50
Adjusted R-squared	0.652033	S.D. dependent var	860.0905
S.E. of regression	507.3563	Akaike info criterion	15.49302
Sum squared resid	4375976.	Schwarz criterion	15.74098
Log likelihood	-165.4232	Hannan-Quinn criter.	15.55143
F-statistic	10.83765	Durbin-Watson stat	1.609664
Prob(F-statistic)	0.000149		

Dependent Variable: ROSEAU_MWH+ROSEAUCIP
Method: Least Squares
Date: 07/25/17 Time: 14:36
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28567.92	11783.18	-2.424466	0.0261
HDD+CDD	1.208306	0.274021	4.409531	0.0003
HHW	13.64169	2.496348	5.464661	0.0000
D12ON	-1730.467	571.3979	-3.028479	0.0072

R-squared	0.700078	Mean dependent var	43621.91
Adjusted R-squared	0.650091	S.D. dependent var	1565.435
S.E. of regression	926.0036	Akaike info criterion	16.66260
Sum squared resid	15434689	Schwarz criterion	16.86097
Log likelihood	-179.2886	Hannan-Quinn criter.	16.70933
F-statistic	14.00520	Durbin-Watson stat	1.125995
Prob(F-statistic)	0.000059		

Dependent Variable: STEPHEN+STEPHENCIP
Method: Least Squares
Date: 07/25/17 Time: 13:56
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8090.801	6453.097	-1.253786	0.2260
HDD	0.686305	0.139783	4.909771	0.0001
CDD	1.715115	0.893101	1.920405	0.0708
HHW	3.757532	2.363395	1.589888	0.1293

R-squared	0.647408	Mean dependent var	9669.773
Adjusted R-squared	0.588643	S.D. dependent var	678.7789
S.E. of regression	435.3492	Akaike info criterion	15.15314
Sum squared resid	3411521.	Schwarz criterion	15.35151
Log likelihood	-162.6845	Hannan-Quinn criter.	15.19987
F-statistic	11.01685	Durbin-Watson stat	1.128437
Prob(F-statistic)	0.000245		

Dependent Variable: TRF+TRFCIP
Method: Least Squares
Date: 07/25/17 Time: 14:05
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-287363.9	77699.09	-3.698421	0.0018
HDD	3.714489	1.033665	3.593513	0.0022
CDD	11.85206	8.179659	1.448968	0.1655
SEMPW	38.32712	16.88792	2.269499	0.0365
HHW	77.21338	25.45273	3.033600	0.0075

R-squared	0.910276	Mean dependent var	135712.9
Adjusted R-squared	0.889164	S.D. dependent var	10928.61
S.E. of regression	3638.359	Akaike info criterion	19.43317
Sum squared resid	2.25E+08	Schwarz criterion	19.68113
Log likelihood	-208.7649	Hannan-Quinn criter.	19.49158
F-statistic	43.11725	Durbin-Watson stat	1.007794
Prob(F-statistic)	0.000000		

Dependent Variable: WARREN+WARRENCIP
Method: Least Squares
Date: 07/25/17 Time: 13:55
Sample (adjusted): 1995 2016
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7869.664	1611.860	4.882350	0.0001
HDD	0.721742	0.142539	5.063469	0.0001
CDD	3.833484	0.912677	4.200263	0.0005
TPI09W(-1)	11.86713	2.127644	5.577593	0.0000

R-squared	0.761689	Mean dependent var	19036.68
Adjusted R-squared	0.721970	S.D. dependent var	859.1626
S.E. of regression	453.0239	Akaike info criterion	15.23273
Sum squared resid	3694152.	Schwarz criterion	15.43110
Log likelihood	-163.5601	Hannan-Quinn criter.	15.27946
F-statistic	19.17715	Durbin-Watson stat	0.812751
Prob(F-statistic)	0.000008		

APPENDIX C

FORM 7 DATABASE

	1. RESIDENTIAL			2. SEASONAL RESIDENTIAL			3. IRRIGATION			4. COMM
	a.	b.	c.	a.	b.	c.	a.	b.	c.	a.
Date	Consumers	KWHs	Revenue	Consumers	KWHs	Revenue	Consumers	KWHs	Revenue	Consumers
1987	62,739	1,060,117,835	58,058,003	5,356	9,361,636	1,120,870	267	9,298,587	539,989	4,914
1988	63,495	1,153,334,959	64,852,826	5,469	9,939,112	1,182,494	265	14,158,487	734,036	4,964
1989	64,445	1,200,468,323	67,242,734	5,501	10,846,478	1,293,539	263	10,419,669	598,111	5,102
1990	65,391	1,185,203,193	67,939,942	5,525	11,352,386	1,335,601	283	10,369,758	597,627	5,230
1991	66,291	1,247,575,358	71,713,839	5,613	11,334,197	1,410,337	360	11,301,137	673,768	5,348
1992	67,471	1,243,730,639	73,881,844	5,714	11,969,587	1,504,862	389	9,246,009	670,542	5,550
1993	68,964	1,333,117,413	77,813,982	5,761	12,765,255	1,547,709	403	4,946,990	530,349	5,747
1994	70,523	1,342,635,892	79,015,539	5,828	12,216,718	2,258,390	410	9,057,841	715,698	5,906
1995	72,133	1,408,445,732	81,850,718	5,840	12,960,677	1,576,549	409	9,879,273	714,806	6,073
1996	73,981	1,533,814,728	86,223,090	5,746	14,482,975	1,623,749	422	11,080,260	793,858	6,262
1997	75,728	1,489,896,613	84,606,635	5,540	14,015,419	1,605,219	434	9,371,288	735,680	6,403
1998	77,387	1,381,036,652	82,134,928	5,422	13,213,253	1,517,560	442	12,410,399	860,701	6,673
1999	78,845	1,451,488,010	86,221,545	5,447	14,304,629	1,632,893	451	9,944,867	770,480	6,843
2000	80,885	1,563,589,809	92,092,209	5,443	14,542,269	1,720,131	431	10,022,560	872,623	6,888
2001	84,982	1,623,580,258	96,973,120	4,969	14,055,021	1,643,774	363	8,562,566	778,459	5,539
2002	87,208	1,714,172,012	103,606,080	4,892	15,300,039	1,769,751	370	9,775,794	773,183	5,751
2003	89,889	1,708,840,132	108,451,068	4,679	14,504,224	1,849,126	421	13,198,104	1,012,486	6,014
2004	92,942	1,744,547,948	115,034,437	4,457	14,277,309	1,902,161	426	11,227,968	918,408	6,357
2005	95,888	1,777,230,743	121,251,666	4,269	13,618,659	1,876,689	406	8,417,491	790,616	6,569
2006	99,668	1,788,259,644	125,242,503	3,081	10,558,027	1,538,195	410	17,416,772	1,307,656	6,833
2007	102,231	1,882,154,134	137,373,131	2,621	10,027,368	1,535,674	414	12,052,373	1,182,594	7,128
2008	104,044	2,003,239,253	148,491,579	2,409	10,071,854	1,575,775	421	13,595,103	1,185,402	7,369
2009	106,122	2,079,989,668	165,536,458	1,519	8,784,230	1,363,739	427	11,672,028	1,165,827	7,561
2010	107,219	1,948,467,543	177,576,475	1,475	8,010,096	1,372,810	430	10,058,495	1,115,654	7,869
2011	108,276	1,969,410,474	201,056,711	1,417	8,138,230	1,483,921	426	7,081,318	1,042,109	8,039
2012	109,920	1,832,850,278	204,778,259	1,355	8,055,729	1,485,373	434	17,400,319	1,952,522	8,101
2013	112,115	2,089,026,945	226,074,176	1,294	8,842,488	1,626,797	446	17,319,225	1,966,866	8,161
2014	114,820	2,195,604,747	237,558,999	1,224	8,975,457	1,607,305	462	11,273,681	1,462,776	8,416
2015	118,403	1,917,457,254	220,848,862	1,193	8,183,710	1,539,294	490	14,074,002	1,800,969	8,870
2016	121,602	1,869,693,492	225,135,425	1,168	8,035,493	1,570,217	509	12,303,615	1,749,339	9,179

	4. & IND. (<1000 kVA)		5. COMM. & IND. (>1000 kVA)			6. PUBLIC STREET & HIGHWAY			7. OTHER SALES TO PU	
	b.	c.	a.	b.	c.	a.	b.	c.	a.	b.
Date	KWHs	Revenue	Consumers	KWHs	Revenue	Consumers	KWHs	Revenue	Consumers	KWHs
1987	251,110,699	12,755,088	87	67,627,836	2,796,560	232	2,517,296	153,908	112	109,993,965
1988	270,714,357	14,020,780	86	87,238,280	3,284,461	233	2,514,260	176,331	112	120,177,914
1989	279,051,909	14,802,540	56	77,965,412	2,606,880	253	2,535,541	187,445	112	122,783,620
1990	286,003,116	15,442,624	58	97,332,237	3,229,113	280	2,686,742	200,372	112	120,326,477
1991	297,013,578	15,771,806	119	105,849,945	4,049,327	295	2,997,490	234,826	113	125,094,271
1992	328,082,924	17,344,962	85	100,569,016	3,687,933	310	2,905,578	238,753	113	121,864,420
1993	351,092,324	19,059,798	88	115,888,395	4,068,379	318	3,160,076	244,841	112	121,565,040
1994	375,189,447	20,215,356	85	129,010,344	4,334,229	335	3,331,127	254,101	112	120,015,271
1995	407,579,610	21,453,665	146	147,616,018	5,170,940	344	3,523,712	268,639	113	120,798,190
1996	446,298,289	22,821,092	88	131,271,622	4,319,075	365	3,676,078	286,476	111	122,293,301
1997	452,419,179	23,344,054	88	132,131,676	4,249,487	378	3,821,017	290,861	111	107,107,265
1998	456,757,299	23,756,029	95	157,405,856	5,025,783	388	4,010,050	317,645	111	92,781,196
1999	472,458,894	24,530,030	267	197,917,692	7,543,132	407	4,383,320	325,348	103	86,969,917
2000	431,223,712	22,646,071	299	230,810,531	8,777,206	429	4,623,499	353,563	87	70,311,740
2001	445,355,368	22,422,093	367	297,667,888	11,434,014	395	5,042,322	366,084	25	67,092,420
2002	486,038,676	25,491,814	300	302,602,373	11,754,415	403	6,048,951	454,675	26	68,284,807
2003	482,426,344	25,556,508	322	322,124,181	13,367,870	370	5,507,857	399,227	28	66,875,948
2004	495,281,517	27,780,395	336	334,801,299	14,632,900	410	5,950,752	425,494	28	66,184,235
2005	522,595,540	30,104,725	330	338,649,316	15,893,875	427	6,468,180	464,964	28	64,102,100
2006	570,500,653	32,389,206	343	357,375,711	15,963,021	448	6,814,781	512,133	26	64,478,575
2007	569,512,248	35,029,610	427	413,666,263	19,627,677	509	7,221,696	569,853	28	106,080,393
2008	609,808,912	38,380,741	475	417,589,622	20,446,952	534	7,587,199	604,696	29	105,857,388
2009	627,863,515	43,094,600	488	413,312,549	22,521,005	553	8,066,195	649,759	29	103,904,716
2010	647,086,507	51,408,821	398	450,677,697	27,901,398	569	8,684,129	728,601	29	99,078,156
2011	643,106,562	57,279,039	404	633,948,572	43,405,361	590	9,246,792	910,726	28	90,651,423
2012	627,781,412	59,811,392	525	725,624,175	54,481,670	610	9,558,017	1,042,720	27	93,781,544
2013	677,622,227	64,398,873	557	771,541,500	58,060,212	619	9,739,152	1,054,131	25	98,569,028
2014	732,571,625	70,006,396	559	801,346,967	60,671,830	625	9,972,645	1,076,708	26	97,591,236
2015	739,930,895	72,428,170	428	776,587,891	60,544,012	638	9,895,011	1,086,123	33	93,810,754
2016	766,195,070	77,427,699	427	755,847,341	62,426,155	649	9,739,522	1,123,439	34	89,487,361

	BL. AUTH.	8. SALE FOR RESALE-RUS BORR.			9. SALES FOR RESALE-OTHERS			10.	11.	12.
	c.	a.	b.	c.	a.	b.	c.	Total	Total	Total
Date	Revenue	Consumers	KWHs	Revenue	Consumers	KWHs	Revenue	Consumers	KWHs	Revenue
1987	4,502,904	1	5,389,200	204,557	10	57,374,051	2,518,836	73,710	1,572,791,105	82,650,715
1988	5,195,755	2	5,713,400	247,733	10	65,525,511	2,797,936	74,628	1,729,316,280	92,492,352
1989	5,513,933	1	5,387,400	233,206	9	65,956,742	2,787,376	74,705	1,775,415,094	95,265,764
1990	5,510,052	1	5,409,600	234,194	9	64,789,493	2,678,018	76,863	1,783,473,002	97,167,543
1991	5,600,382	1	5,103,000	219,862	10	82,965,796	3,407,585	78,105	1,889,234,772	103,081,733
1992	5,501,200	1	5,377,657	231,858	10	91,793,051	3,721,215	79,619	1,915,538,881	106,783,170
1993	5,566,185	1	5,650,555	227,825	12	94,449,803	3,773,159	81,390	2,042,635,851	112,832,227
1994	5,453,962	1	5,684,380	226,947	12	101,486,923	3,953,678	83,194	2,098,627,943	116,427,900
1995	5,378,182	1	5,791,798	228,208	12	101,701,636	3,959,671	85,055	2,218,296,646	120,601,378
1996	5,524,311	1	6,281,174	236,378	12	113,028,048	4,061,950	86,966	2,382,226,475	125,889,979
1997	5,105,499	1	6,526,134	243,579	12	113,306,922	4,045,137	88,673	#N/A	124,226,151
1998	4,479,980	1	6,197,288	238,712	12	120,032,819	4,356,986	90,511	2,243,844,812	122,688,324
1999	3,787,971	1	6,515,407	239,648	13	116,986,481	4,248,609	92,349	2,360,969,217	129,299,656
2000	2,848,481	1	6,672,212	240,581	13	104,219,617	3,835,345	94,409	2,436,015,949	133,386,210
2001	2,612,662	1	6,774,788	241,830	13	102,265,091	4,025,031	96,636	2,570,395,722	140,497,067
2002	2,699,193	1	7,157,112	252,664	12	107,327,932	4,273,888	98,927	2,716,707,696	151,075,663
2003	2,724,460	1	7,278,572	261,418	11	99,385,372	4,291,349	101,693	2,720,140,734	157,913,511
2004	2,902,178	1	7,802,182	294,135	11	103,405,778	4,591,494	104,925	2,783,478,988	168,481,602
2005	2,854,893	1	7,696,019	307,746	10	100,389,760	4,947,968	107,928	2,839,167,808	178,493,142
2006	2,864,028	1	7,618,370	309,741	10	108,730,684	5,386,520	110,819	2,931,753,217	185,513,003
2007	4,255,957	1	8,011,705	341,467	10	100,301,386	5,043,216	113,369	3,109,027,566	204,959,180
2008	4,347,462	1	7,989,728	362,025	11	97,338,150	5,229,105	115,293	3,273,077,209	220,623,737
2009	4,511,797	1	8,118,785	408,183	11	84,959,823	4,369,324	116,711	3,346,671,509	243,620,693
2010	4,979,646	1	7,860,022	452,421	11	87,776,805	4,792,735	118,002	3,267,699,450	270,328,561
2011	5,871,870	1	7,930,660	568,120	11	78,966,687	4,693,108	119,191	3,448,480,718	316,310,954
2012	6,634,622	1	7,068,507	581,458	11	83,171,073	5,081,378	120,983	3,405,291,054	335,849,394
2013	6,299,887	1	8,316,494	703,521	11	73,618,137	4,407,613	123,227	3,742,668,912	364,299,240
2014	6,291,834	1	9,003,400	540,107	11	93,747,434	5,649,704	127,807	3,958,625,138	384,916,626
2015	6,115,523	1	8,460,850	670,818	11	111,480,554	7,301,678	130,068	3,643,139,258	372,335,449
2016	6,106,282	1	13,863,124	693,806	10	135,042,659	8,749,497	133,342	3,660,207,677	384,981,859

Date	13. Other Elec Revenue	14. KWHs Own Use	15. Total KWHs Purchased	16. Total KWHs Generated	17. Power Cost	18. Interhange KWHs - Net
1987	5,583,243	1,468,179	1,673,780,734	0	306,030,606	0
1988	3,900,946	1,722,117	1,838,946,866	0	342,481,842	0
1989	4,152,201	1,863,279	1,920,072,947	0	354,143,900	0
1990	3,210,685	1,830,678	1,860,323,758	0	347,789,999	0
1991	3,283,698	1,921,753	2,018,791,437	0	359,635,301	0
1992	3,393,669	1,833,084	2,017,999,077	0	363,739,731	0
1993	705,274	2,110,472	2,160,868,404	0	67,336,898	0
1994	861,980	2,069,718	2,228,292,118	0	68,555,446	0
1995	870,484	2,216,488	2,352,345,157	0	70,457,447	0
1996	846,747	2,390,393	2,488,709,763	0	73,284,161	0
1997	787,429	2,447,135	2,456,133,009	0	72,686,475	0
1998	894,986	2,330,084	2,347,967,688	0	72,116,507	0
1999	1,088,284	2,413,889	2,473,173,826	0	73,007,397	0
2000	1,051,445	2,400,963	2,553,456,063	0	74,226,637	0
2001	670,273	2,883,341	2,692,023,962	0	77,553,094	0
2002	767,674	3,723,219	2,865,733,827	0	86,470,217	0
2003	1,079,654	3,734,977	2,860,849,278	0	91,601,769	0
2004	1,170,448	4,335,914	2,930,437,198	0	102,186,806	0
2005	1,311,372	4,451,840	2,997,936,193	0	107,891,489	0
2006	1,305,690	3,882,043	3,080,882,004	0	111,627,258	0
2007	1,433,968	3,822,352	3,269,299,708	0	125,324,070	0
2008	1,544,972	4,166,528	3,460,221,100	0	139,215,284	0
2009	1,521,822	4,224,715	3,518,961,371	0	158,545,292	0
2010	1,906,590	4,239,650	3,425,668,796	0	183,152,404	0
2011	1,851,827	4,109,474	3,602,110,274	0	234,097,872	0
2012	1,770,895	6,436,308	3,556,036,304	0	243,475,402	0
2013	(1,202,275)	7,490,907	3,910,199,522	0	258,957,726	0
2014	(1,349,383)	7,676,049	4,040,336,674	0	270,549,010	0
2015	2,259,502	6,512,772	3,845,597,041	0	277,236,315	0
2016	2,706,385	8,466,688	3,812,156,031	0	284,816,774	96,615

APPENDIX D

MONTHLY PEAK DEMAND

JOINT SYSTEM: At time of Minnkota Peak (not MAPP)

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak
2006.01	JointSys	2006	1			638,270		
2006.02	JointSys	2006	2			745,872		
2006.03	JointSys	2006	3			573,213		
2006.04	JointSys	2006	4			501,096		
2006.05	JointSys	2006	5			438,528		
2006.06	JointSys	2006	6			450,844		
2006.07	JointSys	2006	7			486,024		
2006.08	JointSys	2006	8			466,988		
2006.09	JointSys	2006	9			433,239		
2006.10	JointSys	2006	10			586,842		
2006.11	JointSys	2006	11			678,426		
2006.12	JointSys	2006	12			672,006		
2007.01	JointSys	2007	1			703,610		
2007.02	JointSys	2007	2			761,472		
2007.03	JointSys	2007	3			647,009		
2007.04	JointSys	2007	4			620,342		
2007.05	JointSys	2007	5			402,709		
2007.06	JointSys	2007	6			485,826		
2007.07	JointSys	2007	7			476,581		
2007.08	JointSys	2007	8			493,944		
2007.09	JointSys	2007	9			486,129		
2007.10	JointSys	2007	10			541,311		
2007.11	JointSys	2007	11			719,135		
2007.12	JointSys	2007	12			734,325		
2008.01	JointSys	2008	1			840,464		
2008.02	JointSys	2008	2			797,682		
2008.03	JointSys	2008	3			771,570		
2008.04	JointSys	2008	4			567,985		
2008.05	JointSys	2008	5			485,539		
2008.06	JointSys	2008	6			426,371		
2008.07	JointSys	2008	7			460,448		
2008.08	JointSys	2008	8			481,111		
2008.09	JointSys	2008	9			474,031		
2008.10	JointSys	2008	10			579,396		
2008.11	JointSys	2008	11			715,180		
2008.12	JointSys	2008	12			839,400		
2009.01	JointSys	2009	1			856,419		
2009.02	JointSys	2009	2			754,851		
2009.03	JointSys	2009	3			790,269		
2009.04	JointSys	2009	4			586,658		
2009.05	JointSys	2009	5			500,798		
2009.06	JointSys	2009	6			448,326		
2009.07	JointSys	2009	7			436,350		
2009.08	JointSys	2009	8			477,896		
2009.09	JointSys	2009	9			478,970		
2009.10	JointSys	2009	10			587,491		
2009.11	JointSys	2009	11			597,384		
2009.12	JointSys	2009	12			795,359		
2010.01	JointSys	2010	1			799,209		
2010.02	JointSys	2010	2			761,389		
2010.03	JointSys	2010	3			643,607		
2010.04	JointSys	2010	4			533,339		
2010.05	JointSys	2010	5			477,101		
2010.06	JointSys	2010	6			437,818		
2010.07	JointSys	2010	7			495,227		
2010.08	JointSys	2010	8			540,445		
2010.09	JointSys	2010	9			403,825		
2010.10	JointSys	2010	10			581,338		
2010.11	JointSys	2010	11			692,729		
2010.12	JointSys	2010	12			773,153		
2011.01	JointSys	2011	1			843,260		
2011.02	JointSys	2011	2			818,012		
2011.03	JointSys	2011	3			730,303		
2011.04	JointSys	2011	4			565,518		
2011.05	JointSys	2011	5			529,614		
2011.06	JointSys	2011	6			532,906		
2011.07	JointSys	2011	7			545,941		
2011.08	JointSys	2011	8			541,317		
2011.09	JointSys	2011	9			508,547		
2011.10	JointSys	2011	10			571,322		

JOINT SYSTEM: At time of Minnkota Peak (not MAPP)

