

Minnkota Power Cooperative, Inc.
– and –
Northern Municipal Power Agency

**2022 INTEGRATED
RESOURCE PLAN**
2022 – 2036

Submitted to the
Western Area Power Administration
– and the –
Minnesota Public Utilities Commission

**PUBLIC DOCUMENT – TRADE SECRET DATA HAS BEEN
EXCISED**



SERVICE AREA

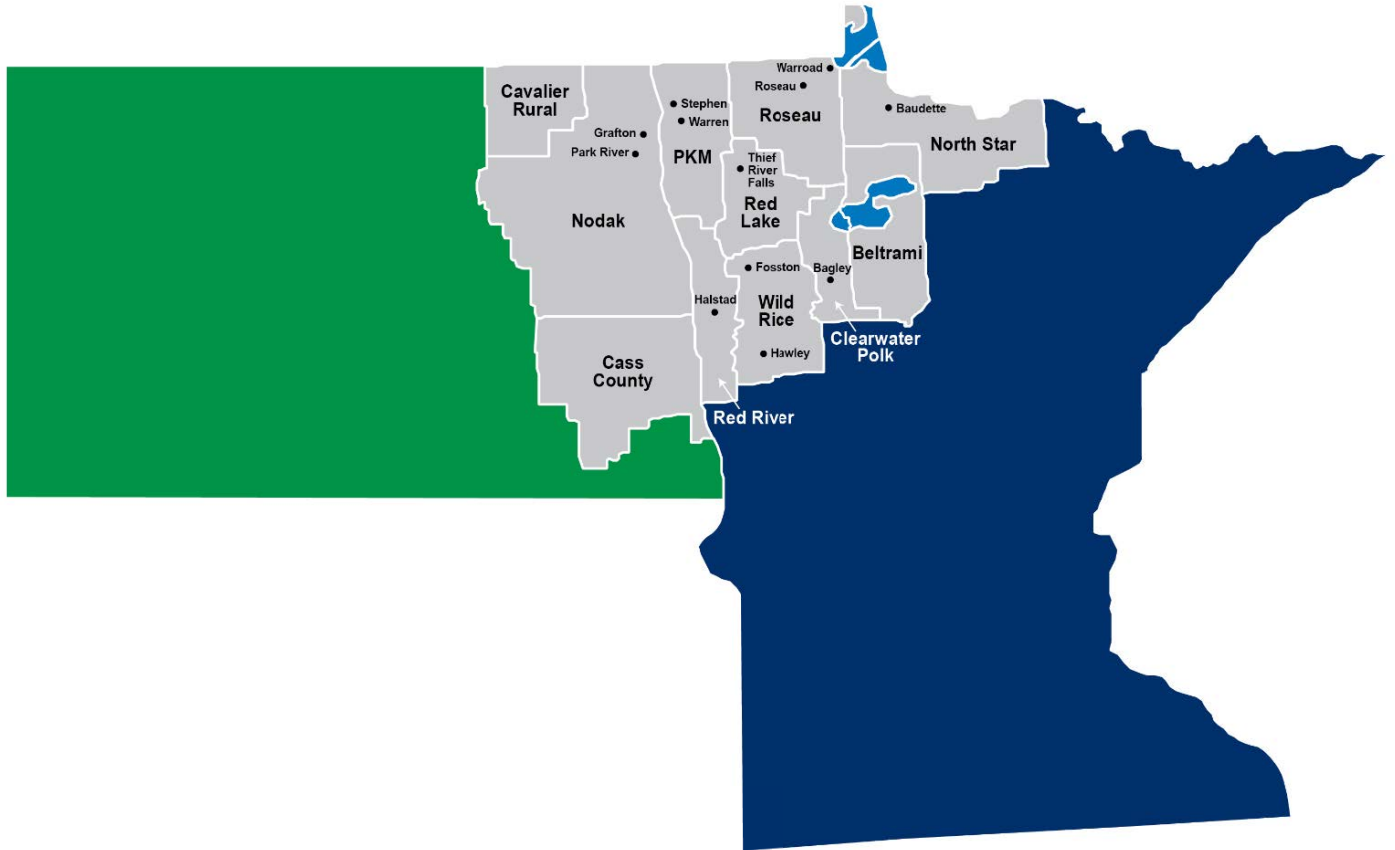


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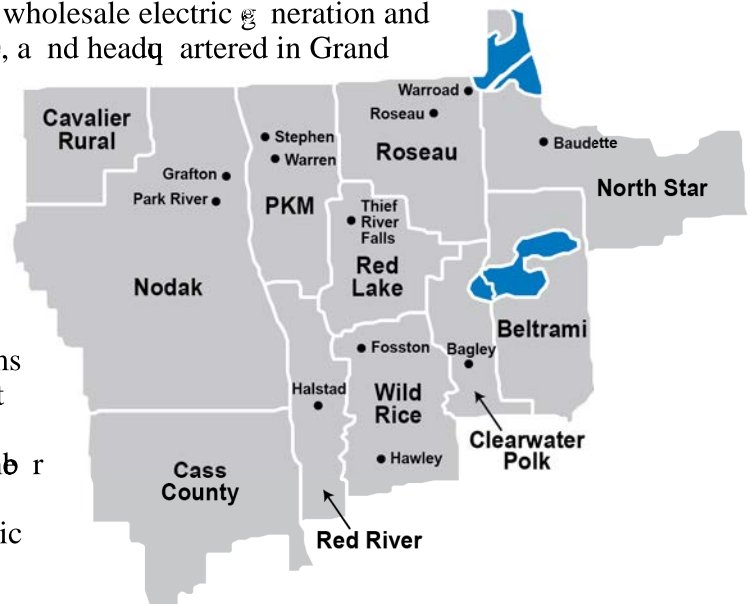
SECTION 1

Introduction

Minnkota Power Cooperative, Inc.

Minnkota Power Cooperative, Inc. (Minnkota) is a wholesale electric generation and transmission cooperative formed on March 28, 1990, and headquartered in Grand Forks, ND. Minnkota provides, on a not-for-profit basis, wholesale electric service to 11 retail distribution cooperatives, which are the members and owners of Minnkota. Minnkota is also associated with the Northern Municipal Power Agency, which is a municipal power agency serving 12 municipalities within its service territory.

The member-owner distribution cooperative systems (member systems) are cooperative associations that provide retail electric service to their own member consumers. In general, the membership of the member systems consists of residential, commercial, and industrial consumers within a contiguous geographic area.



The member systems' service areas, which encompass 3,450 square miles, are located in northwestern Minnesota and the eastern third of North Dakota and contain an aggregate population of approximately 36,000 people. The member systems serve approximately 160 customers. The primary function of the member systems is to provide the total electrical requirements of their own member-owner consumers through wholesale purchases of capacity and energy from Minnkota and to deliver this capacity and energy through their electrical distribution facilities.

Member Systems' Wholesale Power Contracts

Minnkota has entered into a Wholesale Power Contract with each of the 11 member systems until Dec. 31, 2018, and thereafter until terminated with six months' written notice of either party. These Wholesale Power Contracts provide that Minnkota shall sell and deliver to each of the member systems, and that the member systems shall purchase and receive from Minnkota, at least 95% of the members' electrical capacity and energy requirements. The members may elect to purchase up to 5% of their requirements from sources other than Minnkota, providing certain conditions are met.

Each member system is required to compensate Minnkota for capacity and energy furnished under the Wholesale Power Contract in accordance with the rates set forth in the Wholesale Power Rate Schedule. Minnkota reviews its Wholesale Power Rate Schedule at such intervals as it deems appropriate and is required to do so at least once every year.

The rates will be revised as necessary so that the revenues derived will be sufficient, together with its revenue from all other sources, to pay all operating and maintenance costs, taxes, the cost of purchased power, the cost of transmission services, and principal and interest on all indebtedness, and to provide for the establishment and maintenance of reasonable reserves. Any excess revenue is returned to the members as capital credits.

The Wholesale Power Rate Schedule is structured so as to enable Minnkota to comply with all requirements under an Indenture of Mortgage, dated as of June 14, 2012, as supplemented, between Minnkota and the United States acting through the Administrator of the Rural Utilities Service (RUS), formerly the Rural Electrification Administration (REA). The Wholesale Power Rate Schedule is subject to the approval of the RUS.

Organizational Structure

Each member system is governed by a board of directors who are elected from the membership of that system. Minnkota is governed by a board of directors consisting of one director from each of the 11 member systems. Directors are elected annually at a delegate meeting. Meetings of the Minnkota Board are held monthly. The officers are elected from the members of the Board of Directors by the board members. The officers are the Chair, Vice Chair, and Secretary-Treasurer. The Minnkota Board also appoints an Assistant Secretary. The officers constitute the executive committee, which makes recommendations to the Board.

Northern Municipal Power Agency

The Northern Municipal Power Agency (NMPA) consists of 12 municipal utilities, 10 in northwestern Minnesota and two in eastern North Dakota. The 12 municipal utilities serve the electrical requirements of approximately 15,800 customers.

NMPA was founded in 1976 and is headquartered in Thief River Falls, Minn. The Board of Directors of NMPA consists of one representative from each of the 12 participants. NMPA is a Class B member of Minnkota and selects a nonvoting member to attend meetings of Minnkota's Board of Directors as a liaison.

NMPA owns a 30% share of the Coyote generating plant, a 427 MW facility located near Beulah, N.D. NMPA also owns an undivided interest in Minnkota's transmission system based on a ratio of NMPA's load to the Joint System load. Minnkota is the operating agent for NMPA.

Minnkota Membership

The 11 member systems are Class A members of Minnkota. NMPA is a Class B member of Minnkota. In addition, there are several other Class B members and Class C members, all of which may contract for short-term power purchases from Minnkota and are entitled to have delegates attend Minnkota membership meetings.

Joint System Concept and Relationship

Minnkota and NMPA effectively form a Joint System. This is by virtue of operating agreements and joint ownership of transmission facilities. Additionally, Minnkota's generation, NMPA's generation, Minnkota's Western Area Power Administration (WAPA) allocation, and the NMPA WAPA allocations are collectively utilized to serve the Joint System capacity and energy requirements consistent with applicable tax law relative to NMPA's tax-exempt financing. Also, both the member systems of Minnkota and the member municipalities of NMPA purchase their total electric capacity and energy requirements under similar Wholesale Power Rate Schedules.

Management and Administration

Minnkota is operated by approximately 390 full-time employees under the direction of the President & Chief Executive Officer, who is appointed by and is responsible to the board and who is not eligible to serve as a director of Minnkota. Approximately 210 employees operate out of the general headquarters in Grand Forks, N.D. Approximately 180 are employed at the Milton R. Young Station located near Center, N.D.

Market Participant - Midcontinent Independent System Operator's Energy Market (MISO)

Minnkota is a market participant in the MISO energy market. This allows Minnkota to purchase energy from or sell energy into the MISO energy market. This MISO market is another source for the Joint System's energy requirements.

SECTION 2

Resource Plan Summary

Introduction

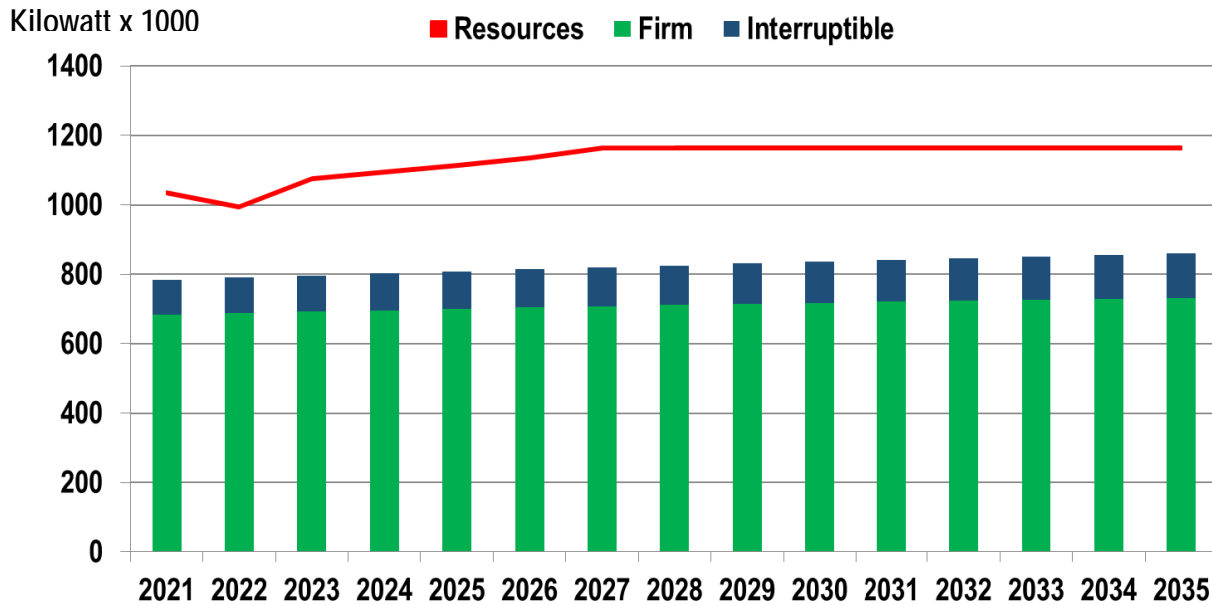
Minnkota and NMPA together submit this 2022 Integrated Resource Plan (IRP). This document has been prepared to fulfill the IRP requirements of WAPA and the Minnesota Public Utilities Commission.

The primary function of an IRP is to demonstrate how a utility plans to meet the electrical needs of its end-use consumers over the next 15 years. The resource plan includes the resource and demand side options that best fit the utility's forecasted energy requirements. Resource plans must consider how to maintain or improve electric service to customers, maintain low electric rates, minimize environmental impacts and minimize the risk of adverse effects from financial and technological impacts.

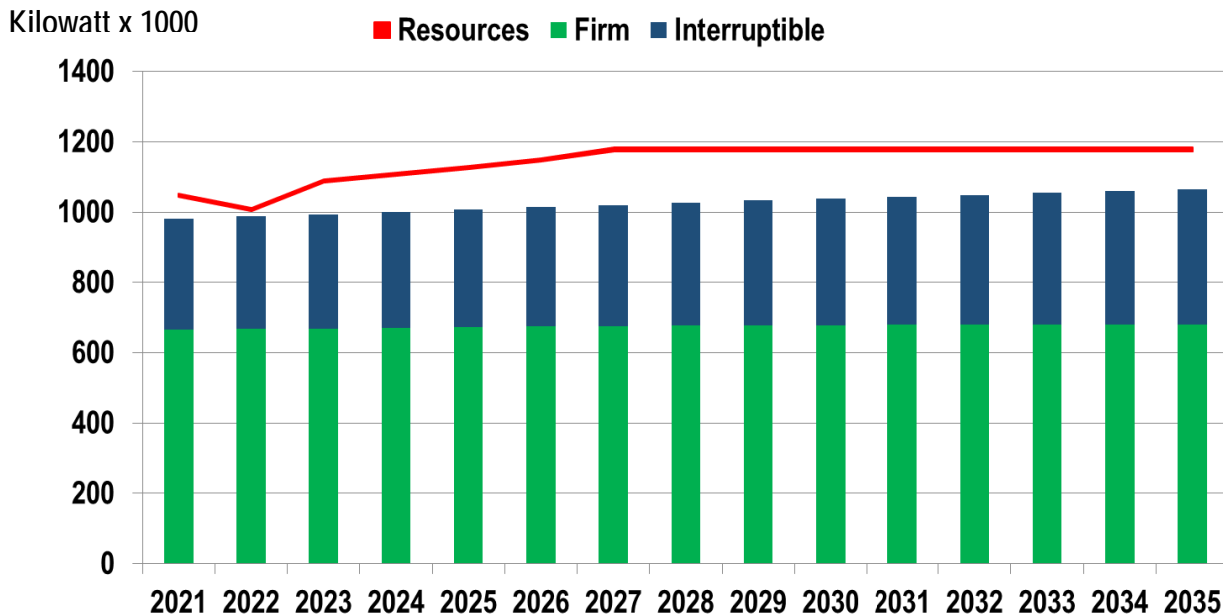
Load Forecasts

The Joint System energy requirements are forecasted to increase at a rate of 0.7% per year. The summer and winter peak demands are also forecasted to increase at a rate of 0.7% and 0.6% respectively per year. This is based on the 30-year projections from the 2021 Load Forecast Study. The following charts display the winter and summer peak demands, separated into the firm and interruptible components. Also shown in these charts are the winter and summer capacity resources. For purposes of illustration, capacity resources are the Joint System generation plants plus the WAPA firm power allocations plus power purchases minus power sales.

Summer Capacity vs. Load



Winter Capacity vs. Load



As seen in the above tables, the Joint System has more than sufficient resource capacity to serve its firm load during the next 15 years.

Energy Considerations

The amount of energy that the Joint System needs to procure from generation resources not under its control is another important factor in long-term generation expansion planning.

The Joint System has diverse energy resources as detailed in Section 4. The Young 1, Young 2, and Coyote generating units are all baseload generation. The Joint System also utilizes Minnkota's firm power allocation and the NMPA firm power allocations from WAPA to fulfill its energy requirements. Minnkota also has a number of power purchase agreements for wind-derived energy.

The majority of the Joint System's future energy requirements will be supplied from the resources listed above. The energy requirements not fulfilled by the Joint System's resources will most likely be purchased from the MISO energy market.

From an analysis of the forecasted Joint System energy requirements and the expected output of its generation resources, WAPA firm power allocations, and power purchase agreements, it is forecasted that the Joint System purchases from the MISO energy market will range from a low of 0.3% to a high of 2.4% of its total annual energy requirements.

Since the amounts of energy forecasted to be purchased from the MISO energy market are minor, there is no need for additional generation additions from an energy supply perspective. A more detailed explanation of projected MISO energy purchases can be found in Section 7.

Summary

From both a resource capacity perspective and an energy requirements perspective, the Joint System does not need additional generation resources in the 2022-2035 timeframe.

SECTION 3

Demand Response Program

Historical Perspective

Beginning in 1973, Minnkota and the member systems instituted a comprehensive and effective Demand Response (DR) program. Currently about 55,000 end-use consumers participate in this important program. Due to the large amount of electric heating loads, Minnkota's DR program started with dual heating systems as the main focus of its effort.

Interruptible Loads

The Joint System's philosophy is to develop interruptible loads in such a manner that the DR program causes as little inconvenience as possible to the end-user, while also being cost-effective for both the end-user and the Joint System.

The Joint System has developed a high degree of expertise in determining what end-use loads are adaptable to the DR program and which ones are not. Today, for the winter season, the DR program utilizes, in addition to dual heating systems, water heaters, slab storage heating, thermal storage heating, electric transportation, and miscellaneous loads.

In the mid-1990s, the Joint System extended its DR program to include the summer season. This was done to offset increasing costs caused by growing summer load growth and increasing generation expansion costs.

Currently, for the summer season, the DR program utilizes large capacity water heaters, irrigation systems, low temperature grain drying, loads with generator backup, electric transportation and miscellaneous loads.

Winter and Summer Interruptible Load Forecasts

Winter Season	Interruptible Load - MW
2022	350
2023	355
2024	360
2025	365
2026	370
2027	375
2028	380
2029	385
2030	390
2031	395
2032	400
2033	405
2034	410
2035	415
2036	420

Summer Season	Interruptible Load - MW
2022	100
2023	102
2024	104
2025	106
2026	108
2027	110
2028	112
2029	114
2030	116
2031	118
2032	120
2033	122
2034	124
2035	126
2036	128

Based on operational experience with winter and summer interruptible loads, the above is a forecast of the amount of demand relief that will be realized in future peak load periods.

SECTION 4

Existing Resources, Purchases, and Sales

Overview

The Joint System has a variety of existing resources that economically and reliably fulfill the energy requirements of the end-use customers of its member systems and the NMPA municipals.

Existing resources consist of baseload, diesel, hydro allocations, biomass, and wind generation.

Minnkota and eight of the NMPA municipals have firm power allocations from WAPA. These firm power allocations supply varying amounts of capacity and energy throughout the year.

Existing Generation

MILTON R. YOUNG UNIT 1

Milton R. Young Unit 1 (Young 1) was built and is operated and maintained by Minnkota. Young 1 is a 250 MW lignite-fired mine-mouth generator located approximately seven miles southeast of Center, N.D.

MILTON R. YOUNG UNIT 2

Milton R. Young Unit 2 (Young 2) is a 455-MW lignite-fired mine-mouth generator (owned by Square Butte) also located approximately seven miles southeast of Center, N.D.

COYOTE PLANT

The Coyote Plant is a 427 MW lignite-fired generating plant located southwest of Beulah, N.D., and is operated by Otter Tail Power Company (OTP). NMPA owns a 30 percent share (128.1 MW) of this unit and has appointed Minnkota as its agent for scheduling capacity and energy from Coyote and for operational management responsibilities.

LANGDON WIND

The Langdon Wind Project is comprised of two separate wind farms located near Langdon, N.D.

The first wind farm, Langdon I, consists of 106 turbines, of which 79 are owned by NextEra and 27 are owned by OTP. The turbines are 1.62 MW General Electric machines with a total capacity of 171.7 MW. OTP owns 43.74 MW and NextEra owns 127.98 MW of the turbine capacity of Langdon I. Minnkota has a long-term power purchase agreement with NextEra for 99 MW of capacity and energy.

The second wind farm, Langdon II, consists of 27 turbines, all of which are owned by NextEra. These turbines are also 1.5-MW General Electric machines with a repower total capacity of 40.5 MW. Minnkota has a long-term power purchase agreement with NextEra for all the capacity and energy produced by Langdon II.

ASHTABULA WIND

The Ashtabula Wind Project is comprised of two separate wind farms located near Pillsbury, N.D.

The first wind farm, Ashtabula I, consists of 131 turbines, of which 99 are owned by NextEra and 32 are owned by OTP. The turbines are 1.5 MW General Electric machines with a total capacity of 196.5 MW. NextEra owns 148.5 MW of the turbine capacity of Ashtabula I. Minnkota has a long-term power purchase agreement with NextEra for 148.5 MW of capacity and energy.

The second wind farm, Ashtabula II, consists of 113 turbines, of which 80 are owned by NextEra and 33 are owned by OTP. These turbines are also 1.5 MW General Electric machines with a total capacity of 169.5 MW. NextEra owns 120.0 MW and OTP owns 49.5 MW of the turbine capacity of Ashtabula II. Minnkota has a long-term power purchase agreement with NextEra for the output of 69.0 MW of capacity and energy.

OLIVER III WIND

The Oliver III Wind Project consists of 43 GE 2.10 MW wind turbine generators and 5 GE 1.79 MW wind turbine generators owned by NextEra, with a total capacity of 99.3 MW, in Morton County and Oliver County, N.D. Minnkota has a long-term power purchase agreement with NextEra for the output of 99.3 MW of capacity and energy.

INFINITY WIND

Minnkota's Infinity Wind Program consists of two 0.900 MW wind turbines, one located near Valley City, N.D., and one located near Petersburg, N.D. The Valley City turbine commenced operation on Jan. 25, 2002. The Petersburg turbine became operational on July 12, 2002. Both units are expected to produce approximately 2,800 MWh annually.

THIEF RIVER FALLS HYDRO PLANT

Thief River Falls, a NMPA member municipal, owns and operates a 0.500 MW hydro plant that has been in operation since 1927. This unit produces an average of 2,000 MWh annually.

CASS COUNTY ELECTRIC COOPERATIVE DIESEL GENERATION

Minnkota leases 10 diesel generating units for Cass County Electric Cooperative. These generators are located at several substations and are the financial responsibility of Cass County. Minnkota purchases the capacity and energy from these units. The 10 diesel generators have a total capacity rating of 18.28 MW. Minnkota also purchases the capacity and energy from three of Cass County's customer-owned generators that have capacity ratings of 2.0 MW, 0.9 MW and 0.8 MW.

NMPA DIESEL GENERATION

Three of the NMPA municipal members, Thief River Falls, Grafton, and Halstad, have diesel generators leased to Minnkota. The total capacity of these NMPA diesel generators is 13.536 MW.

Purchases

WAPA FIRM POWER ALLOCATION TO MINNKOTA

Minnkota has a Firm Power Allocation from WAPA. This allocation provides firm capacity and energy to the Joint System of 72.632 MW and 358,303 MWh per year.

WAPA FIRM POWER ALLOCATION TO THE NMPA MUNICIPALS

Eight of the 12 NMPA municipals have a WAPA Firm Power Allocation. These allocations provide firm capacity and energy to the Joint System of 40.6 winter / 36.2 summer and 174,311 MWh per year.

FARGO LANDFILL GAS FACILITY

Minnkota purchases the electrical output from the Fargo, N.D., landfill gas facility, which has a capacity of 0.925 MW.

Sales

BASIN ELECTRIC POWER COOPERATIVE SALES

2022 Annual 100 MW March 2022 – May 2022

MONTANA-DAKOTA UTILITIES

Minnkota has a sales agreement with Montana-Dakota Utilities for the following amounts of capacity from the Joint System:

2021-2022	Annual	75MW	June-May
2022-2023	Annual	90MW	June-May
2023-2024	Annual	30MW	June-May
2024-2025	Annual	30MW	June-May
2025-2026	Annual	30MW	June-May

Transmission Facilities

Minnkota's transmission facilities consist of 464 miles of 345 kV, 444 miles of 230 kV, 284 miles of 115 kV and 2,158 miles of line up to and including 69 kV. Additionally, Minnkota completed a 250-mile 345 kV transmission line between Center, N.D., and Grand Forks, N.D., in the summer of 2014.

The transmission system is directly interconnected with seven area utilities: Manitoba Hydro, Montana-Dakota Utilities Company, Minnesota Power, Otter Tail Power Company, Xcel Energy, Great River Energy, and WAPA.

Minnkota's extensive transmission system and large number of interconnections with other utilities serves to enhance service reliability to the end-use customer and permits the sale or purchase of energy with neighboring companies.

SECTION 5

Load Forecast

Overview

The primary function of the IRP is to demonstrate how a utility plans on supplying the energy requirements of its end-use consumers over the next 15 years. The IRP documents the resource and demand side options that best fit the utility's forecasted energy requirements.

This is the seventh IRP that Minnkota Power Cooperative, Inc. and NMPA have filed jointly with the Minnesota Public Utilities Commission under MN Statute 216B.2422 and MN Rules Part 7843.

Resource Plan Objectives

The objectives of this IRP are based on the resource planning requirements of Minnkota and NMPA and fulfill the evaluation criteria requirements of MN Rules Part 7843.

- Study Objective #1: Maintain or improve the adequacy and reliability of utility service.
- Study Objective #2: Keep customers' bills and the utility's rates as low as practicable, given regulatory and other constraints.
- Study Objective #3: Minimize adverse socioeconomic effects and adverse effects upon the environment.
- Study Objective #4: Enhance the utility's ability to respond to changes in the financial, social and technological factors affecting its operations.
- Study Objective #5: Limit the risk of adverse effects on the utility and its customers from financial, social and technological factors that the utility cannot control.

Load Forecast Study

Rural Utilities Service (RUS) defines a Load Forecast Study (LFS) as a "thorough study of a borrower's electric loads and the factors that affect those loads in order to determine, as accurately as practical, the borrower's future requirements for energy and capacity. The LFS of a power supply borrower includes and integrates the LFSs of its member systems." The LFS must meet the guidelines and procedures outlined in Title 7 Part 1710 Subpart E of the Code of Federal Regulations, which defines the purposes, basic policies, requirements and criteria that must be met before RUS will approve a LFS.

LFS Approach

Econometric modeling was the primary forecasting technique utilized in the member systems' LFS. Econometric modeling identifies relationships between energy use and economic, demographic and system trends. The models are based upon 30 years of historical data and utilize such factors as population, employment, income, weather, electricity prices, alternate fuel prices, agricultural economic conditions, as well as other factors pertinent to model development. The studies specifically determined and quantified the factors that historically had impacts on electrical usage.

Econometric models were developed to forecast the number of residential consumers, residential energy usage, the number of small commercial consumers and small commercial usage.

Forecasts for the number of large commercial customers and usage were developed judgmentally, based on input from the member systems.

Judgment and trend analysis were utilized to forecast irrigation sales, street lighting, sales to public authorities, sales for resale, own usage and losses for each of the member systems.

Models were developed using the ordinary least squares approach to regression analysis. All of the models and their resulting forecasts were selected on the basis of theoretical and statistical validity and reasonableness of results.

Load Forecast

The Joint System load forecast is comprised of the Minnkota Load Forecast Study and a load forecast of the 12 NMPA municipal systems.

The member-owner distribution cooperatives and Minnkota are required to complete a Rural Utilities Service (RUS)-approved Load Forecast Study. The LFS is on a two-year cycle, meaning that new studies of the individual member-owners and Minnkota are completed every other year. The latest LFSs were completed in 2021.

Minnkota's LFS was developed in a bottom-up manner. The individual member system's energy and capacity requirements forecasts were summated to form Minnkota's base forecast. A forecast of Minnkota's transmission losses was also developed.

The municipal members of NMPA are not required to complete a LFS. However, a load forecast utilizing a linear regression analysis of the historical period 2005 through 2020 was completed for each of the members of NMPA.

The forecast of the Joint System's energy requirements is the sum of the forecasts of Minnkota's energy requirements, NMPA's energy requirements, and transmission losses. The forecasts of the winter and summer peak demands are based on historical trending.

Data Mining-Processing

Minnkota has seen data mining/processing industrial loads develop in its service territory in 2021 and will see more load developing in 2022. However, the data mining/processing loads have been excluded from the LFS because the loads are special interruptible loads that are registered with MISO (Midcontinent Independent System Operator) as load modifying resources and are under either three-year or five-year electric service contracts. Because reporting requirements differ between RUS, MISO, and member systems/municipal systems (NMPA), the data mining/processing loads were included in an updated Executive Summary that is located in Appendix G of the attached LFS. The narrative and tables project the impact of Minnkota's interruptible data mining/processing loads, which is used for MISO and Module E reporting.

Joint System Median Annual Energy Requirements, Winter Peak, and Summer Peak Forecasts

The Joint System median forecast of its annual energy requirements, winter peak demands and summer peak demands are shown in the following table: (LFS Table 4.3)

Median Load Growth Forecasts

Year	Energy Requirements MWH	Winter Peak MW	Summer Peak MW
2022	4,687,225	985	789
2023	4,744,149	994	796
2024	4,788,853	1,001	802
2025	4,834,014	1,007	808
2026	4,875,355	1,014	814
2027	4,915,579	1,020	819
2028	4,959,010	1,027	825
2029	5,001,694	1,033	831
2030	5,038,686	1,038	836
2031	5,077,416	1,044	841
2032	5,115,597	1,049	846
2033	5,148,414	1,054	850
2034	5,186,007	1,059	855
2035	5,224,654	1,065	860
2036	5,256,383	1,069	864

The Joint System's median forecast of annual energy requirements is projected to increase at a rate of 0.7% per year. The winter peak demand is projected to increase at a rate of 0.6% per year and the summer peak demand is projected to increase at a rate of 0.7% per year. These numbers are based on the 30-year projections from the 2021 Load Forecast Study.