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak
2011.11	JointSys	2011	11			690,935		
2011.12	JointSys	2011	12			738,100		
2012.01	JointSys	2012	1			844,816		
2012.02	JointSys	2012	2			815,763		
2012.03	JointSys	2012	3			689,047		
2012.04	JointSys	2012	4			564,420		
2012.05	JointSys	2012	5			444,917		
2012.06	JointSys	2012	6			504,280		
2012.07	JointSys	2012	7			567,805		
2012.08	JointSys	2012	8			564,386		
2012.09	JointSys	2012	9			493,981		
2012.10	JointSys	2012	10			598,064		
2012.11	JointSys	2012	11			718,592		
2012.12	JointSys	2012	12			792,869		
2013.01	JointSys	2013	1			902,967		
2013.02	JointSys	2013	2			821,140		
2013.03	JointSys	2013	3			729,031		
2013.04	JointSys	2013	4			654,208		
2013.05	JointSys	2013	5			558,040		
2013.06	JointSys	2013	6			505,951		
2013.07	JointSys	2013	7			561,876		
2013.08	JointSys	2013	8			608,212		
2013.09	JointSys	2013	9			561,083		
2013.10	JointSys	2013	10			680,083		
2013.11	JointSys	2013	11			752,754		
2013.12	JointSys	2013	12			868,172		
2014.01	JointSys	2014	1			869,474		
2014.02	JointSys	2014	2			858,313		
2014.03	JointSys	2014	3			826,608		
2014.04	JointSys	2014	4			708,105		
2014.05	JointSys	2014	5			539,652		
2014.06	JointSys	2014	6			508,474		
2014.07	JointSys	2014	7			600,587		
2014.08	JointSys	2014	8			562,621		
2014.09	JointSys	2014	9			551,535		
2014.10	JointSys	2014	10			683,029		
2014.11	JointSys	2014	11			793,334		
2014.12	JointSys	2014	12			830,381		
2015.01	JointSys	2015	1			885,124	430,337,680	887,423
2015.02	JointSys	2015	2			863,681	409,312,103	864,438
2015.03	JointSys	2015	3			810,420	347,060,731	803,167
2015.04	JointSys	2015	4			599,569	282,227,909	639,459
2015.05	JointSys	2015	5			521,934	257,693,155	563,626
2015.06	JointSys	2015	6			515,207	248,303,150	540,350
2015.07	JointSys	2015	7			596,165	281,816,730	607,961
2015.08	JointSys	2015	8			626,827	292,983,770	652,367
2015.09	JointSys	2015	9			629,646	266,473,085	632,692
2015.10	JointSys	2015	10			514,295	295,826,282	631,973
2015.11	JointSys	2015	11			581,384	330,433,463	723,401
2015.12	JointSys	2015	12			743,764	403,128,983	760,394
2016.01	JointSys	2016	1			842,900	427,540,729	858,479
2016.02	JointSys	2016	2			755,956	364,907,434	782,734
2016.03	JointSys	2016	3			710,700	321,615,168	688,246
2016.04	JointSys	2016	4			600,942	284,876,108	613,145
2016.05	JointSys	2016	5			472,784	242,652,000	571,366
2016.06	JointSys	2016	6			552,184	249,346,608	586,657
2016.07	JointSys	2016	7			611,288	277,767,675	611,861
2016.08	JointSys	2016	8			617,610	295,694,200	657,716
2016.09	JointSys	2016	9			543,890	259,961,075	561,617
2016.10	JointSys	2016	10			623,838	317,040,342	657,789
2016.11	JointSys	2016	11			674,013	338,256,069	715,288
2016.12	JointSys	2016	12			817,834	432,498,623	855,378
2017.01		2017	1			898,900	501,529,223	982,311
2017.02		2017	2			841,920	473,960,578	948,796
2017.03		2017	3			773,544	404,207,180	871,800
2017.04		2017	4			615,888	349,263,510	712,814
2017.05		2017	5			535,455	300,504,277	690,194
2017.06		2017	6			532,533	288,013,117	638,630
2017.07		2017	7			594,907	318,967,931	689,920
2017.08		2017	8			603,651	328,398,084	707,516

JOINT SYSTEM: At time of Minnkota Peak (not MAPP)

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak
2017.09		2017	9			576,831	316,734,413	709,331
2017.10		2017	10			677,925	343,120,191	802,105
2017.11		2017	11			759,883	417,300,241	918,607
2017.12		2017	12			871,405	495,602,369	983,670
2018.01		2018	1			912,663	510,575,629	996,748
2018.02		2018	2			857,020	483,720,270	965,294
2018.03		2018	3			787,436	412,390,887	886,926
2018.04		2018	4			626,527	356,202,493	724,731
2018.05		2018	5			544,509	306,237,070	701,411
2018.06		2018	6			540,650	293,216,946	648,370
2018.07		2018	7			604,221	324,685,914	700,373
2018.08		2018	8			613,002	334,163,829	718,175
2018.09		2018	9			585,915	322,344,741	719,787
2018.10		2018	10			689,236	349,483,944	814,640
2018.11		2018	11			773,076	425,440,329	933,424
2018.12		2018	12			889,104	507,102,102	1,002,749
2019.01		2019	1			920,635	516,041,865	1,005,481
2019.02		2019	2			864,559	488,907,842	973,799
2019.03		2019	3			794,446	416,839,317	894,836
2019.04		2019	4			632,228	360,049,334	731,340
2019.05		2019	5			549,567	309,578,970	707,973
2019.06		2019	6			545,930	296,462,042	654,643
2019.07		2019	7			610,110	328,302,799	707,143
2019.08		2019	8			618,947	337,842,922	725,048
2019.09		2019	9			591,481	325,835,363	726,538
2019.10		2019	10			695,521	353,232,586	822,154
2019.11		2019	11			779,958	430,014,255	941,857
2019.12		2019	12			896,884	512,498,414	1,011,651
2020.01		2020	1			927,901	521,251,159	1,013,580
2020.02		2020	2			871,480	493,857,084	981,698
2020.03		2020	3			800,905	421,124,553	902,227
2020.04		2020	4			637,608	363,785,645	737,651
2020.05		2020	5			554,409	312,884,106	714,346
2020.06		2020	6			551,177	299,714,531	660,898
2020.07		2020	7			615,915	331,943,897	713,832
2020.08		2020	8			624,827	341,534,330	731,870
2020.09		2020	9			596,920	329,321,494	733,218
2020.10		2020	10			701,473	356,909,195	829,471
2020.11		2020	11			786,341	434,448,144	949,948
2020.12		2020	12			904,042	517,634,955	1,020,007
2021.01		2021	1			934,311	525,942,988	1,020,710
2021.02		2021	2			877,596	498,317,500	988,671
2021.03		2021	3			806,614	424,982,622	908,752
2021.04		2021	4			642,388	367,145,660	743,238
2021.05		2021	5			558,711	315,857,623	720,007
2021.06		2021	6			555,884	302,646,919	666,486
2021.07		2021	7			621,131	335,232,835	719,825
2021.08		2021	8			630,088	344,855,751	737,956
2021.09		2021	9			601,764	332,449,888	739,140
2021.10		2021	10			706,741	360,201,901	835,954
2021.11		2021	11			791,993	438,428,295	957,105
2021.12		2021	12			910,376	522,265,392	1,027,413
2022.01		2022	1			941,069	530,909,651	1,028,184
2022.02		2022	2			884,024	503,030,494	995,975
2022.03		2022	3			812,616	429,048,018	915,572
2022.04		2022	4			647,379	370,675,432	749,041
2022.05		2022	5			563,180	318,965,382	725,865
2022.06		2022	6			560,767	305,704,634	672,244
2022.07		2022	7			626,535	338,659,996	725,999
2022.08		2022	8			635,550	348,323,663	744,252
2022.09		2022	9			606,795	335,721,282	745,252
2022.10		2022	10			712,240	363,657,648	842,676
2022.11		2022	11			797,930	442,618,069	964,554
2022.12		2022	12			917,027	527,149,243	1,035,152
2023.01		2023	1			947,611	535,784,691	1,035,522
2023.02		2023	2			890,279	507,666,563	1,003,142
2023.03		2023	3			818,474	433,077,965	922,309
2023.04		2023	4			652,324	374,197,561	754,859
2023.05		2023	5			567,649	322,100,701	731,781
2023.06		2023	6			565,691	308,808,599	678,100

JOINT SYSTEM: At time of Minnkota Peak (not MAPP)

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak
2023.07		2023	7			631,977	342,138,472	732,263
2023.08		2023	8			641,055	351,842,732	750,639
2023.09		2023	9			611,864	339,038,776	751,472
2023.10		2023	10			717,698	367,126,995	849,462
2023.11		2023	11			803,719	446,783,446	971,990
2023.12		2023	12			923,503	531,960,690	1,042,785
2024.01		2024	1			954,158	540,734,989	1,042,834
2024.02		2024	2			896,551	512,378,927	1,010,313
2024.03		2024	3			824,335	437,169,467	929,033
2024.04		2024	4			657,271	377,766,872	760,644
2024.05		2024	5			572,108	325,281,773	737,683
2024.06		2024	6			570,681	311,970,666	684,001
2024.07		2024	7			637,505	345,695,429	738,597
2024.08		2024	8			646,614	355,418,541	757,057
2024.09		2024	9			616,941	342,393,412	757,655
2024.10		2024	10			723,134	370,622,963	856,230
2024.11		2024	11			809,508	450,998,084	979,411
2024.12		2024	12			929,992	536,847,278	1,050,461
2025.01		2025	1			960,551	545,556,880	1,049,958
2025.02		2025	2			902,648	516,962,725	1,017,268
2025.03		2025	3			830,030	441,141,337	935,545
2025.04		2025	4			662,060	381,225,902	766,242
2025.05		2025	5			576,418	328,354,562	743,382
2025.06		2025	6			575,479	315,018,908	689,671
2025.07		2025	7			642,822	349,123,164	744,681
2025.08		2025	8			651,962	358,868,014	763,231
2025.09		2025	9			621,836	345,632,365	763,611
2025.10		2025	10			728,414	374,020,488	862,785
2025.11		2025	11			815,141	455,099,895	986,613
2025.12		2025	12			936,321	541,611,554	1,057,900
2026.01		2026	1			968,492	551,489,652	1,058,804
2026.02		2026	2			910,234	522,613,607	1,025,926
2026.03		2026	3			837,096	446,036,467	943,634
2026.04		2026	4			667,976	385,494,588	773,159
2026.05		2026	5			581,730	332,144,313	750,382
2026.06		2026	6			581,318	318,768,152	696,607
2026.07		2026	7			649,299	353,333,699	752,129
2026.08		2026	8			658,472	363,105,565	770,767
2026.09		2026	9			627,823	349,616,209	770,934
2026.10		2026	10			734,922	378,194,075	870,827
2026.11		2026	11			822,128	460,140,535	995,489
2026.12		2026	12			944,182	547,484,504	1,067,140
2027.01		2027	1			975,207	556,643,599	1,066,306
2027.02		2027	2			916,670	527,522,022	1,033,286
2027.03		2027	3			843,105	450,298,359	950,530
2027.04		2027	4			673,047	389,212,483	779,087
2027.05		2027	5			586,295	335,461,161	756,431
2027.06		2027	6			586,446	322,069,599	702,669
2027.07		2027	7			654,981	357,050,928	758,639
2027.08		2027	8			664,178	366,836,091	777,355
2027.09		2027	9			633,027	353,112,593	777,269
2027.10		2027	10			740,489	381,832,496	877,772
2027.11		2027	11			828,064	464,527,897	1,003,110
2027.12		2027	12			950,845	552,574,862	1,075,034
2028.01		2028	1			981,799	561,684,928	1,073,651
2028.02		2028	2			922,959	532,315,730	1,040,460
2028.03		2028	3			848,975	454,451,499	957,243
2028.04		2028	4			677,979	392,828,901	784,848
2028.05		2028	5			590,728	338,674,980	762,294
2028.06		2028	6			591,389	325,260,114	708,507
2028.07		2028	7			660,460	360,640,369	764,907
2028.08		2028	8			669,684	370,445,134	783,710
2028.09		2028	9			638,063	356,500,167	783,393
2028.10		2028	10			745,922	385,381,993	884,524
2028.11		2028	11			833,869	468,813,903	1,010,535
2028.12		2028	12			957,375	557,558,957	1,082,718
2029.01		2029	1			988,660	566,924,854	1,081,354
2029.02		2029	2			929,526	537,303,281	1,047,990
2029.03		2029	3			855,117	458,791,414	964,316
2029.04		2029	4			683,163	396,623,331	790,943

JOINT SYSTEM: At time of Minnkota Peak (not MAPP)

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak
2029.05		2029	5			595,406	342,061,569	768,498
2029.06		2029	6			596,583	328,624,184	714,678
2029.07		2029	7			666,206	364,417,130	771,516
2029.08		2029	8			675,481	374,254,859	790,435
2029.09		2029	9			643,385	360,085,310	789,917
2029.10		2029	10			751,638	389,117,266	891,661
2029.11		2029	11			839,939	473,296,873	1,018,362
2029.12		2029	12			964,181	562,739,293	1,090,777
2030.01		2030	1			996,041	572,677,755	1,089,601
2030.02		2030	2			936,608	542,785,193	1,056,089
2030.03		2030	3			861,724	463,554,036	971,901
2030.04		2030	4			688,732	400,778,417	797,449
2030.05		2030	5			600,414	345,773,582	775,139
2030.06		2030	6			602,239	332,326,257	721,352
2030.07		2030	7			672,477	368,588,928	778,692
2030.08		2030	8			681,766	378,434,841	797,685
2030.09		2030	9			649,107	363,998,083	796,865
2030.10		2030	10			757,741	393,177,663	899,292
2030.11		2030	11			846,454	478,193,058	1,026,741
2030.12		2030	12			971,510	568,425,078	1,099,487
2031.01		2031	1			1,002,304	577,676,143	1,096,601
2031.02		2031	2			942,632	547,547,502	1,062,979
2031.03		2031	3			867,378	467,688,554	978,391
2031.04		2031	4			693,550	404,385,434	803,081
2031.05		2031	5			604,755	348,990,912	780,887
2031.06		2031	6			607,111	335,527,417	727,110
2031.07		2031	7			677,876	372,191,973	784,879
2031.08		2031	8			687,184	382,048,415	803,937
2031.09		2031	9			654,050	367,383,212	802,880
2031.10		2031	10			763,023	396,698,690	905,877
2031.11		2031	11			852,064	482,441,063	1,033,942
2031.12		2031	12			977,752	573,360,918	1,106,889
2032.01		2032	1			1,010,263	583,882,994	1,105,462
2032.02		2032	2			950,246	553,447,484	1,071,668
2032.03		2032	3			874,518	472,801,881	986,551
2032.04		2032	4			699,561	408,838,951	810,095
2032.05		2032	5			610,142	352,942,786	787,990
2032.06		2032	6			613,082	339,442,931	734,153
2032.07		2032	7			684,482	376,589,228	792,430
2032.08		2032	8			693,847	386,483,011	811,623
2032.09		2032	9			660,160	371,553,977	810,310
2032.10		2032	10			769,637	401,062,879	914,056
2032.11		2032	11			859,139	487,709,426	1,042,943
2032.12		2032	12			985,636	579,475,562	1,116,170
2033.01		2033	1			1,016,735	589,129,826	1,112,702
2033.02		2033	2			956,475	558,448,192	1,078,796
2033.03		2033	3			880,364	477,148,288	993,268
2033.04		2033	4			704,584	412,633,073	815,966
2033.05		2033	5			614,668	356,333,166	793,988
2033.06		2033	6			618,185	342,822,899	740,180
2033.07		2033	7			690,138	380,396,236	798,906
2033.08		2033	8			699,520	390,297,946	818,165
2033.09		2033	9			665,327	375,124,398	816,591
2033.10		2033	10			775,140	404,767,781	920,935
2033.11		2033	11			864,933	492,175,836	1,050,399
2033.12		2033	12			992,084	584,660,827	1,123,837
2034.01		2034	1			1,023,538	594,673,527	1,120,313
2034.02		2034	2			963,023	563,732,472	1,086,290
2034.03		2034	3			886,505	481,741,494	1,000,322
2034.04		2034	4			709,852	416,642,317	822,123
2034.05		2034	5			619,412	359,918,065	800,281
2034.06		2034	6			623,553	346,400,068	746,512
2034.07		2034	7			696,088	384,427,517	805,713
2034.08		2034	8			705,481	394,334,126	825,036
2034.09		2034	9			670,749	378,898,965	823,177
2034.10		2034	10			780,908	408,680,029	928,152
2034.11		2034	11			871,012	496,893,096	1,058,230
2034.12		2034	12			998,861	590,138,016	1,131,904

APPENDIX E

COMPARISON WITH PREVIOUS FORECASTS

Appendix E
Comparison to Previous PRS Forecasts

Appendix E presents Minnkota's 2017 Load Forecast results compared to the projections developed for the 2015, 2013, 2011, 2009, 2007, 2005, 2003, 2001, 1999, 1997 and 1995 forecasts. The 1995 forecast projected an average growth rate of 2.1 percent per year for total member system energy requirements while the 1997 forecast forecasted an average annual growth rate of 2.4 percent. The projected long-term growth rate in the 1999 and 2001 forecasts was 2.5 percent per year. The 2003 forecast projected member system energy requirements to grow at 2.3 percent per year through 2016. The 2005 forecast projected requirements to grow at 2.6 percent per year. Long-term growth rates peaked with the 2007 forecast, before falling off to 2.5 and then 1.7 percent per year with the 2011, 2103 and 2015 forecasts. Much of explanation for the drop-off in growth projected growth can be traced to the severe economic downturn, the worst since the Great Depression. The nearest forecast cycle to this would be the 1995 study, which projected 2.1 percent annual growth and followed the early 1990's recession.

Among all of the previous forecasts, the projected sales levels have maintained a remarkable level of consistency. This lends support to the idea of a long-term forecast trend that Minnkota sales seem to be experiencing. The 2017 forecast projects member system energy requirements to grow at 1.2 percent per year for 2017 through 2026.

There are numerous cooperative-specific factors that have contributed to the long-term outlook for members' sales. These factors are described in detail in each of the member systems' reports. However, the primary drivers of this expectation can be generalized to include the following factors:

- Increasing long-term wholesale rate forecasts from Minnkota.
- Dampened real per-capita income, employment, and population projections from Woods & Poole following the economic crisis.
- Expectations of slower growth and expansion of more urban areas into traditionally rural areas as the housing market continues to be slow.

As this forecast is monitored and updated in the future, Minnkota will benefit from paying close attention to the developments that affect these important input assumptions.

Comparison With Previous Forecast Results - Total Member System Energy Requirements [1]

Minnkota Power Cooperative, Inc.

(MWh)

Year	1995 PRS		1997 PRS		1999 PRS		2001 Forecast		2003 Forecast		2005 Forecast		2007 Forecast		2009 Forecast		2011 Forecast		2013 Forecast		2015 Forecast		2017 Forecast	
1994	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]	2,228,292	[2]
1995	2,284,228	[3]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]	2,352,345	[2]
1996	2,336,274	[3]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]	2,488,710	[2]
1997	2,404,069	[3]	2,481,196	[3]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]	2,456,133	[2]
1998	2,456,116	[3]	2,678,129	[3]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]	2,347,968	[2]
1999	2,500,447	[3]	2,691,542	[3]	2,492,504	[3]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]	2,473,174	[2]
2000	2,522,659	[3]	2,741,590	[3]	2,550,020	[3]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]	2,553,456	[2]
2001	2,576,011	[3]	2,800,605	[3]	2,620,172	[3]	2,719,707	[3]	2,692,024	[2]	2,692,024	[2]	2,692,024	[2]	2,692,024	[2]	2,692,024	[2]	2,692,024	[2]	2,692,024	[2]	2,692,024	[2]
2002	2,637,983	[3]	2,857,033	[3]	2,678,977	[3]	2,814,857	[3]	2,865,734	[2]	2,865,734	[2]	2,865,734	[2]	2,865,734	[2]	2,865,734	[2]	2,865,734	[2]	2,865,734	[2]	2,865,734	[2]
2003	2,684,275	[3]	2,912,795	[3]	2,741,503	[3]	2,842,662	[3]	2,923,230	[3]	2,860,849	[2]	2,860,849	[2]	2,860,849	[2]	2,860,849	[2]	2,860,849	[2]	2,860,849	[2]	2,860,849	[2]
2004	2,744,549	[3]	2,967,492	[3]	2,806,651	[3]	2,901,868	[3]	2,980,973	[3]	2,930,437	[2]	2,930,437	[2]	2,930,437	[2]	2,930,437	[2]	2,930,437	[2]	2,930,437	[2]	2,930,437	[2]
2005			3,021,109	[3]	2,877,840	[3]	2,981,372	[3]	3,015,329	[3]	3,081,977	[3]	2,997,936	[2]	2,997,936	[2]	2,997,936	[2]	2,997,936	[2]	2,997,936	[2]	2,997,936	[2]
2006			3,076,021	[3]	2,950,995	[3]	3,060,589	[3]	3,088,801	[3]	3,142,079	[3]	3,080,882	[2]	3,080,882	[2]	3,080,882	[2]	3,080,882	[2]	3,080,882	[2]	3,080,882	[2]
2007					3,027,646	[3]	3,137,355	[3]	3,146,281	[3]	3,244,956	[3]	3,272,116	[3]	3,269,300	[2]	3,269,300	[2]	3,269,300	[2]	3,269,300	[2]	3,269,300	[2]
2008					3,106,103	[3]	3,217,465	[3]	3,236,635	[3]	3,305,869	[3]	3,382,192	[3]	3,460,221	[2]	3,460,221	[2]	3,460,221	[2]	3,460,221	[2]	3,460,221	[2]
2009							3,297,268	[3]	3,330,112	[3]	3,393,782	[3]	3,492,849	[3]	3,417,485	[3]	3,518,961	[2]	3,518,961	[2]	3,518,961	[2]	3,518,961	[2]
2010							3,384,043	[3]	3,414,350	[3]	3,489,123	[3]	3,799,110	[3]	3,645,860	[3]	3,425,669	[2]	3,425,669	[2]	3,425,669	[2]	3,425,669	[2]
2011									3,502,807	[3]	3,581,108	[3]	4,007,562	[3]	3,809,597	[3]	3,659,417	[3]	3,602,110	[2]	3,602,110	[2]	3,602,110	[2]
2012									3,599,109	[3]	3,678,532	[3]	4,081,638	[3]	3,859,302	[3]	3,705,183	[3]	3,556,036	[2]	3,556,036	[2]	3,556,036	[2]
2013											3,776,986	[3]	4,162,169	[3]	3,927,747	[3]	3,766,993	[3]	3,710,442	[3]	3,910,200	[2]	3,910,200	[2]
2014											3,878,044	[3]	4,236,106	[3]	3,989,032	[3]	3,849,531	[3]	3,787,366	[3]	4,040,337	[2]	4,040,337	[2]
2015													4,323,620	[3]	4,055,013	[3]	3,909,367	[3]	3,840,122	[3]	4,074,429	[3]	3,845,597	[2]
2016													4,399,861	[3]	4,118,611	[3]	3,976,014	[3]	3,915,718	[3]	4,151,546	[3]	3,812,156	[2]
2017													4,491,652	[3]	4,197,790	[3]	4,033,111	[3]	3,986,103	[3]	4,275,673	[3]	4,081,884	[3]
2018													4,570,844	[3]	4,275,281	[3]	4,098,980	[3]	4,065,969	[3]	4,381,551	[3]	4,166,373	[3]
2019													4,658,073	[3]	4,354,700	[3]	4,172,537	[3]	4,126,345	[3]	4,440,342	[3]	4,210,455	[3]
2020													4,748,679	[3]	4,428,262	[3]	4,252,809	[3]	4,191,988	[3]	4,501,146	[3]	4,256,700	[3]
2021													4,852,197	[3]	4,508,939	[3]	4,331,271	[3]	4,252,980	[3]	4,565,429	[3]	4,298,271	[3]
2022													4,956,505	[3]	4,586,309	[3]	4,407,937	[3]	4,325,392	[3]	4,626,287	[3]	4,342,739	[3]
2023													5,065,500	[3]	4,668,547	[3]	4,474,839	[3]	4,393,453	[3]	4,693,708	[3]	4,387,507	[3]
2024													5,168,607	[3]	4,743,202	[3]	4,534,303	[3]	4,458,147	[3]	4,762,618	[3]	4,433,245	[3]
2025													5,278,191	[3]	4,820,684	[3]	4,584,762	[3]	4,516,664	[3]	4,829,975	[3]	4,477,797	[3]
2026													5,380,937	[3]	4,894,574	[3]	4,633,270	[3]	4,578,999	[3]	4,886,534	[3]	4,533,001	[3]
2027															4,977,125	[3]	4,679,209	[3]	4,623,996	[3]	4,946,738	[3]	4,581,194	[3]
2028															5,056,823	[3]	4,727,781	[3]	4,671,285	[3]	5,007,371	[3]	4,628,208	[3]
2029															5,138,507	[3]	4,773,210	[3]	4,719,799	[3]	5,056,773	[3]	4,677,695	[3]
2030															5,216,713	[3]	4,821,261	[3]	4,767,469	[3]	5,109,970	[3]	4,732,220	[3]
2031															5,300,004	[3]	4,866,610	[3]	4,809,214	[3]	5,166,242	[3]	4,779,704	[3]
2032															5,381,224	[3]	4,913,159	[3]	4,856,735	[3]	5,220,405	[3]	4,838,437	[3]
2033															5,466,524	[3]	4,954,367	[3]	4,904,800	[3]	5,273,428	[3]	4,888,704	[3]
2034																	5,003,296	[3]	4,950,946	[3]	5,323,463	[3]	4,941,950	[3]
2035																	5,043,851	[3]	4,991,854	[3]	5,378,746	[3]	4,994,467	[3]
2036																	5,088,272	[3]	5,037,346	[3]	5,432,350	[3]	5,055,850	[3]
2037																	5,129,264	[3]	5,084,014	[3]	5,481,036	[3]	5,105,683	[3]
2038																	5,173,538	[3]	5,128,436	[3]	5,529,196	[3]	5,158,795	[3]
2039																	5,213,514	[3]	5,169,525	[3]	5,586,051	[3]	5,212,742	[3]
2040																	5,257,180	[3]	5,213,950	[3]	5,633,820	[3]	5,263,316	[3]
2041																			5,254,209	[3]	5,681,629	[3]	5,317,302	[3]
2042																			5,298,268	[3]	5,732,211	[3]	5,372,193	[3]
2043																					5,779,260	[3]	5,418,482	[3]
2044																					5,825,255	[3]	5,473,955	[3]
2045																							5,520,217	[3]
2046																							5,572,713	[3]