Joint System Annual Energy Requirements, Winter Peak Demand, and Summer Peak Demand Forecast Bandwidths

Analysis was done to determine the sensitivity of projected load growth to weather, the economy, and alternate fuel prices. This work was included in the LFS and has been incorporated into this IRP.

The low load growth scenario was based on the impacts that pessimistic economic conditions would have on the forecast. The high load growth scenario was based on the impacts that optimistic economic conditions would have on the forecast. Economic conditions were found to impact the forecast more than any other factor.

These two scenarios are the basis for the bandwidth forecasts for the member systems. Although the sensitivity analyses were only studied for the member systems, the same percentage variation was applied to the Joint System annual energy requirements, since the characteristics of the municipals' electric load are similar to those of the member systems' load characteristics.

The forecasts of the Joint System's annual energy requirements, winter peak demands, and summer peak demands for the low load scenario are shown in the following table:

Low Load Growth Forecasts

Year	Energy Requirements MWH	Winter Peak MW	Summer Peak MW
2022	4,573,332	963	698
2023	4,571,602	960	733
2024	4,557,003	956	756
2025	4,539,401	949	762
2026	4,560,053	952	765
2027	4,580,782	956	768
2028	4,601,588	959	772
2029	4,622,472	963	775
2030	4,643,433	966	778
2031	4,659,268	968	779
2032	4,675,147	971	780
2033	4,691,070	973	782
2034	4,707,038	976	783
2035	4,723,051	978	784
2036	4,736,069	978	786

The Joint System's low load growth scenario forecasts an increase of 0.85% per year for annual energy requirements. The winter peak demand is forecasted to increase at a rate of 0.45% per year and the summer peak demand is forecasted to increase at a rate of 0.45% per year.

The forecasts of the Joint System's annual energy requirements, winter peak demands, and summer peak demands for the high load growth scenario are shown in the following table:

High Load Growth Forecasts

Year	Energy Requirements MWH	Winter Peak MW	Summer Peak MW
2022	4,801,117	985	807
2023	4,916,695	994	824
2024	5,020,704	1,001	839
2025	5,131,980	1,007	864
2026	5,198,495	1,014	871
2027	5,265,731	1,020	877
2028	5,333,696	1,027	884
2029	5,402,397	1,033	890
2030	5,471,842	1,038	897
2031	5,538,678	1,044	906
2032	5,606,204	1,049	916
2033	5,674,427	1,054	926
2034	5,743,353	1,059	935
2035	5,812,990	1,065	945
2036	5,878,164	1,069	953

The Joint System's high load growth scenario forecasts an increase of 1.8% per year for annual energy requirements. The winter peak demand is forecasted to increase at a rate of 1.3% per year and the summer peak demand is forecasted to increase at a rate of 1.2% per year.

SECTION 6

Resource Adequacy

Discussion

The Joint System is a load serving entity within the MISO area of operations. As such, the Joint System is obligated to conform to MISO's Resource Adequacy requirements. A reliable bulk electric system requires, among other things, that generation capacity exceeds customer demand by an adequate margin. The margins necessary to ensure adequate reliability are assessed on a near-term (operational) basis and on a longer-term (planning) basis.

The focus of Resource Adequacy is on the longer-term planning margins that are required to provide sufficient generating resources to reliably serve customer demand in the planning horizon. Planning reserve margins must be sufficient to cover the following situations:

1. Planned generator maintenance;
2. Unplanned forced outages of generating equipment;
3. Reductions in generation capacity due to operational problems;
4. Uncertainty in demand forecasts;
5. Outages of transmission lines and other electrical equipment; and
6. Anticipated variations in weather patterns

MISO determines the amount of Minnkota's planning reserve margin on an annual basis. This determination takes into account Minnkota's demand forecasts, its generation resources, and any transactions. Minnkota is required to meet MISO's planning reserve obligations, and failure to meet such obligations will result in charges assessed to Minnkota.

SECTION 7

Energy Requirement Considerations

Introduction

Another important consideration in generation planning is the degree to which the Joint System will be dependent on market-based resources to meet its load requirements. The Joint System has the Young 1, Young 2, and Coyote coal-fired generators, NMPA WAPA allocations, Minnkota's WAPA allocation, and power purchase agreements for wind energy from the Langdon, Ashtabula and Oliver III wind projects to fulfill its energy requirements.

However, since the coal-fired generating units require periodic maintenance during which time they are not generating energy, and since wind is intermittent by nature, the Joint System has to purchase energy to serve its load requirements from the wholesale electricity market. During those times when the Joint System doesn't have the generation resources to fulfill its energy requirements, it almost always purchases that energy from the MISO energy market.

A financial danger exists in depending too greatly on the MISO energy market, since the MISO market can be extremely volatile and expensive at times. Also, delivery of market power can be an issue. In order to minimize the financial risk of having to purchase high-cost energy, the Joint System prefers to fulfill as much of its energy requirements as practical from generating resources it owns or has agreements to purchase the output at fixed prices.

Percentage of Joint System Energy Requirements Purchased from MISO Energy Market

The following tables contain the forecasts of the annual Joint System energy requirements and the amounts of energy purchased from the MISO energy market for the low, median and high load scenarios.

The following table contains the forecasts of the Joint System's annual energy requirements for the low growth, median growth, and the high growth scenarios. (LFS Table 4.3)

Year	Joint System Low Growth Scenario Energy Requirements MWH	Joint System Median Growth Scenario Energy Requirements MWH	Joint System High Growth Scenario Energy Requirements MWH
2022	4,573,332	4,687,225	4,801,117
2023	4,571,602	4,744,149	4,916,695
2024	4,557,003	4,788,853	5,020,704
2025	4,539,401	4,834,014	5,131,980
2026	4,560,053	4,875,355	5,198,495
2027	4,580,782	4,915,579	5,265,731
2028	4,601,588	4,959,010	5,333,696
2029	4,622,472	5,001,694	5,402,397
2030	4,643,433	5,038,686	5,471,842
2031	4,659,268	5,077,416	5,538,678
2032	4,675,147	5,115,597	5,606,204
2033	4,691,070	5,148,414	5,674,427
2034	4,707,038	5,186,007	5,743,353
2035	4,723,051	5,224,654	5,812,990
2036	4,736,069	5,256,383	5,878,164

The following table contains the forecasts of the Joint System's annual energy purchases from the MISO energy market for the low, medium and high growth scenarios:

Year	Energy Purchased from MISO Energy Market Low Growth Scenario MWH	Energy Purchased from MISO Energy Market Median Growth Scenario MWH	Energy Purchased from MISO Energy Market High Growth Scenario MWH
2022	45,733	46,872	48,011
2023	91,432	94,883	98,334
2024	45,570	47,889	50,207
2025	45,394	48,340	51,320
2026	45,601	48,754	51,985
2027	45,808	49,156	52,657
2028	46,016	49,590	53,337
2029	46,225	50,017	54,024
2030	46,434	50,387	54,718
2031	46,593	50,774	55,387
2032	46,751	51,156	56,062
2033	46,911	51,484	56,744
2034	47,070	51,860	57,434
2035	47,231	52,247	58,130
2036	47,361	52,564	58,782

The above tables show that the forecasted amounts of annual Joint System energy requirements purchased from the MISO energy market are quite small compared to the requirements fulfilled by its own generation and agreements. Given the small amounts of energy that will need to be purchased, the Joint System will be well-shielded from a high-cost and volatile MISO energy market. Therefore, there will be very little risk of financial damage since the Joint System will have minimal dependence on the MISO energy market.

Long-Term Resource Needs

The Joint System's generation resources, power purchase agreements and extensive demand response program will meet the forecasts for peak demand and energy requirements. The Joint System is expected to have adequate resources to meet the capacity and energy requirements of its members/customers and will have a minimal dependence on the MISO energy market. Therefore, there is no need for future generation additions and no need for additional power purchase agreements in the next 15-year timeframe. Even with adequate resources, Minnkota continues to evaluate new opportunities with its neighboring utilities, as well as the development of new technologies.

SECTION 8

Minnesota Renewable Energy Standard and Greenhouse Gas Emissions

8.1 Renewable Energy Standard Objectives Discussion

Minnesota Statute § 216B.1691 addresses the Renewable Energy Standard, which requires utilities to generate or procure certain amounts of renewable generation.

During the 2007 Legislative session, the statute was amended, in part, to establish a Renewable Energy Standard (RES) with specified mandated renewable energy goals beginning in 2010 and amended the definition of an eligible energy technology.

Each electric utility, other than those that owned a nuclear generating facility as of Jan. 1, 2007, shall generate or procure sufficient electricity generated by an eligible energy technology to provide its Minnesota retail customers or the retail members of a distribution utility to which the electric utility provides wholesale electric service, so that at a minimum the following percentages of the electric utility's total electric sales to retail customers in Minnesota are generated by eligible energy technologies by the end of the year as follows:

▪ 2010	7%
▪ 2012	12%
▪ 2016	17%
▪ 2020	20%
▪ 2025	25%

The definition of an eligible energy technology was changed to one that:

Generates electricity from the following renewable energy sources: (1) solar; (2) wind; (3) hydroelectric with a capacity of less than 100 megawatts; (4) hydrogen provided that after Jan. 1, 2010, the hydrogen must be generated from resources listed in this clause; or (5) biomass, which includes, without limitation, landfill gas, an anaerobic digester system, and an energy-recovery facility used to capture the heat value of mixed municipal solid waste or refused-derived fuel from mixed municipal solid waste as a primary fuel.

Minnkota purchases small amounts of energy from a landfill gas generator located in Fargo, N.D. Minnkota also owns two 0.9 MW wind generators, one located near Valley City, N.D., and the other located near Petersburg, N.D. Since the outputs of these generators are comparatively small relative to Minnkota's large renewable resources, this section will only focus on the large renewable resources. The smaller resources were only noted so that the reader has knowledge of the full extent of the Joint System's renewable energy efforts.

Minnkota has power purchase agreements with NextEra, a wind developer, for portions of its Langdon, Ashtabula and Oliver III wind projects located in North Dakota. From the Langdon wind project, Minnkota has rights to the output of 93 wind turbines with a nameplate capacity of 139.5 MW. From the Ashtabula wind project, Minnkota has rights to the output of 145 wind turbines with a nameplate capacity of 217.5 MW. From the Oliver III wind project, Minnkota has rights to the output of 48 wind turbines with a nameplate capacity of 100 MW.

Between the Langdon, Ashtabula and Oliver III wind projects, Minnkota has rights to the output of 286 wind turbines with a nameplate capacity of 457 MW. For study purposes, it was assumed that the annual capacity factor would be 42% at the Langdon and Ashtabula facilities and 50% at the Oliver III facility, which translates to approximately 1,751,500 MWh of wind energy for the Joint System.

The following table documents the Joint System's Minnesota RES given its long-term energy forecast and the percent required to be generated by renewable resources. Also displayed in the table are the amounts of wind energy forecasted to be generated by the portions of the Langdon and Ashtabula wind projects for which Minnkota has power purchase agreements. (MPC Req Summary 2019 Table 3.17 / Summary 3).

Year	Joint System Minnesota Retail Sales MWH	% Required For MN RES	Energy Requirement For MN RES MWH	Langdon, Ashtabula and Oliver III Wind Energy Production MWH
2022	2,184,555	20	436,911	1,688,753
2023	2,210,534	20	442,107	1,688,753
2024	2,232,526	20	446,505	1,688,753
2025	2,256,240	25	564,060	1,688,753
2026	2,279,506	25	569,876	1,688,753
2027	2,302,144	25	575,536	1,688,753
2028	2,328,354	25	582,088	1,688,753
2029	2,352,797	25	588,199	1,688,753
2030	2,375,752	25	593,938	1,688,753
2031	2,400,706	25	600,176	1,688,753
2032	2,422,827	25	605,707	1,688,753
2033	2,442,925	25	610,731	1,688,753
2034	2,468,399	25	617,100	1,688,753
2035	2,489,506	25	622,377	1,688,753
2036	2,509,172	25	627,293	1,688,753

From the above tables, it can be seen that the Joint System purchases from renewable energy resources are significantly greater than its requirements.

These tables demonstrate the Joint System's strong dedication to fulfilling its Minnesota RES requirements.

8.2 Greenhouse Gas Emissions

Discussion

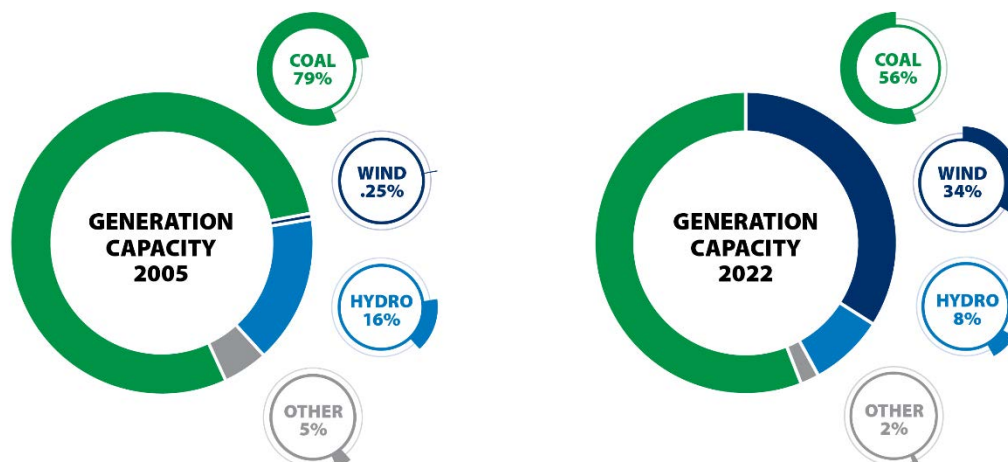
Minnesota Statute 216.02 addresses Minnesota’s greenhouse gas emissions-reduction goal, which states that it is the goal of the State to reduce statewide greenhouse gas emissions across all sectors producing those emissions to a level at least 15 percent below 2005 levels by 2015, to at least 30 percent below 2005 levels by 2025, and to a level at least 80 percent below 2005 levels by 2050.

Minn. Stat. §216.01, Sub. 2, defines statewide greenhouse gas emissions as follows:

“Statewide greenhouse gas emissions” include emissions of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride emitted by anthropogenic sources within the state and from the generation of electricity imported from outside the state and consumed in Minnesota. Carbon dioxide that is injected into geological formations to prevent its release to the atmosphere in compliance with applicable laws, and carbon dioxide associated with the combustion of fuels other than coal, petroleum, and natural gas are not counted as contributing to statewide greenhouse gas emissions.

The Joint System does not own any sources of generation located in Minnesota. All of the Joint System’s generation resources are located in North Dakota. As noted in the two charts below, since 2005, the Joint System has seen a significant increase in its wind generation capacity.

Generation Mix Changes



Illustrated below are the following tables which demonstrate the calculation of Joint System’s CO₂ emission reductions. Table 1 shows the Joint System’s projected MWhs generated by coal fired generators which can serve Joint System’s load. Table 2 shows emission statistics for coal generation resources which served Joint System’s Minnesota load for 2005 and possible emission projections for 2022 thru 2040. Table 3 compares CO₂ emissions for 2005 to CO₂ emissions for 2022 thru 2040 levels.

Table 1

Year	Member MN (MWh)	NMPA MN (MWh)	TOTAL MN (MWh)	MN RES Mandate	Fossil Fuel (MWh)
2005	1,406,229	384,515	1,790,744	0	1,790,744.00
2014	1,623,674	392,176	2,015,850	12%	1,773,948.11
2015	1,515,319	378,173	1,893,492	12%	1,666,273.06
2016	1,494,552	372,330	1,866,882	12%	1,642,856.50
2017	1,498,450	367,600	1,866,050	17%	1,548,821.68
2018	1,522,570	376,250	1,898,820	17%	1,576,020.60
2019	1,531,624	370,681	1,902,305	17%	1,578,913.15
2020	1,484,380	367,379	1,851,759	20%	1,481,407.20
2021	1,505,347	375,761	1,881,108	20%	1,504,886.11
2022	1,526,347	377,883	1,904,230	20%	1,523,384.00
2023	1,539,241	379,694	1,918,935	20%	1,535,147.69
2024	1,552,245	381,220	1,933,465	20%	1,546,772.13
2025	1,563,085	382,397	1,945,482	25%	1,459,111.61
2026	1,570,575	383,321	1,953,896	25%	1,465,422.28
2027	1,580,057	384,055	1,964,112	25%	1,473,084.00
2028	1,590,217	384,562	1,974,779	25%	1,481,084.45
2029	1,599,941	384,717	1,984,658	25%	1,488,493.71
2030	1,607,442	384,734	1,992,176	25%	1,494,132.05
2031	1,614,338	384,531	1,998,869	25%	1,499,151.68
2032	1,621,277	384,145	2,005,422	25%	1,504,066.51
2033	1,626,402	383,557	2,009,959	25%	1,507,468.92
2034	1,633,300	382,843	2,016,143	25%	1,512,107.12
2035	1,641,395	381,954	2,023,349	25%	1,517,512.02
2036	1,645,438	381,028	2,026,466	25%	1,519,849.45
2037	1,649,211	379,971	2,029,182	25%	1,521,886.80
2038	1,654,721	379,002	2,033,723	25%	1,525,291.96
2039	1,657,742	378,010	2,035,752	25%	1,526,814.10
2040	1,661,298	377,019	2,038,317	25%	1,528,737.49

Column descriptions for Table 1

- **Member MN (MWh)** = Total MN member MWh sales plus 4% transmission losses
- **NMPA MN (MWh)** = Total MN MWh sales to NMPA members plus 4% transmission losses
- **Total MN (MWh)** = Member MN (MWh) + NMPA MN (MWh)
- **MN RES Mandate** = MN renewable mandate
- **Fossil Fuel (MWh)** = TOTAL MN (MWh) * (1 – MN RES Mandate)

Table 2

Year	Young 1 CO₂ emissions lb/MWh	Young 2 CO₂ emissions lb/MWh	Coyote CO₂ emissions lb/MWh	Weighted Average	Fossil Fuel MWh	MN annual CO2 emissions in tons
2005	2,345	2,464	2,374	2,394	1,790,744	2,143,689
2014	2,074	2,154	2,404	2,211	1,773,948	1,960,741
2015	2,193	2,166	2,405	2,255	1,666,273	1,878,563
2016	2,382	2,141	2,281	2,268	1,642,857	1,862,782
2017	2,282	2,199	2,339	2,273	1,548,822	1,760,344
2018	2,308	2,199	2,319	2,275	1,576,021	1,792,720
2019	2,199	2,131	2,319	2,216	1,578,913	1,749,515
2020	2,118	2,179	2,292	2,196	1,481,407	1,626,925
2021	2,165	2,182	2,331	2,226	1,504,886	1,674,891
2022	2,165	2,182	2,331	2,226	1,523,384	1,695,479
2023	2,165	2,182	2,331	2,226	1,535,148	1,708,571
2024	2,165	2,182	2,331	2,226	1,546,772	1,721,509
2025	2,165	2,182	2,331	2,226	1,459,112	1,623,946
2026	1,516	218	2,331	954	1,465,422	699,225
2027	1,516	218	2,331	954	1,473,084	702,881
2028	1,516	218	2,331	954	1,481,084	706,699
2029	1,516	218	2,331	954	1,488,494	710,234
2030	1,516	218	2,331	954	1,494,132	712,924
2031	1,516	218	2,331	954	1,499,152	715,319
2032	1,516	218	2,331	954	1,504,067	717,664
2033	1,516	218	2,331	954	1,507,469	719,288
2034	1,516	218	2,331	954	1,512,107	721,501
2035	1,516	218	2,331	954	1,517,512	724,080
2036	1,516	218	2,331	954	1,519,849	725,195
2037	1,516	218	2,331	954	1,521,887	726,167
2038	1,516	218	2,331	954	1,525,292	727,792
2039	1,516	218	2,331	954	1,526,814	728,518
2040	1,516	218	2,331	954	1,528,737	729,436

Table 3

Year	2005 CO₂ Emissions, Tons	Projected CO₂ Emissions, Tons	Percent reduction of CO₂ from 2005
2014	2,143,689.25	1,960,741	-8.5%
2015		1,878,563	-12.4%
2016		1,862,782	-13.1%
2017		1,760,344	-17.9%
2018		1,842,867	-14.0%
2019		1,713,255	-20.1%
2020		1,673,409	-21.9%
2021		1,695,835	-20.9%
2022		1,717,712	-19.9%
2023		1,736,197	-19.0%
2024		1,756,070	-18.1%
2025		1,658,524	-22.6%
2026		878,629	-59.0%
2027		887,415	-58.6%
2028		896,290	-58.2%
2029		905,252	-57.8%
2030		914,305	-57.3%
2031		923,448	-56.9%
2032		932,682	-56.5%
2033		942,009	-56.1%
2034		951,429	-55.6%
2035		960,944	-55.2%
2036		970,553	-54.7%
2037		980,163	-54.3%
2038		989,772	-53.8%
2039		999,381	-53.4%
2040		1,008,991	-52.9%

The CO₂ emissions are based on the MWh generation needed to serve Minnesota load from Young 1, Young 2 and Coyote only. Young 1, Young 2, and Coyote CO₂ emissions are used as a weighted average (from Table 2) and multiplied by Fossil Fuel MWhs (from Table 1) needed to serve Minnesota load.

As described in Section 12 of Joint System's IRP, Minnkota is pursuing Project Tundra, which is estimated to capture 90% of the CO₂ emissions from Young 2 and additional capture from Young 1. If the project moves forward, Minnkota currently anticipates construction to initiate in 2022-2023, with an in-service date of 2025-2026.

Accordingly, the Joint System submits Table 3 showing Joint System CO₂ emissions in 2005 at 2,143,689 tons. Upon the successful completion of Project Tundra, Joint System CO₂ emissions would be significantly reduced as demonstrated in 2026 in Table 3.

The Commission's Order requested that the Joint System include scenarios that do not assume approval and success of carbon sequestration. At present, Minnkota has completed the Department of Energy-sponsored Front-End Engineering and Design study and is confident in the technology and anticipates final permits to be issued in Q3 of 2022.

Minnkota currently has the largest fully-permitted CO₂ storage facility in the United States. In January of 2022, Minnkota received its Class VI injection well permit from the State of North Dakota. Further, it received approval of its Monitoring, Reporting and Verification plan from the EPA.

In light of the above information, the Joint System is confident that its significant generation mix changes from 2005 to the present as noted above, coupled with Minnkota's continued progress towards development of Project Tundra, as well as the growing support for Carbon Capture and Storage at every level of government will satisfy the Commission's inquiry as to the Joint System's progress towards meeting its greenhouse gas emissions reduction goals.

If it were to be determined that Project Tundra is not plausible by 2025, the Joint System is in position with its generation mix to meet Minnesota's goal of offsetting greenhouse gas emissions from the generation of electricity imported from outside the state and consumed in Minnesota by at least 30 percent from 2005 levels.

It is the intent of the Joint System to comply with all applicable federal and state requirements regarding reducing carbon emission once those requirements are identified going forward.

SECTION 9

Energy Efficiency and Conservation Program

Discussion

Energy conservation and efficiency strategies play significant roles for Minnesota cooperatives and municipals in the Joint System's service territories. State law requires Minnesota electric utilities to invest a portion of their revenues each year in conservation improvement programs that promote energy-efficient technologies and practices to their consumers.

In order to meet the state's requirements, the PowerSavers program was formed to help business and residential consumers become more efficient energy users and to also improve Minnkota's own efficiency as an energy provider. The program offers incentives to both residential and business end-use customers.

The residential program includes several incentives for electric heating, ventilation and air conditioning (HVAC), lighting and ENERGYSTAR® appliances.

The business program offers several incentives for HVAC, lighting, motors, adjustable speed drives, refrigeration and compressed-air technologies commonly used by businesses.

The table below shows the annual kWh savings totals reached through the PowerSavers program from 2014 to 2021.

PowerSavers Program Summary of kWh Savings			
2014	27,209,892 kWh	2018	21,538,490 kWh
2015	27,678,829 kWh	2019	18,343,689 kWh
2016	33,330,584 kWh	2020	18,529,409 kWh
2017	27,628,406 kWh	2021	19,418,632 kWh

The Joint System has met the Minnesota energy efficiency and conservation requirements since the inception of the PowerSavers CIP program and will continue to strive to meet the requirements in the future.

Note: The decrease in kWh savings from 2018-2021 is due to legislation that was passed in 2017. This legislation allowed municipals with fewer than 1,000 customers and cooperatives with fewer 5,000 members an exemption from CIP requirements. Due to the passing of the legislation, we had cooperatives and municipals decide to no longer participate in the PowerSavers program.

9.2 Development

As part of the Next Generation Energy Act of 2007 (Act), the Minnesota Legislature revised the Conservation Improvement Program (CIP) and renamed it the Energy Efficiency and Conservation (EE&C) Program. The modifications to the Act transitions the program from one

that focused on the amount of money spent on conservation to one that focuses on calculated energy savings.

The EE&C Program established an annual energy savings goal of 1.5% of annual retail energy sales. The energy savings are based on the average of the prior three-year weather-normalized retail sales.

In the development of the conservation and energy efficiency programs, staff of Minnkota's Minnesota member-owner distribution cooperatives and participating NMPA municipals realized that it would be significantly more beneficial if all the members collaborated as a group to develop ideas and implement consistent energy-saving programs for their consumers. The group has compiled ideas and resources under the PowerSavers name and logo.

The group organized under the name PowerSavers, which originally included Beltrami Electric Cooperative, Clearwater-Polk Electric Cooperative, North Star Electric Cooperative, PKM Electric Cooperative, Red River Valley Cooperative Power Association, Red Lake Electric Cooperative, Roseau Electric Cooperative, Wild Rice Electric Cooperative, Bagley Public Utilities, Baudette Municipal Utilities, Fosston Municipal Utilities, Halstad Municipal Utilities, Hawley Public Utilities, Roseau Municipal Utilities, Stephen Municipal Utilities, Thief River Falls Municipal Utilities and Warren Municipal Utilities.

It was also apparent that help from outside sources was needed to get the various programs off the ground. To that end, Franklin Energy Services (Franklin) of Port Washington, Wisc., was chosen to develop a comprehensive set of conservation and efficiency improvement programs to help residential and low income consumers, as well as small and large businesses.

One of the first steps taken by PowerSavers and Franklin was to develop a set of goals for the new endeavor. The five goals were: 1) consistent programs between all the members; 2) effective retail marketing; 3) business ally support; 4) customer behavior modification; and 5) energy efficiency education.

PowerSavers and Franklin developed a program portfolio consisting of five residential and three business programs. The residential programs consist of 1) Prescriptive Incentive; 2) Low Income; 3) Direct Installation; 4) Energy Behavior Use Change; and 5) Existing Homes.

The Residential Prescriptive Incentive Program is designed to support end-use customers choosing high-efficiency equipment at the time normal equipment is replaced or during major renovations. Recommendations for replacement equipment include heating, ventilation and air conditioning (HVAC) equipment, hot water heaters and ENERGYSTAR® appliances.

The Residential Low-Income program utilizes direct installation services to address domestic hot water, lighting, energy use and weatherization in low income housing. The low-income program targets participants with an income at or below 200% of the federal poverty level. Eligible households are contacted through direct mail and install services.

The Residential Direct Installation program is designed to make an immediate impact on home electric energy usage through the installation of high-efficiency measures. These measures include LEDs, low-flow faucet aerators, showerheads, pre-rinse sprayer valves and water heater

temperature turndown. An auditor performs an energy assessment and provides feedback to the homeowner regarding their energy usage.

The Residential Existing Homes program provides homeowners with information, access to qualified contractors and financial incentives to improve energy efficiency for their homes. An auditor conducts a thorough energy assessment as a basis to provide recommendations for efficiency improvements. These assessments often use equipment such as a blower door, which measures the extent of air leaks in the building, and infrared cameras, which reveal heat loss and pinpoint the need for additional insulation.

The Residential Energy Behavior Use Change program is designed to help customers decide how to best address their own energy use behavior. This is done through an online program that allows customers to actuate their own energy usage and monitor how their energy usage increases and/or decreases based on behavior changes they make in their homes. Turning off lights, turning down water heaters and using a programmable thermostat are just a few examples.

The business programs are 1) Prescriptive Incentive; 2) Custom; and 3) Direct Installation.

The Business Prescriptive Incentive Program provides financial incentives and information to increase the use of high-efficiency HVAC technologies, lighting, motors and drives, variable speed drives and food service equipment commonly utilized by businesses.

The Business Custom Program aids retail, agricultural, school, commercial and industrial customers in installing a variety of energy-saving technologies not included in the Business Prescriptive Incentive Program.

The Business Direct Installation program is designed to make an immediate impact on commercial electric energy usage through the installation of high-efficiency measures. These measures include LEDs, low-flow faucet aerators, showerheads, pre-rinse sprayer valves, water heater temperature turndown and LED exit light retrofits.

Legislation was passed in May 2017, which removed the CIP requirements for cooperatives with fewer than 5,000 members and municipals with fewer than 1,000 consumers.

This reduced the participating cooperatives and municipals to the following:

*City of Alvarado	*Bagley Municipal Utilities
*Baudette Municipal Utilities	Beltrami Electric
*Fosston Municipal Utilities	Hawley Public Utilities
North Star Electric	Roseau Electric
Roseau Municipal Utilities	Thief River Falls Municipal
*Warren Municipal Utilities	Wild Rice Electric

****Starred utilities are exempt from CIP but are still participating voluntarily.***

In May 2021, the Energy Conservation and Optimization Act (ECO Act) was signed into law by Governor Walz. It is the first significant update to the CIP program since the Next Generation Act of 2007.

Summary of the ECO Act bill as it pertains to the Minnkota cooperatives and municipal systems

- Retains the mandated 1.5% savings goal
 - 0.95% of goal must be met with energy conservation measures.
 - 0.55% of goal can be met with additional conservation measures, EUI measures, and fuel-switching measures.
 - Utility can request a reduction of minimum savings goal to as low as 0.95%.
- Spending on fuel-switching improvements must not exceed 0.55% until July 1, 2026.
- Spending requirement of 1.5% has been eliminated unless a utility falls short of the minimum savings goal for three consecutive years.
- Low-income spending requirement of 0.2% remained the same.
 - Up to 15% of low-income spending can be spent on pre-weatherization measures.
 - Can contribute money to the Healthy AIR Account to provide pre-weatherization measures that count toward the low-income spending goal (up to 15%).

SECTION 10

Region Transmission Operator (RTO) Participation

Discussion

Minnkota occasionally performs studies to analyze RTO membership. Minnkota has strong transmission connections to Southwest Power Pool (SPP) and MISO, making them the logical options. Minnkota is presently a MISO market participant, which allows the purchase or sale of energy within the MISO energy market.

To date, the studies have shown that it is not in Minnkota's best interest to join an RTO, and Minnkota therefore does not presently have plans to do so.

SECTION 11

Transmission Planning

Introduction

Transmission lines are built for four main reasons, which are outlined below:

1. To serve local load
2. To provide an outlet for generation resources
3. To maintain or improve transmission system reliability
4. To enable wholesale economic energy transactions between utilities

Because the construction of transmission lines is driven by different needs as outlined above, transmission planning occurs in various venues. Minnkota is responsible for the transmission planning of its 345 kV, 230 kV, 115 kV, and 69 kV transmission facilities required to maintain reliable and economical service to its member systems' customers. In some instances, this planning effort is done entirely by Minnkota. At other times, potential transmission additions will have impacts on other area utilities. When this is the case, Minnkota works with those utilities in a joint transmission planning process to ensure that its transmission projects do not cause problems for others. Joint planning with other area utilities also helps minimize future facility additions. By incorporating the various needs of the utilities into joint planning studies, the resultant project may be an integrated solution that is less costly and more reliable than the individual additions that would have been built absent joint planning.

Regional Planning

For transmission projects above 115 kV, Minnkota interacts with a number of entities such as MISO and Minnesota Transmission Owners (MTO).

MISO TRANSMISSION PLANNING

Through a Planning Coordinator (PC) services agreement, MISO has the responsibility to conduct regional transmission planning for Minnkota and others in its PC footprint to ensure the continued reliability and efficient expansion of its transmission system. MISO is required to develop a long-range transmission expansion plan that addresses both short-term and long-term load serving needs, generation interconnections, and economic analysis, all with transparency through stakeholder input. In addition, MISO coordinates with neighboring PCs, such as Southwest Power Pool (SPP).

Transmission owners that are members of MISO are responsible for developing their own system-specific transmission plans with help from MISO, which are then consolidated by MISO into an integrated overall MISO Transmission Expansion Plan. MISO planning staff incorporates the plans submitted by the individual MISO transmission owners and sub-regional planning groups with stakeholder input and includes generation interconnection requests to develop a regional integrated plan for the orderly and cost-effective expansion of the MISO transmission system.

MINNESOTA TRANSMISSION OWNERS

The Minnesota Transmission Owners (MTO) is an organization of 16 utilities that own or operate high-voltage transmission lines within the state of Minnesota. Minnkota is a member of the MTO.

The MTO has responsibility for the Minnesota Biennial Transmission Projects Report. The major purpose of the Report is to inform the public of transmission issues and to facilitate the tracking of proposed solutions to transmission issues.

The report addresses such issues as transmission system interruptions or curtailments, identifies present and reasonable foreseeable future transmission inadequacies, and determines the transmission system enhancements needed to meet the state's Renewable Energy Standard.

SECTION 12

Environmental Compliance

General

1. Milton R. Young Station

Minnkota operates the Milton R. Young Station (MRYS) near Center, N.D. Unit 1 of the station is owned and operated by Minnkota and has a rating of 250 MW. Unit 2 is owned by Square Butte Electric Cooperative (affiliated with Minnkota by common ownership), has a rating of 455 MW, and is operated by Minnkota. Unit 1 began commercial operation in 1970, while Unit 2 began commercial operation in 1977. Both units are fueled by lignite coal obtained from the adjacent Center Mine, which is operated by BNI Coal, Ltd, a subsidiary of Allete. Both units have the same suite of environmental controls, including wet lime flue gas desulfurization for SO₂ control, advanced separated over-fire air and selective non-catalytic reduction for NO_x control, an electrostatic precipitator for particulate matter control, and a halide and post-combustion activated carbon injection system for mercury control.

2. Coyote Station

The Coyote Station (Coyote) is co-owned by Otter Tail (35%), Northern Municipal Power Agency (Minnkota serves as operating agent) (30%), Montana-Dakota Utilities (25 percent), and Northwestern Energy (10%). Otter Tail operates the plant, rated at 427 MW, on behalf of the owners. Coyote began commercial operation in 1983. Coyote is fueled by lignite coal obtained from the adjacent Coyote Creek Mine, operated by Coyote Creek Mining Company, LLC, a subsidiary of North American Coal Corporation. Coyote employs dry flue gas desulfurization and a fabric filter baghouse for SO₂ and particulate matter control, separated over-fire air for NO_x control, and activated carbon injection for mercury control.

Coal Combustion Residuals (CCR) Rule

The final federal rule regulating the disposal of coal combustion residuals in landfills and surface impoundments was published in the Federal Register on April 17, 2015, and became effective on October 19, 2015. The CCR rule set requirements for both existing and newly-constructed impoundments/landfills, including location restrictions, structural integrity, operating criteria, groundwater protections, monitoring/reporting, closure/post-closure care, and the requirement of operators to publish facility data on a public-facing website.

The MRYS and Coyote CCR disposal sites maintain compliance with the provisions of the CCR Rule. In addition to the federal requirements, the MRYS and Coyote waste disposal sites are permitted and inspected by the North Dakota Department of Environmental Quality (NDDEQ).

Significant challenges in maintaining compliance with the CCR Rule at MRYS or Coyote Station are not anticipated.

Waters of the United States (WOTUS)

The long-standing definition of federally jurisdictional WOTUS, under the Clean Water Act (CWA), was updated in a final rule issued in May 2015. The rule significantly expanded the jurisdiction of the federal government to include four new categories – tributaries, adjacent waters and wetlands, certain regional features, and waters within the 100-year floodplain – and retained the four previously defined categories – traditional navigable waters, interstate waters, territorial seas, and impoundment of any of these.

As written, the 2015 definition of WOTUS would have had a tremendous impact by increasing costs associated with construction and maintenance of transmission and distribution infrastructure, plant construction, operation, maintenance and decommissioning.

North Dakota was among a group of 28 states in which the 2015 WOTUS rule was eventually stayed. As a result of Executive Order 13778 under President Trump, EPA and the Army Corps reviewed the 2015 WOTUS rule, rescinded it, and replaced it with a new WOTUS definition that was published in February 2019. The 2019 proposal was generally consistent with the pre-2015 definition of WOTUS, and was finalized in 2020.

On December 7, 2021, the EPA and Department of the Army (the agencies) published a proposed rule in the Federal Register that revises again the definition of “Waters of the United States.” The proposal puts back into place the pre-2015 definition, updated to reflect consideration of recent Supreme Court decisions. The agencies intend to consider further revisions in a second rule in light of additional stakeholder engagement and implementation considerations, scientific developments, and environmental justice values. This effort will also be informed by the experience of implementing the pre-2015 rule, the 2015 Clean Water Rule, and the 2020 Navigable Waters Protection Rule.

Minnkota intends to continue to follow closely the development of these rulemakings.

Steam Electric Effluent Limitation Guidelines (ELG)

The most recent updates to effluent limitations at electric generating units (EGUs) was published in November 2015, and provides additional regulatory standards for wastewater discharged to surface waters. These standards are incorporated into facility North Dakota Pollutant Discharge Elimination System (NDPDES) permits.

This rule has minimal effect on the MRYS. The station utilizes closed-loop FGD systems that do not produce effluent that discharges to surface waters. Fly ash is managed in a dry form, and produces no effluent. Bottom ash is managed in a dry form, and the water used to transfer the ash internally to day bins is not discharged.

Coyote Station operates a dry scrubber and has dry fly ash and bottom ash handling, and does not produce associated effluent that discharges to surface waters.

Unless there are significant unexpected changes to the rule, compliance challenges are not anticipated.

Regional Haze

The Regional Haze program was established by the 1977 Clean Air Act Amendments. The second Regional Haze planning period is presently underway. The North Dakota Department of Environmental Quality (NDDEQ) requested that Minnkota complete a Four-Factor Analysis of technically feasible control measures applicable to the MRYS, and required the same of Otter Tail for the Coyote Station.

The draft NDDEQ State Implementation Plan (SIP) has been issued for EPA and Federal Land Manager comments. The Executive Summary of the SIP states:

North Dakota is currently projected to meet its 2028 visibility goals and is projected to remain on track to meet the 2064 visibility goals (below the adjusted glidepath). Continuing to remain below the adjusted glidepath and showing improvement on the most impaired days for each planning period will accomplish the 2063 end goals. North Dakota has determined that the additional controls evaluated will not have a meaningful impact on the 2028 visibility projections. Therefore, the Department determined that it is not reasonable to require additional controls during this planning period.”

The NDDEQ held a public comment period on the draft SIP during spring 2022, which closed June 2, 2022. A hearing was also held on June 1, 2022. NDDEQ will review and address substantive comments prior to submittal of the final SIP to EPA. The timeline for submittal is August 2022. Minnkota recognizes the possibility of EPA not accepting the state’s conclusion “that it is not reasonable to require additional controls.” EPA may reject the SIP, and issue a Federal Implementation Plan (FIP), which, if upheld, may require additional controls at MRYS and Coyote Station by December 31, 2028. The timing of a final decision on any additional controls is undetermined, since administrative process and possible litigation will affect the process.

Mercury & Air Toxics Standards (MATS)

EPA promulgated the final Utility MATS rule in February 2012. The MATS rule targets emissions reductions of heavy metals, including mercury, arsenic, chromium and nickel; and acid gases such as hydrochloric and hydrofluoric acids. These are also known as hazardous air pollutants (HAPs) or air toxics. For lignite-fired electric generating units (EGUs), such as the MRYS and Coyote, the primary standard of importance is for mercury, which was set at 4.0 lbs./TBtu (trillion Btu).

To achieve compliance with the MATS rule, the MRYS and Coyote Station have installed mercury control equipment. The rule became effective in 2015, and MRYS and Coyote have maintained compliance since that date.

Various EPA actions on MATS have occurred since implementation. The latest action is an EPA proposed rule published in the Federal Register on February 9, 2022. The proposal is to reaffirm the Appropriate and Necessary Finding, and solicit information on the cost and performance of new or improved technologies to control HAP emissions, including improved operation and risk-related information. It is possible that this proposed rule could result in a final rule that will increase expectations for additional HAP controls at MRYS and Coyote.

MRYS and Coyote will maintain and continue to operate mercury control systems to ensure compliance with the present 4 lbs./TBtu limit.

Greenhouse Gas Regulation

The Environmental Protection Agency's (EPA) Clean Power Plan (CPP) final rule was published under section 111(d) of the Clean Air Act in October 2015. The CPP was a phased program of "building blocks" that targeted a nationwide CO₂ reduction of 30% by 2030. Several states, including North Dakota and Minnesota, were more severely regulated than others; North Dakota was mandated a 45% emissions reduction and Minnesota a 40% reduction (both on a lbs./MWh rate basis). Extensive litigation ensued, and ultimately the CPP was stayed by the U.S. Supreme Court in February 2016.

Subsequently, the EPA finalized a new rule under President Trump – the Affordable Clean Energy (ACE) rule – that replaced the CPP under 111(d). The ACE rule was formally proposed on August 31, 2018, and finalized on June 19, 2019.

In January 2021, the ACE rule was vacated by the United States Court of Appeals for the District of Columbia. Vacating the ACE rule also vacated the repeal of the CPP contained in the rulemaking that established ACE. The EPA has clarified to states that there is no requirement for submittal of state implementation plans under either the ACE rule or the CPP. Instead, EPA has indicated most recently that a new rulemaking on greenhouse gas for existing EGUs will be issued in late 2022 or early 2023.

Oral arguments were held at the Supreme Court of the United States on February 28, 2022, to determine whether EPA has limited authority under the Clean Air Act to issue rules and standards of performance that could potentially reshape the country's transmission grids and unilaterally decarbonize any sector of the economy. A decision from the Court is anticipated in June 2022 and may result in establishing the breadth of EPA's authority in designing a program for regulating CO₂. Minnkota intends to continue closely following the development of these rulemakings.

Project Tundra

Minnkota recognizes that the potential exists for future stringent CO₂ regulations for existing coal-fired EGUs. Despite carbon capture, utilization and storage (CCUS) technology not being adequately demonstrated to assume nationwide viability, the MRYS facility is situated in a unique geographical location in close proximity to secure geologic CO₂ storage sites (deep saline

aquifers). This is not the case for many (or most) EGUs, and thus MRYS is in a unique situation where CCUS may be commercially viable. Additionally, the project would provide a low-carbon source of dispatchable electric capacity that provides grid stability and reliability to Minnkota's member-owners.

For these reasons, Minnkota has sponsored studies for the retrofit of a carbon capture system on the MRYS facility, with sequestration in the form of geological sequestration in saline aquifers located directly below the MRYS facility (Project Tundra). Project Tundra's design targets the capture of 12,978 short tons of CO₂ per day from the flue gas from Unit 2 and Unit 1 (in varying percentages) at the MRYS. The project will capture and sequester an annual average of 4 million tonnes/year of CO₂.

The project builds upon prior federal investment by scaling up the application to process more flue gas, apply the technology to a cold weather climate, and utilize steam and electrical energy provided by the coal units. The ultimate goal is to create a new benchmark – a large-scale, integrated demonstration of a “plant-based” approach, where flue gas and steam from more than one unit will be integrated in the CO₂ capture process. Once demonstrated, the process can be commercially and economically replicated across the region, the country, and the world.

Project Tundra has received important bipartisan support, and has partnered with federal and state of North Dakota entities to advance its research and development. The project is presently completing a Front-End Engineering Design (FEED) study, including advanced amine solvents, economic modeling and aerosol mitigation and management. In addition, Minnkota has partnered with the state of North Dakota and Fluor Enterprises to conduct the final body of engineering, with the goal to produce construction-ready engineering, scheduling, and pricing terms by the end of 2022. Importantly, Minnkota has received its Class VI CO₂ storage facility permits and EPA approval of the Monitoring, Reporting and Verification (MRV) plan for the storage site.

Minnkota is currently seeking outside investment in the project from entities that can harness applicable tax credits for carbon capture projects, so that the financial risk to Minnkota members will be limited. Tax equity investment interest in the project is strong, as multiple investors capable of consuming 100% of the tax equity have signed non-disclosure agreements with Minnkota.

Ultimately, Project Tundra would result in ~450 net MW of near-zero carbon power produced with limited or no increase in cost, while enabling continued use of North Dakota's abundant, reliable and low-cost lignite coal resources, and ensuring the capital investment in MRYS can continue to be utilized.

Minnkota recognizes that CO₂ regulations present a longer-term risk to maintaining affordable and reliable resources that emit CO₂. If constructed, Project Tundra could help provide continued reliability and affordability of electricity. Using a technology-driven solution will help to reduce the risk to our member-owners, given the uncertainty of future CO₂ regulations. More details on Project Tundra can be found at www.projecttundra.com.

SECTION 13

Two-Year Action Plan

The Joint System will take the following actions during the 2022 to 2023 time frame as part of its ongoing efforts in Integrated Resource Planning.

A Load Forecast Study (LFS) will be completed for the Joint System in the fall of 2023. The LFS will track the growth in the demand and energy requirements of the Joint System.

Discussions and meetings will continue to take place between the member systems, the NMPA municipals and Minnkota. These meetings will focus on strategies to reduce energy costs to the end-use customers.

Minnkota staff will continue to study and forward recommendations to the Minnkota Board of Directors concerning modifications or additions needed in the Wholesale Power Rate Schedule. These efforts will continue to focus on developing a rate philosophy that is fair and equitable to the members.

Minnkota staff will continue to analyze the cost-effectiveness of integrating demand-side management programs and renewable energy resources into the Joint System power supply resource mix.

SECTION 14

Five-Year Action Plan

In addition to the activities outlined in the Two-Year Action Plan, the Joint System will take the following actions during the 2024-2026 time frame as part of its ongoing efforts in Integrated Resource Planning.

A Load Forecast Study will be completed for the Joint System in 2025 and 2027. These studies will track the growth in the demand and energy requirements of the member systems. The LFS forecasts will be an important and ongoing part of the Integrated Resource Planning process.

Minnkota staff will continue to analyze and forward recommendations to the Minnkota Board of Directors on the best methods of promoting and enhancing Demand Response activities.

Minnkota staff will continue to analyze the cost-effectiveness of integrating demand-side management programs and renewable energy resources into the Joint System power supply resource mix.

Future Integrated Resource Plans will be completed as required.

SECTION 15

Contingencies

Sudden Addition of a Large Load

The sudden unexpected appearance of a new large load is a situation that many utilities face. If this were to occur in the Joint System service territory, the Joint System would most likely arrange the purchase of short-term generation capacity to serve the new load. The purchase would allow the necessary time to complete an analysis of the alternatives or options for long-term capacity commitments. Minnkota would utilize short-term capacity purchases rather than prematurely commit to a long-term obligation without having completed a detailed analysis.

Sudden Loss of a Large Load

The sudden loss of a large load is also a situation that many utilities face. If this would occur to the Joint System, Minnkota would market the energy that normally would have been sold to the large load into the MISO energy market.

Resource Options Available in the Event of Facilities Shutdown

The Joint System would have a limited number of resource options available in the event that it was forced to shut down its lignite generation facilities. The Joint System currently has no surplus generation resources standing idle and ready to be placed into service other than costly standby diesel generators. In our view, the Joint System's options, upon loss of an existing resource, would be similar to what other utilities have available to them.

The range of options varies with the severity of the shutdown scenario being evaluated. The economic impact (rate increases) to the end-use customer would increase as the severity of the shutdown scenarios increases.

If only one of the Joint System's lignite-fired generators was shut down for a limited period of time (less than a year), Minnkota would likely purchase replacement power from the MISO market and neighboring utilities until the unit was returned to service. The cost of the replacement energy would be dictated by the market conditions at the time of the outage and the length of time replacement energy had to be secured.

If the generator that was shut down had to be replaced with a new coal-fired or gas-fired generator, replacement power would have to be purchased for a longer period of time. The longer time period would make it more problematic for Minnkota to purchase replacement power and capacity. It is difficult to estimate the likelihood of successfully purchasing replacement power and capacity for the length of time needed to install new generation capacity. However, it would take two to three years to install new simple-cycle gas-fired generation and three to five years to install a new combined cycle combustion turbine. Given the current regulatory climate, it is unlikely new coal-fired generation could be constructed.

If all of Joint System's coal-fired generation were shut down, the financial impact on the Joint System, and consequently the end-use customer, would be disastrous. The Joint System and its members/customers would carry the financial burden of the debt service for the shutdown generators, shoulder the costs for replacement power and, at the same time, finance new generation capacity.

SECTION 16

Environmental Costs

In theory, environmental costs are defined as impacts on the environment from electric generation, which are not included in utility costs or customer rates. The MN PUC has adopted environmental externality values for selected air emissions, which includes carbon dioxide (CO₂), sulfur dioxide (SO₂), nitrous oxide (NO_x), particulate matter 10 microns and less (PM-10) and volatile organic compounds (VOCs).

Electric utilities in Minnesota are required to use the externality values in conjunction with other factors for generation capacity options reviewed or approved by the MN PUC. However, environmental externality values are not to be applied to unit commitment, dispatch or other operating decisions.

Unlike environmental abatement costs (compliance costs, fees, taxes, etc.), environmental externality values do not represent actual direct costs to end-use customers. Results of any environmental externality analyses should be compared with the socioeconomic impacts, project cost payback, net present value or other non-quantifiable impacts and costs.

The MN PUC has required economic analyses be conducted considering environmental externality values when considering generation options.

At the present time, the Joint System has no plans for adding generation capacity.

SECTION 17

Renewable Resource Scenarios – 50% and 75%

The Joint System currently has 459MW installed wind nameplate capacity to serve the energy needs for Minnesota and North Dakota members/customers. Currently, North Dakota does not impose a renewable energy requirement. So long as North Dakota does not impose such a requirement, a 50% or 75% renewable requirement would not require additional new renewable resources from the Joint System. However, a 50% or 75% renewable requirement in Minnesota without a renewable requirement in North Dakota, would likely force the Joint System to develop separate Minnesota and North Dakota wholesale power rates. Under these scenarios, they would likely lead to a significantly higher rate and cost to the Minnesota cooperative and municipal system end-use members/customers.

Any resource option under Minn. Stat. § 216B.2422, Subd. 2(c), requiring either 50% or 75% of all energy needs from facilities through a combination of conservation and renewable energy resources will be significantly more costly than the base case option because of the intermittence of renewable resources. Under the alternative resource options, backup generation, such as a new natural gas turbine, would be needed to serve firm load when renewable resources are not producing energy.

The Joint System does not believe that the 50% and 75% renewable resource options represent a viable or cost-effective method of meeting its future energy and generation capacity needs.

SECTION 18

Public Participation

Public participation in the integrated resource planning process was provided by the governing boards of the member systems, which represent end-use customers. Their ideas and concerns were solicited as part of the overall resource planning process. Shown below is a list of the dates and locations at which presentations of the draft IRP report were given.

Date		Location
Beltrami Electric Cooperative	May 23, 2022	Bemidji, MN
Cass County Electric Cooperative	April 26, 2022	Fargo, ND
Cavalier Rural Electric Cooperative	April 25, 2022	Langdon, ND
Clearwater-Polk Electric Cooperative	April 27, 2022	Bagley, MN
Nodak Electric Cooperative	April 12, 2022	Grand Forks, ND
North Star Electric Cooperative	March 30, 2022	Grand Forks, ND
PKM Electric Cooperative	April 26, 2022	Warren, MN
Red Lake Electric Cooperative	May 25, 2022	Red Lake Falls, MN
Red River Valley Cooperative Power Assoc.	April 25, 2022	Halstad, MN
Roseau Electric Cooperative	April 27, 2022	Roseau, MN
Wild Rice Electric Cooperative	May 31, 2022	Mahnomen, MN
Northern Municipal Power Agency	April 20, 2022	Thief River Falls, MN
Minnkota Power Cooperative, Inc.	May 26, 2022	Grand Forks, ND

At these meetings, individual members of the Board of Directors of the member systems were given the opportunity to participate in the IRP process and to provide their input, ideas, and comments were solicited and received. Their board resolutions are included in Appendix H.

SECTION 19

Plan is in the Public Interest

Maintain or Improve the Adequacy of Utility Service

The IRP maximizes the use of existing resources by maintaining and extending the useful life of its assets where it is practical and economically justifiable.

Keep Customers' Bills and Utility Rates as Low as Practical, Given Regulatory and Other Constraints

The IRP documents how the Joint System will evaluate energy-efficiency programs and resource options and select those that are the most cost-effective.

Minimize Adverse Socioeconomic Effects and Adverse Effects Upon the Environment

The Joint System intends to meet any federal and state environmental requirements. This goal is implicit in the IRP.

Enhance the Utility's Ability to Respond to Changes in the Financial, Social and Technological Factors Affecting its Operations

The Joint System recognizes the need to be flexible in matters concerning these factors. This flexibility is evident in that the Joint System has its generation resources diversified into three different baseload plants, has a well-established and extensive Demand Response program, has numerous transmission ties with various area utilities, is a MISO market participant, and has 459 MW of wind capacity through power purchase agreements. The Joint System will continue to maintain flexibility in those areas that affect its ability to serve its customers in a cost-effective manner.

Limit the Risk of Adverse Effects on the Utility and its Customers from Financial, Social and Technological Factors that the Utility Cannot Control

The Joint System is mindful of the many risks that the electric industry faces. It is continually evaluating those risks as it analyzes the various generation options that are presently available. It is also evaluating the advantages, disadvantages, and risks involved in becoming a member of a regional transmission organization such as MISO. The IRP outlines the concerns about these risks and discusses how the risks may be avoided or minimized.

Summary

The IRP fulfills the requirements of Minnesota statutes and rules. Minnkota and NMPA believe that it presents a clear and concise picture of how the Joint System intends to satisfy the electrical requirements of its customers in a cost-effective and reliable manner while meeting federal and state environmental requirements.

SECTION 20

Cross Reference Guide

Cross Reference of Resource Plan Requirements

<u>Rule or Statute</u>		<u>Reference Section</u>
216B.1691 <i>Subdivision 2</i>	Report on plans, activities, and progress with regard to the renewable energy objectives.	8
216B.2422 <i>Subdivision 2</i>	Include least-cost plans for meeting 50 percent and 75 percent of all new and refurbished capacity needs with conservation and renewable energy.	17
<i>Subdivision 3</i>	Utility must use the environmental cost values, along with other socioeconomic factors, in selecting resources.	16
<i>Subdivision 6</i>	Utility should state if it intends to site or construct a large energy facility.	2
7843.0300 <i>Subparagraph 5</i>	Submit 15 copies of the plan to the Commission, and copies to the Department, Attorney General, MEQB, and other interested parties	See Service List
7843.0400 <i>Subparagraph 1</i>	Include a copy of the latest advance forecast to the DOC and MEQB.	See Appendix A
<i>Subparagraph 3</i>	Description of the process and analytical techniques used in developing the plan.	7
<i>Subparagraph 3</i>	Include a five-year action plan with a schedule of key activities and regulatory filings.	14
<i>Subparagraph 3</i>	Include a narrative of why the plan is in the public interest.	19
<i>Subparagraph 4</i>	Include a nontechnical summary not to exceed 25 pages in length.	2
<i>Notice</i>	Submit an original copy of the filing as an unbound, one-sided document on 8½-by-11 paper with no tabbed dividers.	Enclosed with PUC Filing

Cross Reference to 2019 Integrated Resource Plan Two-Year Action Plan

Section

A.	A Load Forecast Study (LFS) will be completed for each of the 11 member systems and Minnkota in 2019. The LFS will track the growth in the demand and energy requirements of the member systems.	Completed
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- | | | |
|----|---|------------------|
| B. | Discussions and meetings will continue to take place between the member systems, the NMPA municipals and Minnkota. These meetings will focus on strategies to reduce energy costs to the end-use customers. | Completed |
| C. | Minnkota staff will continue to study and forward recommendations to the Minnkota Board of Directors concerning modifications or additions needed to the Wholesale Power Rate Schedule. These efforts will continue to focus on developing a rate philosophy that is fair and equitable to the members and reflects the applicable power supply expenses. | Ongoing |
| D. | Minnkota staff will continue to analyze the cost-effectiveness of integrating demand side management programs and renewable energy resources into the Joint System power supply resource mix. | Ongoing |

Cross Reference to 2019 Integrated Resource Five-Year Action Plan

Section

- | | | |
|----|--|----------------|
| A. | A Load Forecast Study (LFS) will be completed for each of the 11 member systems and Minnkota in 2019 and 2021. These studies will track the growth in the demand and energy requirements of the member systems. The LFS forecasts will be an important and ongoing part of the Integrated Resource Planning process. | Ongoing |
| B. | Minnkota staff will continue to analyze and forward recommendations to the Minnkota Board of Directors on the best methods of promoting and enhancing Demand Response activities. | Ongoing |
| C. | Minnkota staff will continue to analyze the cost-effectiveness of integrating demand side management programs and renewable energy resources into the Joint System power supply mix. | Ongoing |
| D. | Future Integrated Resource Plans will be completed as required. | Ongoing |

APPENDIX A

Minnesota Electric Utility Annual Report

7610.0120 REGISTRATION

ENTITY ID#	69
REPORT YEAR	2020

Number of Power Plants	4
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UTILITY DETAILS	
UTILITY NAME	Minnkota Power Coop
STREET ADDRESS	5301 32nd Ave S
CITY	Grand Forks
STATE	ND
ZIP CODE	58201-3312
TELEPHONE	701-795-4000
Scroll down to see allowable UTILITY TYPES	
* UTILITY TYPE	COOP

CONTACT INFORMATION	
CONTACT NAME	JAMIE OVERGAARD
CONTACT TITLE	RATES, LOAD AND PLANNING MANAGER
CONTACT STREET ADDRESS	5301 32nd Ave S
CITY	Grand Forks
STATE	ND
ZIP CODE	58201-3312
TELEPHONE	701-795-4219
CONTACT EMAIL ADDRESS	jovergaard@minnkota.com

[illegible]

PREPARER INFORMATION	
PERSON PREPARING FORMS	JAMIE OVERGAARD
PREPARER'S TITLE	RATES, LOAD AND PLANNING MANAGER
DATE	7/1/2021
PREPARER'S EMAIL ADDRESS	

COMMENTS	

Code*
Private
Public
Co-op

APPENDIX B












Minnesota Service Area Maps

Geographical System Map



0 25 50 75 100 Miles

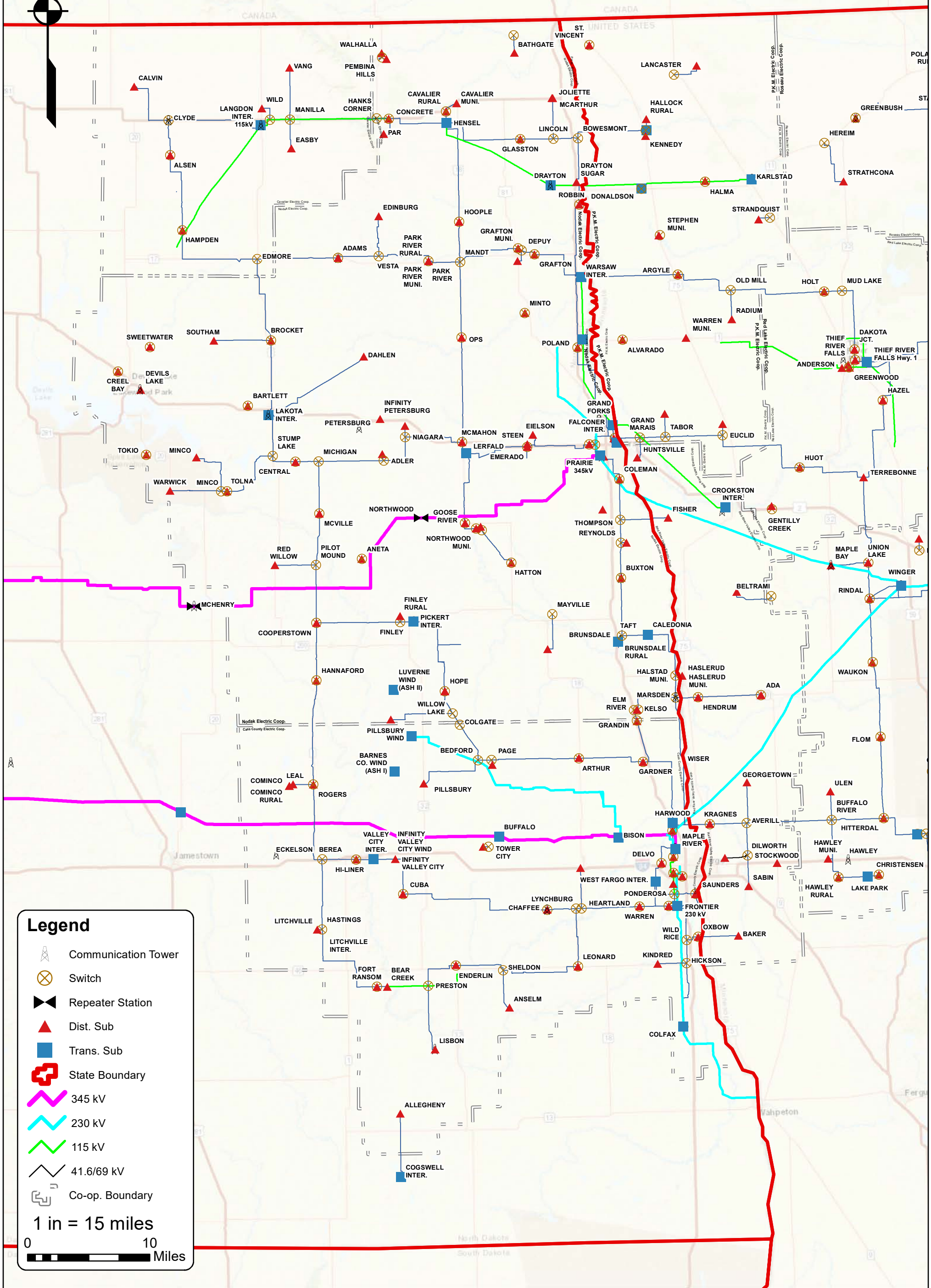
Legend

-  Communication Tower
-  Switch
-  Repeater Station
-  Dist. Sub
-  Trans. Sub
-  345 kV
-  230 kV
-  115 kV
-  41.6/69 kV
-  State Boundary
-  Co-op. Boundary