Average Annual Growth Rates

1996-2016	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	2.9%	2.6%	2.4%	2.3%	2.6%	2.2%
2006-2016	--	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	3.6%	2.9%	2.6%	2.4%	3.0%	2.2%
2011-2016	--	--	--	--	-100.0%	-100.0%	1.9%	1.6%	1.7%	1.7%	2.9%	1.1%
2016-2021	--	--	--	--	--	--	2.0%	1.8%	1.7%	1.7%	1.9%	2.4%
2016-2026	--	--	--	--	--	--	2.0%	1.7%	1.5%	1.6%	1.6%	1.7%
2016-2036	--	--	--	--	--	--	--	--	1.2%	1.3%	1.4%	1.4%
2016-2046	--	--	--	--	--	--	--	--	--	--	--	1.3%
10-Yr Fore	2.1%	2.4%	2.5%	2.5%	2.3%	2.6%	3.3%	2.5%	1.7%	1.7%	1.7%	1.2%

[1] Includes Member Own-Use and Losses. Excludes CAFS, NMPA and MPC Own-Use and Losses.
[2] Historic
[3] Projected

APPENDIX F

SUPPLEMENTAL TABLES

Own-Use/Loss Forecast By Member (MWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Own-Use/Loss
1987	8,276	16,138	1,754	4,400	26,083	6,221	4,743	6,176	8,367	5,884	12,410	100,452
1988	13,020	12,862	2,100	4,899	23,060	6,683	4,672	6,836	7,944	7,323	19,149	108,548
1989	17,472	22,183	2,362	5,589	32,107	7,488	8,324	9,464	8,283	10,149	21,318	144,741
1990	9,467	10,878	1,555	2,656	15,303	6,104	3,586	4,298	5,020	4,060	14,585	77,511
1991	14,822	18,651	2,391	5,327	28,551	7,610	6,389	7,691	7,992	9,224	20,315	128,962
1992	13,421	15,851	2,101	4,393	23,446	5,930	6,758	6,016	6,765	6,675	11,103	102,460
1993	13,609	17,082	2,645	5,737	30,809	7,228	4,921	6,976	9,119	6,691	13,416	118,233
1994	16,693	20,444	2,999	5,313	28,453	7,359	7,744	7,677	8,513	8,284	16,458	129,937
1995	19,448	18,241	3,470	5,804	28,074	6,582	6,958	9,333	9,565	9,804	16,768	134,049
1996	17,200	10,755	3,289	4,588	24,925	6,228	6,586	7,261	4,936	7,261	13,455	106,483
1997	14,737	30,660	2,201	3,906	32,350	8,015	4,267	6,586	3,042	3,886	17,888	127,537
1998	15,209	13,274	2,860	4,470	26,938	5,247	6,119	7,229	2,505	7,667	12,606	104,123
1999	17,909	20,214	2,674	3,318	24,454	7,504	6,014	7,959	5,951	(950)	17,157	112,205
2000	16,781	18,786	3,599	5,481	18,518	7,160	6,101	9,798	8,233	6,802	16,179	117,440
2001	17,208	26,222	198	4,857	32,383	7,550	2,472	(311)	6,721	8,857	15,455	121,612
2002	18,851	24,549	3,128	6,084	32,713	9,885	9,047	8,008	8,354	7,827	20,581	149,026
2003	21,260	23,767	3,290	6,273	27,834	9,024	6,464	8,062	7,664	7,785	19,288	140,710
2004	23,066	30,983	3,647	5,642	28,005	11,003	9,118	8,195	7,482	8,418	11,398	146,957
2005	24,047	31,128	3,067	6,333	34,849	9,489	8,386	7,906	7,730	7,837	17,996	158,768
2006	24,771	31,259	2,847	5,713	27,140	8,472	6,201	7,184	7,234	7,614	20,685	149,120
2007	27,297	31,445	3,685	6,819	28,100	11,617	5,118	7,912	9,157	9,214	20,092	160,456
2008	28,541	35,596	3,733	7,149	33,838	8,986	16,002	10,875	10,635	8,963	22,966	187,284
2009	26,078	34,583	3,778	5,909	35,189	8,170	10,521	8,077	8,183	7,061	24,934	172,483
2010	24,091	39,786	3,646	6,656	30,641	7,850	2,419	8,239	3,770	7,482	23,387	157,969
2011	24,796	28,136	3,063	4,763	30,160	7,831	7,184	6,822	9,378	8,590	22,907	153,630
2012	22,714	34,925	3,382	5,480	29,707	7,804	6,038	7,529	8,736	4,914	19,516	150,745
2013	25,557	38,950	1,119	11,086	14,264	7,731	9,385	8,718	9,869	6,099	22,691	155,469
2014	18,869	11,229	4,013	(146)	4,589	8,563	3,921	(3,537)	6,165	7,226	19,347	80,238
2015	25,452	38,303	3,432	5,998	31,911	7,503	9,063	7,008	8,799	6,977	21,174	165,620
2016	16,205	36,181	3,087	6,845	31,604	7,111	7,562	6,972	8,096	7,383	20,972	152,018
2017	23,347	45,636	3,082	5,708	24,646	7,236	7,343	5,381	8,019	6,619	21,272	158,290
2018	23,581	46,123	3,069	8,509	25,041	7,326	7,342	5,405	8,092	6,744	21,477	162,708
2019	23,689	46,886	3,058	8,531	25,245	7,366	7,351	5,444	8,210	6,883	21,694	164,357
2020	23,793	47,833	3,049	8,550	25,508	7,398	7,356	5,477	8,260	6,881	21,830	165,935
2021	23,895	48,754	3,042	8,569	25,702	7,432	7,364	5,504	8,311	6,878	21,928	167,378
2022	23,984	49,721	3,036	8,583	25,885	7,473	7,368	5,612	8,420	6,876	21,985	168,943
2023	24,066	50,737	3,031	8,593	26,120	7,505	7,373	5,634	8,461	6,881	22,026	170,427
2024	24,147	51,900	3,029	8,604	26,292	7,527	7,377	5,654	8,503	6,885	22,068	171,986
2025	24,232	52,992	3,028	8,614	26,461	7,542	7,379	5,672	8,611	6,890	22,110	173,531
2026	24,416	54,273	3,028	8,623	26,693	7,560	7,385	5,685	8,653	6,895	22,233	175,444
2027	24,509	55,529	3,030	8,632	26,860	7,583	7,389	5,698	8,696	6,894	22,274	177,094
2028	24,605	56,701	3,031	8,641	27,027	7,601	7,396	5,712	8,805	6,900	22,312	178,732
2029	24,704	57,899	3,035	8,650	27,256	7,618	7,401	5,724	8,845	6,905	22,342	180,378
2030	24,804	59,373	3,038	8,659	27,422	7,640	7,410	5,733	8,883	6,916	22,369	182,247
2031	24,907	60,604	3,036	8,669	27,585	7,672	7,410	5,750	8,920	6,920	22,398	183,872
2032	25,010	62,017	3,033	8,679	27,811	7,699	7,411	5,852	9,020	6,925	22,424	185,881
2033	25,114	63,360	3,032	8,688	27,974	7,718	7,413	5,869	9,052	6,929	22,441	187,590
2034	25,219	64,808	3,030	8,697	28,136	7,742	7,415	5,886	9,084	6,933	22,450	189,401
2035	25,323	66,119	3,029	8,705	28,367	7,762	7,418	5,901	9,116	6,936	22,462	191,139
2036	25,523	67,734	3,029	8,714	28,531	7,789	7,419	5,917	9,214	6,940	22,484	193,292
2037	25,628	69,059	3,028	8,723	28,695	7,810	7,420	5,934	9,247	6,941	22,502	194,986
2038	25,732	70,391	3,027	8,730	28,923	7,836	7,419	5,951	9,281	6,943	22,515	196,749
2039	25,836	71,866	3,026	8,737	29,083	7,866	7,420	5,968	9,314	6,944	22,530	198,590
2040	25,941	73,219	3,026	8,743	29,250	7,887	7,420	5,986	9,345	6,944	22,542	200,302
2041	26,044	74,587	3,025	8,748	29,482	7,911	7,418	6,003	9,377	6,938	22,554	202,087
2042	26,148	76,103	3,024	8,753	29,645	7,930	7,418	6,018	9,410	6,937	22,563	203,949
2043	26,251	77,308	3,024	8,756	29,815	7,951	7,415	6,035	9,441	6,930	22,582	205,508
2044	26,353	78,729	3,024	8,759	30,045	7,971	7,416	6,050	9,473	6,927	22,602	207,350
2045	26,456	79,946	3,024	8,762	30,211	7,987	7,412	6,065	9,504	6,918	22,623	208,908
2046	26,557	81,378	3,023	8,764	30,379	8,007	7,411	6,081	9,535	6,909	22,639	210,684
Average Annual Growth Rates												
1987-2016	2.3%	2.8%	2.0%	1.5%	0.7%	0.5%	1.6%	0.4%	-0.1%	0.8%	1.8%	1.4%
2001-2016	-0.4%	2.2%	20.1%	2.3%	-0.2%	-0.4%	7.7%	--	1.2%	-1.2%	2.1%	1.5%
2006-2016	-4.2%	1.5%	0.8%	1.8%	1.5%	-1.7%	2.0%	-0.3%	1.1%	-0.3%	0.1%	0.2%
2011-2016	-8.2%	5.2%	0.2%	7.5%	0.9%	-1.9%	1.0%	0.4%	-2.9%	-3.0%	-1.7%	-0.2%
2016-2021	8.1%	6.1%	-0.3%	4.6%	-4.1%	0.9%	-0.5%	-4.6%	0.5%	-1.4%	0.9%	1.9%
2016-2026	4.2%	4.1%	-0.2%	2.3%	-1.7%	0.6%	-0.2%	-2.0%	0.7%	-0.7%	0.6%	1.4%
2016-2036	2.3%	3.2%	-0.1%	1.2%	-0.5%	0.5%	-0.1%	-0.8%	0.6%	-0.3%	0.3%	1.2%
2016-2046	1.7%	2.7%	-0.1%	0.8%	-0.1%	0.4%	-0.1%	-0.5%	0.5%	-0.2%	0.3%	1.1%
2017-2046	0.4%	2.0%	-0.1%	1.5%	0.7%	0.3%	0.0%	0.4%	0.6%	0.1%	0.2%	1.0%

Retail Energy Forecasts By Class (MWh) - MN

Minnkota Power Cooperative, Inc.

Year	Residential	Seasonal	Irrigation	Small Commercial	Large Commercial	Street Lighting	Public Authority	Resale RUS	Resale Other	Total Member Sales	MWh From 2015 PRS
1996	875,059	13,769	1,531	137,290	43,979	1,208	-	6,281	109,476	1,188,592	
1997	865,998	13,313	1,584	139,332	46,408	1,217	-	6,526	109,758	1,184,135	
1998	798,011	12,385	1,913	139,682	49,677	1,277	-	6,197	117,152	1,126,294	
1999	843,880	13,341	1,671	146,814	63,839	1,341	-	6,515	113,927	1,191,329	
2000	865,735	13,545	2,185	147,853	72,181	1,268	-	6,672	101,272	1,210,712	
2001	915,782	14,055	1,801	149,586	74,271	1,376	-	6,775	99,534	1,263,181	
2002	961,894	14,615	1,472	155,968	78,541	1,416	-	7,157	103,977	1,325,040	
2003	953,498	14,504	1,957	160,471	80,366	1,403	-	7,279	96,263	1,315,741	
2004	972,596	14,277	2,053	163,990	83,958	1,338	-	7,802	99,773	1,345,788	
2005	976,147	13,619	1,608	165,609	87,631	1,282	-	7,696	98,552	1,352,143	
2006	977,331	10,558	1,626	162,960	85,382	1,355	-	7,618	105,224	1,352,054	
2007	1,021,008	10,027	2,194	173,060	91,244	1,388	-	8,012	96,796	1,403,729	
2008	1,076,673	10,072	2,048	178,598	98,456	1,437	-	7,990	93,532	1,468,805	
2009	1,106,864	8,784	1,605	189,586	92,966	1,421	-	8,119	80,975	1,490,320	
2010	1,032,259	8,010	2,136	191,542	98,357	1,423	-	7,860	84,359	1,425,946	
2011	1,034,957	8,138	1,664	181,053	106,786	1,413	-	7,931	75,683	1,417,625	
2012	965,369	8,056	2,331	174,007	119,699	1,387	-	7,069	79,838	1,357,755	
2013	1,075,089	8,842	2,155	204,633	131,899	1,385	-	8,316	69,539	1,501,859	
2014	1,111,954	8,975	2,351	211,139	135,749	1,390	-	9,003	89,522	1,570,083	
2015	965,739	8,184	2,969	191,523	136,557	1,136	-	8,461	108,620	1,423,189	1,521,083
2016	923,176	8,035	3,214	192,237	137,555	1,183	-	13,863	132,327	1,411,591	1,545,504
2017	969,486	8,250	2,869	194,282	136,975	1,178	-	13,863	131,038	1,457,942	1,577,237
2018	977,712	8,269	2,869	194,364	176,658	1,173	-	13,863	131,061	1,505,970	1,633,050
2019	987,511	8,290	2,911	195,239	177,705	1,175	-	13,863	131,083	1,517,778	1,643,510
2020	992,812	8,311	2,911	196,051	177,753	1,170	-	13,863	131,106	1,523,977	1,655,952
2021	997,713	8,333	2,911	196,636	177,801	1,165	-	13,863	131,128	1,529,550	1,664,567
2022	1,001,549	8,356	2,952	197,281	180,850	1,167	-	13,863	131,151	1,537,169	1,676,733
2023	1,004,862	8,380	2,972	198,009	180,898	1,162	-	13,863	131,174	1,541,320	1,694,735
2024	1,008,016	8,404	2,992	198,712	180,947	1,157	-	13,863	131,197	1,545,288	1,715,107
2025	1,011,198	8,429	3,034	199,241	181,996	1,159	-	13,863	131,220	1,550,141	1,730,203
2026	1,014,580	8,455	3,054	199,705	185,045	1,154	-	13,863	131,243	1,557,100	1,745,067
2027	1,017,966	8,482	3,074	200,153	185,095	1,150	-	13,863	131,266	1,561,048	1,761,254
2028	1,021,465	8,509	3,115	200,611	186,145	1,151	-	13,863	131,289	1,566,148	1,775,541
2029	1,024,840	8,537	3,135	201,010	186,195	1,147	-	13,863	131,312	1,570,039	1,785,460
2030	1,028,410	8,566	3,155	201,404	186,245	1,142	-	13,863	131,335	1,574,121	1,796,332
2031	1,032,024	8,596	3,197	201,831	186,295	1,144	-	13,863	131,358	1,578,308	1,807,265
2032	1,035,487	8,626	3,217	202,301	189,346	1,139	-	13,863	131,382	1,585,361	1,821,900
2033	1,038,794	8,657	3,237	202,694	189,397	1,134	-	13,863	131,405	1,589,181	1,832,871
2034	1,042,072	8,688	3,278	203,065	189,448	1,136	-	13,863	131,428	1,592,980	1,844,410
2035	1,045,340	8,721	3,298	203,355	189,500	1,132	-	13,863	131,452	1,596,660	1,855,405
2036	1,048,851	8,754	3,318	203,658	192,552	1,127	-	13,863	131,475	1,603,598	1,868,039
2037	1,052,212	8,787	3,360	203,966	192,604	1,129	-	13,863	131,499	1,607,419	1,879,257
2038	1,055,527	8,821	3,380	204,291	192,656	1,124	-	13,863	131,523	1,611,185	1,890,320
2039	1,058,873	8,856	3,400	204,650	192,708	1,120	-	13,863	131,546	1,615,017	1,901,408
2040	1,062,013	8,892	3,441	204,979	192,761	1,121	-	13,863	131,570	1,618,641	1,912,612
2041	1,065,033	8,928	3,461	205,302	192,814	1,117	-	13,863	131,594	1,622,113	1,924,050
2042	1,068,095	8,965	3,481	205,577	192,868	1,112	-	13,863	131,618	1,625,579	1,935,645
2043	1,071,124	9,003	3,523	205,815	192,921	1,114	-	13,863	131,642	1,629,005	1,946,885
2044	1,074,269	9,041	3,543	206,080	192,975	1,110	-	13,863	131,666	1,632,546	1,957,636
2045	1,077,215	9,080	3,563	206,255	193,029	1,105	-	13,863	131,690	1,635,800	
2046	1,080,131	9,119	3,604	206,449	193,084	1,107	-	13,863	131,714	1,639,071	
Average Annual Growth Rates											
1996-2016	0.3%	-2.7%	3.8%	1.7%	5.9%	-0.1%	--	4.0%	1.0%	0.9%	--
2001-2016	0.1%	-3.7%	3.9%	1.7%	4.2%	-1.0%	--	4.9%	1.9%	0.7%	--
2006-2016	-0.6%	-2.7%	7.1%	1.7%	4.9%	-1.4%	--	6.2%	2.3%	0.4%	--
2011-2016	-2.3%	-0.3%	14.1%	1.2%	5.2%	-3.5%	--	11.8%	11.8%	-0.1%	--
2016-2021	1.6%	0.7%	-2.0%	0.5%	5.3%	-0.3%	--	0.0%	-0.2%	1.6%	1.5%
2016-2026	0.9%	0.5%	-0.5%	0.4%	3.0%	-0.2%	--	0.0%	-0.1%	1.0%	1.2%
2016-2036	0.6%	0.4%	0.2%	0.3%	1.7%	-0.2%	--	0.0%	0.0%	0.6%	1.0%
2016-2046	0.5%	0.4%	0.4%	0.2%	1.1%	-0.2%	--	0.0%	0.0%	0.5%	
2017-2046	0.4%	0.3%	0.8%	0.2%	1.2%	-0.2%	--	0.0%	0.0%	0.4%	

Retail Energy Forecasts By Class (MWh) - ND

Minnkota Power Cooperative, Inc.