1 in = 25 miles

Geographical System Map

North Dakota

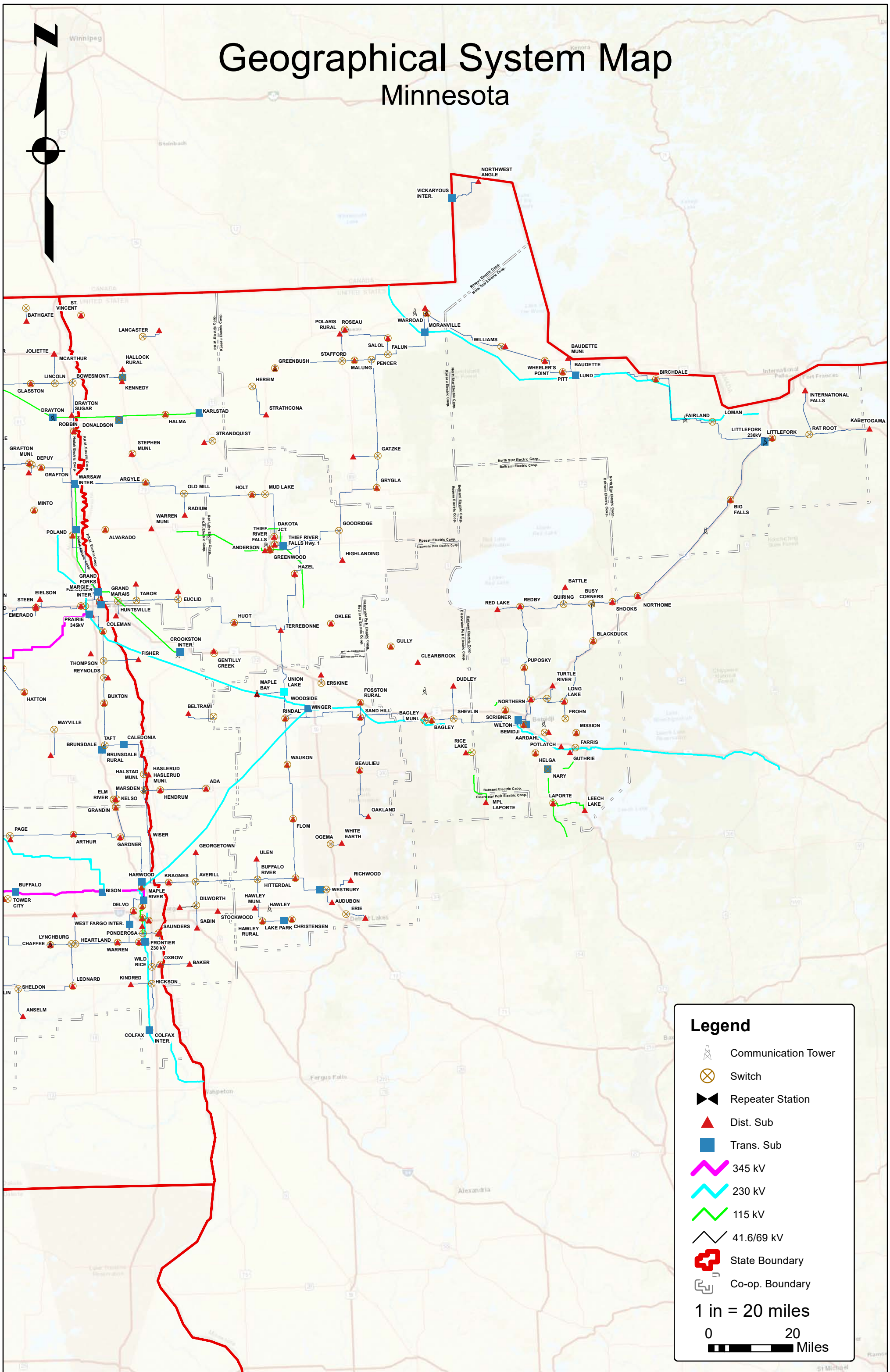


Legend

- Communication Tower
 - Switch
 - Repeater Station
 - Dist. Sub
 - Trans. Sub
 - State Boundary
 - 345 kV
 - 230 kV
 - 115 kV
 - 41.6/69 kV
 - Co-op. Boundary
- 1 in = 15 miles
- 0 10 Miles

Geographical System Map

Minnesota



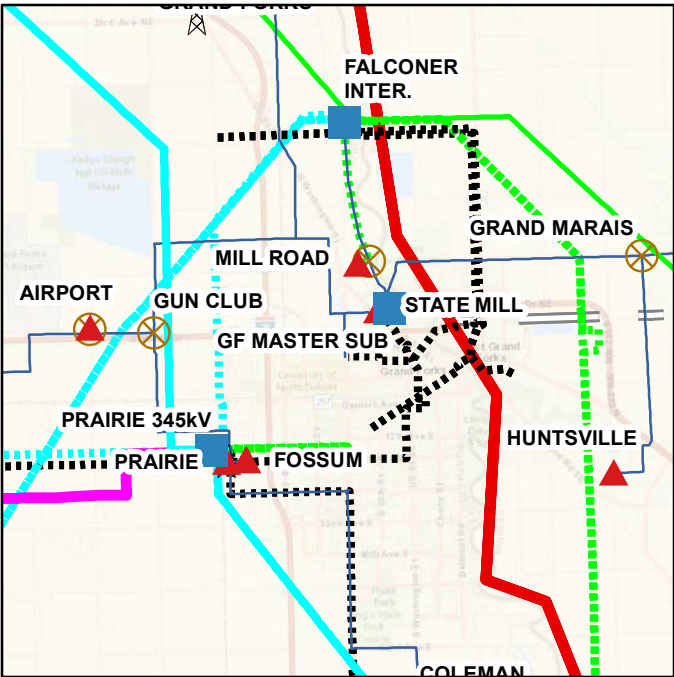
Legend

- Communication Tower
- Switch
- Repeater Station
- Dist. Sub
- Trans. Sub
- 345 kV
- 230 kV
- 115 kV
- 41.6/69 kV
- State Boundary
- Co-op. Boundary

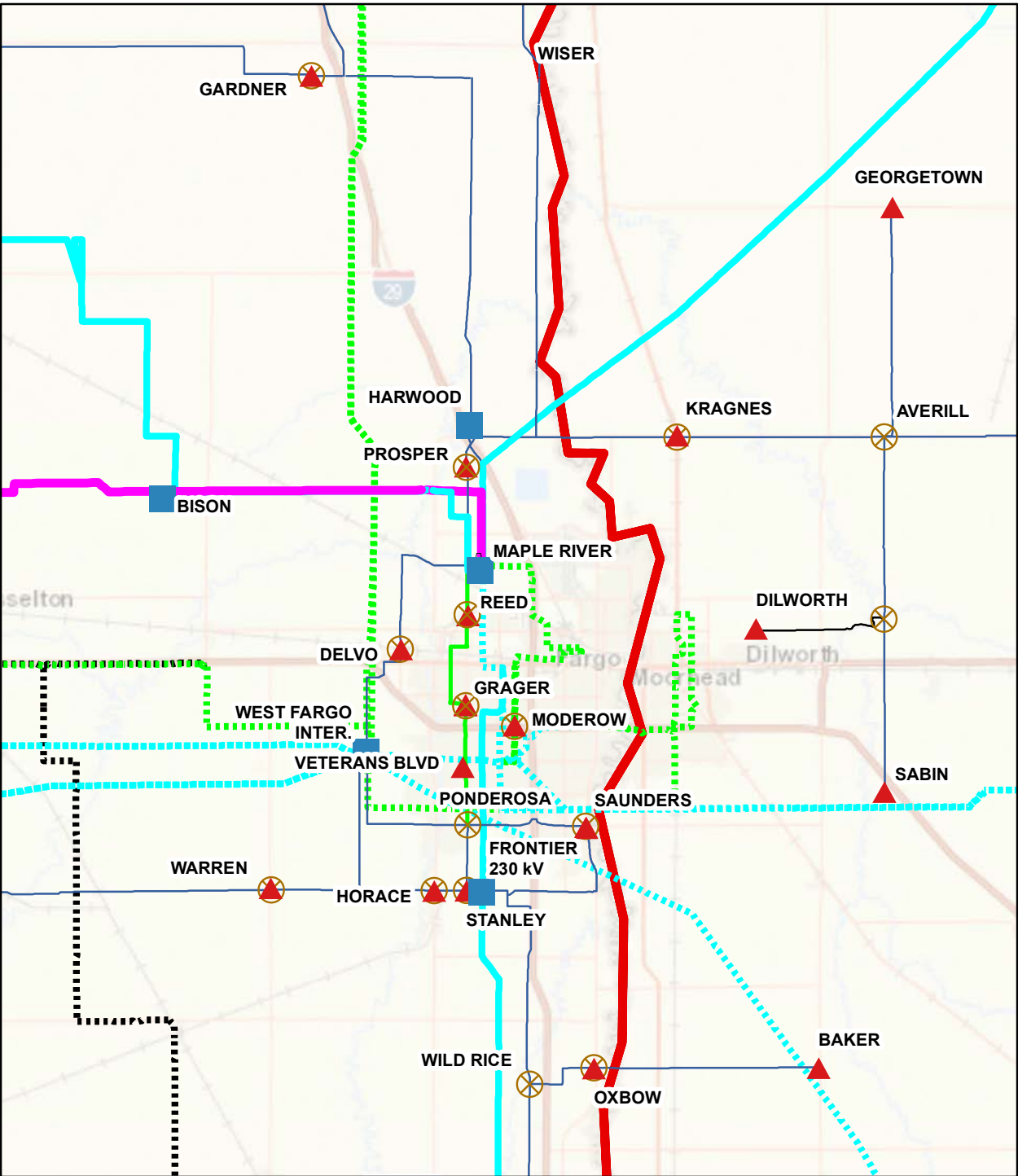
1 in = 20 miles

0 20 Miles

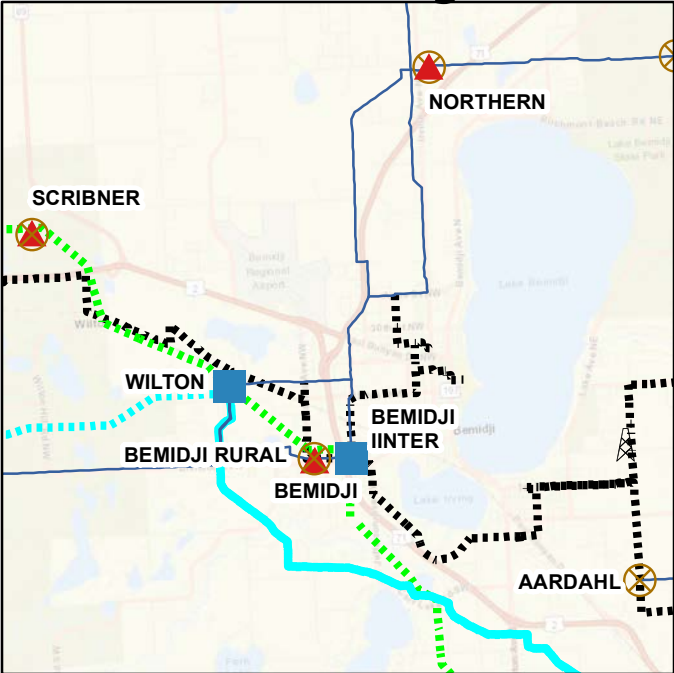
Grand Forks



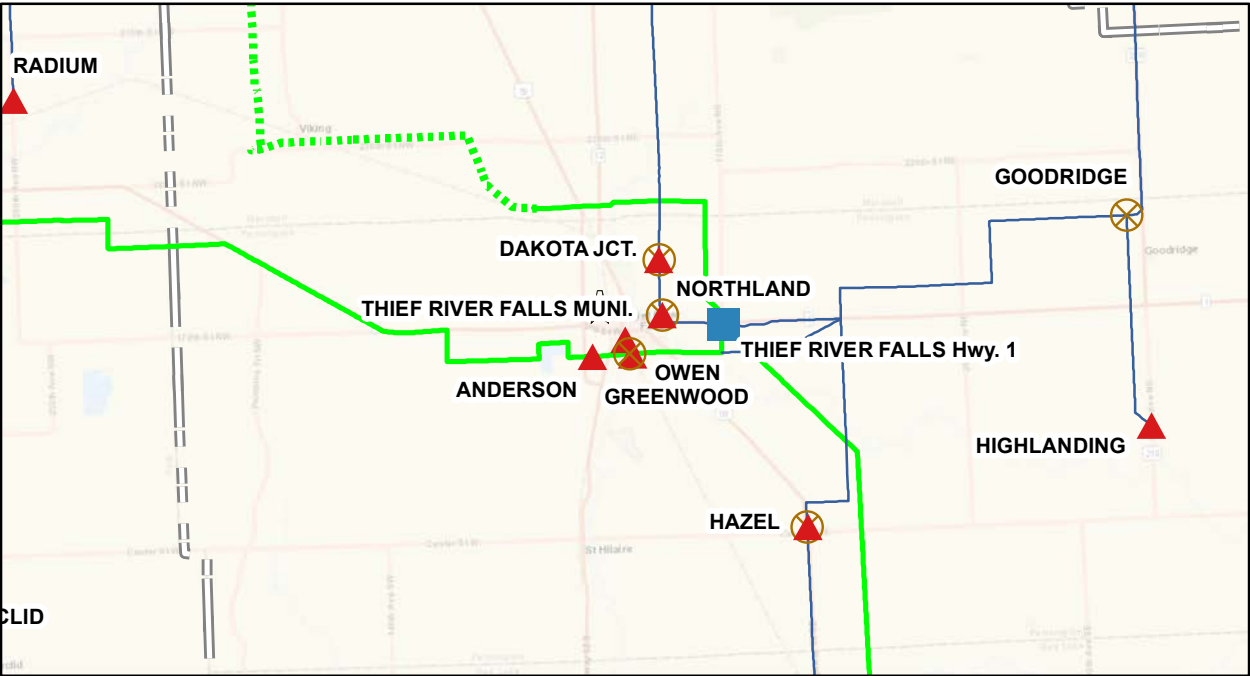
Fargo



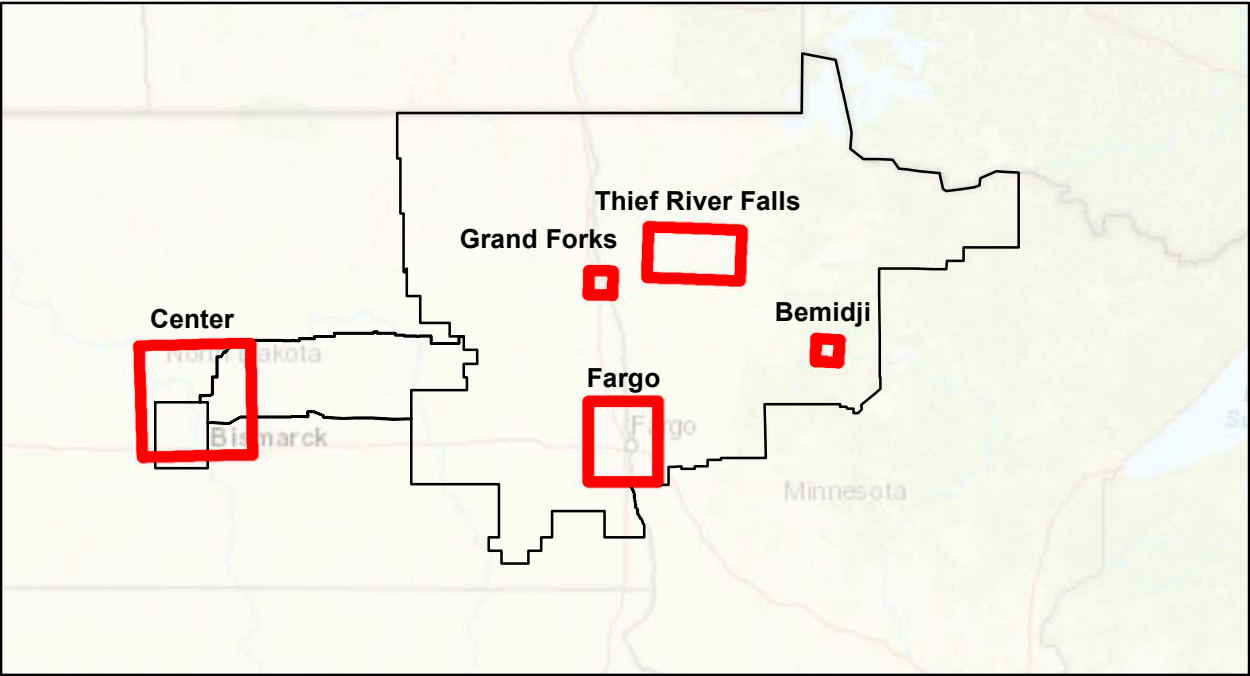
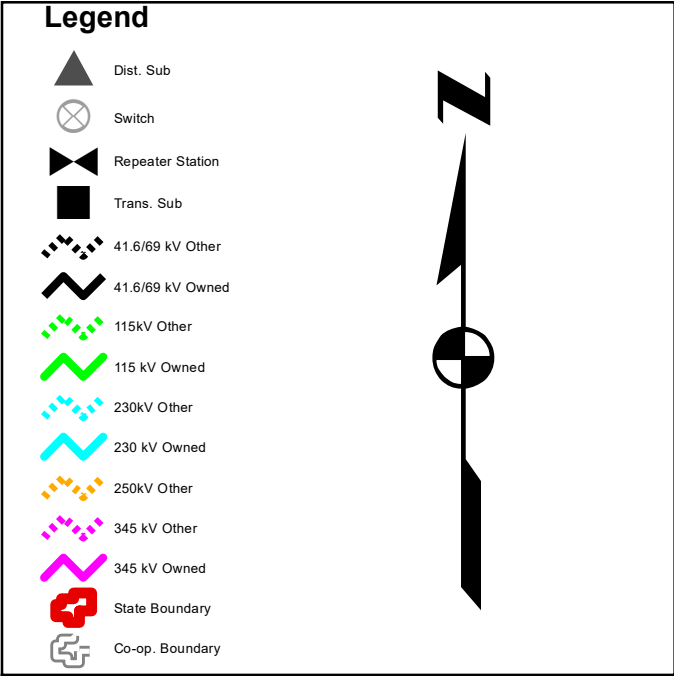
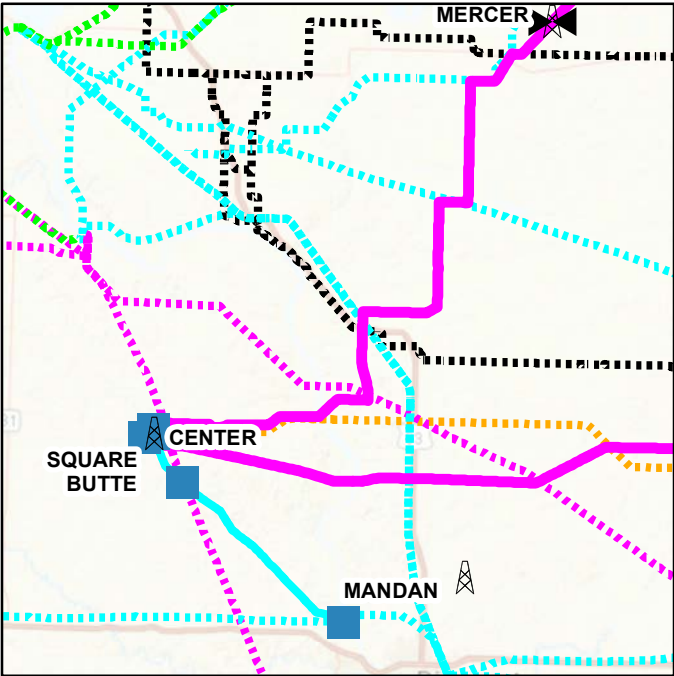
Bemidji



Thief River Falls



Center



APPENDIX C

Minnkota Power Cooperative Inc

Wholesale Power Rate



Minnkota Power
COOPERATIVE

A Touchstone Energy® Cooperative



April 1, 2022 to April 1, 2023

Minnkota Wholesale Power Rate Schedule

**PUBLIC DOCUMENT – TRADE SECRET DATA HAS BEEN
EXCISED**

**Minnkota Power Cooperative, Inc.
Grand Forks, North Dakota**

April 1, 2022

[TRADE SECRET DATA BEGINS....]

[...TRADE SECRET DATA ENDS]

APPENDIX D

Form EIA-861

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 Landon Schneider
Title: Accountant

REPORT FOR: Minnkota Power Coop, Inc 12658
REPORTING PERIOD: 2021

Phone: (701) 795-4262 FAX: Email: lschneider@minnkota.com

Supervisor Brenda Sem
Title: Accounting Manager

Logged By / Date:

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

Phone: (701) 795-4270 FAX: Email: bsem@minnkota.com

1	Legal Name of Industry Participant	Minnkota Power Coop, Inc	Submission Status/Date:	<input type="text" value="Submitted"/>	<input type="text" value="03/31/2022"/>
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)	<div><input type="checkbox"/> Federal<input type="checkbox"/> State<input type="checkbox"/> Transmission</div> <div><input type="checkbox"/> Political Subdivision<input type="checkbox"/> Municipal<input type="checkbox"/> Behind the Meter</div> <div><input type="checkbox"/> Municipal Marketing Authority<input type="checkbox"/> Investor-Owned<input type="checkbox"/> Wholesale Power Marketer</div> <div><input checked="" type="checkbox"/> Cooperative<input type="checkbox"/> Retail Power Marketer (or Energy Service Provider)<input type="checkbox"/> DSM Administrator</div> <div><input type="checkbox"/> Independent Power Producer or Qualifying Facility<input type="checkbox"/> Community Choice Aggregator</div>			

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

ANNUAL ELECTRIC POWER
INDUSTRY REPORT

Form Approved
OMB No. 1905-0129
Approved Expires 05/31/2023

REPORT FOR: Minnkota Power Coop, Inc

12658

REPORT PERIOD ENDING: 2021

SCHEDULE 2. PART A. GENERAL INFORMATION

LINE NO.				
1	Regional North American Electric Reliability Council (Not applicable for power marketers)	<input type="checkbox"/> TRE (formerly ERCOT) <input type="checkbox"/> FRCC <input checked="" type="checkbox"/> MRO	<input type="checkbox"/> NPCC <input type="checkbox"/> RFC (formerly ECAR, MAIN. MAAC) <input type="checkbox"/> SERC	<input type="checkbox"/> SPP <input type="checkbox"/> WECC
2	Name of RTO or ISO	<input type="checkbox"/> California ISO <input type="checkbox"/> Electric Reliability Council of Texas <input type="checkbox"/> PJM Interconnection <input type="checkbox"/> New York ISO	<input type="checkbox"/> Southwest Power Pool <input checked="" type="checkbox"/> Midwest ISO <input type="checkbox"/> ISO New England <input type="checkbox"/> 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)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
5	Identify The Activities Your Company Was Engaged In During The Year (Check appropriate activities)	<input checked="" type="checkbox"/> Generation from company owned plant <input checked="" type="checkbox"/> Transmission <input checked="" type="checkbox"/> Buying transmission services on other electrical system <input type="checkbox"/> Distribution using owned/leased electric wires	<input type="checkbox"/> Buying distribution on other electrical system <input checked="" type="checkbox"/> Wholesale power marketing <input type="checkbox"/> Retail power marketing <input type="checkbox"/> 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) Winter (Megawatts)	732.0 886.0	Prior Year Prior Year 669.4 826.3
7	Did Your Company Operate Alternative-Fueled Vehicles During the Year? Does Your Company Plan to Operate Such Vehicles During the Coming Year? If "Yes", Please Provide Additional Contact Information	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Name: Lowell Stave Title: VP & COO Telephone: 701 - 795 - 4212 Fax: 701 - 795 - 4215 Email: lstave@minnkota.com		

REPORT FOR: Minnkota Power Coop, Inc

12658

REPORT PERIOD ENDING: 2021

SCHEDULE 2. PART B. ENERGY SOURCES AND DISPOSITION

	SOURCE OF ENERGY	MEGAWATTHOURS		DISPOSITION OF ENERGY	MEGAWATTHOURS
1	Net Generation	1,502,104	11	Sales to Ultimate Consumers	
2	Purchases from Electricity Suppliers	5,104,367	12	Sales For Resale	6,435,296
3	Exchanged Received (In)		13	Energy Furnished Without Charge	36,950
4	Exchanged Delivered (Out)	28,240	14	Energy Consumed By Respondent Without Charge	
5	Exchanged Net	-28,240			
6	Wheeled Received (In)	21,671			
7	Wheeled Delivered (Out)	20,253	15	Total Energy Losses (positive number)	107,403
8	Wheeled Net	1,418			
9	Transmission by Others Losses (Negative Number)				
10	Total Sources (sum of lines 1, 2, 5, 8 & 9)	6,579,649	16	Total Disposition (sum of lines 11, 12, 13, 14, & 15)	6,579,649

REPORT FOR: Minnkota Power Coop, Inc

12658

REPORT PERIOD ENDING: 2021

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 \$	386,814.8
4	Electric Credits/Other Adjustments \$	
5	Revenue from Transmission \$	3,302.6
6	Other Electric Operating Revenue \$	11,915.0
7	Total Electric Operating Revenue (sum of lines 1, 2, 3, 4, 5 and 6) \$	402,032.4

REPORT FOR: Minnkota Power Coop, Inc

REPORT PERIOD ENDING:

<p align="center">SCHEDULE 3. PART A. DISTRIBUTION SYSTEM RELIABILITY DATA</p>
--

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 IEEE-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.

REPORT FOR: Minnkota Power Coop, Inc 12658

REPORT PERIOD ENDING: 2021

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

REPORT FOR:
Minnkota Power Coop, Inc
12658

REPORT PERIOD ENDING:
2021

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

		RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TRANSPORTATION	TOTAL
		(a)	(b)	(c)	(d)	(e)
State	Balancing Authority					
Revenue (thousand dollars)						
Megawatthours						
Number of Customers						
Are your rates decoupled?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If the answer is YES, is the revenue adjustment automatic or does it require a rate-making proceeding?		<input type="checkbox"/> N automatic	<input type="checkbox"/> N automatic	<input type="checkbox"/> N automatic	<input type="checkbox"/> N automatic	
		<input type="checkbox"/> N proceeding	<input type="checkbox"/> N proceeding	<input type="checkbox"/> N proceeding	<input type="checkbox"/> 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

REPORT FOR: Minnkota Power Coop, Inc12658

REPORT PERIOD ENDING: 2021

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: 2021

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

REPORT FOR: Minnkota Power Coop, Inc

12658

REPORT PERIOD ENDING: 2021

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: 2021

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

REPORT FOR: Minnkota Power Coop, Inc

12658

REPORT PERIOD ENDING: 2021

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				Total
		RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TRANS	
		(a)	(b)	(c)	(d)	
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 Cycle 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: 2021

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: 2021

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

Reporting Year Savings

		(a)	(b)	(c)	(d)	(e)
		Residential	Commercial	Industrial	Transportation	Total
State/Territory	Balancing Authority					
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)
	Net Metering Installed Capacity (MW)					
	Net Metering Installations					
	Storage Installed Capacity (MW)					
	Storage Installations					
	Photovoltaic 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: 2021

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:
 2021

SCHEDULE 9. COMMENTS				
SCHEDULE	PART	LINE NO.	COLUMN	NOTES
(a)	(b)	(c)	(d)	(e)

US Department of Energy Energy Information Administration Form EIA-861	ANNUAL ELECTRIC POWER INDUSTRY REPORT	Form Approved OMB No. 1905-0129 Approved Expires 05/31/2023				
REPORT FOR: Minnkota Power Coop, Inc12658						
REPORT PERIOD ENDING: 2021						
EIA861 ERROR LOG						
Part	State	BA ID	Error No.	Error Description/Override Comment	Type	Override

APPENDIX E

RUS Form 12

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0572-0032. The time required to complete this information collection is estimated to average 21 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

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 2021 (Prepared with Audited Data)

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)

☒ 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

3/28/2022

DATE

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART A - FINANCIAL		BORROWER DESIGNATION ND0020			
		PERIOD ENDED December 2021			
		INSTRUCTIONS - See help in the online application.			
SECTION A. STATEMENT OF OPERATIONS					
ITEM		YEAR-TO-DATE			THIS MONTH (d)
		LAST YEAR (a)	THIS YEAR (b)	BUDGET (c)	
1.	Electric Energy Revenues	378,110,272	386,814,839		
2.	Income From Leased Property (Net)				
3.	Other Operating Revenue and Income	12,228,092	15,217,555		
4.	Total Operation Revenues & Patronage Capital (1 thru 3)	390,338,364	402,032,394		
5.	Operating Expense – Production - Excluding Fuel	15,406,942	14,443,634		
6.	Operating Expense – Production - Fuel	30,662,880	34,069,657		
7.	Operating Expense – Other Power Supply	226,393,506	213,972,287		
8.	Operating Expense – Transmission	14,150,464	16,055,674		
9.	Operating Expense – RTO/ISO				
10.	Operating Expense – Distribution	5,058,564	5,756,671		
11.	Operating Expense – Customer Accounts				
12.	Operating Expense – Customer Service & Information				
13.	Operating Expense – Sales				
14.	Operating Expense – Administrative & General	18,047,774	18,951,878		
15.	Total Operation Expense (5 thru 14)	309,720,130	303,249,801		
16.	Maintenance Expense – Production	8,283,995	16,283,983		
17.	Maintenance Expense – Transmission	5,259,159	5,246,415		
18.	Maintenance Expense – RTO/ISO				
19.	Maintenance Expense – Distribution	1,601,424	2,074,932		
20.	Maintenance Expense – General Plant	1,279,292	1,286,107		
21.	Total Maintenance Expense (16 thru 20)	16,423,870	24,891,437		
22.	Depreciation and Amortization Expense	30,046,349	30,178,580		
23.	Taxes				
24.	Interest on Long-Term Debt	27,308,494	26,265,853		
25.	Interest Charged to Construction – Credit	(490,323)	(181,012)		
26.	Other Interest Expense	504,676	424,768		
27.	Asset Retirement Obligations				
28.	Other Deductions				
29.	Total Cost Of Electric Service (15 + 21 thru 28)	383,513,196	384,829,427		
30.	Operating Margins (4 less 29)	6,825,168	17,202,967		
31.	Interest Income	461,737	140,123		
32.	Allowance For Funds Used During Construction				
33.	Income (Loss) from Equity Investments				
34.	Other Non-operating Income (Net)	(811,933)	2,741,020		
35.	Generation & Transmission Capital Credits				
36.	Other Capital Credits and Patronage Dividends	1,195,320	1,423,416		
37.	Extraordinary Items				
38.	Net Patronage Capital Or Margins (30 thru 37)	7,670,292	21,507,526		

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART A - FINANCIAL		BORROWER DESIGNATION ND0020	
INSTRUCTIONS – See help in the online application.		PERIOD ENDED December 2021	
SECTION B. BALANCE SHEET			
ASSETS AND OTHER DEBITS		LIABILITIES AND OTHER CREDITS	
1. Total Utility Plant in Service	1,327,189,549	33. Memberships	1,136
2. Construction Work in Progress	17,589,914	34. Patronage Capital	
3. Total Utility Plant (1 + 2)	1,344,779,463	a. Assigned and Assignable	37,557,191
4. Accum. Provision for Depreciation and Amortization	362,708,709	b. Retired This year	6,765,700
5. Net Utility Plant (3 - 4)	982,070,754	c. Retired Prior years	0
6. Non-Utility Property (Net)	0	d. Net Patronage Capital (a - b - c)	30,791,491
7. Investments in Subsidiary Companies	0	35. Operating Margins - Prior Years	0
8. Invest. in Assoc. Org. - Patronage Capital	98,681	36. Operating Margin - Current Year	17,202,966
9. Invest. in Assoc. Org. - Other - General Funds	0	37. Non-Operating Margins	4,304,559
10. Invest. in Assoc. Org. - Other - Nongeneral Funds	0	38. Other Margins and Equities	138,294,140
11. Investments in Economic Development Projects	0	39. Total Margins & Equities (33 +34d thru 38)	190,594,292
12. Other Investments	9,527,703	40. Long-Term Debt - RUS (Net)	0
13. Special Funds	53,256,329	41. Long-Term Debt - FFB - RUS Guaranteed	692,849,402
14. Total Other Property And Investments (6 thru 13)	62,882,713	42. Long-Term Debt - Other - RUS Guaranteed	0
15. Cash - General Funds	173,251	43. Long-Term Debt - Other (Net)	111,597,670
16. Cash - Construction Funds - Trustee	100	44. Long-Term Debt - RUS - Econ. Devel. (Net)	0
17. Special Deposits	0	45. Payments – Unapplied	0
18. Temporary Investments	4,373	46. Total Long-Term Debt (40 thru 44 - 45)	804,447,072
19. Notes Receivable (Net)	0	47. Obligations Under Capital Leases Noncurrent	13,396
20. Accounts Receivable - Sales of Energy (Net)	33,427,982	48. Accumulated Operating Provisions and Asset Retirement Obligations	6,991,349
21. Accounts Receivable - Other (Net)	15,064,626	49. Total Other NonCurrent Liabilities (47 + 48)	7,004,745
22. Fuel Stock	5,404,538	50. Notes Payable	15,635,000
23. Renewable Energy Credits	0	51. Accounts Payable	39,755,448
24. Materials and Supplies - Other	29,350,582	52. Current Maturities Long-Term Debt	26,453,266
25. Prepayments	8,067,547	53. Current Maturities Long-Term Debt - Rural Devel.	0
26. Other Current and Accrued Assets	0	54. Current Maturities Capital Leases	68,677
27. Total Current And Accrued Assets (15 thru 26)	91,492,999	55. Taxes Accrued	4,016,115
28. Unamortized Debt Discount & Extraordinary Property Losses	0	56. Interest Accrued	229,215
29. Regulatory Assets	0	57. Other Current and Accrued Liabilities	5,109,982
30. Other Deferred Debits	4,021,602	58. Total Current & Accrued Liabilities (50 thru 57)	91,267,703
31. Accumulated Deferred Income Taxes	0	59. Deferred Credits	47,154,256
32. Total Assets and Other Debits (5+14+27 thru 31)	1,140,468,068	60. Accumulated Deferred Income Taxes	0
		61. Total Liabilities and Other Credits (39 + 46 + 49 + 58 thru 60)	1,140,468,068

<div>UNITED STATES DEPARTMENT OF AGRICULTURE</div> <div>RURAL UTILITIES SERVICE</div> <div>FINANCIAL AND OPERATING REPORT</div> <div>ELECTRIC POWER SUPPLY</div>	<div>BORROWER DESIGNATION</div> <div>ND0020</div>
<div>INSTRUCTIONS - See help in the online application.</div>	<div>PERIOD ENDED</div> <div>December 2021</div>
<div>SECTION C. NOTES TO FINANCIAL STATEMENTS</div>	

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 2021
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 2021				
PART B SE - SALES OF ELECTRICITY								
Sale No.	Name Of Company or Public Authority	RUS Borrower Designation	Statistical Classification	Renewable Energy Program Name	Primary Renewable Fuel Type	Average Monthly Billing Demand (MW) (f)	Actual Average Monthly NCP Demand (g)	Actual Average Monthly CP Demand (h)
	(a)	(b)	(c)	(d)	(e)			
1	Ultimate Consumer(s)							
2	Beltrami Electric Coop, Inc		LF			53	85	75
3	Cass County Electric Coop, Inc (ND0011)	ND0011	LF			180	238	212
4	Cavalier Rural Elec Coop, Inc (ND0038)	ND0038	LF			5	8	5
5	Clearwater-Polk Elec Coop Inc		LF			12	16	15
6	Nodak Electric Coop, Inc (ND0019)	ND0019	LF			135	202	169
7	North Star Electric Coop, Inc (MN0095)	MN0095	LF			14	20	18
8	P K M Electric Coop, Inc (MN0087)	MN0087	LF			15	20	18
9	Red Lake Electric Coop, Inc (MN0075)	MN0075	LF			19	21	19
10	Red River Valley Coop Pwr Assn (MN0074)	MN0074	LF			16	23	20
11	Roseau Electric Coop, Inc		LF			17	27	24
12	Wild Rice Electric Coop, Inc (MN0082)	MN0082	LF			38	50	45
13	Midwest Independent Transmission System Operator, Inc. (IN)		AD					
14	Minnesota Power & Light Co		OS					
15	Basin Electric Power Coop (ND0045)	ND0045	OS					
16	*Miscellaneous		OS					
17	NextEra Energy Power Marketing LLC (FL)		OS					
18	Montana Dakota Utilities Co		OS					
19	Nodak Electric Coop, Inc (ND0019)	ND0019	OS					
20	Northern Municipal Power Agency		OS					
UC	Total for Ultimate Consumer(s)							
Dist	Total for Distribution Borrowers					422	582	506
G&T	Total for G&T Borrowers					0	0	0
Other	Total for Other					82	128	114
Total	Grand Total					504	710	620

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 2021		
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	487,629	16,100,746	20,576,048	331,879	37,008,673
3	1,348,763	46,455,024	56,578,142	1,163,034	104,196,200
4	33,693	1,217,975	1,427,055	69,770	2,714,800
5	95,296	3,036,255	4,020,749	103,637	7,160,641
6	1,181,281	36,452,327	49,528,554	(238,105)	85,742,776
7	110,374	3,823,677	4,668,548	201,044	8,693,269
8	116,505	4,066,498	4,908,874	131,761	9,107,133
9	119,847	4,690,904	5,062,253	77,440	9,830,597
10	118,800	4,393,799	5,009,632	179,586	9,583,017
11	148,559	4,707,070	6,272,634	182,652	11,162,356
12	267,581	10,268,347	11,300,052	334,329	21,902,728
13	1,369,765		46,998,180		46,998,180
14	33,828		1,085,780		1,085,780
15	573,900		26,191,700		26,191,700
16			(10,622,323)		(10,622,323)
17	144,000		4,572,000		4,572,000
18	154,530		3,760,680		3,760,680
19	130,945		6,481,389		6,481,389
20			1,245,243		1,245,243
UC					
Dist	3,427,789	111,368,551	144,964,499	1,918,859	258,251,909
G&T	0	0	0	0	0
Other	3,007,507	23,844,071	104,100,691	618,168	128,562,930
Total	6,435,296	135,212,622	249,065,190	2,537,027	386,814,839

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 2021
PART B SE - SALES OF ELECTRICITY		
Sale No	Comments	
1		
2		
3		
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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 2021				
PART B PP - PURCHASED POWER								
Purch ase No.	Name Of Company or Public Authority	RUS Borrower Designation	Statistical Classification	Renewable Energy Program Name	Primary Renewable Fuel Type	Average Monthly Billing Demand (MW) (f)	Actual Average Monthly NCP Demand (g)	Actual Average Monthly CP Demand () (h)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	Manitoba Hydro		OS					
2	Northern Municipal Power Agency		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					
21	*Miscellaneous		OS					
22	*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 2021			
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	8,030					621,000	621,000
2	266,028						
3	1,488,781					82,873,822	82,873,822
4	834,375					46,228,703	46,228,703
5	521,323			5,433,813	7,509,464		12,943,277
6	121,159					6,945,812	6,945,812
7	1,862,742					63,869,768	63,869,768
8	1,420					68,129	68,129
9	450					11,238	11,238
10						2,328	2,328
11						7,888	7,888
12	59					71,131	71,131
13						231,404	231,404
14						10,945	10,945
15						15,774	15,774
16						3,206	3,206
17						21,975	21,975
18						3,441	3,441
19						1,714	1,714
20						8,444	8,444
21						26,005	26,005
22						6,283	6,283
Dist	0	0	0	0	0	0	0
G&T	1,488,781	0	0	0	0	82,873,822	82,873,822
Other	3,615,586	0	0	5,433,813	7,509,464	118,155,188	131,098,465
Total	5,104,367	0	0	5,433,813	7,509,464	201,029,010	213,972,287

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 2021
PART B PP - PURCHASED POWER		
Purchase No	Comments	
1		
2		
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7		
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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 2021			
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	2042.0	25.90
Infinity - Petersburg	Large Wind	Wind	100.00	900.0	2633.0	33.40
Total:				1800.0	4675.0	

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 2021			
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	26	51	1,006	100	0
Infinity - Petersburg	0	20	40	1,006	100	0
Total:	0	46	91	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 2021	
PART C RE - RENEWABLE GENERATING PLANT SUMMARY			
Plant Name	Comments		
Infinity - Valley City			
Infinity - Petersburg			

reUNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE		BORROWER DESIGNATION ND0020		
FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART C - SOURCES AND DISTRIBUTION OF ENERGY		PERIOD ENDED December 2021		
INSTRUCTIONS - See help in the online application.				
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	1,497,429	84,893,579
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	4,675	207,971
7. Total in Own Plant (1 thru 6)	1	256,200	1,502,104	85,101,550
Purchased Power				
8. Total Purchased Power			5,104,367	213,972,287
Interchanged Power				
9. Received Into System (Gross)			0	0
10. Delivered Out of System (Gross)			28,240	0
11. Net Interchange (9 - 10)			(28,240)	0
Transmission For or By Others - (Wheeling)				
12. Received Into System			21,671	0
13. Delivered Out of System			20,253	0
14. Net Energy Wheeled (12 - 13)			1,418	0
15. Total Energy Available for Sale (7 + 8 + 11 + 14)			6,579,649	
Distribution of Energy				
16. Total Sales			6,435,296	
17. Energy Furnished to Others Without Charge			36,950	
18. Energy Used by Borrower (Excluding Station Use)			0	
19. Total Energy Accounted For (16 thru 18)			6,472,246	
Losses				
20. Energy Losses - MWh (15 - 19)			107,403	
21. Energy Losses - Percentage ((20 / 15) * 100)			1.63 %	

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART D - STEAM PLANT							BORROWER DESIGNATION ND0020 PLANT Milton R. Young #1 PERIOD ENDED December 2021				
INSTRUCTIONS - See help in the online application.											
SECTION A. BOILERS/TURBINES											
NO.	UNIT NO. (a)	TIMES STARTED (b)	FUEL CONSUMPTION					OPERATING HOURS			
			COAL (1000 Lbs.) (c)	OIL (1000 Gals.) (d)	GAS (1000 C.F.) (e)	OTHER (f)	TOTAL (g)	IN SERVICE (h)	ON STANDBY (i)	OUT OF SERVICE SCHED. (j) UNSCH. (k)	
1.	1	9	2,672.00	456.00				7,271	30	1,273	187
2.											
3.											
4.											
5.											
6.	Total	9	2,672	456.00	0.00	0.00			7,271	30	1,273
7.	Average BTU		6,701	140,000.00							
8.	Total BTU (10 ⁶)		17,906.00	63,840			81,746				
9.	Total Del. Cost (\$)		33,171,491	1,368,068.00							
SECTION A. BOILERS/TURBINES (Continued)					SECTION B. LABOR REPORT			SEC. C. FACTORS & MAX. DEMAND			
NO.	UNIT NO. (l)	SIZE (kW) (m)	GROSS GEN. (MWh) (n)	BTU PER kWh (o)	NO.	ITEM	VALUE	NO.	ITEM	VALUE	
1.	1	256,200	1,680,645.00		1.	No. Employees Full-Time (Include Superintendent)	66	1.	Load Factor (%)	67.67%	
2.					2.	No. Employees Part-Time	3	2.	Plant Factor (%)	74.88%	
3.					3.	Total Employee Hours Worked	136,915	3.	Running Plant Capacity Factor (%)	90.22%	
4.								4.	15 Minute Gross Max. Demand (kW)	283,500	
5.					5.	Indicated Gross Max. Demand (kW)					
6.	Total	256,200	1,680,645.00	49	4.	Operating Plant Payroll (\$)	2,739,378				
7.	Station Service (MWh)		183,216.00		5.	Maintenance Plant Payroll (\$)	2,017,581				
8.	Net Generation (MWh)		1,497,429.00	54.59	6.	Other Accts. Plant Payroll (\$)	1,170,921				
9.	Station Service (%)		10.90		7.	Total Plant Payroll (\$)	5,927,880				
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	1,368,068						
2.	Fuel, Coal			501.1	33,171,491		1,852.53				
3.	Fuel, Oil			501.2	898,165		14.06				
4.	Fuel, Gas			501.3							
5.	Fuel, Other			501.4							
6.	Fuel SubTotal (2 thru 5)			501	34,069,656	22.75	416.77				
7.	Steam Expenses			502	6,744,344						
8.	Electric Expenses			505	369,373						
9.	Miscellaneous Steam Power Expenses			506	4,900,043						
10.	Allowances			509							
11.	Rents			507							
12.	Non-Fuel SubTotal (1 + 7 thru 11)				13,381,828	8.93					
13.	Operation Expense (6 + 12)				47,451,484	31.68					
14.	Maintenance, Supervision and Engineering			510	1,732,320						
15.	Maintenance of Structures			511	413,427						
16.	Maintenance of Boiler Plant			512	11,010,068						
17.	Maintenance of Electric Plant			513	3,872,489						
18.	Maintenance of Miscellaneous Plant			514	210,112						
19.	Maintenance Expense (14 thru 18)				17,238,416	11.51					
20.	Total Production Expense (13 + 19)				64,689,900	43.20					
21.	Depreciation			403.1, 411.10	13,266,488						
22.	Interest			427	6,937,191						
23.	Total Fixed Cost (21 + 22)				20,203,679		13.49				
24.	Power Cost (20 + 23)				84,893,579	56.69					
Remarks											

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE				BORROWER DESIGNATION				
FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART E - HYDRO PLANT				PLANT				
				PERIOD ENDED				
INSTRUCTIONS - See help in the online application.								
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 <input type="checkbox"/> Yes <input type="checkbox"/> No				
SECTION B. LABOR REPORT						SECTION C. FACTORS & MAXIMUM DEMAND		
NO.	ITEM	VALUE	NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full-Time (Include Superintendent)		5.	Maintenance Plant Payroll (\$)		1.	Load Factor (%)	
2.	No. Employees Part Time			6.	Other Accounts Plant Payroll (\$)		2.	Plant Factor (%)
3.	Total Employee Hours Worked		7.		Total Plant Payroll (\$)		3.	Running Plant Capacity Factor (%)
4.	Operating Plant Payroll (\$)						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							BORROWER DESIGNATION PLANT PERIOD ENDED					
INSTRUCTIONS - See help in the online application.												
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)	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						SECTION C. FACTORS & MAXIMUM DEMAND						
NO.	ITEM	VALUE	NO.	ITEM	VALUE	NO.	ITEM	VALUE				
1.	No. Employees Full Time (Include Superintendent)		5.	Maintenance Plant Payroll (\$)		1.	Load Factor (%)					
2.	No. Employees Part Time			2.	Plant Factor (%)							
3.	Total Employee Hours Worked		6.	Other Accounts Plant Payroll (\$)		3.	Running Plant Capacity Factor (%)					
4.	Operating Plant Payroll (\$)		7.	Total Plant Payroll (\$)		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**

BORROWER DESIGNATION

PLANT

PERIOD ENDED

INSTRUCTIONS - See help in the online application.

SECTION A. COMBINED CYCLE GENERATING UNITS

NO.	UNIT NO. (a)	SIZE (kW) (b)	FUEL CONSUMPTION				OPERATING HOURS					
			OIL (1000 Gals.) (c)	GAS (1000 CF) (d)	OTHER (e)	TOTAL (f)	IN SERVICE (g)	ON STANDBY (h)	OUT OF SERVICE SCHED. (i) 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

SECTION C. FACTORS & MAXIMUM DEMAND

NO.	ITEM	VALUE	NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full Time (Include. Superintendent)		5.	Maintenance Plant Payroll (\$)		1.	Load Factor (%)	
2.	No. Employees Part Time		6.	Other Accounts Plant Payroll (\$)		2.	Plant Factor (%)	
3.	Total Employee Hours Worked		7.	Total Plant Payroll (\$)		3.	Running Plant Capacity Factor (%)	
4.	Operating Plant Payroll (\$)					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)	547			
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)				

Remarks

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE					BORROWER DESIGNATION			
FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART G - NUCLEAR PLANT					PLANT			
					PERIOD ENDED			
INSTRUCTIONS - See help in the online application.								
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)	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					SECTION C. FACTORS & MAXIMUM DEMAND			
NO.	ITEM	VALUE	NO.	ITEM	VALUE	NO.	ITEM	VALUE
1.	No. Employees Full Time (Include. Superintendent)		5.	Maintenance Plant Payroll (\$)		1.	Load Factor (%)	
2.	No. Employees Part Time			2.	Plant Factor (%)			
3.	Total Employee Hours Worked		6.	Other Accounts Plant Payroll (\$)		3.	Running Plant Capacity Factor (%)	
4.	Operating Plant Payroll (\$)			4.	15 Min. Gross Max. Demand (kW)			
			7.	Total Plant Payroll (\$)		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			BORROWER DESIGNATION ND0020			
FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT			PERIOD ENDED December 2021			
INSTRUCTIONS - See help in the online application.						
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)	407,331,914	5,503,323	84		412,835,153	
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)	409,343,867	5,503,323	84		414,847,106	
7. Land and Land Rights (350)	26,743,871	1,368,718	11,012		28,101,577	
8. Structures and Improvements (352)	0				0	
9. Station Equipment (353)	130,889,383	4,115,929	2,361,521		132,643,791	
10. Other Transmission Plant (354 thru 359.1)	504,622,460	7,866,412	2,267,133		510,221,739	
11. Total Transmission Plant (7 thru 10)	662,255,714	13,351,059	4,639,666		670,967,107	
12. Land and Land Rights (360)	0				0	
13. Structures and Improvements (361)	0				0	
14. Station Equipment (362)	110,906,507	13,309,495	2,759,690		121,456,312	
15. Other Distribution Plant (363 thru 374)	0				0	
16. Total Distribution Plant (12 thru 15)	110,906,507	13,309,495	2,759,690		121,456,312	
17. RTO/ISO Plant (380 thru 386)						
18. Total General Plant (389 thru 399.1)	124,367,592	2,871,769	7,320,337		119,919,024	
19. Electric Plant in Service (1 + 6 + 11 + 16 thru 18)	1,306,873,680	35,035,646	14,719,777		1,327,189,549	
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)	1,306,873,680	35,035,646	14,719,777		1,327,189,549	
28. Construction Work in Progress (107)	19,986,795			(2,396,881)	17,589,914	
29. Total Utility Plant (27 + 28)	1,326,860,475	35,035,646	14,719,777	(2,396,881)	1,344,779,463	
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)		147,840,429	12,984,535	84		160,824,880
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)		1,843,532	100,598			1,944,130
5. Depr. of Transmission Plant (108.5)		125,876,639	12,170,648	3,345,099		134,702,188
6. Depr. of Distribution Plant (108.6)		26,026,611	2,686,054	1,108,661		27,604,004
7. Depr. of General Plant (108.7)		39,459,715	5,101,018	6,927,226		37,633,507
8. Retirement Work in Progress (108.8)		0				0
9. Total Depr. for Elec. Plant in Serv. (1 thru 8)		341,046,926				362,708,709
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)		341,046,926	33,042,853	11,381,070		362,708,709

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 2021			
SECTION B. ACCUMULATED PROVISION FOR DEPRECIATION AND AMORTIZATION - UTILITY PLANT <i>(Continued)</i>						
19. Amount of Annual Accrual Charged to Expense \$ 33,042,852		20. Amount of Annual Accrual Charged to Other Accounts \$		21. Book Cost of Property Retired \$ 12,147,982		
22. Removal Cost of Property Retired \$ 442,099		23. Salvage Material from Property Retired \$ 4,028,279		24. Renewal and Replacement Cost \$		
SECTION C. NON-UTILITY PLANT						
ITEM		BALANCE BEGINNING OF YEAR <i>(a)</i>	ADDITIONS <i>(b)</i>	RETIREMENTS <i>(c)</i>	ADJUSTMENTS AND TRANSFERS <i>(d)</i>	BALANCE END OF YEAR <i>(e)</i>
1. NonUtility Property (121)						
2. Provision For Depr. & Amort. (122)						
SECTION D. DEMAND AND ENERGY AT POWER SOURCES						
MONTH	PEAK DEMAND (MW) <i>(a)</i>	MONTHLY PEAKS			ENERGY OUTPUT (MWh) <i>(e)</i>	
		DATE <i>(b)</i>	TIME <i>(c)</i>	TYPE OF READING <i>(d)</i>		
1. January	796	01/27/2021	7	Coincident	446,615	
2. February	846	02/12/2021	8	Coincident	443,270	
3. March	740	03/01/2021	8	Coincident	379,931	
4. April	619	04/01/2021	8	Coincident	339,570	
5. May	531	05/17/2021	18	Coincident	316,431	
6. June	685	06/30/2021	18	Coincident	355,375	
7. July	696	07/02/2021	18	Coincident	393,820	
8. August	732	08/18/2021	18	Coincident	375,039	
9. September	592	09/28/2021	18	Coincident	322,434	
10. October	614	10/26/2021	8	Coincident	360,796	
11. November	729	11/24/2021	18	Coincident	419,805	
12. December	886	12/29/2021	16	Coincident	517,853	
13. Annual Peak	886			Annual Total	4,670,939	
SECTION E. DEMAND AND ENERGY AT DELIVERY POINTS						
MONTH	DELIVERED TO RUS BORROWERS		DELIVERED TO OTHERS		TOTAL DELIVERED	
	DEMAND (MW) <i>(a)</i>	ENERGY (MWh) <i>(b)</i>	DEMAND (MW) <i>(c)</i>	ENERGY (MWh) <i>(d)</i>	DEMAND (MW) <i>(e)</i>	ENERGY (MWh) <i>(f)</i>
1. January	672	376,378	51	202,094	723	578,472
2. February	715	370,928	56	185,073	771	556,001
3. March	624	315,880	49	234,998	673	550,878
4. April	520	283,799	38	203,088	558	486,887
5. May	448	261,738	24	255,453	472	517,191
6. June	558	288,418	31	183,876	589	472,294
7. July	574	315,945	31	257,535	605	573,480
8. August	593	299,843	36	237,767	629	537,610
9. September	486	252,868	26	224,990	512	477,858
10. October	498	287,759	30	206,991	528	494,750
11. November	601	331,661	41	215,510	642	547,171
12. December	697	399,255	53	243,449	750	642,704
13. Peak or Total	715	3,784,472	56	2,650,824	771	6,435,296

<p>UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE</p> <p>FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT</p>	<p>BORROWER DESIGNATION ND0020</p> <p>PERIOD ENDED December 2021</p>
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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	3,085			
	Cass County Electric Cooperative, Inc.	6,709			
	Cavalier Rural Electric Cooperative, Inc.	2,626			
	Clearwater-Pol Electric Cooperative, Inc.	2,590			
	Nodak Electric Cooperative, Inc.	72,056			
	North Star Electric Cooperative, Inc.	2,889			
	PKM Electric Cooperative, Inc.	2,306			
	Red Lake Electric Cooperative, Inc.	1,594			
	Red River Valley Cooperative Power Association	2,031			
	Roseau Electric Cooperative, Inc.	2,387			
	Wild Rice Electric Cooperative, Inc.	307			
	Lignite Electric Cooperative	100			
	Totals	98,680			
4	Other Investments				
	Capital Electric Coop	5,741			
	Cenex (CHS)	9,334			
	CoBank	8,206,015			
	Dakota Valley	2,111			
	Dairyland Power Coop.	10			
	Federated Rural Electric	410,826			
	Garden Valley Telephone	25,990			
	Lake States Forestry Corp.	100			
	National Rural Utilities CFC	6,444			
	Northern Plains Electric	6,244			
	Paul Bunyan Rural Telephone	5,266			
	Polar Communications Corp.	3,662			
	Red River Communications	4,330			
	RESCO - Rural Electric Coop.	97,875			
	Roughrider Electric Cooperative (Oliver-Mercer)	7,322			
	Touchstone Energy	1,515			
	United Telephone Mutual Aid Corporation	570			
	Verendrye Electric Cooperative	1,007			
	West River Mutual Aid Telephone	233,341			
	Airtonomy, Inc.	500,000			
	Totals	9,527,703			
5	Special Funds				
	Deferred Revenue	53,256,329			
	Totals	53,256,329			
6	Cash - General				
	Petty Cash	6,200			
	General Checking and Savings	155,551			
	Land and Easement Fund	11,500			
	Totals	173,251			
8	Temporary Investments				
	Temporary Investments	4,373			
	Totals	4,373			
9	Accounts and Notes Receivable - NET				
	Accounts Receivable	15,064,626			

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE		BORROWER DESIGNATION ND0020	
FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART H - ANNUAL SUPPLEMENT		PERIOD ENDED December 2021	
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			
	Totals	15,064,626	
11	TOTAL INVESTMENTS (1 thru 10)	78,124,962	

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 2021			
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 2021		
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)]					5.81 %
SECTION F. INVESTMENTS, LOAN GUARANTEES AND LOANS SUB SECTION IV. LOAN					
No	Organization	Maturity Date	Original Amount	Loan Balance	Rural Development
	(a)	(b)	(\$) (c)	(\$) (d)	(e)
	TOTAL				

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 2021		
		INSTRUCTIONS - See help in the online application.		
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	3,429,454	29,236,445	29,841,151	2,824,748
2. Other Fuel	954,751	4,384,207	2,759,169	2,579,789
3. Production Plant Parts and Supplies	9,736,294	4,761,042	4,198,709	10,298,627
4. Station Transformers and Equipment	12,844,884	4,806,370	4,145,722	13,505,532
5. Line Materials and Supplies	4,611,190	2,450,216	1,939,240	5,122,166
6. Other Materials and Supplies	349,469	546,494	471,705	424,258
7. Total (1 thru 6)	31,926,042	46,184,774	43,355,696	34,755,120

RUS Financial and Operating Report Electric Power Supply – Part H - Annual Supplement

Revision Date 2013

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE OPERATING REPORT- ANNUAL SUPPLEMENT		BORROWER DESIGNATION ND0020			
		PERIOD ENDED December 2021			
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)				
2	National Rural Utilities Cooperative Finance Corporation				
3	CoBank, ACB	88,247,578	2,145,402	21,618,068	23,763,470
4	Federal Financing Bank	714,553,290	22,128,461	19,683,346	41,811,807
5	RUS - Economic Development Loans				
6	Payments Unapplied				
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	22,385,000	1,616,802	600,000	2,216,802
11	Accrued Pension	5,714,470			
12	Digital Press/Copier Lease	82,073	5,996	70,320	76,316
	TOTAL	830,982,411	25,896,661	41,971,734	67,868,395