Year	Residential	Seasonal	Irrigation	Small Commercial	Large Commercial	Street Lighting	Public Authority	Resale RUS	Resale Other	Total Member Sales	MWh From 2015 PRS
1996	658,756	714	9,549	324,194	72,107	2,468	122,293	-	3,552	1,193,634	
1997	623,899	703	7,787	327,139	71,672	2,604	107,107	-	3,549	1,144,460	
1998	583,026	828	10,497	336,476	88,328	2,733	92,781	-	2,881	1,117,550	
1999	607,608	964	8,274	357,607	102,117	3,042	86,970	-	3,059	1,169,640	
2000	697,854	997	7,837	327,528	114,471	3,356	70,312	-	2,948	1,225,304	
2001	708,281	-	6,761	365,889	152,812	3,666	67,092	-	2,731	1,307,232	
2002	751,583	685	8,304	392,406	162,420	4,633	68,285	-	3,351	1,391,668	
2003	752,440	-	11,241	412,103	154,511	4,105	66,876	-	3,122	1,404,398	
2004	771,891	-	9,175	315,302	266,894	4,613	66,184	-	3,632	1,437,692	
2005	801,010	-	6,809	321,114	286,965	5,186	64,102	-	1,838	1,487,025	
2006	809,611	-	15,791	324,331	356,530	5,459	64,479	-	3,507	1,579,708	
2007	860,962	-	9,859	352,397	366,478	5,834	106,080	-	3,505	1,705,115	
2008	926,426	-	11,547	313,806	436,539	6,151	105,857	-	3,807	1,804,132	
2009	972,933	-	10,067	319,093	439,531	6,645	103,905	-	3,985	1,856,159	
2010	916,208	-	7,922	311,982	495,884	7,261	99,078	-	3,418	1,841,753	
2011	934,453	-	5,417	300,035	689,182	7,834	90,651	-	3,284	2,030,855	
2012	867,481	-	15,070	298,664	761,036	8,171	93,782	-	3,333	2,047,536	
2013	1,014,074	-	15,165	318,809	793,823	8,354	98,569	-	4,079	2,252,872	
2014	1,083,662	-	8,923	351,749	835,283	8,583	97,591	-	4,226	2,390,016	
2015	951,814	-	11,105	318,873	869,566	8,759	93,811	-	2,860	2,256,788	2,382,917
2016	946,448	-	9,089	330,796	861,454	8,556	89,487	-	2,716	2,248,547	2,432,759
2017	1,052,457	-	12,996	344,489	948,766	8,632	94,870	-	3,443	2,465,653	2,524,191
2018	1,073,966	-	13,102	348,161	955,445	8,709	94,870	-	3,443	2,497,695	2,570,362
2019	1,093,066	-	13,237	354,949	959,956	8,800	94,870	-	3,443	2,528,321	2,616,508
2020	1,114,915	-	13,343	362,495	968,832	8,889	94,870	-	3,443	2,566,787	2,662,557
2021	1,131,972	-	13,478	370,733	977,870	8,976	94,870	-	3,443	2,601,342	2,715,978
2022	1,152,001	-	13,584	379,593	984,077	9,060	94,870	-	3,443	2,636,627	2,762,453
2023	1,172,114	-	13,720	389,017	993,456	9,141	94,870	-	3,443	2,675,760	2,809,213
2024	1,192,417	-	13,825	399,165	1,003,013	9,236	94,870	-	3,443	2,715,970	2,854,895
2025	1,212,731	-	13,961	410,037	1,009,754	9,329	94,870	-	3,443	2,754,125	2,904,595
2026	1,237,334	-	14,066	421,641	1,019,684	9,420	94,870	-	3,443	2,800,457	2,944,026
2027	1,257,340	-	14,202	433,882	1,029,808	9,507	94,870	-	3,443	2,843,052	2,985,641
2028	1,277,262	-	14,307	446,705	1,037,132	9,608	94,870	-	3,443	2,883,328	3,029,691
2029	1,297,078	-	14,443	460,076	1,047,662	9,706	94,870	-	3,443	2,927,278	3,067,325
2030	1,320,897	-	14,549	473,888	1,058,405	9,801	94,870	-	3,443	2,975,852	3,107,628
2031	1,340,035	-	14,684	488,234	1,066,366	9,894	94,870	-	3,443	3,017,525	3,150,904
2032	1,363,538	-	14,790	503,019	1,077,552	9,983	94,870	-	3,443	3,067,194	3,188,322
2033	1,381,476	-	14,925	518,164	1,088,970	10,085	94,870	-	3,443	3,111,933	3,228,361
2034	1,404,677	-	15,031	533,738	1,097,626	10,184	94,870	-	3,443	3,159,569	3,264,947
2035	1,423,676	-	15,166	549,705	1,109,528	10,280	94,870	-	3,443	3,206,669	3,307,212
2036	1,447,235	-	15,272	566,069	1,121,683	10,389	94,870	-	3,443	3,258,961	3,346,120
2037	1,465,089	-	15,408	582,876	1,131,099	10,494	94,870	-	3,443	3,303,278	3,381,733
2038	1,482,742	-	15,513	599,914	1,143,783	10,596	94,870	-	3,443	3,350,861	3,416,999
2039	1,500,457	-	15,649	617,279	1,156,744	10,695	94,870	-	3,443	3,399,135	3,460,683
2040	1,517,610	-	15,754	634,902	1,166,988	10,805	94,870	-	3,443	3,444,373	3,495,431
2041	1,534,684	-	15,890	652,778	1,180,526	10,912	94,870	-	3,443	3,493,103	3,529,979
2042	1,552,027	-	15,995	670,948	1,194,366	11,016	94,870	-	3,443	3,542,666	3,567,037
2043	1,563,568	-	16,131	689,310	1,205,516	11,131	94,870	-	3,443	3,583,969	3,601,053
2044	1,580,448	-	16,237	707,833	1,219,987	11,242	94,870	-	3,443	3,634,059	3,634,548
2045	1,591,164	-	16,372	726,524	1,231,786	11,350	94,870	-	3,443	3,675,508	
2046	1,607,447	-	16,478	745,340	1,243,926	11,454	94,870	-	3,443	3,722,958	
Average Annual Growth Rates											
1996-2016	1.8%	-100.0%	-0.2%	0.1%	13.2%	6.4%	-1.5%	--	-1.3%	3.2%	--
2001-2016	2.0%	--	2.0%	-0.7%	12.2%	5.8%	1.9%	--	0.0%	3.7%	--
2006-2016	1.6%	--	-5.4%	0.2%	9.2%	4.6%	3.3%	--	-2.5%	3.6%	--
2011-2016	0.3%	--	10.9%	2.0%	4.6%	1.8%	-0.3%	--	-3.7%	2.1%	--
2016-2021	3.6%	--	8.2%	2.3%	2.6%	1.0%	1.2%	--	4.9%	3.0%	2.2%
2016-2026	2.7%	--	4.5%	2.5%	1.7%	1.0%	0.6%	--	2.4%	2.2%	1.9%
2016-2036	2.1%	--	2.6%	2.7%	1.3%	1.0%	0.3%	--	1.2%	1.9%	1.6%
2016-2046	1.8%	--	2.0%	2.7%	1.2%	1.0%	0.2%	--	0.8%	1.7%	
2017-2046	1.5%	--	0.8%	2.7%	0.9%	1.0%	0.0%	--	0.0%	1.4%	

Member Forecasts By Class-MN

Year	Residential	Seasonal	Irrigation	General Commercial	Large Commercial	Street Lighting	Public Authority	Resale RUS	Resale Other	Total Members
1987	39,536	4,911	62	2,296	12	81	-	1	7	46,905
1988	40,124	5,013	58	2,321	11	82	-	1	7	47,617
1989	40,620	5,032	52	2,380	11	82	-	1	7	48,184
1990	41,131	5,049	63	2,429	11	86	-	1	7	48,777
1991	41,631	5,134	82	2,491	11	91	-	1	8	49,447
1992	42,166	5,238	96	2,568	13	91	-	1	8	50,182
1993	42,859	5,307	108	2,654	15	92	-	1	9	51,045
1994	43,395	5,399	106	2,728	16	89	-	1	9	51,743
1995	44,199	5,412	101	2,802	21	91	-	1	9	52,637
1996	45,065	5,326	104	2,868	22	94	-	1	9	53,489
1997	45,897	5,132	101	2,945	24	94	-	1	9	54,204
1998	46,770	5,027	100	3,058	28	95	-	1	9	55,088
1999	47,584	5,055	105	3,141	32	100	-	1	11	56,029
2000	48,486	5,064	97	3,232	34	102	-	1	10	57,026
2001	49,321	4,969	93	3,320	35	108	-	1	9	57,855
2002	50,384	4,840	89	3,468	35	110	-	1	8	58,935
2003	51,488	4,679	88	3,628	36	111	-	1	8	60,039
2004	52,651	4,457	92	3,766	36	113	-	1	8	61,125
2005	53,482	4,269	77	3,827	36	123	-	1	8	61,823
2006	55,365	3,081	81	3,937	37	133	-	1	8	62,643
2007	56,451	2,621	85	4,088	40	136	-	1	8	63,430
2008	57,088	2,409	88	4,158	44	142	-	1	9	63,940
2009	58,231	1,519	91	4,186	52	144	-	1	9	64,232
2010	58,455	1,475	88	4,229	53	149	-	1	9	64,460
2011	58,645	1,417	86	4,265	68	157	-	1	9	64,648
2012	58,836	1,355	84	4,274	71	166	-	1	9	64,795
2013	59,083	1,294	88	4,280	68	166	-	1	9	64,990
2014	59,444	1,224	95	4,308	69	167	-	1	9	65,318
2015	59,836	1,193	104	4,311	90	174	-	1	9	65,717
2016	60,336	1,168	113	4,331	90	185	-	1	8	66,231
2017	60,387	1,136	113	4,355	90	185	-	1	8	66,274
2018	60,894	1,123	113	4,383	92	185	-	1	8	66,799
2019	61,340	1,110	115	4,411	93	187	-	1	8	67,264
2020	61,742	1,097	115	4,439	93	187	-	1	8	67,682
2021	62,115	1,084	115	4,466	93	187	-	1	8	68,069
2022	62,409	1,071	117	4,492	95	189	-	1	8	68,382
2023	62,661	1,058	118	4,516	95	189	-	1	8	68,646
2024	62,885	1,045	119	4,539	95	189	-	1	8	68,880
2025	63,094	1,032	121	4,560	96	191	-	1	8	69,102
2026	63,293	1,019	122	4,580	98	191	-	1	8	69,312
2027	63,486	1,006	123	4,599	98	191	-	1	8	69,512
2028	63,672	993	125	4,618	99	193	-	1	8	69,708
2029	63,850	980	126	4,635	99	193	-	1	8	69,892
2030	64,025	967	127	4,652	99	193	-	1	8	70,071
2031	64,197	954	129	4,667	99	195	-	1	8	70,250
2032	64,368	941	130	4,683	101	195	-	1	8	70,426
2033	64,539	928	131	4,697	101	195	-	1	8	70,600
2034	64,710	915	133	4,711	101	197	-	1	8	70,776
2035	64,881	902	134	4,725	101	197	-	1	8	70,948
2036	65,052	889	135	4,738	103	197	-	1	8	71,123
2037	65,223	876	137	4,752	103	199	-	1	8	71,299
2038	65,394	863	138	4,766	103	199	-	1	8	71,472
2039	65,565	850	139	4,780	103	199	-	1	8	71,645
2040	65,736	837	141	4,794	103	201	-	1	8	71,821
2041	65,907	824	142	4,808	103	201	-	1	8	71,994
2042	66,078	811	143	4,823	103	201	-	1	8	72,167
2043	66,249	798	145	4,838	103	203	-	1	8	72,344
2044	66,420	785	146	4,852	103	203	-	1	8	72,518
2045	66,591	772	147	4,867	103	203	-	1	8	72,691
2046	66,762	759	149	4,881	103	205	-	1	8	72,868
Average Annual Growth Rates										
1987-2016	1.5%	-4.8%	2.1%	2.2%	7.2%	2.9%	--	0.0%	0.6%	1.2%
2001-2016	1.4%	-9.2%	1.3%	1.8%	6.5%	3.7%	--	0.0%	-0.4%	0.9%
2006-2016	0.9%	-9.2%	3.4%	1.0%	9.3%	3.3%	--	0.0%	0.0%	0.6%
2011-2016	0.6%	-3.8%	5.5%	0.3%	5.8%	3.3%	--	0.0%	-2.3%	0.5%
2016-2021	0.6%	-1.5%	0.4%	0.6%	0.7%	0.2%	--	0.0%	0.0%	0.5%
2016-2026	0.5%	-1.4%	0.8%	0.6%	0.9%	0.3%	--	0.0%	0.0%	0.5%
2016-2036	0.4%	-1.4%	0.9%	0.5%	0.7%	0.3%	--	0.0%	0.0%	0.4%
2016-2046	0.3%	-1.4%	0.9%	0.4%	0.5%	0.3%	--	0.0%	0.0%	0.3%
2017-2046	0.3%	-1.4%	1.0%	0.4%	0.5%	0.4%	--	0.0%	0.0%	0.3%

Member Forecasts By Class-ND

Minnkota Power Cooperative, Inc.

Year	Residential	Seasonal	Irrigation	General Commercial	Large Commercial	Street Lighting	Public Authority	Resale RUS	Resale Other	Total Members
1987	23,341	445	200	2,653	39	150	112	-	3	26,942
1988	23,488	456	205	2,678	39	147	112	1	3	27,129
1989	24,056	469	207	2,726	39	166	112	-	2	27,777
1990	24,485	476	210	2,806	41	179	112	-	2	28,311
1991	24,919	479	243	2,923	42	196	113	-	2	28,917
1992	25,742	476	278	3,011	42	210	113	-	2	29,874
1993	26,643	454	289	3,121	42	221	112	-	2	30,885
1994	27,572	428	298	3,205	42	236	112	-	2	31,895
1995	28,333	428	303	3,348	42	248	113	-	2	32,817
1996	29,405	420	310	3,417	42	258	111	-	2	33,966
1997	29,867	408	322	3,479	42	275	111	-	2	34,506
1998	30,643	396	333	3,633	43	289	111	-	2	35,449
1999	31,300	391	338	3,888	43	295	103	-	2	36,359
2000	32,378	380	291	3,887	23	314	87	-	2	37,362
2001	35,724	-	266	2,567	16	281	25	-	3	38,883
2002	36,856	52	272	2,545	18	278	26	-	3	40,049
2003	38,462	-	315	2,821	18	242	28	-	2	41,888
2004	40,314	-	330	2,896	66	271	28	-	2	43,906
2005	42,391	-	329	3,064	69	304	28	-	2	46,186
2006	44,321	-	329	3,265	82	315	26	-	2	48,339
2007	45,795	-	329	3,337	90	374	28	-	2	49,953
2008	46,996	-	333	3,543	99	392	29	-	2	51,393
2009	47,962	-	336	3,702	109	409	29	-	2	52,549
2010	48,777	-	342	3,862	123	420	29	-	2	53,556
2011	50,131	-	339	3,974	136	433	28	-	2	55,043
2012	51,855	-	350	4,139	141	444	27	-	2	56,958
2013	53,033	-	358	4,222	147	453	25	-	2	58,239
2014	55,376	-	368	4,448	150	457	26	-	2	60,827
2015	58,568	-	386	4,740	157	465	33	-	2	64,350
2016	61,349	-	397	5,029	160	464	34	-	2	67,435
2017	63,430	-	400	5,133	163	473	34	-	2	69,635
2018	65,334	-	403	5,247	167	482	34	-	2	71,669
2019	67,071	-	407	5,367	169	492	34	-	2	73,542
2020	68,789	-	410	5,494	172	502	34	-	2	75,403
2021	70,490	-	414	5,626	175	512	34	-	2	77,252
2022	72,129	-	417	5,761	178	522	34	-	2	79,043
2023	73,722	-	421	5,901	180	532	34	-	2	80,792
2024	75,273	-	424	6,043	183	543	34	-	2	82,503
2025	76,784	-	428	6,189	186	554	34	-	2	84,177
2026	78,258	-	431	6,336	188	565	34	-	2	85,814
2027	79,694	-	435	6,484	191	576	34	-	2	87,417
2028	81,095	-	438	6,634	194	588	34	-	2	88,985
2029	82,461	-	442	6,785	196	600	34	-	2	90,520
2030	83,792	-	445	6,935	199	612	34	-	2	92,020
2031	85,088	-	449	7,086	202	624	34	-	2	93,486
2032	86,349	-	452	7,237	204	636	34	-	2	94,914
2033	87,575	-	456	7,387	207	649	34	-	2	96,310
2034	88,791	-	459	7,537	209	662	34	-	2	97,694
2035	89,997	-	463	7,685	212	675	34	-	2	99,069
2036	91,193	-	466	7,833	215	689	34	-	2	100,433
2037	92,379	-	470	7,980	217	703	34	-	2	101,785
2038	93,555	-	473	8,125	219	717	34	-	2	103,126
2039	94,721	-	477	8,269	223	731	34	-	2	104,458
2040	95,877	-	480	8,412	225	746	34	-	2	105,776
2041	97,023	-	484	8,553	227	761	34	-	2	107,085
2042	98,159	-	487	8,693	230	776	34	-	2	108,381
2043	99,285	-	491	8,830	232	792	34	-	2	109,667
2044	100,401	-	494	8,966	234	808	34	-	2	110,940
2045	101,507	-	498	9,101	236	824	34	-	2	112,202
2046	102,603	-	501	9,233	238	840	34	-	2	113,451
Average Annual Growth Rates										
1987-2016	3.4%	-100.0%	2.4%	2.2%	5.0%	4.0%	-4.0%	--	-1.4%	3.2%
2001-2016	3.7%	--	2.7%	4.6%	16.6%	3.4%	2.1%	--	-2.7%	3.7%
2006-2016	3.3%	--	1.9%	4.4%	6.9%	4.0%	2.8%	--	0.0%	3.4%
2011-2016	4.1%	--	3.2%	4.8%	3.3%	1.4%	4.2%	--	0.0%	4.1%
2016-2021	2.8%	--	0.8%	2.3%	1.8%	2.0%	0.0%	--	0.0%	2.8%
2016-2026	2.5%	--	0.8%	2.3%	1.6%	2.0%	0.0%	--	0.0%	2.4%
2016-2036	2.0%	--	0.8%	2.2%	1.5%	2.0%	0.0%	--	0.0%	2.0%
2016-2046	1.7%	--	0.8%	2.0%	1.3%	2.0%	0.0%	--	0.0%	1.7%
2017-2046	1.7%	--	0.8%	2.0%	1.3%	2.0%	0.0%	--	0.0%	1.7%

Seasonal Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	1,754	-	-	362	445	1,036	-	-	-	171	1,588	5,356
1988	1,788	-	-	375	456	1,079	-	-	-	179	1,592	5,469
1989	1,785	-	-	382	469	1,101	-	-	-	183	1,581	5,501
1990	1,826	-	-	388	476	1,116	-	-	-	189	1,530	5,525
1991	1,880	-	-	384	479	1,169	-	-	-	196	1,505	5,613
1992	1,927	-	-	394	476	1,227	-	-	-	204	1,486	5,714
1993	1,962	-	-	413	454	1,253	-	-	-	218	1,462	5,761
1994	2,002	-	-	429	428	1,286	-	-	-	229	1,453	5,828
1995	1,990	-	-	437	428	1,311	-	-	-	244	1,430	5,840
1996	2,016	-	-	347	420	1,312	-	-	-	257	1,394	5,746
1997	1,995	-	-	173	408	1,340	-	-	-	260	1,365	5,540
1998	1,999	-	-	32	396	1,367	-	-	-	270	1,359	5,422
1999	1,984	-	-	-	391	1,406	-	-	-	278	1,387	5,447
2000	1,943	-	-	-	380	1,442	-	-	-	308	1,371	5,443
2001	1,870	-	-	-	-	1,446	-	-	-	305	1,349	4,969
2002	1,745	-	-	-	52	1,468	-	-	-	314	1,313	4,892
2003	1,618	-	-	-	-	1,479	-	-	-	323	1,260	4,679
2004	1,463	-	-	-	-	1,493	-	-	-	337	1,164	4,457
2005	1,373	-	-	-	-	1,501	-	-	-	344	1,050	4,269
2006	1,201	-	-	-	-	1,353	-	-	-	361	166	3,081
2007	1,001	-	-	-	-	1,258	-	-	-	363	-	2,621
2008	856	-	-	-	-	1,187	-	-	-	367	-	2,409
2009	-	-	-	-	-	1,146	-	-	-	374	-	1,519
2010	-	-	-	-	-	1,098	-	-	-	377	-	1,475
2011	-	-	-	-	-	1,035	-	-	-	382	-	1,417
2012	-	-	-	-	-	969	-	-	-	386	-	1,355
2013	-	-	-	-	-	906	-	-	-	388	-	1,294
2014	-	-	-	-	-	831	-	-	-	394	-	1,224
2015	-	-	-	-	-	794	-	-	-	399	-	1,193
2016	-	-	-	-	-	762	-	-	-	406	-	1,168
2017	-	-	-	-	-	737	-	-	-	399	-	1,136
2018	-	-	-	-	-	722	-	-	-	401	-	1,123
2019	-	-	-	-	-	707	-	-	-	403	-	1,110
2020	-	-	-	-	-	692	-	-	-	405	-	1,097
2021	-	-	-	-	-	677	-	-	-	407	-	1,084
2022	-	-	-	-	-	662	-	-	-	409	-	1,071
2023	-	-	-	-	-	647	-	-	-	411	-	1,058
2024	-	-	-	-	-	632	-	-	-	413	-	1,045
2025	-	-	-	-	-	617	-	-	-	415	-	1,032
2026	-	-	-	-	-	602	-	-	-	417	-	1,019
2027	-	-	-	-	-	587	-	-	-	419	-	1,006
2028	-	-	-	-	-	572	-	-	-	421	-	993
2029	-	-	-	-	-	557	-	-	-	423	-	980
2030	-	-	-	-	-	542	-	-	-	425	-	967
2031	-	-	-	-	-	527	-	-	-	427	-	954
2032	-	-	-	-	-	512	-	-	-	429	-	941
2033	-	-	-	-	-	497	-	-	-	431	-	928
2034	-	-	-	-	-	482	-	-	-	433	-	915
2035	-	-	-	-	-	467	-	-	-	435	-	902
2036	-	-	-	-	-	452	-	-	-	437	-	889
2037	-	-	-	-	-	437	-	-	-	439	-	876
2038	-	-	-	-	-	422	-	-	-	441	-	863
2039	-	-	-	-	-	407	-	-	-	443	-	850
2040	-	-	-	-	-	392	-	-	-	445	-	837
2041	-	-	-	-	-	377	-	-	-	447	-	824
2042	-	-	-	-	-	362	-	-	-	449	-	811
2043	-	-	-	-	-	347	-	-	-	451	-	798
2044	-	-	-	-	-	332	-	-	-	453	-	785
2045	-	-	-	-	-	317	-	-	-	455	-	772
2046	-	-	-	-	-	302	-	-	-	457	-	759
Average Annual Growth Rates												
1987-2016	-100.0%	--	--	-100.0%	-100.0%	-1.1%	--	--	--	3.0%	-100.0%	-5.1%
2001-2016	-100.0%	--	--	--	--	-4.2%	--	--	--	1.9%	-100.0%	-9.2%
2006-2016	-100.0%	--	--	--	--	-5.6%	--	--	--	1.2%	-100.0%	-9.2%
2011-2016	--	--	--	--	--	-5.9%	--	--	--	1.2%	--	-3.8%
2016-2021	--	--	--	--	--	-2.3%	--	--	--	0.1%	--	-1.5%
2016-2026	--	--	--	--	--	-2.3%	--	--	--	0.3%	--	-1.4%
2016-2036	--	--	--	--	--	-2.6%	--	--	--	0.4%	--	-1.4%
2016-2046	--	--	--	--	--	-3.0%	--	--	--	0.4%	--	-1.4%
2017-2046	--	--	--	--	--	-3.0%	--	--	--	0.5%	--	-1.4%

Irrigation Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	13	149	-	24	51	-	7	-	11	-	8	263
1988	13	151	-	20	54	-	5	-	10	-	10	262
1989	11	152	-	18	55	-	5	-	10	-	8	259
1990	18	154	-	20	56	-	5	-	12	-	8	273
1991	22	156	-	20	87	-	7	9	16	-	7	325
1992	25	164	-	23	114	-	9	12	20	-	8	374
1993	26	169	-	23	120	-	9	12	24	-	13	396
1994	26	172	-	20	126	-	10	12	26	-	13	404
1995	26	173	-	15	130	-	9	12	26	-	13	404
1996	26	178	-	13	132	-	14	12	25	-	13	414
1997	24	185	-	13	137	-	16	12	25	-	12	423
1998	22	190	-	15	143	-	16	12	24	-	12	433
1999	27	191	-	13	147	-	15	13	25	-	12	443
2000	22	188	-	14	104	-	14	13	24	-	10	388
2001	21	184	-	12	82	-	13	11	24	-	11	359
2002	20	188	-	12	83	-	12	11	23	-	11	361
2003	20	190	-	11	124	-	12	11	23	-	11	403
2004	21	190	-	15	140	-	13	11	23	-	10	422
2005	20	188	-	13	141	-	13	11	10	-	11	406
2006	20	187	-	14	142	-	15	11	10	-	11	410
2007	19	187	-	16	142	-	19	11	10	-	10	414
2008	19	188	-	17	145	-	21	11	10	-	10	421
2009	20	189	-	17	147	-	24	11	8	-	11	427
2010	18	190	-	17	152	-	25	11	7	-	11	430
2011	15	187	-	17	152	-	25	11	7	-	11	426
2012	15	190	-	13	159	-	26	12	7	-	11	434
2013	16	194	-	12	164	-	26	13	7	-	15	446
2014	16	197	-	13	171	-	25	15	6	-	20	462
2015	17	200	-	14	187	-	25	18	5	-	24	490
2016	18	202	-	14	194	-	22	23	5	-	31	509
2017	18	202	-	14	197	-	22	23	5	-	31	512
2018	18	202	-	14	200	-	22	23	5	-	31	515
2019	18	203	-	14	203	-	22	24	5	-	32	521
2020	18	203	-	14	206	-	22	24	5	-	32	524
2021	18	204	-	14	209	-	22	24	5	-	32	528
2022	18	204	-	14	212	-	22	25	5	-	33	533
2023	18	205	-	14	215	-	22	25	5	-	34	538
2024	18	205	-	14	218	-	22	25	5	-	35	542
2025	18	206	-	14	221	-	22	26	5	-	36	548
2026	18	206	-	14	224	-	22	26	5	-	37	552
2027	18	207	-	14	227	-	22	26	5	-	38	557
2028	18	207	-	14	230	-	22	27	5	-	39	562
2029	18	208	-	14	233	-	22	27	5	-	40	567
2030	18	208	-	14	236	-	22	27	5	-	41	571
2031	18	209	-	14	239	-	22	28	5	-	42	577
2032	18	209	-	14	242	-	22	28	5	-	43	581
2033	18	210	-	14	245	-	22	28	5	-	44	586
2034	18	210	-	14	248	-	22	29	5	-	45	591
2035	18	211	-	14	251	-	22	29	5	-	46	596
2036	18	211	-	14	254	-	22	29	5	-	47	600
2037	18	212	-	14	257	-	22	30	5	-	48	606
2038	18	212	-	14	260	-	22	30	5	-	49	610
2039	18	213	-	14	263	-	22	30	5	-	50	615
2040	18	213	-	14	266	-	22	31	5	-	51	620
2041	18	214	-	14	269	-	22	31	5	-	52	625
2042	18	214	-	14	272	-	22	31	5	-	53	629
2043	18	215	-	14	275	-	22	32	5	-	54	635
2044	18	215	-	14	278	-	22	32	5	-	55	639
2045	18	216	-	14	281	-	22	32	5	-	56	644
2046	18	216	-	14	284	-	22	33	5	-	57	649
Average Annual Growth Rates												
1987-2016	1.0%	1.1%	--	-1.8%	4.7%	--	4.1%	--	-2.6%	--	5.0%	2.3%
2001-2016	-1.1%	0.6%	--	0.9%	5.9%	--	3.4%	4.9%	-9.9%	--	7.1%	2.4%
2006-2016	-1.1%	0.8%	--	0.1%	3.2%	--	3.8%	7.7%	-6.7%	--	10.7%	2.2%
2011-2016	3.1%	1.6%	--	-3.8%	5.0%	--	-2.6%	16.1%	-6.5%	--	22.9%	3.7%
2016-2021	0.0%	0.2%	--	0.0%	1.5%	--	0.0%	0.8%	0.0%	--	0.6%	0.7%
2016-2026	0.0%	0.2%	--	0.0%	1.4%	--	0.0%	1.2%	0.0%	--	1.8%	0.8%
2016-2036	0.0%	0.2%	--	0.0%	1.4%	--	0.0%	1.2%	0.0%	--	2.1%	0.8%
2016-2046	0.0%	0.2%	--	0.0%	1.3%	--	0.0%	1.2%	0.0%	--	2.1%	0.8%
2017-2046	0.0%	0.2%	--	0.0%	1.3%	--	0.0%	1.2%	0.0%	--	2.1%	0.8%

Street Lighting Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	28	70	-	-	80	19	-	2	3	2	27	231
1988	28	71	-	-	76	19	-	2	3	2	28	229
1989	28	90	-	-	76	18	-	2	3	2	29	248
1990	28	99	-	-	80	18	-	2	3	2	33	265
1991	28	115	-	-	81	18	-	2	3	2	38	286
1992	28	128	-	-	82	17	-	2	3	2	39	301
1993	28	139	-	-	82	18	-	2	3	2	39	312
1994	27	153	-	-	83	16	-	2	3	2	39	325
1995	27	164	-	-	83	17	-	2	3	2	41	339
1996	27	173	-	-	85	18	-	2	3	2	42	352
1997	26	188	-	-	87	19	-	2	3	2	42	369
1998	26	199	-	-	89	19	-	2	3	2	43	383
1999	26	205	-	-	90	19	-	2	7	2	44	394
2000	27	224	-	-	90	19	-	2	7	2	45	417
2001	28	242	-	-	39	21	-	4	7	3	45	389
2002	27	252	-	-	26	22	-	4	7	3	46	387
2003	28	242	-	-	-	24	-	4	7	2	47	354
2004	27	271	-	-	-	24	-	4	7	2	49	385
2005	29	304	-	-	-	25	-	4	16	2	48	427
2006	39	315	-	-	-	25	-	4	15	2	48	448
2007	42	374	-	-	-	25	-	4	14	2	49	509
2008	45	392	-	-	-	25	-	4	15	4	49	534
2009	50	409	-	-	-	24	-	4	15	4	47	553
2010	54	420	-	-	-	24	-	4	16	4	47	569
2011	62	433	-	-	-	23	-	5	17	4	47	590
2012	66	444	-	-	-	23	-	9	16	5	47	610
2013	66	453	-	-	-	23	-	9	17	5	46	619
2014	66	457	-	-	-	23	-	10	17	5	46	625
2015	66	465	-	-	-	23	-	16	18	5	46	638
2016	73	464	-	-	-	23	-	21	18	5	46	649
2017	73	473	-	-	-	23	-	21	18	5	46	658
2018	73	482	-	-	-	23	-	21	18	5	46	667
2019	74	492	-	-	-	23	-	22	18	5	46	679
2020	74	502	-	-	-	23	-	22	18	5	46	689
2021	74	512	-	-	-	23	-	22	18	5	46	699
2022	75	522	-	-	-	23	-	23	18	5	46	711
2023	75	532	-	-	-	23	-	23	18	5	46	721
2024	75	543	-	-	-	23	-	23	18	5	46	732
2025	76	554	-	-	-	23	-	24	18	5	46	745
2026	76	565	-	-	-	23	-	24	18	5	46	756
2027	76	576	-	-	-	23	-	24	18	5	46	767
2028	77	588	-	-	-	23	-	25	18	5	46	781
2029	77	600	-	-	-	23	-	25	18	5	46	793
2030	77	612	-	-	-	23	-	25	18	5	46	805
2031	78	624	-	-	-	23	-	26	18	5	46	819
2032	78	636	-	-	-	23	-	26	18	5	46	831
2033	78	649	-	-	-	23	-	26	18	5	46	844
2034	79	662	-	-	-	23	-	27	18	5	46	859
2035	79	675	-	-	-	23	-	27	18	5	46	872
2036	79	689	-	-	-	23	-	27	18	5	46	886
2037	80	703	-	-	-	23	-	28	18	5	46	902
2038	80	717	-	-	-	23	-	28	18	5	46	916
2039	80	731	-	-	-	23	-	28	18	5	46	930
2040	81	746	-	-	-	23	-	29	18	5	46	947
2041	81	761	-	-	-	23	-	29	18	5	46	962
2042	81	776	-	-	-	23	-	29	18	5	46	977
2043	82	792	-	-	-	23	-	30	18	5	46	995
2044	82	808	-	-	-	23	-	30	18	5	46	1,011
2045	82	824	-	-	-	23	-	30	18	5	46	1,027
2046	83	840	-	-	-	23	-	31	18	5	46	1,045
Average Annual Growth Rates												
1987-2016	3.3%	6.8%	--	--	-100.0%	0.7%	--	8.4%	6.3%	3.2%	1.9%	3.6%
2001-2016	6.7%	4.4%	--	--	-100.0%	0.6%	--	11.9%	6.4%	4.1%	0.1%	3.5%
2006-2016	6.3%	4.0%	--	--	--	-0.8%	--	17.9%	1.7%	9.6%	-0.5%	3.8%
2011-2016	3.3%	1.4%	--	--	--	0.0%	--	35.3%	1.0%	4.6%	-0.4%	1.9%
2016-2021	0.3%	2.0%	--	--	--	0.0%	--	0.9%	0.0%	0.0%	0.0%	1.5%
2016-2026	0.4%	2.0%	--	--	--	0.0%	--	1.4%	0.0%	0.0%	0.0%	1.5%
2016-2036	0.4%	2.0%	--	--	--	0.0%	--	1.3%	0.0%	0.0%	0.0%	1.6%
2016-2046	0.4%	2.0%	--	--	--	0.0%	--	1.3%	0.0%	0.0%	0.0%	1.6%
2017-2046	0.4%	2.0%	--	--	--	0.0%	--	1.4%	0.0%	0.0%	0.0%	1.6%

Public Authority Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	-	11	27	-	74	-	-	-	-	-	-	112
1988	-	11	27	-	74	-	-	-	-	-	-	112
1989	-	11	27	-	74	-	-	-	-	-	-	112
1990	-	11	27	-	74	-	-	-	-	-	-	112
1991	-	11	28	-	74	-	-	-	-	-	-	113
1992	-	11	28	-	74	-	-	-	-	-	-	113
1993	-	11	27	-	74	-	-	-	-	-	-	112
1994	-	11	27	-	74	-	-	-	-	-	-	112
1995	-	11	28	-	74	-	-	-	-	-	-	113
1996	-	11	26	-	74	-	-	-	-	-	-	111
1997	-	11	26	-	74	-	-	-	-	-	-	111
1998	-	11	26	-	74	-	-	-	-	-	-	111
1999	-	11	26	-	66	-	-	-	-	-	-	103
2000	-	5	25	-	57	-	-	-	-	-	-	87
2001	-	-	24	-	1	-	-	-	-	-	-	25
2002	-	-	25	-	1	-	-	-	-	-	-	26
2003	-	-	27	-	1	-	-	-	-	-	-	28
2004	-	-	27	-	1	-	-	-	-	-	-	28
2005	-	-	27	-	1	-	-	-	-	-	-	28
2006	-	-	25	-	1	-	-	-	-	-	-	26
2007	-	-	26	-	2	-	-	-	-	-	-	28
2008	-	-	27	-	2	-	-	-	-	-	-	29
2009	-	-	27	-	2	-	-	-	-	-	-	29
2010	-	-	27	-	2	-	-	-	-	-	-	29
2011	-	-	26	-	2	-	-	-	-	-	-	28
2012	-	-	25	-	2	-	-	-	-	-	-	27
2013	-	-	23	-	2	-	-	-	-	-	-	25
2014	-	-	24	-	2	-	-	-	-	-	-	26
2015	-	-	31	-	2	-	-	-	-	-	-	33
2016	-	-	32	-	2	-	-	-	-	-	-	34
2017	-	-	32	-	2	-	-	-	-	-	-	34
2018	-	-	32	-	2	-	-	-	-	-	-	34
2019	-	-	32	-	2	-	-	-	-	-	-	34
2020	-	-	32	-	2	-	-	-	-	-	-	34
2021	-	-	32	-	2	-	-	-	-	-	-	34
2022	-	-	32	-	2	-	-	-	-	-	-	34
2023	-	-	32	-	2	-	-	-	-	-	-	34
2024	-	-	32	-	2	-	-	-	-	-	-	34
2025	-	-	32	-	2	-	-	-	-	-	-	34
2026	-	-	32	-	2	-	-	-	-	-	-	34
2027	-	-	32	-	2	-	-	-	-	-	-	34
2028	-	-	32	-	2	-	-	-	-	-	-	34
2029	-	-	32	-	2	-	-	-	-	-	-	34
2030	-	-	32	-	2	-	-	-	-	-	-	34
2031	-	-	32	-	2	-	-	-	-	-	-	34
2032	-	-	32	-	2	-	-	-	-	-	-	34
2033	-	-	32	-	2	-	-	-	-	-	-	34
2034	-	-	32	-	2	-	-	-	-	-	-	34
2035	-	-	32	-	2	-	-	-	-	-	-	34
2036	-	-	32	-	2	-	-	-	-	-	-	34
2037	-	-	32	-	2	-	-	-	-	-	-	34
2038	-	-	32	-	2	-	-	-	-	-	-	34
2039	-	-	32	-	2	-	-	-	-	-	-	34
2040	-	-	32	-	2	-	-	-	-	-	-	34
2041	-	-	32	-	2	-	-	-	-	-	-	34
2042	-	-	32	-	2	-	-	-	-	-	-	34
2043	-	-	32	-	2	-	-	-	-	-	-	34
2044	-	-	32	-	2	-	-	-	-	-	-	34
2045	-	-	32	-	2	-	-	-	-	-	-	34
2046	-	-	32	-	2	-	-	-	-	-	-	34
Average Annual Growth Rates												
1987-2016	--	-100.0%	0.7%	--	-11.7%	--	--	--	--	--	--	-4.0%
2001-2016	--	--	2.0%	--	4.7%	--	--	--	--	--	--	2.1%
2006-2016	--	--	2.6%	--	7.2%	--	--	--	--	--	--	2.8%
2011-2016	--	--	4.5%	--	0.0%	--	--	--	--	--	--	4.2%
2016-2021	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2016-2026	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2016-2036	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2016-2046	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2017-2046	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%

Resale-RUS Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	1	-	-	-	-	-	-	-	-	-	-	1
1988	1	-	1	-	-	-	-	-	-	-	-	2
1989	1	-	-	-	-	-	-	-	-	-	-	1
1990	1	-	-	-	-	-	-	-	-	-	-	1
1991	1	-	-	-	-	-	-	-	-	-	-	1
1992	1	-	-	-	-	-	-	-	-	-	-	1
1993	1	-	-	-	-	-	-	-	-	-	-	1
1994	1	-	-	-	-	-	-	-	-	-	-	1
1995	1	-	-	-	-	-	-	-	-	-	-	1
1996	1	-	-	-	-	-	-	-	-	-	-	1
1997	1	-	-	-	-	-	-	-	-	-	-	1
1998	1	-	-	-	-	-	-	-	-	-	-	1
1999	1	-	-	-	-	-	-	-	-	-	-	1
2000	1	-	-	-	-	-	-	-	-	-	-	1
2001	1	-	-	-	-	-	-	-	-	-	-	1
2002	1	-	-	-	-	-	-	-	-	-	-	1
2003	1	-	-	-	-	-	-	-	-	-	-	1
2004	1	-	-	-	-	-	-	-	-	-	-	1
2005	1	-	-	-	-	-	-	-	-	-	-	1
2006	1	-	-	-	-	-	-	-	-	-	-	1
2007	1	-	-	-	-	-	-	-	-	-	-	1
2008	1	-	-	-	-	-	-	-	-	-	-	1
2009	1	-	-	-	-	-	-	-	-	-	-	1
2010	1	-	-	-	-	-	-	-	-	-	-	1
2011	1	-	-	-	-	-	-	-	-	-	-	1
2012	1	-	-	-	-	-	-	-	-	-	-	1
2013	1	-	-	-	-	-	-	-	-	-	-	1
2014	1	-	-	-	-	-	-	-	-	-	-	1
2015	1	-	-	-	-	-	-	-	-	-	-	1
2016	1	-	-	-	-	-	-	-	-	-	-	1
2017	1	-	-	-	-	-	-	-	-	-	-	1
2018	1	-	-	-	-	-	-	-	-	-	-	1
2019	1	-	-	-	-	-	-	-	-	-	-	1
2020	1	-	-	-	-	-	-	-	-	-	-	1
2021	1	-	-	-	-	-	-	-	-	-	-	1
2022	1	-	-	-	-	-	-	-	-	-	-	1
2023	1	-	-	-	-	-	-	-	-	-	-	1
2024	1	-	-	-	-	-	-	-	-	-	-	1
2025	1	-	-	-	-	-	-	-	-	-	-	1
2026	1	-	-	-	-	-	-	-	-	-	-	1
2027	1	-	-	-	-	-	-	-	-	-	-	1
2028	1	-	-	-	-	-	-	-	-	-	-	1
2029	1	-	-	-	-	-	-	-	-	-	-	1
2030	1	-	-	-	-	-	-	-	-	-	-	1
2031	1	-	-	-	-	-	-	-	-	-	-	1
2032	1	-	-	-	-	-	-	-	-	-	-	1
2033	1	-	-	-	-	-	-	-	-	-	-	1
2034	1	-	-	-	-	-	-	-	-	-	-	1
2035	1	-	-	-	-	-	-	-	-	-	-	1
2036	1	-	-	-	-	-	-	-	-	-	-	1
2037	1	-	-	-	-	-	-	-	-	-	-	1
2038	1	-	-	-	-	-	-	-	-	-	-	1
2039	1	-	-	-	-	-	-	-	-	-	-	1
2040	1	-	-	-	-	-	-	-	-	-	-	1
2041	1	-	-	-	-	-	-	-	-	-	-	1
2042	1	-	-	-	-	-	-	-	-	-	-	1
2043	1	-	-	-	-	-	-	-	-	-	-	1
2044	1	-	-	-	-	-	-	-	-	-	-	1
2045	1	-	-	-	-	-	-	-	-	-	-	1
2046	1	-	-	-	-	-	-	-	-	-	-	1
Average Annual Growth Rates												
1987-2016	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2001-2016	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2006-2016	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2011-2016	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2021	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2026	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2036	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2016-2046	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2017-2046	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%

Resale-Other Customer Forecasts By Member

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Members
1987	5	-	1	-	2	-	2	-	-	-	-	10
1988	5	-	1	-	2	-	2	-	-	-	-	10
1989	5	-	-	-	2	-	2	-	-	-	-	9
1990	5	-	-	-	2	-	2	-	-	-	-	9
1991	6	-	-	-	2	-	2	-	-	-	-	10
1992	6	-	-	-	2	-	2	-	-	-	-	10
1993	6	-	-	-	2	-	3	-	0	-	-	11
1994	6	-	-	-	2	-	3	-	0	-	-	11
1995	6	-	-	-	2	-	3	-	0	-	-	11
1996	6	-	-	-	2	-	3	-	0	-	-	11
1997	6	-	-	-	2	-	3	-	0	-	-	11
1998	6	-	-	-	2	-	3	-	0	-	-	11
1999	6	-	-	-	2	-	3	-	2	-	-	13
2000	6	-	-	-	2	-	2	-	2	-	-	12
2001	6	-	1	-	2	-	2	-	1	-	-	12
2002	6	-	1	-	2	-	2	-	0	-	-	11
2003	6	-	-	-	2	-	2	-	0	-	-	10
2004	6	-	-	-	2	-	2	-	0	-	-	10
2005	6	-	-	-	2	-	2	-	0	-	-	10
2006	6	-	-	-	2	-	2	-	-	-	-	10
2007	6	-	-	-	2	-	2	-	-	-	-	10
2008	6	-	-	-	2	-	2	1	-	-	-	11
2009	6	-	-	-	2	-	2	1	-	-	-	11
2010	6	-	-	-	2	-	2	1	-	-	-	11
2011	6	-	-	-	2	-	2	1	-	-	-	11
2012	6	-	-	-	2	-	2	1	-	-	-	11
2013	6	-	-	-	2	-	2	1	-	-	-	11
2014	6	-	-	-	2	-	2	1	-	-	-	11
2015	6	-	-	-	2	-	2	1	-	-	-	11
2016	5	-	-	-	2	-	2	1	-	-	-	10
2017	5	-	-	-	2	-	2	1	-	-	-	10
2018	5	-	-	-	2	-	2	1	-	-	-	10
2019	5	-	-	-	2	-	2	1	-	-	-	10
2020	5	-	-	-	2	-	2	1	-	-	-	10
2021	5	-	-	-	2	-	2	1	-	-	-	10
2022	5	-	-	-	2	-	2	1	-	-	-	10
2023	5	-	-	-	2	-	2	1	-	-	-	10
2024	5	-	-	-	2	-	2	1	-	-	-	10
2025	5	-	-	-	2	-	2	1	-	-	-	10
2026	5	-	-	-	2	-	2	1	-	-	-	10
2027	5	-	-	-	2	-	2	1	-	-	-	10
2028	5	-	-	-	2	-	2	1	-	-	-	10
2029	5	-	-	-	2	-	2	1	-	-	-	10
2030	5	-	-	-	2	-	2	1	-	-	-	10
2031	5	-	-	-	2	-	2	1	-	-	-	10
2032	5	-	-	-	2	-	2	1	-	-	-	10
2033	5	-	-	-	2	-	2	1	-	-	-	10
2034	5	-	-	-	2	-	2	1	-	-	-	10
2035	5	-	-	-	2	-	2	1	-	-	-	10
2036	5	-	-	-	2	-	2	1	-	-	-	10
2037	5	-	-	-	2	-	2	1	-	-	-	10
2038	5	-	-	-	2	-	2	1	-	-	-	10
2039	5	-	-	-	2	-	2	1	-	-	-	10
2040	5	-	-	-	2	-	2	1	-	-	-	10
2041	5	-	-	-	2	-	2	1	-	-	-	10
2042	5	-	-	-	2	-	2	1	-	-	-	10
2043	5	-	-	-	2	-	2	1	-	-	-	10
2044	5	-	-	-	2	-	2	1	-	-	-	10
2045	5	-	-	-	2	-	2	1	-	-	-	10
2046	5	-	-	-	2	-	2	1	-	-	-	10
Average Annual Growth Rates												
1987-2016	0.2%	--	-100.0%	--	0.0%	--	0.0%	--	--	--	--	0.1%
2001-2016	-1.2%	--	-100.0%	--	0.0%	--	0.0%	--	-100.0%	--	--	-0.9%
2006-2016	-1.8%	--	--	--	0.0%	--	0.0%	--	--	--	--	0.0%
2011-2016	-3.6%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	-1.9%
2016-2021	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%
2016-2026	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%
2016-2036	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%
2016-2046	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%
2017-2046	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%