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 2021	
SECTION I. ANNUAL MEETING AND BOARD DATA			
1. Date of Last Annual Meeting 3 / 26 / 2021	2. Total Number of Members 31	3. Number of Members Present at Meeting 12	4. Was Quorum Present? Yes
5. Number of Members Voting by Proxy or Mail 0	6. Total Number of Board Members 12	7. Total Amount of Fees and Expenses for Board Members \$ 276,000	8. Does Manager Have Written Contract? No
SECTION J. MAN-HOUR AND PAYROLL STATISTICS			
1. Number of Full Time Employees	379	4. Payroll Expensed	34,076,116
2. Man-Hours Worked - Regular Time	816,724	5. Payroll Capitalized	5,995,272
3. Man-Hours Worked – Overtime	38,291	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 2021	
SECTION K. LONG-TERM LEASES			
No	Name Of Lessor (a)	Type Of Property (b)	Rental This Year (c)
	TOTAL		

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 2021			
SECTION L. RENEWABLE ENERGY CREDITS					
ITEM	BALANCE BEGINNING OF YEAR (a)	ADDITIONS (b)	RETIREMENTS (c)	ADJUSTMENTS AND TRANSFER (d)	BALANCE END OF YEAR (e)
1. Renewable Energy Credits					

UNITED STATES DEPARTMENT OF AGRICULTURE RURAL UTILITIES SERVICE FINANCIAL AND OPERATING REPORT ELECTRIC POWER SUPPLY PART I - LINES AND STATIONS		BORROWER DESIGNATION ND0020				
		PERIOD ENDED December 2021				
		INSTRUCTIONS - See help in the online application.				
SECTION A. EXPENSES AND COSTS						
ITEM		ACCOUNT NUMBER	LINES (a)	STATIONS (b)		
Transmission Operation						
1.	Supervision and Engineering	560	1,631,144			
2.	Load Dispatching	561	6,068,630			
3.	Station Expenses	562		591,518		
4.	Overhead Line Expenses	563	2,960,767			
5.	Underground Line Expenses	564				
6.	Miscellaneous Expenses	566	945,296			
7.	Subtotal (1 thru 6)		11,605,837	591,518		
8.	Transmission of Electricity by Others	565	3,852,301			
9.	Rents	567	5,985			
10.	Total Transmission Operation (7 thru 9)		15,464,123	591,518		
Transmission Maintenance						
11.	Supervision and Engineering	568				
12.	Structures	569				
13.	Station Equipment	570		1,532,359		
14.	Overhead Lines	571	3,714,055			
15.	Underground Lines	572				
16.	Miscellaneous Transmission Plant	573				
17.	Total Transmission Maintenance (11 thru 16)		3,714,055	1,532,359		
18.	Total Transmission Expense (10 + 17)		19,178,178	2,123,877		
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		4,847,935		
23.	Distribution Expense - Maintenance	590-598		2,074,932		
24.	Total Distribution Expense (22 + 23)			6,922,867		
25.	Total Operation And Maintenance (18 + 21 + 24)		19,178,178	9,046,744		
Fixed Costs						
26.	Depreciation – Transmission	403.5	8,949,798	3,220,850		
27.	Depreciation – Distribution	403.6		2,686,054		
28.	Interest – Transmission	427	11,786,968	4,241,889		
29.	Interest – Distribution	427		3,537,558		
30.	Total Transmission (18 + 26 + 28)		39,914,944	9,586,616		
31.	Total Distribution (24 + 27 + 29)			13,146,479		
32.	Total Lines And Stations (21 + 30 + 31)		39,914,944	22,733,095		
SECTION B. FACILITIES IN SERVICE		SECTION C. LABOR AND MATERIAL SUMMARY				
TRANSMISSION LINES		SUBSTATIONS		1. Number of Employees 90		
VOLTAGE (kV)	MILES	TYPE	CAPACITY(kVA)	ITEM	LINES	STATIONS
1. 230 KV	444.27	13. Distribution Lines		2. Oper. Labor	2,964,737	1,892,409
2. 41 KV	29.13			3. Maint. Labor	785,376	1,712,656
3. 69 KV	2,129.67	14. Total (12 + 13)	3,372.66	4. Oper. Material	43,836	55,994
4. 345 KV	464.25			5. Maint. Material	75,084	574,865
5. 115 KV	305.34	15. Stepup at Generating Plants	256,000			
6.		16. Transmission	2,522,200			
7.						
8.		17. Distribution	1,496,487			
9.						
10.		18. Total (15 thru 17)	4,274,687			
11.						
12. Total (1 thru 11)	3,372.66					

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 MegaWatts)

			Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
			SEASONAL MAXIMUM DEMAND	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 (Column 3 - 5 + 6)	ANNUAL ADJUSTED NET DEMAND (Column 4 - 5 + 6)	NET GENERATING CAPABILITY
Past Year	2019	Summer	678	87	668	668	77	0	591	591	1233
		Winter	1093	337	677	677	103	0	574	574	1238
Present Year	2020	Summer	687	87	681	681	77	0	604	604	1233
		Winter	1105	340	691	691	103	0	588	588	1268
1st Forecast Year	2021	Summer	693	88	695	695	77	0	618	618	1183
		Winter	1114	344	705	705	103	0	602	602	1218
2nd Forecast Year	2022	Summer	699	89	709	709	77	0	632	632	1183
		Winter	1123	347	719	719	103	0	616	616	1218
3rd Forecast Year	2023	Summer	705	90	723	723	77	0	646	646	1083
		Winter	1132	350	733	733	103	0	630	630	1218
4th Forecast Year	2024	Summer	711	91	737	737	77	0	660	660	1083
		Winter	1141	354	748	748	103	0	645	645	1218
5th Forecast Year	2025	Summer	719	92	752	752	77	0	675	675	1083
		Winter	1152	357	763	763	103	0	660	660	1218
6th Forecast Year	2026	Summer	726	93	767	767	77	0	690	690	1083
		Winter	1163	361	778	778	103	0	675	675	1218
7th Forecast Year	2027	Summer	693	88	695	695	77	0	618	618	1083
		Winter	1114	344	705	705	103	0	602	602	1218
8th Forecast Year	2028	Summer	699	89	709	709	77	0	632	632	1083
		Winter	1123	347	719	719	103	0	616	616	1218
9th Forecast Year	2029	Summer	705	90	723	723	77	0	646	646	1083
		Winter	1132	350	733	733	103	0	630	630	1218
10th Forecast Year	2030	Summer	711	91	737	737	77	0	660	660	1083
		Winter	1141	354	748	748	103	0	645	645	1218
11th Forecast Year	2031	Summer	719	92	752	752	77	0	675	675	1083
		Winter	1152	357	763	763	103	0	660	660	1218
12th Forecast Year	2032	Summer	726	93	767	767	77	0	690	690	1083
		Winter	1163	361	778	778	103	0	675	675	1218
13th Forecast Year	2033	Summer	733	94	782	792	77	0	705	715	1083
		Winter	1174	394	793	793	103	0	690	690	1218
14th Forecast Year	2034	Summer	740	95	797	817	77	0	720	740	1083
		Winter	1185	427	808	808	103	0	705	705	1218

COMMENTS

MINNESOTA ELECTRIC U

7610.0310 Item G. LOAD AND GENE

			Column 10	Column 11	Column 12	Column 13	Column 14	Column 15
			PARTICIPATION PURCHASES (TOTAL)	PARTICIPATION SALES (TOTAL)	ADJUSTED NET CAPABILITY (Column 9 + 10 - 11)	NET RESERVE CAPACITY OBLIGATION	TOTAL FIRM CAPACITY OBLIGATION (Column 7 + 13)	SURPLUS (+) OR DEFICIT (-) CAPACITY (Column 12 - 14)
Past Year	2019	Summer	15	150	1098		591	507
		Winter	15	50	1203		574	629
Present Year	2020	Summer	15	50	1198		604	594
		Winter	15	50	1233		588	645
1st Forecast Year	2021	Summer	15	50	1148		618	530
		Winter	15	0	1233		602	631
2nd Forecast Year	2022	Summer	15	0	1198		632	566
		Winter	15	0	1233		616	617
3rd Forecast Year	2023	Summer	15	0	1098		646	452
		Winter	15	0	1233		630	603
4th Forecast Year	2024	Summer	15	0	1098		660	438
		Winter	15	0	1233		645	588
5th Forecast Year	2025	Summer	15	0	1098		675	423
		Winter	15	0	1233		660	573
6th Forecast Year	2026	Summer	15	0	1098		690	408
		Winter	15	0	1233		675	558
7th Forecast Year	2027	Summer	15	0	1098		618	480
		Winter	15	0	1233		602	631
8th Forecast Year	2028	Summer	15	0	1098		632	466
		Winter	15	0	1233		616	617
9th Forecast Year	2029	Summer	15	0	1098		646	452
		Winter	15	0	1233		630	603
10th Forecast Year	2030	Summer	15	0	1098		660	438
		Winter	15	0	1233		645	588
11th Forecast Year	2031	Summer	15	0	1098		675	423
		Winter	15	0	1233		660	573
12th Forecast Year	2032	Summer	15	0	1098		690	408
		Winter	15	0	1233		675	558
13th Forecast Year	2033	Summer	15	0	1098		705	393
		Winter	15	0	1233		690	543
14th Forecast Year	2034	Summer	15	0	1098		720	378
		Winter	15	0	1233		705	528

COMMENTS

APPENDIX G

Minnkota Power Cooperative's 2017 Load Forecast Study



2021 Electric Load Forecast Study

November 2021
Revised January 25, 2022



Prepared by:
Clearspring Energy Advisors LLC

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2021 Electric Load Forecast

Minnkota Power Cooperative, Inc.

Grand Forks, ND

Prepared By:

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Presented By:



Joshua P. Hoyt
Principal Consultant

Minnkota Power Cooperative, Inc.
2021 Electric Load Forecast Study

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EXECUTIVE SUMMARY

Minnkota Power Cooperative, Inc. **2021 Electric Load Forecast**

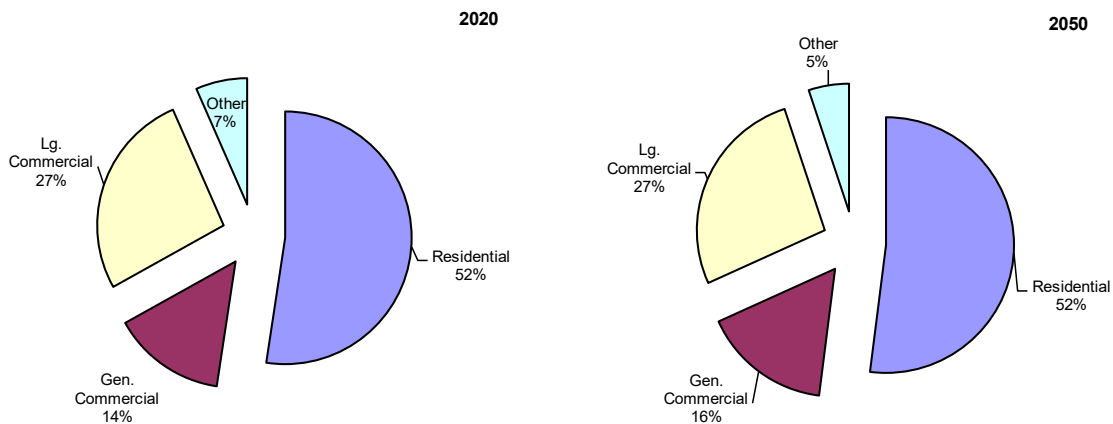
Executive Summary

Overview

The 2021 Electric Load Forecast Study (Load Forecast) is a thirty-year (2021 through 2050) 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. 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 2019.

Member System Forecast Summary
Minnkota Power Cooperative, Inc.

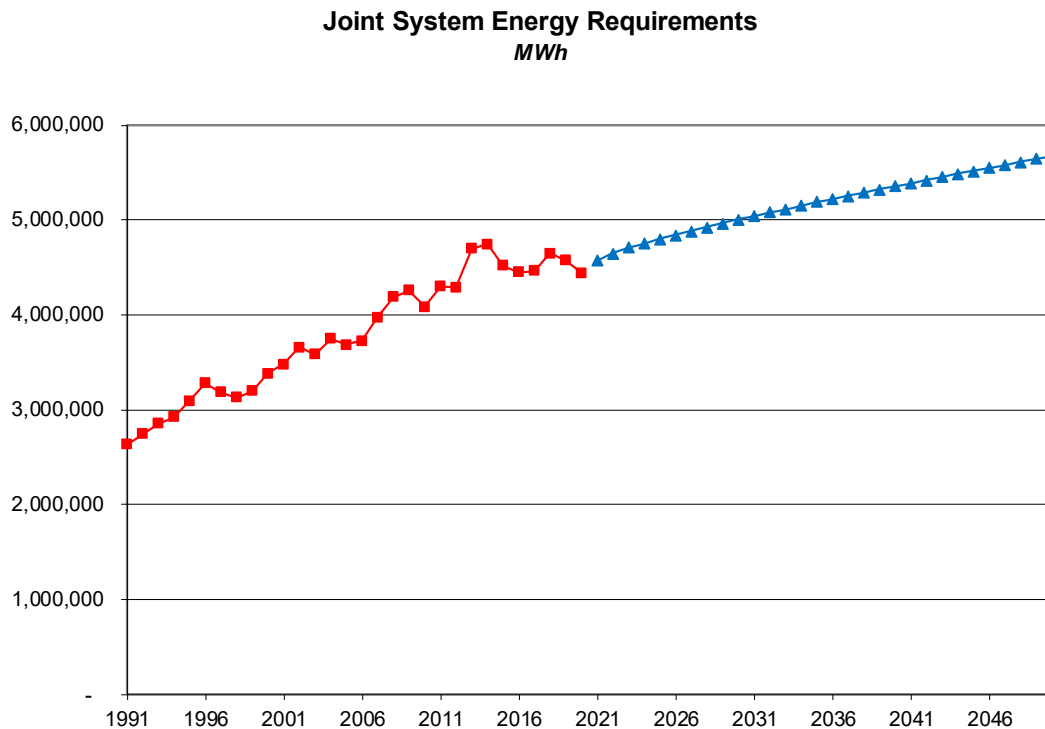


The forecasting process relies heavily on internal system data, third-party demographic and economic data, and insight from cooperative staff that are most familiar with the

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 0.8 percent per year over the 2021-2050 forecast period and total Joint System energy requirements are expected to increase at 0.7 percent per year during that same period (2021-2050). The following tables present the member system projections by consumer class and the summary of Joint System total energy requirements.



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.
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	492,441	1,251,903	34,196	75,987	1,146,820	112,623	125,715	133,343	124,513	156,203	277,094	3,930,838
2018	518,275	1,314,627	34,533	79,848	1,189,348	117,725	127,252	133,343	130,757	158,903	290,381	4,094,992
2019	513,068	1,328,581	35,474	80,490	1,162,299	118,463	125,715	135,768	131,002	160,728	289,131	4,080,720
2020	498,648	1,298,488	38,572	77,210	1,102,733	113,289	124,760	127,360	125,849	157,076	281,113	3,945,098
2021	507,167	1,365,389	38,329	79,555	1,122,745	115,227	128,408	131,572	128,309	155,918	287,234	4,059,852
2022	509,997	1,412,416	38,422	79,374	1,127,294	116,331	129,385	132,780	130,583	158,653	297,687	4,132,923
2023	513,259	1,444,548	38,533	80,234	1,136,192	117,358	130,293	133,777	132,303	159,347	301,373	4,187,216
2024	516,366	1,466,903	38,759	81,344	1,142,878	118,344	131,090	136,782	134,527	160,014	302,746	4,229,754
2025	520,395	1,489,109	38,958	82,023	1,152,754	119,835	131,783	137,514	135,815	160,850	304,045	4,273,082
2026	523,779	1,514,283	39,043	82,631	1,159,696	118,971	132,310	138,181	136,756	161,488	305,762	4,312,901
2027	526,658	1,536,215	39,356	84,495	1,166,675	118,816	132,922	138,748	138,086	162,321	307,510	4,351,801
2028	530,221	1,558,020	39,680	85,196	1,176,488	118,612	133,537	139,261	139,452	163,369	310,253	4,394,088
2029	532,576	1,582,812	39,915	86,387	1,183,441	119,102	134,222	139,667	141,861	164,157	311,846	4,435,985
2030	534,778	1,604,380	40,118	86,974	1,190,450	120,090	134,605	140,032	142,884	164,869	313,232	4,472,413
2031	536,860	1,626,837	40,256	87,793	1,200,172	120,520	134,927	140,513	143,867	165,473	314,546	4,510,764
2032	538,823	1,650,295	40,359	88,266	1,206,541	120,918	135,052	140,967	145,667	166,185	315,689	4,548,761
2033	540,676	1,671,540	40,422	88,721	1,212,915	121,284	135,123	141,349	146,357	166,522	316,759	4,581,668
2034	542,443	1,692,685	40,469	89,164	1,222,424	121,617	135,147	143,845	147,033	166,837	317,745	4,619,408
2035	544,135	1,716,841	40,532	90,674	1,228,891	122,464	135,105	144,158	148,730	168,153	318,674	4,658,356
2036	545,775	1,737,795	40,627	91,102	1,235,895	122,710	135,199	144,064	149,210	168,606	319,545	4,690,527
2037	547,366	1,758,659	40,740	91,516	1,245,641	122,934	135,277	143,916	149,883	168,791	320,373	4,725,096
2038	549,949	1,782,546	40,827	91,921	1,252,389	123,130	135,366	143,769	151,408	168,972	321,147	4,761,424
2039	551,424	1,803,239	40,918	92,315	1,259,198	123,304	135,386	143,566	151,766	169,106	321,876	4,792,097
2040	552,870	1,823,850	41,022	92,712	1,269,298	124,003	135,418	143,373	152,174	169,238	322,583	4,826,541
2041	554,370	1,847,491	41,110	93,119	1,275,494	124,160	135,435	143,169	153,570	169,575	323,322	4,860,816
2042	555,937	1,867,949	41,222	93,545	1,281,746	124,338	135,478	143,017	154,010	169,700	324,103	4,891,045
2043	557,573	1,888,336	41,311	93,985	1,291,088	124,508	135,566	142,853	154,639	169,821	324,930	4,924,610
2044	559,243	1,911,764	41,426	94,435	1,297,712	124,692	135,600	142,725	156,082	170,017	325,781	4,959,476
2045	560,919	1,932,021	41,518	94,879	1,303,921	125,375	135,644	142,576	156,484	170,152	326,637	4,990,126
2046	562,610	1,952,220	41,612	95,330	1,313,289	125,531	135,699	142,459	156,897	170,515	327,505	5,023,664
2047	564,367	1,972,366	41,730	95,803	1,319,538	125,695	135,753	142,350	158,427	170,703	328,443	5,055,174
2048	566,223	1,992,465	41,830	96,289	1,325,798	125,853	135,825	142,289	158,948	170,939	329,446	5,085,905
2049	568,174	2,012,524	41,954	96,797	1,335,122	126,042	135,947	142,238	159,535	171,194	330,528	5,120,054
2050	570,190	2,032,546	42,059	97,322	1,341,365	126,225	136,069	142,246	160,953	171,459	331,664	5,152,099

Average Annual Growth Rates

1991-2020	1.8%	4.1%	-0.1%	1.2%	2.4%	1.2%	1.3%	0.8%	0.4%	0.9%	1.8%	2.3%
2005-2020	0.4%	3.3%	0.5%	0.0%	2.8%	-0.6%	1.6%	0.1%	-0.2%	-0.5%	0.8%	1.8%
2010-2020	0.5%	2.8%	-0.6%	-0.3%	2.2%	-0.3%	1.1%	-0.8%	-1.4%	-0.5%	0.1%	1.4%
2015-2020	0.6%	1.9%	1.4%	0.4%	-0.2%	-0.6%	-0.7%	-0.9%	-0.9%	-1.2%	0.3%	0.5%
2020-2025	0.9%	2.8%	0.2%	1.2%	0.9%	1.1%	1.1%	1.5%	1.5%	0.5%	1.6%	1.6%
2020-2030	0.7%	2.1%	0.4%	1.2%	0.8%	0.6%	0.8%	1.0%	1.3%	0.5%	1.1%	1.3%
2020-2040	0.5%	1.7%	0.3%	0.9%	0.7%	0.5%	0.4%	0.6%	1.0%	0.4%	0.7%	1.0%
2020-2050	0.4%	1.5%	0.3%	0.8%	0.7%	0.4%	0.3%	0.4%	0.8%	0.3%	0.6%	0.9%
2021-2050	0.4%	1.4%	0.3%	0.7%	0.6%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	0.8%

Wholesale Sales To Member Systems and NMPA (MWh)
Joint System /1

Year	Beltrami	Cass	Clearwater-	Polk	Nodak	North	Red	Red	Roseau	Wild	CAFS /2	Minnkota	NMPA	Joint System
		County	Cavalier			Star	Lake	River		Rice		Sales	Sales	Sales
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	372,491
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	363,032
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	382,175
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	372,754
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	391,546
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	407,465
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	432,625
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
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
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
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
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
2003	453,842	718,517	35,829	76,592	704,943	122,528	95,717	122,966	125,015	169,222	235,659	39,307	2,900,156	473,809
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
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
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
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
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
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
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
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
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
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
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
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
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
2017	492,441	1,251,903	34,196	75,987	1,146,820	112,623	125,715	133,343	124,513	156,203	277,094	-	3,930,838	442,681
2018	518,275	1,314,627	34,533	79,948	1,189,348	117,725	127,252	133,343	130,757	158,903	290,381	-	4,094,992	452,702
2019	513,068	1,328,581	35,474	80,490	1,162,299	118,463	125,715	135,768	131,002	160,728	289,131	-	4,080,720	446,011
2020	498,648	1,298,488	38,572	77,210	1,102,733	113,289	124,760	127,360	125,849	157,076	281,113	-	3,945,098	440,546
2021	507,167	1,365,389	38,329	79,555	1,122,745	115,227	128,408	131,572	128,309	155,918	287,234	-	4,059,852	453,530
2022	509,997	1,412,416	38,422	79,374	1,127,294	116,331	129,385	132,780	130,583	158,653	297,687	-	4,132,923	455,650
2023	513,259	1,444,548	38,533	80,234	1,136,192	117,358	130,293	133,777	132,303	159,347	301,373	-	4,187,216	457,454
2024	516,366	1,466,903	38,759	81,344	1,142,878	118,344	131,090	136,782	134,527	160,014	302,746	-	4,229,754	458,973
2025	520,395	1,489,109	38,958	82,023	1,152,754	119,835	131,783	137,514	135,815	160,850	304,045	-	4,273,082	460,146
2026	523,779	1,514,283	39,043	82,631	1,159,696	118,971	132,310	138,181	136,756	161,488	305,762	-	4,312,901	461,062
2027	526,658	1,536,215	39,356	84,495	1,166,675	118,816	132,922	138,748	138,086	162,321	307,510	-	4,351,801	461,793
2028	530,221	1,558,020	39,680	85,196	1,176,488	118,612	133,537	139,261	139,452	163,369	310,253	-	4,394,088	462,293
2029	532,576	1,582,812	39,915	86,387	1,183,441	119,102	134,222	139,667	141,861	164,157	311,846	-	4,435,985	462,442
2030	534,778	1,604,380	40,118	86,974	1,190,450	120,090	134,605	140,032	142,884	164,869	313,232	-	4,472,413	462,451
2031	536,860	1,625,837	40,256	87,793	1,200,172	120,520	134,927	140,513	143,867	165,473	314,546	-	4,510,764	462,247
2032	538,823	1,650,295	40,359	88,266	1,206,541	120,918	135,052	140,967	145,667	166,185	315,689	-	4,548,761	461,852
2033	540,676	1,671,540	40,422	88,721	1,212,915	121,284	135,123	141,349	146,357	166,522	316,759	-	4,581,668	461,261
2034	542,443	1,692,685	40,469	89,164	1,222,424	121,617	135,147	143,845	147,033	166,837	317,745	-	4,619,408	460,539
2035	544,135	1,716,841	40,532	90,674	1,228,891	122,464	135,105	144,158	148,730	168,153	318,674	-	4,658,356	459,645
2036	545,775	1,737,795	40,627	91,102	1,235,895	122,710	135,199	144,064	149,210	168,606	319,545	-	4,690,527	458,713
2037	547,366	1,758,659	40,740	91,516	1,245,641	122,934	135,277	143,916	149,883	168,791	320,373	-	4,725,096	457,652
2038	549,949	1,782,546	40,827	91,921	1,252,389	123,130	135,366	143,769	151,408	168,972	321,147	-	4,761,424	456,548
2039	551,424	1,803,239	40,918	92,315	1,259,198	123,304	135,386	143,566	151,766	169,106	321,876	-	4,792,097	455,277
2040	552,870	1,823,850	41,022	92,712	1,269,298	124,003	135,418	143,373	152,174	169,238	322,583	-	4,826,541	453,996
2041	554,370	1,847,491	41,110	93,119	1,275,494	124,160	135,435	143,169	153,570	169,575	323,322	-	4,860,816	452,778
2042	555,937	1,867,949	41,222	93,545	1,281,746	124,338	135,478	143,017	154,010	169,700	324,103	-	4,891,045	451,693
2043	557,573	1,888,336	41,311	93,985	1,291,088	124,508	135,566	142,853	154,639	169,821	324,930	-	4,924,610	450,634
2044	559,243	1,911,764	41,426	94,435	1,297,712	124,692	135,600	142,725	155,082	170,017	325,781	-	4,959,476	449,701
2045	560,919	1,932,021	41,518	94,879	1,303,921	125,375	135,644	142,576	155,484	170,152	326,637	-	4,990,126	448,716
2046	562,610	1,952,220	41,612	95,330	1,313,289	125,531	135,699	142,459	155,897	170,515	327,505	-	5,023,664	447,797
2047	564,367	1,972,366	41,730	95,803	1,319,538	125,695	135,753	142,350	156,427	170,703	328,443	-	5,055,174	447,005
2048	566,223	1,992,465	41,830	96,289	1,325,798	125,853	135,825	142,289	156,948	170,939	329,446	-	5,085,905	446,266
2049	568,174	2,012,524	41,954	96,797	1,335,122	126,042	135,947	142,238	157,535	171,194	330,528	-	5,120,054	445,677
2050	570,190	2,032,546	42,059	97,322	1,341,365	126,225	136,069	142,246	160,953	171,459	331,664	-	5,152,099	445,265

Average Annual Growth Rates

1991-2020	1.8%	4.1%	-0.1%	1.2%	2.4%	1.2%	1.3%	0.8%	0.4%	0.9%	1.8%	-100.0%	2.3%	0.6%	2.1%
2005-2020	0.4%	3.3%	0.5%	0.0%	2.8%	-0.6%	1.6%	0.1%	-0.2%	-0.5%	0.8%	-100.0%	1.8%	-0.6%	1.5%
2010-2020	0.5%	2.8%	-0.6%	-0.3%	2.2%	-0.3%	1.1%	-0.8%	-1.4%	-0.5%	0.1%	--	1.4%	-0.5%	1.2%
2015-2020	0.6%	1.9%	1.4%	0.4%	-0.2%	-0.6%	-0.7%	-0.9%	-1.2%	0.3%	--	--	0.5%	-0.7%	0.4%
2020-2025	0.9%	2.8%	0.2%	1.2%	0.9%	1.1%	1.1%	1.5%	0.5%	1.6%	--	--	1.6%	0.9%	1.5%
2020-2030	0.7%	2.1%	0.4%	1.2%	0.8%	0.6%	0.8%	1.0%	1.3%	0.5%	1.1%	--	1.3%	0.5%	1.2%
2020-2040	0.5%	1.7%	0.3%	0.9%	0.7%	0.5%	0.4%	0.6%	1.0%	0.4%	0.7%	--	1.0%	0.2%	0.9%
2020-2050	0.4%	1.5%	0.3%	0.8%	0.7%	0.4%	0.3%	0.4%	0.8%	0.3%	0.6%	--	0.9%	0.0%	0.8%
2021-2050	0.4%	1.4%	0.3%	0.7%	0.6%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	--	0.8%	-0.1%	0.7%

Joint System Energy Requirements
MWh

<u>Year</u>	<u>Total Member Energy Requirements</u>	<u>Minnkota Losses</u>	<u>CAFS</u>	<u>Minnkota Total Requirements</u>	<u>NMPA Energy Requirements</u>	<u>Joint System Energy Requirements</u>
1991	2,018,791	216,791	21,494	2,257,076	372,491	2,629,567
1992	2,017,999	315,258	47,384	2,380,641	363,032	2,743,673
1993	2,160,868	257,865	48,628	2,467,361	382,175	2,849,536
1994	2,228,292	268,455	50,341	2,547,088	372,754	2,919,842
1995	2,352,345	300,501	48,367	2,701,213	391,546	3,092,759
1996	2,488,710	335,722	47,402	2,871,834	407,465	3,279,299
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	3,930,838	87,064 /3	-	4,017,902	442,681	4,460,583
2018	4,094,992	101,136	-	4,196,128	452,702	4,648,830
2019	4,080,720	49,062	-	4,129,782	446,011	4,575,793
2020	3,945,098	56,406	-	4,001,504	440,546	4,442,050
2021	4,059,852	61,825	-	4,121,677	453,530	4,575,208
2022	4,132,923	62,938	-	4,195,861	455,650	4,651,511
2023	4,187,216	63,765	-	4,250,981	457,454	4,708,435
2024	4,229,754	64,413	-	4,294,167	458,973	4,753,140
2025	4,273,082	65,072	-	4,338,154	460,146	4,798,300
2026	4,312,901	65,679	-	4,378,580	461,062	4,839,641
2027	4,351,801	66,271	-	4,418,072	461,793	4,879,866
2028	4,394,088	66,915	-	4,461,003	462,293	4,923,296
2029	4,435,985	67,553	-	4,503,538	462,442	4,965,980
2030	4,472,413	68,108	-	4,540,521	462,451	5,002,972
2031	4,510,764	68,692	-	4,579,455	462,247	5,041,702
2032	4,548,761	69,270	-	4,618,031	461,852	5,079,884
2033	4,581,668	69,772	-	4,651,439	461,261	5,112,700
2034	4,619,408	70,346	-	4,689,754	460,539	5,150,293
2035	4,658,356	70,939	-	4,729,295	459,645	5,188,940
2036	4,690,527	71,429	-	4,761,956	458,713	5,220,669
2037	4,725,096	71,956	-	4,797,052	457,652	5,254,704
2038	4,761,424	72,509	-	4,833,933	456,548	5,290,481
2039	4,792,097	72,976	-	4,865,073	455,277	5,320,350
2040	4,826,541	73,501	-	4,900,042	453,996	5,354,038
2041	4,860,816	74,023	-	4,934,838	452,778	5,387,616
2042	4,891,045	74,483	-	4,965,527	451,693	5,417,220
2043	4,924,610	74,994	-	4,999,604	450,634	5,450,238
2044	4,959,476	75,525	-	5,035,001	449,701	5,484,702
2045	4,990,126	75,992	-	5,066,117	448,716	5,514,833
2046	5,023,664	76,503	-	5,100,167	447,797	5,547,964
2047	5,055,174	76,982	-	5,132,157	447,005	5,579,161
2048	5,085,905	77,450	-	5,163,355	446,266	5,609,622
2049	5,120,054	77,970	-	5,198,024	445,677	5,643,701
2050	5,152,099	78,458	-	5,230,558	445,265	5,675,823

Average Annual Growth Rates

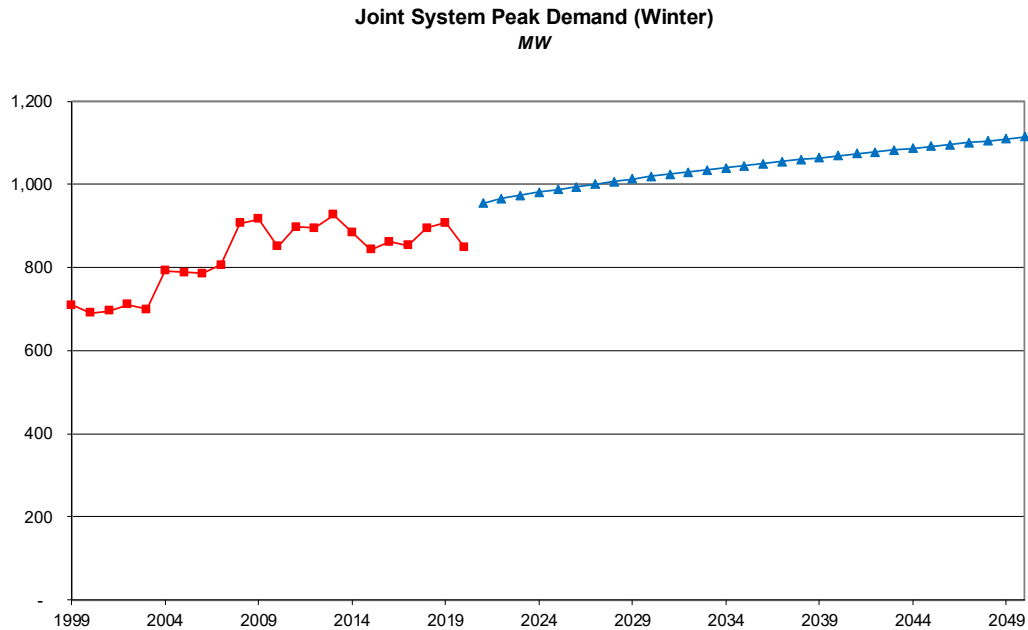
1991-2020	2.3%	-4.5%	-100.0%	2.0%	0.6%	1.8%
2005-2020	1.8%	-7.1%	-100.0%	1.5%	-0.6%	1.3%
2010-2020	1.4%	-11.9%	--	1.0%	-0.5%	0.8%
2015-2020	0.5%	-23.5%	--	-0.3%	-0.7%	-0.3%
2020-2025	1.6%	2.9%	--	1.6%	0.9%	1.6%
2020-2030	1.3%	1.9%	--	1.3%	0.5%	1.2%
2020-2040	1.0%	1.3%	--	1.0%	0.2%	0.9%
2020-2050	0.9%	1.1%	--	0.9%	0.0%	0.8%
2021-2050	0.8%	0.8%	--	0.8%	-0.1%	0.7%

/1 Losses reduced due to calculation adjustment - future loss % set at 1.5%

/2 Transferred to Nodak starting in 2006

/3 MPC HQ now served by Nodak

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 0.5 percent over the forecast horizon. The base forecast for the Joint System winter peak demand is summarized below.



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 2050, the planning range outlook varies from the base forecast of total Joint System energy requirements by approximately +17 to -13 percent.

Joint System Peak Demand
MW

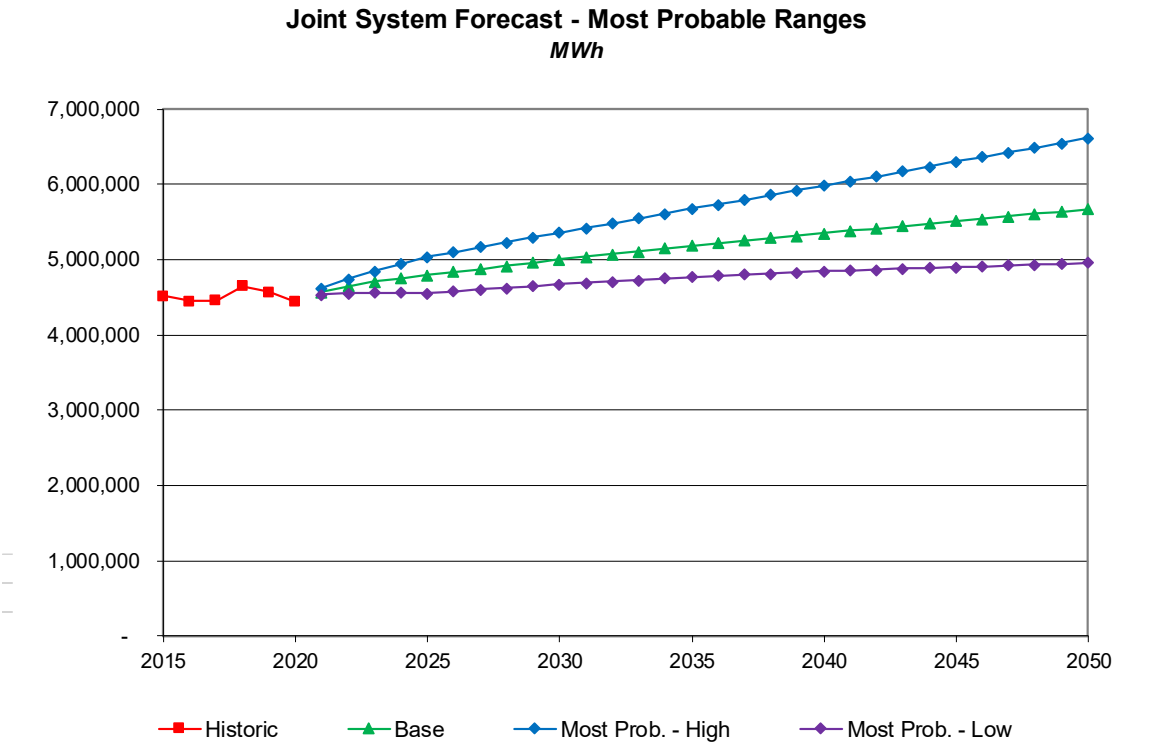
<u>Year</u>	<u>Winter Peak Demand</u>	<u>Summer Peak Demand</u>	<u>Annual Peak Demand</u>	<u>Load Factor %</u>
1999	709	414	709	51%
2000	691	413	691	56%
2001	696	437	696	57%
2002	711	461	711	59%
2003	699	514	699	58%
2004	792	447	792	54%
2005	788	482	788	53%
2006	786	505	786	54%
2007	806	521	806	56%
2008	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	853	646	853	60%
2018	895	646	895	59%
2019	908	647	908	58%
2020	848	691	848	60%
2021	955	736	955	55%
2022	966	749	966	55%
2023	974	756	974	55%
2024	981	762	981	55%
2025	988	768	988	55%
2026	994	774	994	56%
2027	1,000	779	1,000	56%
2028	1,007	785	1,007	56%
2029	1,014	791	1,014	56%
2030	1,019	796	1,019	56%
2031	1,024	801	1,024	56%
2032	1,030	806	1,030	56%
2033	1,034	811	1,034	56%
2034	1,040	816	1,040	57%
2035	1,045	821	1,045	57%
2036	1,050	825	1,050	57%
2037	1,055	829	1,055	57%
2038	1,060	834	1,060	57%
2039	1,064	838	1,064	57%
2040	1,069	843	1,069	57%
2041	1,074	847	1,074	57%
2042	1,078	851	1,078	57%
2043	1,083	855	1,083	57%
2044	1,087	860	1,087	58%
2045	1,092	864	1,092	58%
2046	1,096	868	1,096	58%
2047	1,101	872	1,101	58%
2048	1,105	876	1,105	58%
2049	1,110	880	1,110	58%
2050	1,115	884	1,115	58%

Average Annual Growth Rates

2005-2020	0.5%	2.4%	0.5%
2010-2020	0.0%	1.9%	0.0%
2015-2020	0.1%	1.9%	0.1%
2020-2025	3.1%	2.1%	3.1%
2020-2030	1.9%	1.4%	1.9%
2020-2040	1.2%	1.0%	1.2%
2020-2050	0.9%	0.8%	0.9%
2021-2050	0.5%	0.6%	0.5%

Old Approach: Based on MAPP Form 3 Peak with WAPA allocations

Current Method (2014 on): MPC Sum (aggregation of MPC billing meters)



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 Electric Load Forecast Study (load forecast) is a thirty-year (2021-2050) forecast of energy requirements and seasonal peak demands based on historical data through 2020. The last Load Forecast report for Minnkota was published in 2019. 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 annual member system data. 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 system data on customers, energy, and peak demand monthly through 2020.
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. Descriptions 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 the member systems were made to discuss revisions to the forecasts. A copy of the review responses 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:

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

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.

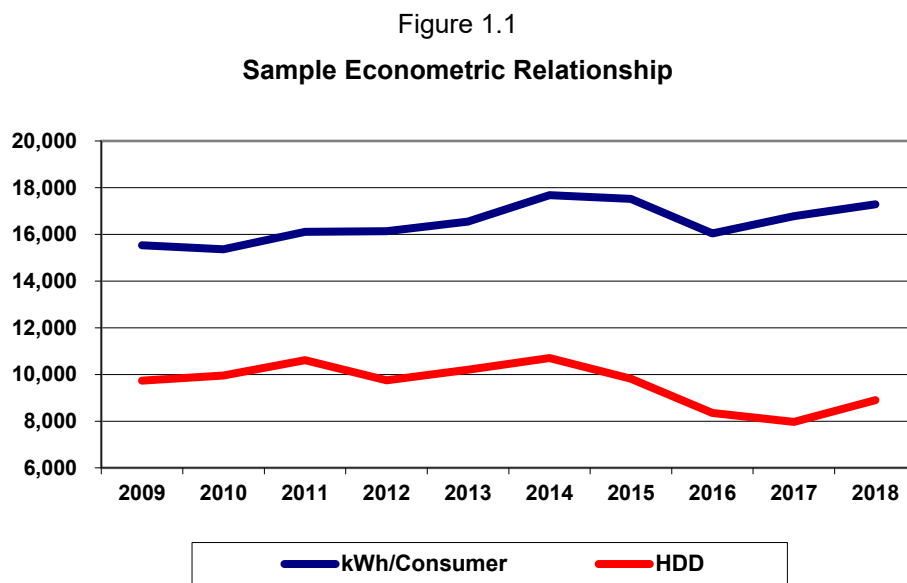
A second form of a regression model, also used in this forecast, is a model in the logarithmic linear form, shown here:

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

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.



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 member system data on members, kWh 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. 2019 and 2020 Joint System data.
2. Minnkota and member monthly peak demand data through 2020.

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), 2021.
2. Midwestern Regional Climate Center online database for select Minnesota and North Dakota weather stations.
3. U.S. Department of Energy. Annual Energy Outlook, 2021.
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 365; EViews, Version 11; and Word 365. 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.

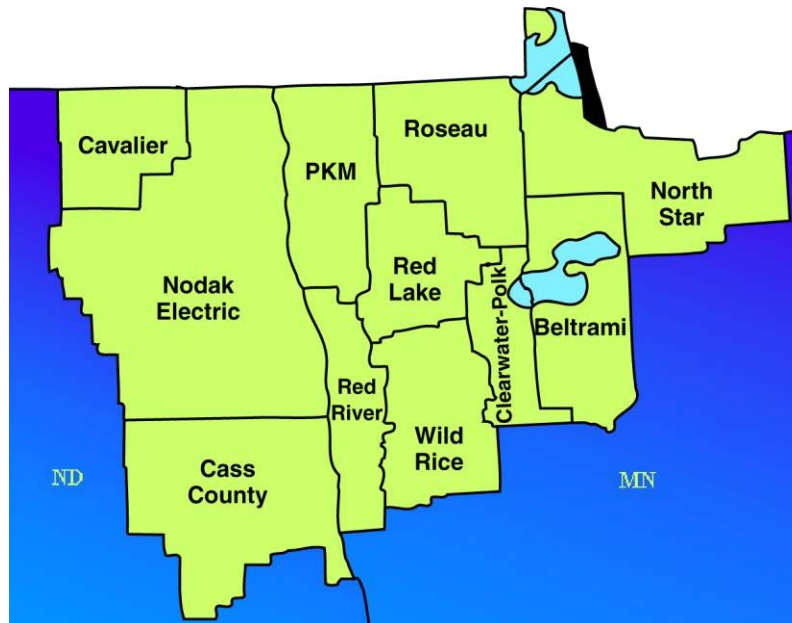
2.1.1 Location

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:

<u>Cooperative</u>	<u>RUS Designation</u>
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 Cooperative Power Assoc. 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 vary 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 (139.5 MW), Ashtabula Wind Energy Center (217.5 MW) and the Oliver III Wind Project (100 MW). The Langdon and Ashtabula projects began operation in 2008-2009 and have been repowered in 2018-2021, they 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 mid-1970. 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 impacts the eight Minnesota member systems, although recent revisions have allowed some smaller cooperatives to opt-out of reporting CIP data. 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 soil, 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. 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 0.5 percent per year over the projection horizon as shown in Table 2.1. This is similar growth to what 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 1.2 percent over the past thirty years, is expected to be 0.9 percent per year over the next thirty years. Per capita income is expected to grow at an annual rate of 1.4 percent per year.

Table 2.1

Economic, Demographic And Weather Forecasts
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Population</u>	<u>Persons Per Household</u>	<u>Total Employment</u>	<u>Income Per Capita (12\$)</u>	<u>Retail Sales (M12\$)</u>	<u>LP Gas Price (12\$/gal)</u>	<u>Heating Degree Days</u>	<u>Cooling Degree Days</u>	<u>Central Air Condition. Sat. %</u>	<u>Electric Space Heat Sat. %</u>
1991	222,807	2.64	129,889	\$24,597	\$2,538	\$1.10	9,261	548	56%	44%
1992	224,810	2.62	132,545	\$26,240	\$2,623	\$0.99	9,407	188	57%	45%
1993	226,475	2.62	135,313	\$24,864	\$2,760	\$1.10	10,002	241	58%	46%
1994	228,529	2.62	140,405	\$26,469	\$2,960	\$1.03	9,374	294	59%	47%
1995	230,368	2.60	144,644	\$26,701	\$3,073	\$1.02	9,964	524	60%	48%
1996	231,518	2.57	147,589	\$29,007	\$3,213	\$1.19	10,960	408	61%	49%
1997	232,300	2.56	149,898	\$28,350	\$3,313	\$1.16	9,742	381	61%	46%
1998	231,641	2.54	152,793	\$30,861	\$3,388	\$0.98	8,411	416	61%	44%
1999	231,965	2.53	154,151	\$31,368	\$3,582	\$0.96	8,577	321	61%	41%
2000	232,370	2.50	156,689	\$33,347	\$3,679	\$1.28	9,285	337	60%	42%
2001	232,456	2.45	157,273	\$32,756	\$3,656	\$1.40	8,954	484	59%	43%
2002	233,001	2.44	157,314	\$33,465	\$3,647	\$1.15	9,540	510	58%	44%
2003	234,470	2.42	157,473	\$35,541	\$3,735	\$1.32	9,511	433	57%	45%
2004	237,381	2.42	160,187	\$34,963	\$3,904	\$1.46	9,725	196	57%	46%
2005	238,470	2.41	162,783	\$35,218	\$4,020	\$1.67	9,060	415	56%	47%
2006	239,751	2.41	164,849	\$35,829	\$4,106	\$1.80	8,623	503	58%	46%
2007	240,787	2.39	167,937	\$37,599	\$4,129	\$1.95	9,426	482	60%	45%
2008	242,527	2.40	168,926	\$40,167	\$4,088	\$2.25	10,482	268	62%	44%
2009	244,156	2.40	167,098	\$38,407	\$3,919	\$1.87	9,961	231	64%	44%
2010	245,952	2.41	167,138	\$40,386	\$4,178	\$2.15	8,933	430	66%	43%
2011	247,601	2.38	170,068	\$41,982	\$4,484	\$2.25	9,188	473	67%	43%
2012	249,801	2.39	174,072	\$45,686	\$4,759	\$1.96	8,175	541	67%	42%
2013	253,407	2.40	176,965	\$44,186	\$5,148	\$1.87	10,083	459	68%	42%
2014	255,400	2.40	180,120	\$44,763	\$5,512	\$2.39	10,008	358	68%	42%
2015	257,599	2.39	181,472	\$45,701	\$5,832	\$1.60	8,502	471	69%	41%
2016	259,508	2.38	181,596	\$45,707	\$6,213	\$1.43	8,105	414	70%	41%
2017	261,524	2.38	181,415	\$45,785	\$6,719	\$1.73	8,836	336	70%	41%
2018	262,638	2.36	182,610	\$47,200	\$6,876	\$1.74	9,784	501	70%	41%
2019	263,303	2.36	184,849	\$47,712	\$7,006	\$1.53	10,237	399	70%	41%
2020	264,335	2.34	182,451	\$49,709	\$7,444	\$1.37	9,214	496	71%	41%
2021	265,783	2.33	188,856	\$48,757	\$7,402	\$1.36	9,317	420	71%	41%
2022	267,264	2.32	190,829	\$49,499	\$7,566	\$1.39	9,317	420	71%	40%
2023	268,716	2.32	192,775	\$50,254	\$7,722	\$1.42	9,317	420	71%	40%
2024	270,171	2.31	194,740	\$51,016	\$7,871	\$1.45	9,317	420	71%	40%
2025	271,623	2.31	196,706	\$51,787	\$8,016	\$1.50	9,317	420	72%	40%
2026	273,070	2.31	198,676	\$52,565	\$8,159	\$1.53	9,317	420	72%	40%
2027	274,507	2.31	200,647	\$53,351	\$8,300	\$1.57	9,317	420	72%	40%
2028	275,931	2.31	202,601	\$54,146	\$8,441	\$1.61	9,317	420	72%	40%
2029	277,343	2.31	204,548	\$54,949	\$8,580	\$1.64	9,317	420	72%	39%
2030	278,751	2.31	206,505	\$55,757	\$8,720	\$1.67	9,317	420	72%	39%
2031	280,145	2.31	208,448	\$56,572	\$8,860	\$1.70	9,317	420	72%	39%
2032	281,527	2.31	210,380	\$57,393	\$9,000	\$1.73	9,317	420	72%	39%
2033	282,895	2.31	212,309	\$58,220	\$9,141	\$1.75	9,317	420	73%	39%
2034	284,247	2.31	214,236	\$59,053	\$9,283	\$1.77	9,317	420	73%	38%
2035	285,577	2.32	216,148	\$59,896	\$9,427	\$1.79	9,317	420	73%	38%
2036	286,884	2.32	218,070	\$60,748	\$9,572	\$1.81	9,317	420	73%	38%
2037	288,166	2.32	219,968	\$61,608	\$9,720	\$1.83	9,317	420	73%	38%
2038	289,433	2.33	221,864	\$62,473	\$9,870	\$1.85	9,317	420	73%	38%
2039	290,684	2.33	223,757	\$63,345	\$10,022	\$1.87	9,317	420	73%	38%
2040	291,932	2.33	225,648	\$64,220	\$10,177	\$1.89	9,317	420	73%	38%
2041	293,185	2.33	227,554	\$65,106	\$10,334	\$1.92	9,317	420	73%	38%
2042	294,444	2.34	229,477	\$66,006	\$10,494	\$1.93	9,317	420	73%	38%
2043	295,708	2.34	231,416	\$66,917	\$10,657	\$1.95	9,317	420	74%	38%
2044	296,978	2.34	233,371	\$67,841	\$10,822	\$1.97	9,317	420	74%	38%
2045	298,253	2.35	235,342	\$68,778	\$10,989	\$1.98	9,317	420	74%	38%
2046	299,533	2.35	237,331	\$69,728	\$11,159	\$1.99	9,317	420	74%	38%
2047	300,819	2.35	239,336	\$70,691	\$11,332	\$2.01	9,317	420	74%	38%
2048	302,111	2.36	241,358	\$71,667	\$11,507	\$2.03	9,317	420	74%	38%
2049	303,408	2.36	243,397	\$72,657	\$11,685	\$2.04	9,317	420	74%	38%
2050	304,710	2.36	245,453	\$73,661	\$11,866	\$2.05	9,317	420	74%	38%

Average Annual Growth Rates

1991-2020	0.6%	-0.4%	1.2%	2.5%	3.8%	0.8%	0.0%	-0.3%	0.8%	-0.3%
2005-2020	0.7%	-0.2%	0.8%	2.3%	4.2%	-1.3%	0.1%	1.2%	1.6%	-1.0%
2010-2020	0.7%	-0.3%	0.9%	2.1%	5.9%	-4.4%	0.3%	1.4%	0.6%	-0.6%
2015-2020	0.5%	-0.4%	0.1%	1.7%	5.0%	-3.1%	1.6%	1.0%	0.5%	-0.3%
2020-2025	0.5%	-0.2%	1.5%	0.8%	1.5%	1.8%	0.2%	-3.3%	0.2%	-0.4%
2020-2030	0.5%	-0.1%	1.2%	1.2%	1.6%	2.0%	0.1%	-1.6%	0.2%	-0.3%
2020-2040	0.5%	0.0%	1.1%	1.3%	1.6%	1.6%	0.1%	-0.8%	0.2%	-0.3%
2020-2050	0.5%	0.0%	1.0%	1.3%	1.6%	1.4%	0.0%	-0.6%	0.2%	-0.3%
2021-2050	0.5%	0.0%	0.9%	1.4%	1.6%	1.4%	0.0%	0.0%	0.2%	-0.3%

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 Member System Data

Sales, revenue and consumer data by class and monthly peak data are compiled on a regular basis by member system staff. The historic annual data from 1991 through 2020 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)*, 2021. 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.

<u>Variable:</u>	<u>Description of Variable:</u>
RESCON	Number of residential customers
SCCON	Number of small commercial customers
RESPRI12	Average revenue per kWh for residential customers (2012\$)
SCPRI12	Average commercial revenue per kWh (2012\$)
SHSAT	Electric space heat saturation percent – service territory
ACSAT	Air conditioning saturation percent – service territory
PCE12	Personal Consumption Expenditure Deflator, 2012 = 100
LPG12	Propane gas price (2012\$/gal)
NGAS12	Natural gas price (2012\$/Mcf)
NO2OIL	No. 2 Fuel Oil price (2012\$/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 2012\$)
TPI12	Real total personal income (millions of 2012\$)
PCI12	Real per capita income (2012\$)
MHI12	Real income per household (2012\$)
GRP12	Gross Regional Product (millions of 2012\$)

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 website allows access to thousands of local weather stations across the 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 for most 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 52 percent of member system energy sales in 2020. Energy sales to the residential sector grew at an average annual rate of 1.6 percent during the study period (1991-2020).

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 2021 to 2050. It indicates the number of residential customers

will grow 0.9 percent per year, from 131,006 to 170,791, during the 2021 to 2050 period. This compares to the 2.3 percent growth rate for the 1991 to 2020 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 (2012\$) 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 slightly declining through 2050. This projection is shown in Table 3.2 by member system.

Table 3.1

Residential Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass</u> <u>County</u>	<u>Clearwater-</u> <u>Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North</u> <u>Star</u>	<u>PKM</u>	<u>Red</u> <u>Lake</u>	<u>Red</u> <u>River</u>	<u>Roseau</u>	<u>Wild</u> <u>Rice</u>	<u>Total</u> <u>Members</u>
1991	10,283	11,502	1,440	2,750	11,718	3,508	3,478	4,425	3,826	4,600	8,761	66,291
1992	10,550	12,120	1,435	2,778	11,750	3,559	3,473	4,420	3,817	4,694	8,875	67,471
1993	10,874	12,820	1,437	2,822	11,847	3,606	3,482	4,444	3,848	4,734	9,051	68,964
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	4,222	5,725	13,261	121,603
2017	19,428	42,661	1,362	4,158	19,167	5,129	3,550	5,054	3,972	5,707	13,321	123,510
2018	19,589	43,950	1,436	4,188	19,422	5,162	3,585	5,096	3,981	5,769	13,448	125,625
2019	19,701	45,229	1,372	4,163	19,680	5,212	3,550	5,140	4,003	5,814	13,495	127,357
2020	19,938	46,305	1,199	4,147	19,895	5,303	3,629	5,172	4,035	5,856	13,556	129,033
2021	20,169	47,461	1,209	4,190	20,145	5,380	3,657	5,204	4,082	5,854	13,655	131,006
2022	20,377	48,566	1,217	4,228	20,395	5,453	3,682	5,231	4,125	5,897	13,736	132,909
2023	20,574	49,597	1,225	4,264	20,645	5,522	3,703	5,254	4,165	5,936	13,809	134,695
2024	20,760	50,617	1,232	4,298	20,895	5,590	3,723	5,274	4,203	5,972	13,873	136,437
2025	20,937	51,628	1,239	4,329	21,145	5,655	3,741	5,290	4,239	6,009	13,931	138,144
2026	21,072	52,629	1,240	4,346	21,395	5,698	3,752	5,306	4,264	6,039	14,008	139,749
2027	21,201	53,619	1,241	4,361	21,645	5,739	3,763	5,320	4,288	6,067	14,080	141,323
2028	21,323	54,600	1,242	4,374	21,895	5,778	3,771	5,331	4,309	6,092	14,148	142,864
2029	21,438	55,570	1,242	4,386	22,145	5,814	3,779	5,340	4,329	6,115	14,210	144,368
2030	21,545	56,531	1,241	4,397	22,395	5,848	3,784	5,347	4,347	6,135	14,266	145,837
2031	21,646	57,482	1,241	4,406	22,620	5,880	3,789	5,352	4,364	6,153	14,319	147,251
2032	21,742	58,422	1,239	4,414	22,845	5,909	3,792	5,356	4,379	6,169	14,367	148,634
2033	21,832	59,353	1,238	4,421	23,070	5,937	3,793	5,357	4,393	6,184	14,411	149,988
2034	21,918	60,273	1,236	4,427	23,295	5,964	3,794	5,357	4,405	6,196	14,453	151,318
2035	22,001	61,184	1,234	4,432	23,520	5,989	3,794	5,356	4,417	6,207	14,491	152,626
2036	22,082	62,085	1,231	4,437	23,745	6,013	3,794	5,354	4,428	6,217	14,528	153,914
2037	22,162	62,975	1,229	4,441	23,970	6,036	3,792	5,351	4,438	6,226	14,564	155,185
2038	22,238	63,856	1,226	4,445	24,195	6,058	3,791	5,347	4,447	6,234	14,597	156,434
2039	22,312	64,726	1,223	4,449	24,420	6,079	3,788	5,342	4,456	6,241	14,627	157,663
2040	22,385	65,587	1,220	4,452	24,645	6,100	3,785	5,337	4,464	6,247	14,658	158,879
2041	22,462	66,438	1,217	4,456	24,845	6,120	3,782	5,332	4,473	6,254	14,691	160,071
2042	22,544	67,278	1,215	4,461	25,045	6,143	3,781	5,329	4,482	6,262	14,727	161,267
2043	22,631	68,109	1,213	4,467	25,245	6,165	3,780	5,326	4,493	6,272	14,765	162,465
2044	22,720	68,929	1,211	4,473	25,445	6,188	3,779	5,324	4,503	6,282	14,805	163,660
2045	22,810	69,740	1,208	4,480	25,645	6,210	3,778	5,322	4,514	6,292	14,845	164,845
2046	22,901	70,541	1,206	4,487	25,845	6,233	3,778	5,320	4,525	6,303	14,886	166,023
2047	22,996	71,331	1,204	4,494	26,045	6,257	3,778	5,319	4,537	6,315	14,929	167,206
2048	23,097	72,112	1,203	4,503	26,245	6,280	3,779	5,320	4,550	6,328	14,977	168,394
2049	23,204	72,882	1,202	4,513	26,445	6,307	3,781	5,322	4,564	6,344	15,028	169,591
2050	23,315	73,643	1,201	4,523	26,645	6,333	3,785	5,325	4,579	6,361	15,081	170,791
Average Annual Growth Rates												
1991-2020	2.3%	4.9%	-0.6%	1.4%	1.8%	1.4%	0.1%	0.5%	0.2%	0.8%	1.5%	2.3%
2005-2020	1.4%	4.2%	-0.7%	0.4%	1.5%	1.5%	0.5%	0.7%	-0.2%	0.3%	1.1%	2.0%
2010-2020	0.6%	4.2%	-1.2%	0.2%	1.7%	1.3%	0.9%	0.7%	-0.2%	0.4%	0.4%	1.9%
2015-2020	0.8%	3.6%	-2.7%	0.2%	1.6%	1.1%	0.8%	0.9%	-1.2%	0.6%	0.6%	1.7%
2020-2025	1.0%	2.2%	0.7%	0.9%	1.2%	1.3%	0.6%	0.5%	1.0%	0.5%	0.5%	1.4%
2020-2030	0.8%	2.0%	0.4%	0.6%	1.2%	1.0%	0.4%	0.3%	0.7%	0.5%	0.5%	1.2%
2020-2040	0.6%	1.8%	0.1%	0.4%	1.1%	0.7%	0.2%	0.2%	0.5%	0.3%	0.4%	1.0%
2020-2050	0.5%	1.6%	0.0%	0.3%	1.0%	0.6%	0.1%	0.1%	0.4%	0.3%	0.4%	0.9%
2021-2050	0.5%	1.5%	0.0%	0.3%	1.0%	0.6%	0.1%	0.1%	0.4%	0.3%	0.3%	0.9%