Retail Base Forecast By Member (kWh) /1

Joint System

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	MPC Retail Base Forecast	NMPA Retail Base Forecast	Joint System Retail Base Forecast
1987	216,358,395	311,389,196	34,840,535	43,217,626	449,064,984	53,979,837	71,936,032	82,104,754	93,713,630	84,501,635	132,221,941	1,573,328,565		
1988	236,361,210	350,733,637	36,270,356	47,092,478	502,073,820	61,152,908	75,800,373	87,731,344	101,308,990	94,398,211	137,475,587	1,730,398,914		
1989	248,114,055	359,144,223	36,564,927	48,117,419	502,331,206	65,995,870	76,336,089	90,980,414	102,920,940	102,200,859	142,626,147	1,775,332,149		
1990	251,740,830	355,884,553	36,547,156	48,049,100	505,929,688	68,092,705	76,571,229	89,990,533	100,873,700	106,702,259	142,430,968	1,782,812,721		
1991	280,044,430	380,957,146	37,122,604	49,178,892	532,557,400	73,092,160	79,389,857	93,231,405	104,405,590	110,909,782	148,940,254	1,889,829,520		
1992	292,592,340	375,660,576	38,234,650	49,252,830	534,939,102	75,394,795	81,622,958	92,424,245	102,404,280	115,047,233	157,965,915	1,915,538,924		
1993	308,453,147	414,848,416	38,262,513	52,052,130	563,681,042	79,663,312	89,229,225	99,185,349	109,574,580	122,213,405	165,472,732	2,042,635,851		
1994	316,842,845	444,094,254	37,085,680	54,047,190	569,919,512	81,724,773	92,042,343	98,867,117	110,628,710	126,189,721	166,912,798	2,098,354,943		
1995	333,512,748	484,229,928	37,225,826	56,074,230	600,003,519	87,093,209	96,454,837	101,359,829	112,765,660	135,300,101	174,276,720	2,218,296,607	407,069,000	2,625,365,607
1996	361,310,038	540,145,899	37,781,366	61,137,648	615,707,016	93,849,834	103,910,870	109,026,453	122,014,790	147,154,337	190,188,224	2,382,226,475	420,021,000	2,802,247,475
1997	370,009,518	522,370,265	34,991,555	62,138,205	587,098,228	92,824,598	98,420,563	107,744,898	118,666,209	148,287,284	186,044,189	2,328,595,512	402,992,000	2,731,587,512
1998	362,423,154	524,652,675	29,740,298	58,357,697	563,157,366	90,752,749	91,637,242	97,365,507	109,792,787	136,368,479	179,596,858	2,243,844,812	407,631,000	2,651,475,812
1999	377,374,165	552,598,631	31,279,488	63,129,284	585,762,211	96,948,374	98,862,883	101,014,473	109,071,573	155,103,325	189,824,810	2,360,969,217	421,947,000	2,782,916,217
2000	394,787,978	591,439,305	28,780,271	63,156,173	605,084,412	102,103,044	87,309,269	103,195,452	108,783,188	154,143,031	197,233,826	2,436,015,949	423,750,000	2,859,765,949
2001	410,028,826	627,813,892	33,100,336	65,210,137	646,317,423	105,090,328	88,487,258	118,386,295	114,507,113	155,378,187	206,092,647	2,570,412,442	439,209,000	3,009,621,442
2002	440,069,053	683,398,662	34,097,106	69,652,376	674,172,220	112,969,581	88,790,172	117,404,798	118,458,403	163,032,649	214,662,676	2,716,707,696	450,474,000	3,167,181,696
2003	432,581,783	694,750,255	32,538,945	70,318,907	677,108,888	113,503,719	89,253,312	114,923,899	117,350,534	161,437,747	216,371,256	2,720,139,245	448,731,000	3,168,870,245
2004	441,562,048	710,523,728	35,138,826	71,384,535	692,029,653	116,222,273	93,108,512	115,003,119	118,164,202	163,139,864	227,203,104	2,783,479,864	454,427,000	3,237,906,864
2005	445,590,952	763,874,352	32,760,407	71,295,429	690,389,973	113,876,648	89,917,232	116,713,026	121,047,823	162,388,670	231,313,296	2,839,167,808	457,397,000	3,296,564,808
2006	459,431,656	805,200,141	30,378,122	71,696,415	744,130,196	112,464,269	87,500,360	115,595,514	117,340,692	157,168,525	230,856,160	2,931,762,050	462,824,831	3,394,586,881
2007	463,761,382	864,858,471	33,217,959	73,561,954	807,038,426	113,256,403	100,620,891	122,044,715	123,401,195	160,834,394	246,247,780	3,108,843,570	464,865,000	3,573,708,570
2008	482,540,766	936,678,756	37,157,527	78,835,007	830,295,681	121,112,345	93,147,321	130,832,879	130,372,885	170,069,749	261,894,421	3,272,937,337	458,871,000	3,731,808,337
2009	471,704,395	968,376,146	38,756,875	79,672,967	849,025,672	119,621,800	104,936,385	134,563,362	142,475,886	165,791,601	271,553,111	3,346,478,200	449,920,526	3,796,398,726
2010	449,640,701	949,128,606	37,377,240	73,306,796	855,247,294	109,176,084	109,684,367	129,688,012	141,704,852	158,447,787	254,297,711	3,267,699,450	441,781,996	3,709,481,446
2011	444,439,966	1,020,487,749	34,972,571	74,674,498	975,395,162	111,141,990	108,872,114	133,316,555	124,880,604	163,609,559	256,689,950	3,448,480,718	442,427,723	3,890,908,441
2012	422,288,512	1,003,599,206	31,738,649	68,722,831	1,012,198,480	105,138,167	114,717,068	122,696,261	117,236,217	166,396,187	240,559,476	3,405,291,054	422,875,098	3,828,166,152
2013	472,437,710	1,119,328,436	40,552,706	74,800,236	1,092,991,142	116,394,570	130,010,764	129,184,482	133,203,606	172,522,638	273,304,535	3,754,730,825	446,831,949	4,201,562,774
2014	478,645,659	1,192,037,318	39,961,105	84,074,810	1,158,017,372	125,639,787	132,420,779	149,924,017	139,664,645	174,195,806	285,517,177	3,960,098,475	457,995,307	4,418,093,782
2015	458,219,667	1,142,364,006	32,479,897	69,808,867	1,081,943,820	109,268,707	120,477,039	126,328,292	122,679,710	160,150,871	256,256,036	3,679,976,912	435,560,217	4,115,537,129
2016	470,691,742	1,158,680,270	32,387,625	67,466,499	1,057,478,859	104,003,534	123,213,628	124,272,808	120,736,711	151,487,200	249,719,356	3,660,138,232	424,580,057	4,084,718,289
2017	492,740,925	1,258,257,360	35,734,463	70,927,459	1,171,660,979	104,628,553	126,713,092	127,448,338	121,168,930	147,318,700	266,995,617	3,923,594,415	429,904,220	4,353,498,635
2018	497,672,791	1,271,664,567	35,584,979	105,729,881	1,190,445,268	105,921,145	126,694,451	128,011,975	122,270,552	150,094,830	269,574,075	4,003,664,513	433,260,640	4,436,925,153
2019	499,953,241	1,292,704,356	35,461,376	106,000,917	1,200,155,573	106,496,591	126,851,225	128,930,619	124,053,070	153,196,772	272,295,077	4,046,098,817	439,078,117	4,485,176,934
2020	502,153,342	1,318,815,315	35,355,633	106,242,013	1,212,616,447	106,971,048	126,936,543	129,716,544	124,813,574	153,137,533	274,006,546	4,090,764,537	441,549,145	4,532,313,682
2021	504,310,286	1,344,229,957	35,269,188	106,477,117	1,221,842,865	107,451,628	127,075,989	130,347,047	125,582,045	153,078,535	275,227,840	4,130,892,497	443,815,337	4,574,707,834
2022	506,176,583	1,370,886,331	35,196,894	106,646,836	1,230,544,028	108,049,818	127,152,586	132,915,365	127,231,294	153,041,815	275,954,372	4,173,795,922	445,424,167	4,619,220,090
2023	507,920,664	1,398,900,857	35,147,851	106,781,470	1,241,710,956	108,514,397	127,227,674	133,433,804	127,847,192	153,136,934	276,458,277	4,217,080,075	446,673,625	4,663,753,701
2024	509,621,896	1,430,950,768	35,122,813	106,911,934	1,249,896,716	108,834,105	127,299,145	133,918,459	128,480,223	153,232,352	276,990,241	4,261,258,652	447,650,177	4,708,908,829
2025	511,423,569	1,461,073,719	35,113,794	107,031,742	1,257,937,285	109,055,098	127,341,588	134,329,773	130,107,761	153,335,826	277,515,181	4,304,265,337	448,406,122	4,752,671,459
2026	515,308,234	1,496,385,822	35,113,571	107,148,013	1,268,957,718	109,308,302	127,432,831	134,652,071	130,749,748	153,445,095	279,055,532	4,357,556,938	448,983,571	4,806,540,509
2027	517,268,062	1,531,002,026	35,126,731	107,261,461	1,276,923,370	109,644,001	127,507,698	134,961,312	131,393,768	153,437,796	279,573,934	4,404,100,157	449,490,534	4,853,590,692
2028	519,296,138	1,563,336,692	35,148,208	107,367,110	1,284,842,780	109,905,013	127,632,942	135,296,454	133,039,673	153,559,292	280,051,811	4,449,476,115	449,876,247	4,899,352,362
2029	521,374,212	1,596,357,124	35,186,064	107,484,509	1,295,734,750	110,146,897	127,718,213	135,561,330	133,649,442	153,670,153	280,434,154	4,497,316,847	450,063,927	4,947,380,774
2030	523,496,214	1,637,008,280	35,221,754	107,596,990	1,303,622,109	110,461,924	127,868,413	135,784,284	134,224,612	153,915,649	280,772,809	4,549,973,039	450,011,537	4,999,984,575
2031	525,657,562	1,670,939,060	35,196,472	107,721,139	1,311,389,224	110,922,858	127,877,096	136,188,675	134,782,397	154,021,232	281,136,711	4,595,832,425	449,761,562	5,045,593,987
2032	527,838,737	1,709,910,633	35,168,527	107,840,005	1,322,115,304	111,324,365	127,895,448	138,605,105	136,289,639	154,113,348	281,454,343	4,652,555,454	449,332,971	5,101,888,425
2033	530,035,929	1,746,921,751	35,150,887	107,957,138	1,329,860,493	111,589,744	127,918,272	139,007,155	136,780,626	154,221,619	281,670,556	4,701,114,169	448,791,291	5,149,905,460
2034	532,244,280	1,786,854,633	35,127,521	108,066,542	1,337,586,717	111,942,297	127,965,596	139,408,379	137,264,811	154,299,840	281,788,113	4,752,548,729	448,110,172	5,200,658,902
2035	534,452,973	1,822,985,226	35,123,751	108,171,761	1,348,559,786	112,225,935	128,001,586	139,758,521	137,740,833	154,366,637	281,941,903	4,803,328,912	447,271,308	5,250,600,220
2036	538,662,161	1,867,511,261	35,116,663	108,279,121	1,356,332,814	112,623,849	128,019,591	140,141,652	139,220,589	154,444,717	282,205,868	4,862,558,287	446,442,729	5,309,001,016
2037	540,874,093	1,904,047,359	35,104,028	108,388,817	1,364,126,627	112,925,198	128,041,180	140,538,083	139,726,607	154,486,585	282,438,744	4,910,697,321	445,820,680	5,356,518,002
2038	543,079,329	1,940,783,004	35,101,777	108,484,329	1,374,976,562	113,301,604	128,032,313	140,934,006	140,233,316	154,516,379	282,603,325	4,962,045,946	445,381,070	5,407,427,016
2039	545,279,923	1,981,439,490	35,089,415	108,570,167	1,382,606,169	113,738,515	128,040,769	141,341,047	140,726,550	154,534,248	282,786,051	5,014,152,343	444,990,949	5,459,143,292
2040	547,478,455	2,018,759,566	35,080,670	108,640,641	1,390,532,698	114,034,263	128,039,614	141,772,284	141,202,007	154,538,616	282,935,355	5,063,014,170	444,793,679	5,507,807,849
2041	549,666,200	2,056,482,643	35,073,261	108,702,147	1,401,547,033	114,376,957	128,014,158	142,173,391	141,683,502	154,408,458	283,087,962	5,115,215,711	444,718,807	5,559,934,517
2042	551,847,278	2,098,279,627	35,065,125	108,758,264	1,409,320,895	114,654,466	128,009,392	142,539,201	142,177,654	154,385,821	283,206,644	5,168,244,367	444,871,262	5,613,115,630
2043	554,024,954	2,131,499,857	35,058,463	108,801,218	1,417,410,269	114,958,735	127,956,577	142,933,436	142,659,008	154,230,878	283,440,268	5,212,973,662	445,101,931	5,658,075,593
2044	556,191,332	2,170,675,128	35,056,771	108,843,144	1,428,327,256	115,246,014	127,978,426	143,293,076	143,139,882	154,159,303	283,694,768	5,266,605,100	445,393,319	5,711,998,419
2045	558,347,368	2,204,228,131	35,056,992	108,875,530	1,436,223,360	115,484,555	127,911,347	143,646,172	143,606,743	153,975,668	283,952,464	5,311,308,330	445,668,868	5,756,977,198
2046	560,494,821	2,243,718,604	35,055,151	108,902,589	1,444,184,043	115,771,973	127,885,371	144,021,343	144,065,321	153,771,208	284,158,728	5,362,029,152	445,920,774	5,807,949,925
Average Annual Growth Rates														
1987-2016	2.7%	4.6%	-0.3%	1.5%	3.0%	2.3%	1.9%	1.4%	0.9%	2.0%	2.2%	3.0%	--	--
1996-2016	1.3%	3.9%	-0.8%	0.5%	2.7%	0.5%	0.9%	0.7%	-0.1%	0.1%	1.4%	2.2%	0.1%	1.9%
2006-2016	0.2%	3.7%	0.6%	-0.6%	3.6%	-0.8%	3.5%	0.7%	0.3%	-0.4%	0.8%	2.2%	-0.9%	1.9%
2011-2016	1.2%	2.6%	-1.5%	-2.0%	1.6%	-1.3%	2.5%	-1.4%	-0.7%	-1.5%	-0.5%	1.2%	-0.8%	1.0%
2016-2021	1.4%	3.0%	1.7%	9.6%	2.9%	0.7%	0.6%	1.0%	0.8%	0.2%	2.0%	2.4%	0.9%	2.3%
2016-2026	0.9%	2.6%	0.8%	4.7%	1.8%	0.5%	0.3%	0.8%	0.8%	0.1%	1.1%	1.8%	0.6%	1.6%
2016-2036	0.7%	2.4%	0.4%	2.4%	1.3%	0.4%	0.2%	0.6%	0.7%	0.1%	0.6%	1.4%	0.3%	1.3%
2016-2046	0.6%	2.2%	0.3%	1.6%	1.0%	0.4%	0.1%	0.5%	0.6%	0.0%	0.4%	1.3%	0.2%	1.2%
2017-2046	0.4%	2.0%	-0.1%	1.5%	0.7%	0.3%	0.0%	0.4%	0.6%	0.1%	0.2%	1.1%	0.1%	1.0%

Excludes Tranmission and Distribution losses

Includes CIP savings

CIP Reduction Forecast By Member (kWh)

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	MPC CIP Req. Forecast	NMPA	Joint System CIP Req. Forecast /1
1996														
1997														
1998														
1999														
2000														
2001														
2002														
2003														
2004														
2005														
2006														
2007														
2008														
2009	847,661	-	-	173,134	-	-	821,775	228,914	222,839	172,400	250,742	2,717,465	543,801	3,261,266
2010	2,376,309	-	-	553,268	-	532,270	2,278,967	893,994	779,308	1,037,573	1,461,068	9,912,757	1,954,193	11,866,950
2011	3,485,044	-	-	975,484	-	933,771	3,301,824	1,271,309	1,406,865	2,675,718	2,479,702	16,529,717	3,940,604	20,470,321
2012	4,964,860	-	-	1,166,222	-	1,200,049	4,825,429	1,784,228	2,187,529	3,184,773	3,861,965	23,175,055	6,453,663	29,628,718
2013	6,551,922	-	-	1,690,833	-	1,627,189	6,642,578	2,199,635	2,797,774	3,906,478	5,127,754	30,544,163	8,003,683	38,547,846
2014	8,920,898	-	-	2,167,831	-	2,156,532	7,474,845	2,878,783	3,451,177	5,019,310	6,749,009	38,818,385	10,715,793	49,534,178
2015	11,110,993	-	-	2,564,764	-	3,203,319	8,593,858	4,208,137	4,160,104	6,356,453	8,924,885	49,122,513	12,321,624	61,444,137
2016	14,131,029	-	-	3,194,162	-	3,877,941	9,954,939	5,319,878	4,810,810	8,005,616	9,998,799	59,293,174	15,844,394	75,137,568
2017	14,554,960	-	-	3,289,987	-	3,994,279	9,997,133	5,426,276	4,955,134	8,201,776	10,262,486	60,682,031	16,166,447	76,848,478
2018	14,991,609	-	-	3,388,686	-	4,114,108	10,040,172	5,534,801	5,103,788	8,402,941	10,533,357	62,109,462	16,495,097	78,604,559
2019	15,441,357	-	-	3,490,347	-	4,237,531	10,084,071	5,645,497	5,256,902	8,609,243	10,811,615	63,576,562	16,830,479	80,407,041
2020	15,904,598	-	-	3,595,057	-	4,364,657	10,128,848	5,758,407	5,414,609	8,820,818	11,097,465	65,084,459	17,172,733	82,257,192
2021	16,381,736	-	-	3,702,909	-	4,495,596	10,174,521	5,873,575	5,577,047	9,037,806	11,391,122	66,634,312	17,522,002	84,156,314
2022	16,873,188	-	-	3,813,996	-	4,630,464	10,221,107	5,991,047	5,744,359	9,260,351	11,692,802	68,227,314	17,878,430	86,105,744
2023	17,379,383	-	-	3,928,416	-	4,769,378	10,268,625	6,110,868	5,916,689	9,488,601	12,002,732	69,864,693	18,242,167	88,106,860
2024	17,900,765	-	-	4,046,269	-	4,912,460	10,317,093	6,233,085	6,094,190	9,722,708	12,321,142	71,547,711	18,613,363	90,161,074
2025	18,437,788	-	-	4,167,657	-	5,059,833	10,366,530	6,357,747	6,277,016	9,962,826	12,648,272	73,277,669	18,992,174	92,269,843
2026	18,990,921	-	-	4,292,687	-	5,211,628	10,416,957	6,484,902	6,465,326	10,209,117	12,984,365	75,055,903	19,378,758	94,434,660
2027	19,560,649	-	-	4,421,467	-	5,367,977	10,468,391	6,614,600	6,659,286	10,461,744	13,329,674	76,883,789	19,773,275	96,657,064
2028	20,147,468	-	-	4,554,111	-	5,529,017	10,520,855	6,746,892	6,859,065	10,720,877	13,684,458	78,762,743	20,175,891	98,938,634
2029	20,751,892	-	-	4,690,735	-	5,694,887	10,574,368	6,881,829	7,064,837	10,986,690	14,048,983	80,694,222	20,586,773	101,280,995
2030	21,374,449	-	-	4,831,457	-	5,865,734	10,628,951	7,019,466	7,276,782	11,259,361	14,423,524	82,679,724	21,006,095	103,685,818
2031	22,015,683	-	-	4,976,400	-	6,041,706	10,684,625	7,159,855	7,495,085	11,539,074	14,808,363	84,720,791	21,434,030	106,154,822
2032	22,676,153	-	-	5,125,692	-	6,222,957	10,741,414	7,303,052	7,719,938	11,826,017	15,203,789	86,819,012	21,870,759	108,689,770
2033	23,356,438	-	-	5,279,463	-	6,409,646	10,799,338	7,449,114	7,951,536	12,120,383	15,610,101	88,976,018	22,316,463	111,292,481
2034	24,057,131	-	-	5,437,847	-	6,601,935	10,858,420	7,598,096	8,190,082	12,422,372	16,027,607	91,193,490	22,771,330	113,964,820
2035	24,778,845	-	-	5,600,982	-	6,799,993	10,918,684	7,750,058	8,435,784	12,732,189	16,456,622	93,473,157	23,235,551	116,708,708
2036	25,522,210	-	-	5,769,012	-	7,003,993	10,980,153	7,905,059	8,688,858	13,050,042	16,897,472	95,816,799	23,709,320	119,526,119
2037	26,287,877	-	-	5,942,082	-	7,214,113	11,042,852	8,063,160	8,949,524	13,376,149	17,350,490	98,226,246	24,192,836	122,419,082
2038	27,076,513	-	-	6,120,345	-	7,430,536	11,106,805	8,224,423	9,218,009	13,710,732	17,816,020	100,703,382	24,686,302	125,389,685
2039	27,888,808	-	-	6,303,955	-	7,653,452	11,172,037	8,388,912	9,494,550	14,054,017	18,294,416	103,250,147	25,189,926	128,440,073
2040	28,725,472	-	-	6,493,074	-	7,883,056	11,238,573	8,556,690	9,779,386	14,406,241	18,786,043	105,868,535	25,703,919	131,572,454
2041	29,587,237	-	-	6,687,866	-	8,119,547	11,306,440	8,727,824	10,072,768	14,767,644	19,291,274	108,560,599	26,228,498	134,789,098
2042	30,474,854	-	-	6,888,502	-	8,363,134	11,375,665	8,902,380	10,374,951	15,138,472	19,810,496	111,328,453	26,763,884	138,092,337
2043	31,389,099	-	-	7,095,157	-	8,614,028	11,446,274	9,080,428	10,686,199	15,518,982	20,344,103	114,174,270	27,310,302	141,484,572
2044	32,330,772	-	-	7,308,012	-	8,872,449	11,518,295	9,262,036	11,006,785	15,909,434	20,892,505	117,100,288	27,867,982	144,968,270
2045	33,300,696	-	-	7,527,252	-	9,138,622	11,591,756	9,447,277	11,336,989	16,310,097	21,456,120	120,108,809	28,437,160	148,545,969
2046	34,299,716	-	-	7,753,070	-	9,412,781	11,666,687	9,636,223	11,677,099	16,721,248	22,035,381	123,202,204	29,018,076	152,220,280
Average Annual Growth Rates														
2001-2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2006-2016	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2011-2016	32.3%	--	--	26.8%	--	32.9%	24.7%	33.1%	27.9%	24.5%	32.2%	29.1%	32.1%	29.7%
2016-2021	3.0%	--	--	3.0%	--	3.0%	0.4%	2.0%	3.0%	2.5%	2.6%	2.4%	2.0%	2.3%
2016-2026	3.0%	--	--	3.0%	--	3.0%	0.5%	2.0%	3.0%	2.5%	2.6%	2.4%	2.0%	2.3%
2016-2036	3.0%	--	--	3.0%	--	3.0%	0.5%	2.0%	3.0%	2.5%	2.7%	2.4%	2.0%	2.3%
2016-2046	3.0%	--	--	3.0%	--	3.0%	0.5%	2.0%	3.0%	2.5%	2.7%	2.5%	2.0%	2.4%
2017-2046	3.0%	--	--	3.0%	--	3.0%	0.5%	2.0%	3.0%	2.5%	2.7%	2.5%	2.0%	2.4%

/1 Retail - excludes losses

NO CIP-Adjusted Retail Base Forecast By Member (kWh) /1 /2

Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Cavalier	Clearwater-Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	MPC Retail Base Forecast	NMPA Retail Base Forecast	Joint System Retail Base Forecast
1996	361,310,038	540,145,899	37,781,366	61,137,648	615,707,016	93,849,834	103,910,870	109,026,453	122,014,790	147,154,337	190,188,224	2,382,226,475	420,021,000	2,802,247,475
1997	370,009,518	522,370,265	34,991,555	62,138,205	587,098,228	92,824,598	98,420,563	107,744,898	118,666,209	148,287,284	186,044,189	2,328,595,512	402,992,000	2,731,587,512
1998	362,423,154	524,652,675	29,740,298	58,357,697	563,157,366	90,752,749	91,637,242	97,365,507	109,792,787	136,368,479	179,596,858	2,243,844,812	407,631,000	2,651,475,812
1999	377,374,165	552,598,631	31,279,488	63,129,284	585,762,211	96,948,374	98,862,883	101,014,473	109,071,573	155,103,325	189,824,810	2,360,969,217	421,947,000	2,782,916,217
2000	394,787,978	591,439,305	28,780,271	63,156,173	605,084,412	102,103,044	87,309,269	103,195,452	108,783,188	154,143,031	197,233,826	2,436,015,949	423,750,000	2,859,765,949
2001	410,028,826	627,813,892	33,100,336	65,210,137	646,317,423	105,090,328	88,487,258	118,386,295	114,507,113	155,378,187	206,092,647	2,570,412,442	439,209,000	3,009,621,442
2002	440,069,053	683,398,662	34,097,106	69,652,376	674,172,220	112,969,581	88,790,172	117,404,798	118,458,403	163,032,649	214,662,676	2,716,707,696	450,474,000	3,167,181,696
2003	432,581,783	694,750,255	32,538,945	70,318,907	677,108,888	113,503,719	89,253,312	114,923,899	117,350,534	161,437,747	216,371,256	2,720,139,245	448,731,000	3,168,870,245
2004	441,562,048	710,523,728	35,138,826	71,384,535	692,029,653	116,222,273	93,108,512	115,003,119	118,164,202	163,139,864	227,203,104	2,783,479,864	454,427,000	3,237,906,864
2005	445,590,952	763,874,352	32,760,407	71,295,429	690,389,973	113,876,648	89,917,232	116,713,026	121,047,823	162,388,670	231,313,296	2,839,167,808	457,397,000	3,296,564,808
2006	459,431,656	805,200,141	30,378,122	71,696,415	744,130,196	112,464,269	87,500,360	115,595,514	117,340,692	157,168,525	230,856,160	2,931,762,050	462,824,831	3,394,586,881
2007	463,761,382	864,858,471	33,217,959	73,561,954	807,038,426	113,256,403	100,620,891	122,044,715	123,401,195	160,834,394	246,247,780	3,108,843,570	464,865,000	3,573,708,570
2008	482,540,766	936,678,756	37,157,527	78,835,007	830,295,681	121,112,345	93,147,321	130,832,879	130,372,885	170,069,749	261,894,421	3,272,937,337	458,871,000	3,731,808,337
2009	471,704,395	968,376,146	38,756,875	79,672,967	849,025,672	119,621,800	104,936,385	134,563,362	142,475,886	165,791,601	271,553,111	3,346,478,200	449,920,526	3,796,398,726
2010	449,640,701	949,128,606	37,377,240	73,306,796	855,247,294	109,176,084	109,684,367	129,688,012	141,704,852	158,447,787	254,297,711	3,267,699,450	441,781,996	3,709,481,446
2011	444,439,966	1,020,487,749	34,972,571	74,674,498	975,395,162	111,141,990	108,872,114	133,316,555	124,880,604	163,609,559	256,689,950	3,448,480,718	442,427,723	3,890,908,441
2012	422,288,512	1,003,599,206	31,738,649	68,722,831	1,012,198,480	105,138,167	114,717,068	122,696,261	117,236,217	166,396,187	240,559,476	3,405,291,054	422,875,098	3,828,166,152
2013	478,989,632	1,119,328,436	40,552,706	76,491,069	1,092,991,142	118,021,759	136,653,342	131,384,117	136,001,380	176,429,116	278,432,289	3,785,274,988	446,831,949	4,232,106,937
2014	487,566,557	1,192,037,318	39,961,105	86,242,641	1,158,017,372	127,796,319	139,895,624	152,802,800	143,115,822	179,215,116	292,266,186	3,998,916,860	457,995,307	4,456,912,167
2015	469,330,660	1,142,364,006	32,479,897	72,373,631	1,081,943,820	112,472,026	129,070,897	130,536,429	126,839,814	166,507,324	265,180,921	3,729,099,425	435,560,217	4,164,659,642
2016	484,822,771	1,158,680,270	32,387,625	70,660,661	1,057,478,859	107,881,475	133,168,567	129,592,686	125,547,521	159,492,816	259,718,155	3,719,431,406	424,580,057	4,144,011,463
2017	507,295,884	1,258,257,360	35,734,463	74,217,446	1,171,660,979	108,622,833	136,710,225	132,874,614	126,124,064	155,520,476	277,258,102	3,984,276,446	429,904,220	4,414,180,666
2018	512,664,399	1,271,664,567	35,584,979	109,118,568	1,190,445,268	110,035,253	136,734,622	133,546,776	127,374,341	158,497,770	280,107,432	4,065,773,975	433,260,640	4,499,034,615
2019	515,394,598	1,292,704,356	35,461,376	109,491,264	1,200,155,573	110,734,122	136,935,296	134,576,116	129,309,972	161,806,015	283,106,692	4,109,675,379	439,078,117	4,548,753,496
2020	518,057,940	1,318,815,315	35,355,633	109,837,071	1,212,616,447	111,335,704	137,065,391	135,474,951	130,228,183	161,958,350	285,104,012	4,155,848,996	441,549,145	4,597,398,141
2021	520,692,021	1,344,229,957	35,269,188	110,180,026	1,221,842,865	111,947,225	137,250,509	136,220,622	131,159,092	162,116,341	286,618,961	4,197,526,809	443,815,337	4,641,342,146
2022	523,049,771	1,370,886,331	35,196,894	110,460,832	1,230,544,028	112,680,282	137,373,693	138,906,412	132,975,653	162,302,167	287,647,174	4,242,023,237	445,424,167	4,687,447,404
2023	525,300,047	1,398,900,857	35,147,851	110,709,886	1,241,710,956	113,283,775	137,496,299	139,544,672	133,763,881	162,625,535	288,461,009	4,286,944,768	446,673,625	4,733,618,393
2024	527,522,661	1,430,950,768	35,122,813	110,958,203	1,249,896,716	113,746,564	137,616,238	140,151,544	134,574,413	162,955,060	289,311,383	4,332,806,363	447,650,177	4,780,456,540
2025	529,861,357	1,461,073,719	35,113,794	111,199,399	1,257,937,285	114,114,932	137,708,118	140,687,520	136,384,777	163,298,652	290,163,453	4,377,543,006	448,406,122	4,825,949,128
2026	534,299,156	1,496,385,822	35,113,571	111,440,700	1,268,957,718	114,519,930	137,849,787	141,136,973	137,215,075	163,654,212	292,039,897	4,432,612,841	448,983,571	4,881,596,412
2027	536,828,711	1,531,002,026	35,126,731	111,682,928	1,276,923,370	115,011,978	137,976,090	141,575,911	138,053,054	163,899,540	292,903,608	4,480,983,946	449,490,534	4,930,474,480
2028	539,443,607	1,563,336,692	35,148,208	111,921,221	1,284,842,780	115,434,030	138,153,797	142,043,346	139,898,738	164,280,169	293,736,269	4,528,238,858	449,876,247	4,978,115,105
2029	542,126,105	1,596,357,124	35,186,064	112,175,243	1,295,734,750	115,841,784	138,292,581	142,443,159	140,714,279	164,656,843	294,483,137	4,578,011,068	450,063,927	5,028,074,995
2030	544,870,664	1,637,008,280	35,221,754	112,428,447	1,303,622,109	116,327,658	138,497,364	142,803,750	141,501,394	165,175,010	295,196,333	4,632,652,762	450,011,537	5,082,664,299
2031	547,673,245	1,670,939,060	35,196,472	112,697,539	1,311,389,224	116,964,564	138,561,721	143,348,530	142,277,483	165,560,306	295,945,073	4,680,553,216	449,761,562	5,130,314,778
2032	550,514,890	1,709,910,633	35,168,527	112,965,697	1,322,115,304	117,547,322	138,636,861	145,908,157	144,009,577	165,939,365	296,658,132	4,739,374,466	449,332,971	5,188,707,437
2033	553,392,367	1,746,921,751	35,150,887	113,236,601	1,329,860,493	117,999,390	138,717,609	146,456,269	144,732,162	166,342,002	297,280,657	4,790,090,187	448,791,291	5,238,881,478
2034	556,301,411	1,786,854,633	35,127,521	113,504,389	1,337,586,717	118,544,232	138,824,016	147,006,475	145,454,893	166,722,212	297,815,720	4,843,742,220	448,110,172	5,291,852,392
2035	559,231,818	1,822,985,226	35,123,751	113,772,744	1,348,559,786	119,025,928	138,920,270	147,508,578	146,176,618	167,098,826	298,398,525	4,896,802,069	447,271,308	5,344,073,377
2036	564,184,371	1,867,511,261	35,116,663	114,048,133	1,356,332,814	119,627,842	138,999,744	148,046,711	147,909,447	167,494,759	299,103,340	4,958,375,086	446,442,729	5,404,817,815
2037	567,161,970	1,904,047,359	35,104,028	114,330,899	1,364,126,627	120,139,311	139,084,032	148,601,243	148,676,130	167,862,735	299,789,233	5,008,923,567	445,820,680	5,454,744,248
2038	570,155,842	1,940,783,004	35,101,777	114,604,674	1,374,976,562	120,732,140	139,139,118	149,158,430	149,451,326	168,227,111	300,419,345	5,062,749,328	445,381,070	5,508,130,398
2039	573,168,732	1,981,439,490	35,089,415	114,874,122	1,382,606,169	121,391,967	139,212,806	149,729,959	150,221,099	168,588,265	301,080,467	5,117,402,490	444,990,949	5,562,393,439
2040	576,203,928	2,018,759,566	35,080,670	115,133,715	1,390,532,698	121,917,319	139,278,187	150,328,974	150,981,393	168,944,857	301,721,398	5,168,882,705	444,793,679	5,613,676,384
2041	579,253,436	2,056,482,643	35,073,261	115,390,013	1,401,547,033	122,496,505	139,320,598	150,901,215	151,756,269	169,176,101	302,379,236	5,223,776,310	444,718,807	5,668,495,117
2042	582,322,132	2,098,279,627	35,065,125	115,646,766	1,409,320,895	123,017,600	139,385,057	151,441,581	152,552,605	169,524,293	303,017,140	5,279,572,820	444,871,262	5,724,444,083
2043	585,414,053	2,131,499,857	35,058,463	115,896,375	1,417,410,269	123,572,763	139,402,851	152,013,864	153,345,207	169,749,860	303,784,371	5,327,147,932	445,101,931	5,772,249,863
2044	588,522,105	2,170,675,128	35,056,771	116,151,156	1,428,327,256	124,118,462	139,496,721	152,555,112	154,146,667	170,068,737	304,587,273	5,383,705,388	445,393,319	5,829,098,707
2045	591,648,064	2,204,228,131	35,056,992	116,402,782	1,436,223,360	124,623,177	139,503,103	153,093,449	154,943,732	170,285,765	305,408,584	5,431,417,139	445,668,868	5,877,086,007
2046	594,794,537	2,243,718,604	35,055,151	116,655,658	1,444,184,043	125,184,754	139,552,058	153,657,566	155,742,419	170,492,456	306,194,109	5,485,231,356	445,920,774	5,931,152,129
Average Annual Growth Rates														
1996-2016	1.5%	3.9%	-0.8%	0.7%	2.7%	0.7%	1.2%	0.9%	0.1%	0.4%	1.6%	2.3%	0.1%	2.0%
2006-2016	0.5%	3.7%	0.6%	-0.1%	3.6%	-0.4%	4.3%	1.1%	0.7%	0.1%	1.2%	2.4%	-0.9%	2.0%
2011-2016	1.8%	2.6%	-1.5%	-1.1%	1.6%	-0.6%	4.1%	-0.6%	0.1%	-0.5%	0.2%	1.5%	-0.8%	1.3%
2016-2021	1.4%	3.0%	1.7%	9.3%	2.9%	0.7%	0.6%	1.0%	0.9%	0.3%	2.0%	2.4%	0.9%	2.3%
2016-2026	1.0%	2.6%	0.8%	4.7%	1.8%	0.6%	0.3%	0.9%	0.9%	0.3%	1.2%	1.8%	0.6%	1.7%
2016-2036	0.8%	2.4%	0.4%	2.4%	1.3%	0.5%	0.2%	0.7%	0.8%	0.2%	0.7%	1.4%	0.3%	1.3%
2016-2046	0.7%	2.2%	0.3%	1.7%	1.0%	0.5%	0.2%	0.6%	0.7%	0.2%	0.6%	1.3%	0.2%	1.2%
2017-2046	0.6%	2.0%	-0.1%	1.6%	0.7%	0.5%	0.1%	0.5%	0.7%	0.3%	0.3%	1.1%	0.1%	1.0%

/1 Excludes Distribution and Transmission Losses

/2 Adds the estimated CIP kWh savings to the base growth to get a NO CIP adjusted forecast.

NMPA Summaries

NMPA Participant Retail Energy Sales (MWh)

Year	Bagley, MN	Baudette, MN	Fosston, MN	Grafton, ND	Halstad, MN	Hawley, MN	Park River, ND	Roseau, MN	Stephen, MN	Thief River Falls, MN	Warren, MN	Warroad, MN	NMPA
1995	21,124	19,142	26,809	65,245	8,170	14,969	18,727	39,133	10,050	115,642	17,354	50,704	407,069
1996	23,326	20,107	26,193	62,706	9,209	15,262	19,653	39,650	10,815	122,630	18,256	52,214	420,021
1997	23,641	20,592	26,660	47,749	8,095	15,163	20,868	40,972	9,807	120,417	17,252	51,776	402,992
1998	21,713	21,026	27,225	61,595	7,934	15,778	19,740	38,701	8,560	116,892	17,015	51,452	407,631
1999	22,933	20,865	29,364	66,267	8,013	16,648	19,723	40,610	9,299	119,066	16,116	53,043	421,947
2000	24,063	17,245	30,577	65,699	8,784	16,714	20,798	40,673	9,347	119,230	17,864	52,756	423,750
2001	25,593	22,591	29,930	67,476	9,084	17,030	20,190	41,830	9,340	126,536	15,526	54,083	439,209
2002	26,166	23,227	31,912	66,910	9,228	17,855	20,283	41,671	9,903	130,934	17,255	55,130	450,474
2003	26,166	22,774	31,829	67,233	9,142	17,422	19,633	41,996	9,000	130,934	18,318	54,284	448,731
2004	26,215	22,772	32,725	68,343	9,094	17,316	18,946	42,302	8,877	134,690	16,935	56,212	454,427
2005	26,559	22,406	32,894	68,360	8,929	18,555	19,311	41,592	8,909	138,646	14,361	56,875	457,397
2006	27,249	22,440	31,478	69,061	8,352	18,485	17,644	42,163	7,817	142,183	17,556	58,398	462,825
2007	27,234	22,412	33,907	67,322	8,725	19,684	16,827	43,221	8,288	140,845	17,270	59,130	464,865
2008	27,920	22,550	34,531	55,847	9,116	20,634	20,626	44,275	9,143	140,897	14,806	58,526	458,871
2009	27,005	22,250	33,986	53,876	9,588	20,396	19,055	41,389	9,443	139,854	17,473	55,606	449,921
2010	26,167	21,796	32,558	52,628	9,256	20,294	19,696	42,525	9,186	137,153	16,307	54,216	441,782
2011	26,874	23,035	31,523	52,645	9,236	19,718	19,587	42,134	8,866	138,936	15,351	54,522	442,428
2012	25,554	21,033	31,440	50,365	8,311	19,017	18,807	40,255	8,395	134,870	13,201	51,626	422,875
2013	25,840	21,467	33,178	54,878	9,234	20,046	20,019	41,216	9,317	141,937	14,676	55,026	446,832
2014	25,732	21,115	34,506	53,848	9,428	20,697	20,093	42,241	8,747	148,528	14,463	58,596	457,995
2015	24,022	***21,022***	***31,463***	***52,151***	9,015	20,286	***19,048***	***38,777***	***8,169***	140,208	***14,449***	56,950	435,560
2016	***24,115***	***20,993***	***31,118***	***50,066***	***8,167***	***19,339***	***18,769***	***37,782***	***7,516***	***135,866***	***13,702***	***57,149*** /1	424,580
2017	23,992	20,688	32,128	52,074	8,507	19,877	18,750	38,921	8,120	137,598	13,381	55,869	429,904
2018	23,992	20,683	32,627	52,177	8,542	19,877	18,795	39,329	8,154	139,821	13,394	55,869	433,261
2019	23,992	20,677	33,040	52,266	8,578	19,877	18,837	39,666	8,178	144,691	13,407	55,869	439,078
2020	23,992	20,671	33,401	52,347	8,615	19,877	18,878	39,954	8,194	146,332	13,419	55,869	441,549
2021	23,992	20,664	33,740	52,421	8,652	19,877	18,916	40,214	8,204	147,836	13,431	55,869	443,815
2022	23,992	20,656	33,974	52,476	8,689	19,877	18,953	40,390	8,200	148,904	13,442	55,869	445,424
2023	23,992	20,649	34,156	52,522	8,726	19,877	18,987	40,519	8,189	149,734	13,453	55,869	446,674
2024	23,992	20,640	34,302	52,561	8,763	19,877	19,019	40,610	8,172	150,381	13,464	55,869	447,650
2025	23,992	20,632	34,413	52,596	8,800	19,877	19,044	40,681	8,151	150,878	13,473	55,869	448,406
2026	23,992	20,622	34,505	52,628	8,837	19,877	19,067	40,726	8,128	151,251	13,482	55,869	448,984
2027	23,992	20,612	34,580	52,656	8,872	19,877	19,084	40,765	8,100	151,593	13,490	55,869	449,491
2028	23,992	20,602	34,636	52,682	8,906	19,877	19,100	40,779	8,070	151,867	13,496	55,869	449,876
2029	23,992	20,591	34,657	52,702	8,940	19,877	19,111	40,772	8,037	152,015	13,502	55,869	450,064
2030	23,992	20,579	34,659	52,718	8,972	19,877	19,119	40,737	8,000	151,983	13,506	55,869	450,012
2031	23,992	20,566	34,627	52,731	9,001	19,877	19,125	40,690	7,960	151,815	13,508	55,869	449,762
2032	23,992	20,553	34,576	52,738	9,029	19,877	19,126	40,614	7,916	151,534	13,508	55,869	449,333
2033	23,992	20,540	34,505	52,742	9,056	19,877	19,128	40,512	7,869	151,195	13,506	55,869	448,791
2034	23,992	20,525	34,402	52,743	9,084	19,877	19,128	40,406	7,820	150,761	13,503	55,869	448,110
2035	23,992	20,510	34,279	52,741	9,112	19,877	19,126	40,272	7,767	150,226	13,500	55,869	447,271
2036	23,992	20,494	34,173	52,741	9,139	19,877	19,122	40,153	7,717	149,668	13,497	55,869	446,443
2037	23,992	20,477	34,085	52,748	9,164	19,877	19,116	40,055	7,670	149,276	13,493	55,869	445,821
2038	23,992	20,460	34,014	52,758	9,187	19,877	19,109	39,979	7,627	149,023	13,486	55,869	445,381
2039	23,992	20,442	33,975	52,774	9,208	19,877	19,104	39,914	7,585	148,775	13,477	55,869	444,991
2040	23,992	20,423	33,938	52,793	9,231	19,877	19,096	39,874	7,547	148,688	13,467	55,869	444,794
2041	23,992	20,403	33,934	52,818	9,251	19,877	19,090	39,852	7,512	148,663	13,457	55,869	444,719
2042	23,992	20,382	33,949	52,849	9,273	19,877	19,080	39,855	7,481	148,820	13,446	55,869	444,871
2043	23,992	20,360	33,980	52,884	9,294	19,877	19,072	39,884	7,453	149,002	13,434	55,869	445,102
2044	23,992	20,337	34,026	52,922	9,315	19,877	19,066	39,913	7,426	149,229	13,422	55,869	445,393
2045	23,992	20,314	34,071	52,959	9,339	19,877	19,057	39,939	7,398	149,445	13,409	55,869	445,669
2046	23,992	20,289	34,100	52,996	9,361	19,877	19,048	39,964	7,370	149,657	13,398	55,869	445,921

/1 Data is estimated

Average Annual Growth Rates													
2001-2016	-0.4%	-0.5%	0.3%	-2.0%	-0.7%	0.9%	-0.5%	-0.7%	-1.4%	0.5%	-0.8%	0.4%	-0.2%
2006-2016	-1.2%	-0.7%	-0.1%	-3.2%	-0.2%	0.5%	0.6%	-1.1%	-0.4%	-0.5%	-2.4%	-0.2%	-0.9%
2011-2016	-2.1%	-1.8%	-0.3%	-1.0%	-2.4%	-0.4%	-0.8%	-2.2%	-3.3%	-0.4%	-2.2%	0.9%	-0.8%
2016-2021	-0.1%	-0.3%	1.6%	0.9%	1.2%	0.5%	0.2%	1.3%	1.8%	1.7%	-0.4%	-0.5%	0.9%
2016-2026	-0.1%	-0.2%	1.0%	0.5%	0.8%	0.3%	0.2%	0.8%	0.8%	1.1%	-0.2%	-0.2%	0.6%
2016-2036	0.0%	-0.1%	0.5%	0.3%	0.6%	0.1%	0.1%	0.3%	0.1%	0.5%	-0.1%	-0.1%	0.3%
2016-2046	0.0%	-0.1%	0.3%	0.2%	0.5%	0.1%	0.0%	0.2%	-0.1%	0.3%	-0.1%	-0.1%	0.2%
2017-2046	0.0%	-0.1%	0.2%	0.1%	0.3%	0.0%	0.1%	0.1%	-0.3%	0.3%	0.0%	0.0%	0.1%

NMPA Energy Purchases By Participant (MWh)

Year	Bagley, MN	Baudette, MN	Fosston, MN	Grafton, ND	Halstad, MN	Hawley, MN	Park River, ND	Roseau, MN	Stephen, MN	Thief River Falls, MN	Warren, MN	Warroad, MN	NMPA
1995	22,443	20,119	31,150	69,171	8,826	16,045	21,500	40,813	10,551	117,254	19,022	51,741	428,635
1996	24,285	21,118	30,695	70,704	9,475	16,394	21,587	42,739	11,123	124,458	20,044	53,460	446,082
1997	25,271	21,786	31,788	58,422	9,202	16,283	21,537	42,718	10,497	123,177	19,424	52,720	432,825
1998	24,245	21,903	30,375	68,321	8,498	16,750	19,740	40,595	8,993	117,664	17,740	52,613	427,437
1999	25,135	22,355	33,205	70,763	8,903	18,040	20,238	41,712	9,812	121,545	17,432	53,234	442,374
2000	25,544	22,661	33,167	71,237	9,307	18,104	20,798	42,551	9,882	120,654	17,487	53,729	445,121
2001	27,109	23,726	34,168	72,557	9,491	18,394	20,189	44,257	9,866	126,388	18,037	55,775	459,957
2002	27,917	24,292	34,974	73,460	9,698	18,880	20,283	45,148	10,331	134,121	18,637	55,164	472,905
2003	28,037	23,944	34,815	73,889	9,664	18,615	19,633	43,662	9,593	138,094	18,657	55,206	473,809
2004	28,332	23,728	35,408	74,333	9,421	18,481	18,946	43,962	9,383	136,171	18,380	57,252	473,797
2005	29,035	23,573	35,109	73,643	9,367	19,612	19,311	43,851	9,383	139,333	19,135	58,286	479,640
2006	29,640	23,409	33,866	74,737	9,169	20,186	19,393	43,844	8,299	144,053	19,057	59,563	485,217
2007	29,659	23,578	35,976	74,418	9,645	20,938	20,291	45,147	8,763	145,384	19,386	60,048	493,233
2008	30,362	23,821	36,976	61,688	10,166	21,707	20,994	46,205	9,635	145,539	19,723	59,746	486,562
2009	29,591	23,408	36,616	60,339	10,060	21,471	21,374	45,723	9,889	139,979	19,528	56,690	474,666
2010	28,391	22,726	35,145	58,744	9,601	21,085	20,614	44,062	9,544	137,743	18,922	54,850	461,427
2011	28,769	22,285	33,753	57,925	9,563	20,720	20,404	43,585	9,515	138,698	19,032	55,535	459,785
2012	27,757	22,153	33,527	57,351	8,846	20,239	19,944	41,924	9,046	138,887	18,288	52,912	450,875
2013	29,323	23,117	37,437	63,001	10,427	22,105	22,400	45,060	10,216	151,925	20,346	57,291	492,647
2014	27,805	22,203	37,124	58,984	10,122	21,973	21,070	42,272	9,422	143,919	19,491	56,725	471,111
2015	26,753	21,804	34,119	58,393	8,976	21,501	20,257	40,364	8,762	139,049	18,761	58,084	456,823
2016	26,448	21,751	33,777	56,093	8,656	20,653	20,024	39,366	8,115	137,408	18,217	57,939	448,447
2017	26,448	21,746	34,964	58,554	9,060	21,294	20,099	40,614	8,778	139,516	18,053	56,590	455,717
2018	26,448	21,740	35,508	58,669	9,098	21,294	20,147	41,041	8,815	141,770	18,071	56,590	459,191
2019	26,448	21,734	35,957	58,770	9,137	21,294	20,192	41,392	8,841	146,709	18,087	56,590	465,150
2020	26,448	21,727	36,350	58,860	9,176	21,294	20,236	41,693	8,859	148,373	18,104	56,590	467,709
2021	26,448	21,720	36,719	58,944	9,215	21,294	20,277	41,964	8,869	149,898	18,120	56,590	470,057
2022	26,448	21,712	36,974	59,005	9,255	21,294	20,317	42,147	8,866	150,981	18,136	56,590	471,724
2023	26,448	21,704	37,172	59,057	9,294	21,294	20,353	42,282	8,853	151,822	18,151	56,590	473,020
2024	26,448	21,695	37,330	59,101	9,333	21,294	20,387	42,377	8,835	152,478	18,164	56,590	474,034
2025	26,448	21,686	37,451	59,141	9,373	21,294	20,414	42,451	8,812	152,982	18,177	56,590	474,819
2026	26,448	21,676	37,552	59,176	9,412	21,294	20,438	42,498	8,787	153,360	18,189	56,590	475,421
2027	26,448	21,666	37,633	59,208	9,449	21,294	20,457	42,539	8,757	153,707	18,200	56,590	475,948
2028	26,448	21,655	37,694	59,237	9,486	21,294	20,473	42,554	8,725	153,984	18,209	56,590	476,349
2029	26,448	21,643	37,717	59,260	9,521	21,294	20,485	42,546	8,689	154,135	18,216	56,590	476,544
2030	26,448	21,631	37,719	59,278	9,556	21,294	20,494	42,510	8,649	154,102	18,221	56,590	476,492
2031	26,448	21,618	37,685	59,292	9,587	21,294	20,500	42,461	8,606	153,932	18,224	56,590	476,236
2032	26,448	21,604	37,628	59,300	9,617	21,294	20,501	42,382	8,559	153,647	18,224	56,590	475,794
2033	26,448	21,590	37,552	59,305	9,646	21,294	20,504	42,275	8,507	153,303	18,221	56,590	475,234
2034	26,448	21,574	37,439	59,306	9,675	21,294	20,504	42,164	8,454	152,863	18,218	56,590	474,530
2035	26,448	21,558	37,306	59,304	9,705	21,294	20,501	42,025	8,397	152,320	18,213	56,590	473,662
2036	26,448	21,542	37,190	59,304	9,734	21,294	20,498	41,901	8,343	151,754	18,209	56,590	472,807
2037	26,448	21,524	37,095	59,311	9,760	21,294	20,491	41,798	8,292	151,358	18,203	56,590	472,163
2038	26,448	21,506	37,017	59,323	9,784	21,294	20,484	41,719	8,246	151,101	18,194	56,590	471,706
2039	26,448	21,487	36,975	59,340	9,807	21,294	20,478	41,651	8,200	150,849	18,183	56,590	471,301
2040	26,448	21,467	36,935	59,361	9,831	21,294	20,470	41,609	8,159	150,761	18,169	56,590	471,094
2041	26,448	21,446	36,931	59,390	9,853	21,294	20,463	41,586	8,121	150,736	18,156	56,590	471,014
2042	26,448	21,424	36,946	59,425	9,876	21,294	20,452	41,590	8,087	150,895	18,140	56,590	471,167
2043	26,448	21,401	36,980	59,465	9,898	21,294	20,444	41,620	8,058	151,080	18,125	56,590	471,402
2044	26,448	21,377	37,031	59,507	9,921	21,294	20,437	41,650	8,028	151,309	18,108	56,590	471,700
2045	26,448	21,352	37,079	59,549	9,947	21,294	20,428	41,677	7,998	151,528	18,091	56,590	471,981
2046	26,448	21,326	37,111	59,590	9,971	21,294	20,418	41,703	7,968	151,744	18,075	56,590	472,237
Average Annual Growth Rates													
2001-2016	-0.2%	-0.6%	-0.1%	-1.7%	-0.6%	0.8%	-0.1%	-0.8%	-1.3%	0.6%	0.1%	0.3%	-0.2%
2006-2016	-1.1%	-0.7%	0.0%	-2.8%	-0.6%	0.2%	0.3%	-1.1%	-0.2%	-0.5%	-0.4%	-0.3%	-0.8%
2011-2016	-1.7%	-0.5%	0.0%	-0.6%	-2.0%	-0.1%	-0.4%	-2.0%	-3.1%	-0.2%	-0.9%	0.9%	-0.5%
2016-2021	0.0%	0.0%	1.7%	1.0%	1.3%	0.6%	0.3%	1.3%	1.8%	1.8%	-0.1%	-0.5%	0.9%
2016-2026	0.0%	0.0%	1.1%	0.5%	0.8%	0.3%	0.2%	0.8%	0.8%	1.1%	0.0%	-0.2%	0.6%
2016-2036	0.0%	0.0%	0.5%	0.3%	0.6%	0.2%	0.1%	0.3%	0.1%	0.5%	0.0%	-0.1%	0.3%
2016-2046	0.0%	-0.1%	0.3%	0.2%	0.5%	0.1%	0.1%	0.2%	-0.1%	0.3%	0.0%	-0.1%	0.2%
2017-2046	0.0%	-0.1%	0.2%	0.1%	0.3%	0.0%	0.1%	0.1%	-0.3%	0.3%	0.0%	0.0%	0.1%

NMPA Participant Energy Purchases by State (MWh)

Northern Municipal Power Agency

Year	Participants' Minnesota Members	Participants' North Dakota Members	Adjusted Total MWh
1992			*372,754*
1993			*391,546*
1994			*407,465*
1995	337,964	90,671	428,635
1996	353,791	92,291	446,082
1997	352,866	79,959	432,825
1998	339,376	88,061	427,437
1999	351,373	91,001	442,374
2000	353,086	92,035	445,121
2001	367,211	92,746	459,957
2002	379,162	93,743	472,905
2003	380,287	93,522	473,809
2004	380,518	93,279	473,797
2005	386,686	92,955	479,640
2006	391,087	94,130	485,217
2007	398,524	94,709	493,233
2008	403,880	82,682	486,562
2009	392,954	81,712	474,666
2010	382,070	79,358	461,427
2011	381,455	78,330	459,785
2012	373,580	77,295	450,875
2013	407,246	85,401	492,647
2014	391,057	80,054	471,111
2015	378,173	78,650	456,823
2016	372,330	76,117	448,447
2017	377,064	78,653	455,717
2018	380,375	78,816	459,191
2019	386,189	78,961	465,150
2020	388,613	79,096	467,709
2021	390,836	79,220	470,057
2022	392,403	79,322	471,724
2023	393,610	79,410	473,020
2024	394,545	79,488	474,034
2025	395,265	79,554	474,819
2026	395,806	79,614	475,421
2027	396,283	79,665	475,948
2028	396,638	79,710	476,349
2029	396,799	79,745	476,544
2030	396,720	79,772	476,492
2031	396,444	79,792	476,236
2032	395,993	79,802	475,794
2033	395,426	79,808	475,234
2034	394,720	79,810	474,530
2035	393,857	79,805	473,662
2036	393,005	79,802	472,807
2037	392,361	79,801	472,163
2038	391,899	79,806	471,706
2039	391,484	79,818	471,301
2040	391,263	79,831	471,094
2041	391,161	79,852	471,014
2042	391,290	79,876	471,167
2043	391,493	79,908	471,402
2044	391,756	79,944	471,700
2045	392,004	79,977	471,981
2046	392,229	80,008	472,237

Average Annual Growth Rates			
2001-2016	0.1%	-1.3%	-0.2%
2006-2016	-0.5%	-2.1%	-0.8%
2011-2016	-0.5%	-0.6%	-0.5%
2016-2021	1.0%	0.8%	0.9%
2016-2026	0.6%	0.5%	0.6%
2016-2036	0.3%	0.2%	0.3%
2016-2046	0.2%	0.2%	0.2%
2017-2046	0.1%	0.1%	0.1%

Forecast based on individual NMPA member forecasts, aggregated to the NMPA total.

Retail Energy Forecasts (MWh) - CIP Scenario

NMPA

Year	MN Base Retail Forecast /1	CIP Requirement Forecast /2	Adjusted Retail Forecast /3
1995	323,097		
1996	337,662		
1997	334,375		
1998	326,296		
1999	335,957		
2000	337,253		
2001	351,543		
2002	363,281		
2003	361,865		
2004	367,138		
2005	369,726		
2006	376,121		
2007	380,716		
2008	382,398		
2009	376,990	544	377,533
2010	369,458	1,954	371,412
2011	370,196	3,941	374,136
2012	353,703	6,454	360,157
2013	371,936	8,004	379,939
2014	384,054	10,716	394,770
2015	364,360	12,322	376,682
2016	355,745	15,844	371,589
2017	359,079	16,166	375,246
2018	362,288	16,495	378,784
2019	367,975	16,830	384,805
2020	370,324	17,173	387,497
2021	372,478	17,522	390,000
2022	373,995	17,878	391,874
2023	375,165	18,242	393,407
2024	376,070	18,613	394,683
2025	376,766	18,992	395,758
2026	377,289	19,379	396,667
2027	377,750	19,773	397,524
2028	378,095	20,176	398,270
2029	378,251	20,587	398,838
2030	378,174	21,006	399,180
2031	377,906	21,434	399,340
2032	377,469	21,871	399,340
2033	376,921	22,316	399,238
2034	376,239	22,771	399,010
2035	375,404	23,236	398,640
2036	374,579	23,709	398,288
2037	373,957	24,193	398,150
2038	373,514	24,686	398,200
2039	373,114	25,190	398,304
2040	372,905	25,704	398,609
2041	372,811	26,228	399,040
2042	372,943	26,764	399,707
2043	373,145	27,310	400,456
2044	373,406	27,868	401,274
2045	373,652	28,437	402,089
2046	373,877	29,018	402,895
Average Annual Growth Rates			
2001-2016	0.1%	--	--
2006-2016	-0.6%	--	--
2011-2016	-0.8%	32.1%	-0.1%
2016-2021	0.9%	2.0%	1.0%
2016-2026	0.6%	2.0%	0.7%
2016-2036	0.3%	2.0%	0.3%
2016-2046	0.2%	2.0%	0.3%
2017-2046	0.1%	2.0%	0.2%

/1 Base-case load forecast - member system retail sales - INCLUDES CIP

/2 Annual reduction - 1.5% reduction in 3-Yr moving average for CIP - Only MN munis adjusted

/3 Forecast EXCLUDES CIP requirement

APPENDIX H

Governing Boards' Resolutions

Approving IRP

Ex D

BOARD OF DIRECTORS
BELTRAMI ELECTRIC COOPERATIVE INC.

RESOLUTION

BE IT RESOLVED that the Board of Directors of Beltrami Electric Cooperative, Inc., after discussion and review of the Joint System 2019 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said IRP.

CERTIFICATION

I, Rick Coe, Chair of the Beltrami Electric Cooperative, do hereby certify that the above resolution is a true and correct copy of the resolution as adopted by the Board of Directors of Beltrami Electric Cooperative, Inc. at their meeting held on May 29, 2019 and that said Resolution now appears in the records of our Minute Book without any changes or alterations.

-SEAL-

BY: Rick Coe
Rick Coe, Chair

Cass County Electric Cooperative

A Touchstone Energy® Cooperative

Resolution No. 19-05-3

RESOLUTION
CASS COUNTY ELECTRIC COOPERATIVE INC.
APPROVAL OF 2019 INTEGRATED RESOURCE PLAN

WHEREAS, the 2019 Integrated Resource Plan (IRP) has been prepared for the Joint System by Minnkota Power Cooperative, Inc., and

WHEREAS, Minnkota has solicited comments from the member system, and

WHEREAS, Minnkota has presented and discussed the IRP with the Board of Directors.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Cass County Electric Cooperative Inc. has reviewed the IRP and does hereby approve the said IRP.

CERTIFICATION OF SECRETARY

I, Glenn D. Mitzel, Secretary of Cass County Electric Cooperative do hereby certify that the above is a true and correct excerpt from the minutes of the meeting of the board of directors of the Cass County Electric Cooperative, held on the 28th day of May 2019 at which meeting a quorum was present.

SEAL

Glenn D. Mitzel 5/28/19

Glenn D. Mitzel

CAVALIER RURAL ELECTRIC COOPERATIVE, INC.

1111 Ninth Avenue • P.O. Box 749 • Langdon, ND 58249-0749
Phone: 701-256-5511 • Fax: 701-256-5513

RESOLUTION

WHEREAS, the 2019 Integrated Resource Plan (IRP) has been prepared for the Joint System by Minnkota Power Cooperative, Inc., and

WHEREAS, Minnkota has solicited comments from the member system, and

WHEREAS, Minnkota has presented and discussed the IRP with the Board of Directors.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of Cavalier Rural Electric Cooperative, Inc. has reviewed the IRP and does hereby approve the said IRP.

CERTIFICATION

I, Steve Hart, certify that I am the Secretary of Cavalier Rural Electric Cooperative, Inc. Board of Directors and that the above is a true and correct copy of a resolution duly adopted at a regular board meeting of the Board of Directors of Cavalier Rural Electric Cooperative, Inc. held on the 24th day of April, 2019 at which a quorum was present.

IN WITNESS WHEREOF, I have subscribed my name to this document of April 24, 2019.

Steve Hart, Secretary

Clearwater-Polk
ELECTRIC COOPERATIVE

A Touchstone Energy® Cooperative

P.O. Box 0
Bagley, MN 56621-1013
Phone (218) 694-6241
Toll-free (888) 694-3833
Fax (218) 694-6245

RESOLUTION

BE IT RESOLVED that the Board of Directors of Clearwater-Polk Electric Cooperative, Inc., after discussion and review of the Joint System 2019 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said IRP.

CERTIFICATION

I, Robert Johnson, certify that I am the Secretary of the Clearwater-Polk Electric Cooperative, Inc. Board of Directors. I further certify that the above is a true excerpt from the minutes of a board meeting of this Board of Directors on the 30th day of April 2019, at which a quorum was present and that the above portion of the minutes has not been modified or rescinded.

Robert Johnson
Signature of the Secretary

April 30, 2019
Date

NODAK ELECTRIC COOPERATIVE, INC.
Grand Forks, North Dakota

RESOLUTION No. 1730

NODAK ELECTRIC COOPERATIVE, INC.
APPROVAL OF 2019 INTEGRATED RESOURCE PLAN

WHEREAS, the 2019 Integrated Resource Plan (IRP) has been prepared for the Joint System by Minnkota Power Cooperative, Inc., and

WHEREAS, Minnkota has solicited comments from the member systems; and

WHEREAS, Minnkota has presented and discussed the IRP with the Board of Directors.

NOW, THEREFORE, BE IT RESOVLED, that the Board of Directors of Nodak Electric Cooperative, Inc. has reviewed the IRP and does hereby approve the said IRP.

CERTIFICATION

I, David Kent, do hereby certify that I am the Secretary of Nodak Electric Cooperative, Inc., and that the foregoing is a true and correct copy of a resolution, which was duly adopted by the Board of Directors at a meeting held on May 7, 2019. A quorum was present at this meeting.

IN WITNESS WHEREOF I have hereunto set my hand and affixed the seal of the Corporation this 7th day of May 2019.

David W. Kent
David Kent, Secretary/Treasurer

(Seal)

North Star
ELECTRIC COOPERATIVE

P.O. Box 719
Baudette, MN 56623
218-634-2202
1-888-634-2202
Fax: 218-634-2203

P.O. Box 371
Littlefork, MN 56653
218-278-6658
1-888-258-2008
Fax: 218-278-4748

e-mail: nsec@wiktel.com
www.northstarelectric.coop

2019 INTEGRATED RESOURCE PLAN

RESOLUTION

WHEREAS, the 2019 Integrated Resource Plan (IRP) has been prepared for the Joint System by Minnkota Power Cooperative, Inc. and

WHEREAS, Minnkota has solicited comments from the member system, and

WHEREAS, Minnkota has presented and discussed the IRP with the Board of Directors,

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of North Star Electric Cooperative of Baudette, Minnesota has reviewed the IRP and does hereby approve the said IRP.

CERTIFICATION

Lorraine Nygaard
~~Chairman~~ Secretary

April 18-2019
Date

Secretary Chairman

APRIL 24 2019
Date

PKM Electric Cooperative, Inc. A Touchstone Energy® Partner

P.O. BOX 108 • 406 NORTH MINNESOTA STREET • WARREN, MN 56762-0108 • 218-745-4711 • 800-552-7366

RESOLUTION

"**WHEREAS,** the 2019 Integrated Resource Plan (IRP) has been prepared for the Joint System of Minnkota Power Cooperative, Inc., and

WHEREAS, Minnkota has solicited comments form the member system, and

WHEREAS, Minnkota has presented and discussed the IRP with the Board of Directors.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors of PKM Electric Cooperative, Inc. has reviewed the IRP and does hereby approve the said IRP."

I hereby certify that the above and foregoing is a full, true and correct copy of a resolution adopted by the Board of Directors of PKM Electric Cooperative, Inc., at a meeting held May 28, 2019, and that said resolution has not been rescinded or modified and that the same is at the date hereof in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Cooperative this 28th day of May 2019.

Wayne Malm
Secretary/Treasurer

Corporate Seal

Red Lake Electric Cooperative

412 International Drive SW
PO Box 430
Red Lake Falls, MN 56750-0430

Office: 218-253-2168
Fax: 218-253-2630
Email: info@redlakeelectric.com

RESOLUTION

BE IT RESOLVED on the 23rd day of April, 2019, that the Board of Directors of Red Lake Electric Cooperative, after discussion and review of the Joint System 2019 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said IRP.

Signed:

Mark Hanson _____ Board Secretary
Mark Hanson

Witnessed:

_____ Board President
Randy Versdahl

RED RIVER VALLEY
CO-OP POWER

P.O. Box 358
Halstad, MN 56548-0358
Phone: 218-456-2139
Fax: 218-456-2102
Toll free: 1-800-788-7784
www.rrvcoop.com

RED RIVER VALLEY COOPERATIVE POWER ASSOCIATION
RESOLUTION

BE IT RESOLVED, that the Board of Directors of Red River Valley Cooperative Power Association, after discussion and review of the proposed Minnkota Joint System Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said proposed IRP plan.

CERTIFICATION

I, Trevor Sorby, do certify that I am the Secretary of Red River Valley Cooperative Power Association, and that the preceding is a true and correct copy of a resolution adopted by the Board of Directors at a meeting of the Board held Wednesday, May 22, 2019, and entered into the minutes book of the Corporation; and that the meeting was held in accordance with the Bylaws of the Corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of the Cooperative this 22nd day of May, 2019.

5-22-19
(Date)

Trevor Sorby, Secretary/Treasurer
Red River Valley Cooperative Power Association

ROSEAU ELECTRIC COOPERATIVE, INC
BOARD RESOLUTION
APPROVING THE JOINT SYSTEM 2019 INTEGRATED RESOURCE PLAN

BE IT RESOLVED that the Board of Directors of Roseau Electric Cooperative, Inc., after discussion and review of the Joint System 2019 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said IRP.

CERTIFICATE OF SECRETARY-TREASURER

I, Collin Jensen, certify that I am Secretary-Treasurer of the Roseau Electric Cooperative, Inc. Board of Directors and that the above is a true excerpt from the minutes of a regular board meeting of the Board of Directors of Roseau Electric Cooperative, Inc., held on the 29th day of May, 2019, at which a quorum was present and that the above portion of the minutes has not been modified nor rescinded.

IN WITNESS WHEREOF, I have set my hand and affixed the seal of Roseau Electric Cooperative, Inc. this 29 day of May, 2019.

(Seal)

(Signature of Secretary-Treasurer)

WILD RICE ELECTRIC COOPERATIVE INC.
Your Touchstone Energy® Cooperative

502 North Main
PO Box 438
Mahnomen MN 56557-0438
Telephone: (218) 935-2517
FAX: (218) 935-2519

WILD RICE ELECTRIC COOPERATIVE, INC.
MAHNOMEN, MINNESOTA

RESOLUTION

WHEREAS, the 2019 Integrated Resource Plan (IRP) has been prepared for the Joint System by Minnkota Power Cooperative, Inc., and

WHEREAS, Minnkota has solicited comments from the member system, and

WHEREAS, Minnkota has presented and discussed the IRP with the Board of Directors.

NOW THEREFORE, BE IT RESOLVED that the Board of Directors of Wild Rice Electric Cooperative, Inc. has reviewed the IRP and does hereby approve the said IRP.

CERTIFICATION

I, Mark Habedank, Secretary of Wild Rice Electric Cooperative, Inc. do hereby certify that the above is a true and correct excerpt from the minutes of the regular board meeting of the Board of the Wild Rice Electric Cooperative, Inc., held on the 28th day of May, 2019, at which meeting a quorum was present.

Mark Habedank, Secretary

SEAL

Northern Municipal Power Agency

123 2nd St W • Thief River Falls, MN 56701-1912

TELEPHONE:
(218) 681-0963

WEBSITE:
www.nmpagency.com

RESOLUTION

WHEREAS, The 2019 Integrated Resource Plan ("IRP") has been prepared for Minnkota Power Cooperative, Inc. Member Cooperatives and Northern Municipal Power Agency ("Joint System") by Minnkota Power Cooperative, Inc., and

WHEREAS, Minnkota Power Cooperative, Inc. has solicited comments from Members of the Joint System, and

WHEREAS, Minnkota Power Cooperative, Inc. has presented and discussed the IRP with the Northern Municipal Power Agency Board of Directors,

Upon motion by Don Martodam and seconded by Shannon Mortenson, it was:

RESOLVED, That the Board of Directors of Northern Municipal Power Agency does hereby approve the IRP as presented at the May 1, 2019 Board Meeting.

MINNKOTA POWER COOPERATIVE, INC.
GRAND FORKS, NORTH DAKOTA

RESOLUTION NO. 3622

WHEREAS, Minnkota Power Cooperative, Inc. (Minnkota) is required to submit an Integrated Resource Plan (IRP) to the Minnesota Public Utilities Commission by July 1, 2019, on behalf of itself and Northern Municipal Power Agency (Northern).

WHEREAS, there has been full public participation in and specific approval of the 2019 IRP by Minnkota's Class A Member Cooperatives and Northern.

WHEREAS, Minnkota's Board of Directors has reviewed the IRP and the process by which it has been developed.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of Minnkota Power Cooperative, Inc., does hereby approve the 2019 IRP and its submittal to the Minnesota Public Utilities Commission.

SECRETARY'S CERTIFICATE

I, Colette Kujava, do hereby certify that I am the duly elected, qualified and acting secretary of Minnkota Power Cooperative, Inc. and the keeper of its records, and that the attached is a true and correct copy of a resolution duly adopted at a meeting of the Board of Directors of said Corporation duly convened and held in accordance with its bylaws, on the 30th day of May, 2019, at which a quorum was present and acting throughout, and I do further certify that said resolution is still in force and effect and has not been repealed.

IN WITNESS WHEREOF, I have hereunto subscribed my name as Secretary and affixed the corporate seal of said Corporation this 30th day of May, 2019.

/s/ Colette Kujava
Secretary-Treasurer

SEAL