Table 3.2

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

<u>Year</u>	<u>Beltrami</u>	<u>Cass County</u>	<u>Clearwater-Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North Star</u>	<u>PKM</u>	<u>Red Lake</u>	<u>Red River</u>	<u>Roseau</u>	<u>Wild Rice</u>	<u>Minnkota Avg. Use</u>
1991	15,539	21,051	20,522	15,569	22,188	14,005	19,610	18,734	22,656	19,370	15,672	18,820
1992	15,362	19,638	21,290	15,668	21,462	14,135	19,785	18,699	22,208	19,628	15,642	18,434
1993	16,109	21,095	21,235	16,217	22,550	14,849	20,824	19,589	23,119	20,358	16,094	19,331
1994	16,130	19,882	20,792	16,187	21,909	15,071	20,001	19,347	23,130	19,997	16,045	18,919
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	18,761	22,542	15,986	20,908	17,808	21,039	21,601	22,237	20,043	16,723	19,091
2002	18,516	19,100	23,259	16,692	21,933	18,949	20,925	20,918	22,616	21,070	17,039	19,649
2003	17,709	18,148	22,098	16,324	21,527	18,379	20,744	20,200	21,992	20,420	16,781	18,998
2004	17,301	17,048	24,130	15,997	21,834	18,492	21,359	20,274	22,125	20,239	17,109	18,766
2005	17,199	17,107	22,471	15,710	21,427	17,730	20,347	20,407	22,629	19,866	16,933	18,537
2006	16,830	16,574	20,820	15,575	20,952	16,974	19,993	20,048	22,623	19,149	15,791	17,939
2007	17,037	16,986	22,236	15,774	21,653	16,847	22,882	20,760	22,649	19,560	16,286	18,408
2008	17,827	17,730	23,401	16,989	22,916	18,187	20,705	21,613	23,914	20,344	17,306	19,246
2009	17,079	17,949	24,608	17,327	24,136	17,976	24,170	22,385	25,766	20,172	17,408	19,587
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	16,557	24,168	16,096	23,737	16,193	23,715	20,203	23,589	18,615	17,167	18,633
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	14,131	18,291	14,737	20,573	14,488	18,981	18,422	20,257	16,770	15,585	16,194
2016	14,119	13,362	18,238	14,064	19,755	13,520	18,643	17,632	19,291	15,958	14,870	15,375
2017	13,526	13,163	17,382	15,551	19,775	13,542	18,284	17,589	18,984	15,900	15,081	15,238
2018	14,659	13,849	16,087	14,973	20,157	13,890	18,854	18,082	20,631	16,147	16,069	15,888
2019	14,969	14,761	18,238	15,108	20,317	13,842	18,284	18,033	21,436	16,378	16,136	16,322
2020	14,398	13,295	12,178	14,621	19,635	12,994	18,588	17,958	20,308	15,675	15,403	15,347
2021	14,441	13,556	11,823	14,758	19,734	13,062	18,707	18,104	20,150	15,401	15,547	15,464
2022	14,385	13,516	11,766	14,563	19,709	13,063	18,660	18,144	20,175	15,694	15,556	15,437
2023	14,360	13,480	11,742	14,607	19,699	13,060	18,644	18,182	20,307	15,669	15,570	15,417
2024	14,336	13,444	11,798	14,714	19,680	13,056	18,640	18,220	20,328	15,651	15,573	15,395
2025	14,362	13,408	11,842	14,734	19,668	13,051	18,641	18,257	20,393	15,657	15,578	15,382
2026	14,389	13,374	11,860	14,790	19,661	13,043	18,649	18,291	20,437	15,654	15,587	15,371
2027	14,400	13,339	12,039	15,126	19,656	13,034	18,696	18,325	20,576	15,686	15,603	15,373
2028	14,400	13,306	12,242	15,220	19,640	13,024	18,759	18,359	20,737	15,761	15,618	15,368
2029	14,400	13,273	12,371	15,422	19,633	13,014	18,859	18,392	20,905	15,803	15,634	15,367
2030	14,400	13,240	12,496	15,504	19,629	13,003	18,895	18,424	21,015	15,842	15,642	15,358
2031	14,400	13,207	12,562	15,638	19,631	12,995	18,926	18,491	21,124	15,870	15,650	15,351
2032	14,400	13,175	12,620	15,704	19,620	12,986	18,922	18,558	21,192	15,923	15,652	15,338
2033	14,400	13,144	12,644	15,771	19,609	12,977	18,911	18,625	21,259	15,925	15,654	15,323
2034	14,400	13,112	12,668	15,838	19,602	12,967	18,897	18,694	21,330	15,930	15,653	15,308
2035	14,400	13,081	12,692	15,906	19,595	12,957	18,872	18,762	21,400	15,932	15,653	15,293
2036	14,400	13,051	12,757	15,974	19,611	12,940	18,889	18,761	21,440	15,968	15,650	15,281
2037	14,400	13,020	12,822	16,041	19,613	12,921	18,901	18,759	21,528	15,966	15,648	15,266
2038	14,400	12,990	12,887	16,110	19,617	12,903	18,926	18,757	21,578	15,969	15,644	15,251
2039	14,400	12,960	12,952	16,177	19,623	12,883	18,937	18,754	21,610	15,968	15,640	15,236
2040	14,400	12,930	13,017	16,246	19,639	12,864	18,954	18,752	21,655	15,969	15,636	15,222
2041	14,400	12,900	13,082	16,313	19,640	12,844	18,965	18,749	21,680	16,000	15,631	15,206
2042	14,400	12,871	13,147	16,380	19,644	12,824	18,976	18,747	21,720	15,995	15,626	15,190
2043	14,400	12,842	13,210	16,447	19,648	12,804	19,000	18,745	21,797	15,988	15,622	15,175
2044	14,400	12,813	13,274	16,513	19,665	12,784	19,011	18,744	21,818	15,990	15,617	15,161
2045	14,400	12,784	13,337	16,579	19,665	12,763	19,022	18,742	21,843	15,983	15,613	15,145
2046	14,400	12,755	13,399	16,644	19,669	12,741	19,036	18,740	21,870	16,011	15,608	15,130
2047	14,400	12,726	13,461	16,709	19,671	12,720	19,047	18,739	21,903	16,004	15,605	15,114
2048	14,400	12,698	13,523	16,773	19,672	12,698	19,058	18,738	21,937	16,000	15,602	15,099
2049	14,400	12,669	13,584	16,836	19,673	12,677	19,077	18,737	21,978	15,993	15,600	15,084
2050	14,400	12,641	13,645	16,899	19,672	12,655	19,092	18,737	21,966	15,984	15,598	15,067
Average Annual Growth Rates												
1991-2020	-0.3%	-1.6%	-1.8%	-0.2%	-0.4%	-0.3%	-0.2%	-0.1%	-0.4%	-0.7%	-0.1%	-0.7%
2005-2020	-1.2%	-1.7%	-4.0%	-0.5%	-0.6%	-2.1%	-0.6%	-0.8%	-0.7%	-1.6%	-0.6%	-1.3%
2010-2020	-1.0%	-2.2%	-6.1%	-0.7%	-1.4%	-2.1%	-2.0%	-1.2%	-2.3%	-1.6%	-0.5%	-1.7%
2015-2020	-0.9%	-1.2%	-7.8%	-0.2%	-0.9%	-2.2%	-0.4%	-0.5%	0.1%	-1.3%	-0.2%	-1.1%
2020-2025	0.0%	0.2%	-0.6%	0.2%	0.0%	0.1%	0.1%	0.3%	0.1%	0.0%	0.2%	0.0%
2020-2030	0.0%	0.0%	0.3%	0.6%	0.0%	0.0%	0.2%	0.3%	0.3%	0.1%	0.2%	0.0%
2020-2040	0.0%	-0.1%	0.3%	0.5%	0.0%	-0.1%	0.1%	0.2%	0.3%	0.1%	0.1%	0.0%
2020-2050	0.0%	-0.2%	0.4%	0.5%	0.0%	-0.1%	0.1%	0.1%	0.3%	0.1%	0.0%	-0.1%
2021-2050	0.0%	-0.2%	0.5%	0.5%	0.0%	-0.1%	0.1%	0.1%	0.3%	0.1%	0.0%	-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 0.8 percent per year through 2050. This is slower than the average annual growth from 1991 to 2020. Total residential sales are forecast to reach 2,573,291 MWh by 2050.

3.2.2 Seasonal Class Forecast

Seasonal energy sales accounted for less than 1 percent of total cooperative energy sales in 2020. 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. Steady 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 524 in 2020, while energy sales were 11,106 MWh. Member system sales were typically projected based on a five-year average of the 2016-2020 period. As shown in Table 3.5, sales are projected to grow 0.4 percent annually through 2050.

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
1991	159,781	242,114	29,548	42,813	259,999	49,132	68,204	82,893	86,679	89,111	137,299	1,247,575
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	281,273	29,757	46,022	262,771	55,196	69,575	86,012	89,366	95,995	145,791	1,342,636
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	361,010	30,352	57,684	316,436	72,548	70,909	97,900	89,425	107,100	173,383	1,623,580
2002	269,964	389,996	31,291	61,417	330,991	78,204	70,450	95,202	92,244	113,892	180,521	1,714,172
2003	268,103	394,224	29,713	61,199	331,405	76,717	69,807	92,630	90,930	111,794	182,319	1,708,840
2004	272,471	396,569	32,322	60,983	343,061	77,889	71,744	93,826	92,422	111,847	191,413	1,744,548
2005	277,965	430,138	30,053	61,087	340,893	75,368	68,740	94,770	93,733	110,659	193,824	1,777,231
2006	281,355	444,809	27,670	61,567	338,450	74,813	66,811	93,700	94,373	107,702	197,008	1,788,260
2007	293,179	477,618	29,616	63,145	353,912	75,891	76,420	97,785	94,685	110,749	209,155	1,882,154
2008	313,521	516,394	31,461	68,541	378,711	83,076	69,141	102,602	100,444	115,542	223,807	2,003,239
2009	317,964	537,043	33,119	70,205	402,965	83,193	80,513	107,267	107,772	114,252	225,697	2,079,990
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	566,070	33,518	65,779	414,350	79,169	81,223	98,429	98,114	105,073	224,721	2,089,027
2014	318,457	600,977	32,835	73,829	449,839	86,149	80,175	112,950	102,588	105,991	231,816	2,195,605
2015	287,921	548,494	25,148	60,438	378,076	72,615	66,261	91,122	86,665	95,365	205,351	1,917,457
2016	273,176	550,411	25,013	58,118	371,093	68,538	65,539	87,806	81,455	91,351	197,193	1,869,693
2017	262,796	561,530	23,672	64,661	379,021	69,451	64,910	88,891	75,406	90,750	200,895	1,881,983
2018	287,156	608,645	23,106	62,699	391,483	71,692	67,590	92,144	82,130	93,153	216,104	1,995,903
2019	294,905	667,621	25,013	62,896	399,822	72,137	64,910	92,690	85,803	95,224	217,750	2,078,772
2020	287,061	615,620	14,595	60,629	390,638	68,901	67,447	92,872	81,939	91,793	208,811	1,980,307
2021	291,268	643,398	14,289	61,831	397,534	70,279	68,414	94,219	82,258	90,158	212,286	2,025,934
2022	293,132	656,426	14,322	61,576	401,963	71,235	68,700	94,914	83,228	92,554	213,679	2,051,728
2023	295,433	668,541	14,385	62,286	406,686	72,123	69,044	95,527	84,585	93,016	215,007	2,076,632
2024	297,614	680,480	14,540	63,233	411,221	72,977	69,398	96,085	85,445	93,468	216,051	2,100,511
2025	300,698	692,244	14,670	63,786	415,881	73,808	69,732	96,585	86,448	94,088	217,013	2,124,953
2026	303,213	703,834	14,711	64,277	420,648	74,318	69,975	97,053	87,144	94,536	218,349	2,148,057
2027	305,289	715,250	14,944	65,964	425,444	74,805	70,346	97,485	88,222	95,167	219,695	2,172,610
2028	307,052	726,492	15,202	66,578	430,019	75,251	70,748	97,877	89,358	96,017	220,968	2,195,561
2029	308,704	737,561	15,362	67,649	434,775	75,661	71,262	98,215	90,498	96,633	222,155	2,218,476
2030	310,245	748,458	15,512	68,169	439,581	76,041	71,500	98,517	91,353	97,191	223,157	2,239,724
2031	311,704	759,182	15,584	68,902	444,050	76,403	71,707	98,967	92,177	97,653	224,090	2,260,418
2032	313,079	769,735	15,641	69,317	448,216	76,739	71,747	99,389	92,796	98,237	224,871	2,279,769
2033	314,378	780,117	15,648	69,719	452,384	77,048	71,734	99,778	93,381	98,475	225,588	2,298,252
2034	315,623	790,328	15,652	70,111	456,631	77,331	71,701	100,146	93,961	98,705	226,231	2,316,421
2035	316,818	800,369	15,657	70,495	460,882	77,598	71,608	100,494	94,520	98,895	226,826	2,334,163
2036	317,987	810,241	15,705	70,877	465,656	77,807	71,657	100,448	94,932	99,277	227,373	2,351,959
2037	319,127	819,943	15,754	71,247	470,121	77,998	71,682	100,380	95,537	99,408	227,883	2,369,080
2038	320,226	829,477	15,797	71,614	474,635	78,167	71,741	100,299	95,959	99,548	228,349	2,385,812
2039	321,290	838,842	15,842	71,968	479,206	78,318	71,729	100,191	96,284	99,647	228,777	2,402,094
2040	322,341	848,040	15,884	72,326	484,007	78,465	71,738	100,078	96,659	99,756	229,189	2,418,484
2041	323,454	857,070	15,927	72,694	487,965	78,607	71,734	99,978	96,964	100,059	229,636	2,434,088
2042	324,636	865,934	15,974	73,077	491,973	78,772	71,745	99,907	97,353	100,165	230,124	2,449,661
2043	325,887	874,631	16,019	73,471	496,014	78,933	71,817	99,844	97,921	100,274	230,656	2,465,467
2044	327,173	883,163	16,068	73,872	500,374	79,111	71,841	99,794	98,252	100,448	231,211	2,481,306
2045	328,465	891,529	16,116	74,271	504,318	79,258	71,871	99,743	98,601	100,567	231,771	2,496,510
2046	329,772	899,731	16,163	74,673	508,357	79,416	71,918	99,699	98,961	100,909	232,340	2,511,939
2047	331,140	907,768	16,213	75,094	512,321	79,585	71,965	99,682	99,371	101,057	232,974	2,527,171
2048	332,599	915,641	16,266	75,525	516,284	79,750	72,023	99,685	99,813	101,251	233,666	2,542,505
2049	334,140	923,351	16,325	75,975	520,247	79,948	72,136	99,715	100,311	101,458	234,428	2,558,033
2050	335,737	930,898	16,382	76,438	524,168	80,144	72,254	99,774	100,588	101,671	235,237	2,573,291
Average Annual Growth Rates												
1991-2020	2.0%	3.3%	-2.4%	1.2%	1.4%	1.2%	0.0%	0.4%	-0.2%	0.1%	1.5%	1.6%
2005-2020	0.2%	2.4%	-4.7%	-0.1%	0.9%	-0.6%	-0.1%	-0.1%	-0.9%	-1.2%	0.5%	0.7%
2010-2020	-0.4%	2.0%	-7.2%	-0.5%	0.3%	-0.9%	-1.1%	-0.5%	-2.5%	-1.2%	-0.1%	0.2%
2015-2020	-0.1%	2.3%	-10.3%	0.1%	0.7%	-1.0%	0.4%	0.4%	-1.1%	-0.8%	0.3%	0.6%
2020-2025	0.9%	2.4%	0.1%	1.0%	1.3%	1.4%	0.7%	0.8%	1.1%	0.5%	0.8%	1.4%
2020-2030	0.8%	2.0%	0.6%	1.2%	1.2%	1.0%	0.6%	0.6%	1.1%	0.6%	0.7%	1.2%
2020-2040	0.6%	1.6%	0.4%	0.9%	1.1%	0.7%	0.3%	0.4%	0.8%	0.4%	0.5%	1.0%
2020-2050	0.5%	1.4%	0.4%	0.8%	1.0%	0.5%	0.2%	0.2%	0.7%	0.3%	0.4%	0.9%
2021-2050	0.5%	1.3%	0.5%	0.7%	1.0%	0.5%	0.2%	0.2%	0.7%	0.4%	0.4%	0.8%

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
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	-	-	-	-	-	1,158	-	-	-	7,342	-	8,500
2018	-	-	-	-	-	1,119	-	-	-	8,130	-	9,249
2019	-	-	-	-	-	1,152	-	-	-	8,309	-	9,461
2020	-	-	-	-	-	1,159	-	-	-	7,406	-	8,564
2021	-	-	-	-	-	1,090	-	-	-	7,828	-	8,918
2022	-	-	-	-	-	1,073	-	-	-	7,921	-	8,993
2023	-	-	-	-	-	1,055	-	-	-	8,014	-	9,069
2024	-	-	-	-	-	1,037	-	-	-	8,107	-	9,144
2025	-	-	-	-	-	1,018	-	-	-	8,201	-	9,219
2026	-	-	-	-	-	999	-	-	-	8,295	-	9,294
2027	-	-	-	-	-	979	-	-	-	8,408	-	9,388
2028	-	-	-	-	-	959	-	-	-	8,522	-	9,481
2029	-	-	-	-	-	938	-	-	-	8,636	-	9,574
2030	-	-	-	-	-	917	-	-	-	8,750	-	9,668
2031	-	-	-	-	-	895	-	-	-	8,866	-	9,761
2032	-	-	-	-	-	873	-	-	-	8,982	-	9,855
2033	-	-	-	-	-	850	-	-	-	9,098	-	9,949
2034	-	-	-	-	-	827	-	-	-	9,215	-	10,042
2035	-	-	-	-	-	803	-	-	-	9,332	-	10,135
2036	-	-	-	-	-	779	-	-	-	9,450	-	10,229
2037	-	-	-	-	-	754	-	-	-	9,568	-	10,322
2038	-	-	-	-	-	728	-	-	-	9,687	-	10,415
2039	-	-	-	-	-	702	-	-	-	9,806	-	10,508
2040	-	-	-	-	-	675	-	-	-	9,926	-	10,602
2041	-	-	-	-	-	648	-	-	-	10,047	-	10,695
2042	-	-	-	-	-	620	-	-	-	10,168	-	10,788
2043	-	-	-	-	-	591	-	-	-	10,290	-	10,881
2044	-	-	-	-	-	562	-	-	-	10,412	-	10,974
2045	-	-	-	-	-	532	-	-	-	10,534	-	11,067
2046	-	-	-	-	-	502	-	-	-	10,657	-	11,159
2047	-	-	-	-	-	471	-	-	-	10,800	-	11,271
2048	-	-	-	-	-	439	-	-	-	10,944	-	11,383
2049	-	-	-	-	-	406	-	-	-	11,089	-	11,495
2050	-	-	-	-	-	373	-	-	-	11,234	-	11,607
Average Annual Growth Rates												
1991-2020	-100.0%	--	--	-100.0%	-100.0%	-1.1%	--	--	--	3.6%	-100.0%	-1.0%
2005-2020	-100.0%	--	--	--	--	-5.4%	--	--	--	2.0%	-100.0%	-3.0%
2010-2020	--	--	--	--	--	-4.8%	--	--	--	1.9%	--	0.7%
2015-2020	--	--	--	--	--	-1.6%	--	--	--	1.3%	--	0.9%
2020-2025	--	--	--	--	--	-2.6%	--	--	--	2.1%	--	1.5%
2020-2030	--	--	--	--	--	-2.3%	--	--	--	1.7%	--	1.2%
2020-2040	--	--	--	--	--	-2.7%	--	--	--	1.5%	--	1.1%
2020-2050	--	--	--	--	--	-3.7%	--	--	--	1.4%	--	1.0%
2021-2050	--	--	--	--	--	-3.6%	--	--	--	1.3%	--	0.9%

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
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	83	6,385	-	702	7,638	-	1,250	549	141	-	686	17,434
2018	70	4,486	-	858	7,921	-	1,246	650	89	-	774	16,093
2019	40	2,620	-	752	5,068	-	1,250	554	7	-	570	10,861
2020	54	2,945	-	802	5,940	-	285	469	22	-	588	11,106
2021	54	4,315	-	1,206	5,970	-	868	650	95	-	671	13,829
2022	54	4,315	-	1,206	6,000	-	868	671	95	-	689	13,898
2023	54	4,315	-	1,206	6,030	-	868	671	95	-	708	13,947
2024	54	4,315	-	1,206	6,060	-	868	691	95	-	727	14,016
2025	54	4,315	-	1,206	6,090	-	868	691	95	-	745	14,064
2026	54	4,315	-	1,206	6,120	-	868	711	95	-	764	14,133
2027	54	4,315	-	1,206	6,150	-	868	711	95	-	782	14,182
2028	54	4,315	-	1,206	6,180	-	868	732	95	-	801	14,251
2029	54	4,315	-	1,206	6,210	-	868	732	95	-	820	14,299
2030	54	4,315	-	1,206	6,240	-	868	752	95	-	838	14,368
2031	54	4,315	-	1,206	6,270	-	868	752	95	-	857	14,417
2032	54	4,315	-	1,206	6,300	-	868	772	95	-	876	14,486
2033	54	4,315	-	1,206	6,330	-	868	772	95	-	894	14,535
2034	54	4,315	-	1,206	6,360	-	868	793	95	-	913	14,603
2035	54	4,315	-	1,206	6,390	-	868	793	95	-	931	14,652
2036	54	4,315	-	1,206	6,420	-	868	813	95	-	950	14,721
2037	54	4,315	-	1,206	6,450	-	868	813	95	-	969	14,770
2038	54	4,315	-	1,206	6,480	-	868	833	95	-	987	14,839
2039	54	4,315	-	1,206	6,510	-	868	833	95	-	1,006	14,887
2040	54	4,315	-	1,206	6,540	-	868	853	95	-	1,025	14,956
2041	54	4,315	-	1,206	6,570	-	868	853	95	-	1,043	15,005
2042	54	4,315	-	1,206	6,600	-	868	874	95	-	1,062	15,074
2043	54	4,315	-	1,206	6,630	-	868	874	95	-	1,080	15,122
2044	54	4,315	-	1,206	6,660	-	868	894	95	-	1,099	15,191
2045	54	4,315	-	1,206	6,690	-	868	894	95	-	1,118	15,240
2046	54	4,315	-	1,206	6,720	-	868	914	95	-	1,136	15,309
2047	54	4,315	-	1,206	6,750	-	868	914	95	-	1,155	15,358
2048	54	4,315	-	1,206	6,780	-	868	935	95	-	1,174	15,427
2049	54	4,315	-	1,206	6,810	-	868	935	95	-	1,192	15,475
2050	54	4,315	-	1,206	6,840	-	868	955	95	-	1,211	15,544
Average Annual Growth Rates												
1991-2020	-3.7%	-2.7%	--	1.0%	2.0%	--	4.0%	2.3%	-8.0%	--	7.4%	-0.1%
2005-2020	-5.9%	0.1%	--	1.1%	2.8%	--	3.8%	4.4%	-7.0%	--	4.3%	1.9%
2010-2020	-0.3%	-0.6%	--	2.7%	2.2%	--	-10.1%	7.0%	-14.8%	--	7.3%	1.0%
2015-2020	-9.6%	-11.5%	--	0.3%	0.9%	--	-25.4%	7.3%	-23.6%	--	6.2%	-4.6%
2020-2025	-0.1%	7.9%	--	8.5%	0.5%	--	24.9%	8.0%	33.5%	--	4.8%	4.8%
2020-2030	0.0%	3.9%	--	4.2%	0.5%	--	11.8%	4.8%	15.6%	--	3.6%	2.6%
2020-2040	0.0%	1.9%	--	2.1%	0.5%	--	5.7%	3.0%	7.5%	--	2.8%	1.5%
2020-2050	0.0%	1.3%	--	1.4%	0.5%	--	3.8%	2.4%	4.9%	--	2.4%	1.1%
2021-2050	0.0%	0.0%	--	0.0%	0.5%	--	0.0%	1.3%	0.0%	--	2.1%	0.4%

Minnkota members provided service to 10,812 general commercial customers in 2020. The largest contributors to this class include a diverse mix of retail, agriculture, small manufacturing, schools and offices. This class accounted for 8 percent of Minnkota's consumers and 14 percent of total energy sales in 2020. General commercial energy sales grew 1.8 percent during the 1991 to 2020 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 1.9 percent through 2050. This is slower than the historical growth of 2.4 percent per year from 1991 through 2020.

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 decrease at -0.7 percent per year through 2050.

General Commercial Energy Sales Forecast

The total general commercial energy sales forecast is summarized in Table 3.8. Steady growth in energy sales to this class is projected throughout the forecast period at a slower rate than what has been experienced historically (1.2 percent over the 2021-2050 period versus 1.8 percent over the 1991-2020 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.

<u>Year</u>	<u>Beltrami</u>	<u>Cass County</u>	<u>Clearwater-Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North Star</u>	<u>PKM</u>	<u>Red Lake</u>	<u>Red River</u>	<u>Roseau</u>	<u>Wild Rice</u>	<u>Total Members</u>
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	1,313	3,325	70	284	307	537	254	355	497	302	644	7,889
2010	1,321	3,488	72	285	302	547	260	353	503	303	654	8,088
2011	1,355	3,611	73	283	290	554	265	347	496	299	664	8,236
2012	1,352	3,774	74	263	292	560	260	353	508	301	671	8,407
2013	1,342	3,910	79	253	233	562	252	345	526	303	690	8,496
2014	1,314	4,118	83	255	247	567	251	350	536	305	725	8,752
2015	1,293	4,386	94	242	260	580	246	352	533	307	752	9,046
2016	1,293	4,680	91	236	260	586	239	357	542	302	767	9,353
2017	1,303	4,959	99	202	260	615	238	363	548	298	777	9,662
2018	1,288	5,148	100	198	266	643	241	377	569	298	783	9,910
2019	1,374	5,339	90	200	263	674	238	392	576	296	778	10,218
2020	1,422	5,567	374	198	262	680	247	409	578	296	777	10,812
2021	1,441	5,715	375	199	262	690	256	412	584	300	777	11,012
2022	1,459	5,920	375	201	262	700	263	425	598	303	778	11,284
2023	1,477	6,126	375	203	262	710	268	436	607	307	778	11,549
2024	1,494	6,335	375	205	262	720	273	445	615	310	779	11,812
2025	1,510	6,546	375	207	262	730	276	452	622	313	780	12,073
2026	1,526	6,760	375	209	262	740	279	458	629	315	782	12,334
2027	1,540	6,976	375	210	262	750	281	463	635	318	783	12,594
2028	1,554	7,195	376	210	262	760	283	467	641	320	785	12,854
2029	1,567	7,418	376	211	262	770	285	470	647	323	787	13,115
2030	1,579	7,644	376	212	262	780	286	473	652	325	788	13,377
2031	1,591	7,873	376	212	262	790	287	475	657	327	790	13,640
2032	1,601	8,105	376	213	262	800	288	477	661	328	792	13,904
2033	1,612	8,340	376	213	262	810	289	479	665	330	794	14,170
2034	1,621	8,580	376	214	262	820	290	480	669	331	795	14,438
2035	1,630	8,822	376	214	262	830	291	480	672	333	797	14,708
2036	1,639	9,069	376	214	262	840	291	481	675	334	799	14,981
2037	1,647	9,319	376	215	262	850	292	481	678	335	800	15,255
2038	1,655	9,572	376	215	262	860	293	481	681	336	802	15,533
2039	1,663	9,830	376	215	262	870	293	481	683	337	803	15,813
2040	1,670	10,091	376	215	262	880	293	481	686	338	805	16,097
2041	1,677	10,357	376	215	262	890	294	480	688	338	806	16,384
2042	1,683	10,626	376	216	262	900	294	480	691	339	807	16,675
2043	1,690	10,899	376	216	262	910	295	480	694	340	808	16,970
2044	1,697	11,177	376	216	262	920	295	479	697	340	810	17,270
2045	1,703	11,459	376	217	262	930	295	479	700	341	811	17,574
2046	1,710	11,745	376	217	262	940	296	479	703	342	813	17,882
2047	1,717	12,036	376	217	262	950	296	478	706	342	814	18,195
2048	1,723	12,331	376	218	262	960	296	478	710	343	815	18,513
2049	1,730	12,631	376	218	262	970	296	478	714	344	817	18,837
2050	1,737	12,936	376	219	262	980	297	478	718	345	818	19,166
Average Annual Growth Rates												
1991-2020	2.8%	5.0%	6.3%	1.4%	-5.8%	1.5%	0.6%	1.9%	1.9%	1.7%	3.1%	2.4%
2005-2020	1.3%	5.0%	12.7%	-2.0%	-1.5%	1.9%	0.2%	1.3%	1.7%	0.3%	2.1%	3.0%
2010-2020	0.7%	4.8%	17.9%	-3.6%	-1.4%	2.2%	-0.5%	1.5%	1.4%	-0.2%	1.7%	2.9%
2015-2020	1.9%	4.9%	31.8%	-3.9%	0.2%	3.2%	0.1%	3.1%	1.6%	-0.7%	0.7%	3.6%
2020-2025	1.2%	3.3%	0.1%	0.9%	0.0%	1.4%	2.2%	2.0%	1.5%	1.1%	0.1%	2.2%
2020-2030	1.1%	3.2%	0.0%	0.7%	0.0%	1.4%	1.5%	1.5%	1.2%	0.9%	0.1%	2.2%
2020-2040	0.8%	3.0%	0.0%	0.4%	0.0%	1.3%	0.9%	0.8%	0.9%	0.7%	0.2%	2.0%
2020-2050	0.7%	2.9%	0.0%	0.3%	0.0%	1.2%	0.6%	0.5%	0.7%	0.5%	0.2%	1.9%
2021-2050	0.6%	2.9%	0.0%	0.3%	0.0%	1.2%	0.5%	0.5%	0.7%	0.5%	0.2%	1.9%

Table 3.7

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

Year	Beltrami	Cass County	Clearwater- Cavalier	Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Minnkota Avg. Use
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	43,566	62,547	67,718	23,395	346,300	39,178	60,948	42,188	49,071	46,883	56,328	64,559
2010	41,116	57,601	76,392	22,580	349,066	37,105	74,959	43,599	51,534	44,800	51,445	61,944
2011	42,813	54,281	76,426	22,851	339,185	37,066	74,398	42,812	37,993	44,005	43,345	58,325
2012	41,102	51,162	71,771	23,344	343,430	35,626	36,254	39,103	40,221	52,362	40,109	55,506
2013	45,764	53,295	76,502	26,449	447,494	38,514	69,967	45,014	45,088	51,309	48,492	60,557
2014	46,430	55,076	71,702	29,888	481,388	41,258	62,083	49,286	49,659	45,083	52,851	63,452
2015	43,122	47,520	57,905	28,136	410,992	35,964	60,483	42,268	44,443	44,160	45,796	55,904
2016	42,413	45,591	60,344	28,270	436,316	34,840	68,348	41,850	42,886	43,565	46,507	55,345
2017	45,530	45,691	57,919	32,641	428,854	34,169	62,272	40,881	43,129	41,439	47,882	55,218
2018	47,939	46,451	69,588	34,659	450,758	33,732	63,952	39,328	41,221	40,965	49,805	56,606
2019	45,831	45,180	58,915	34,445	455,709	32,892	61,134	39,686	41,262	42,525	48,845	55,064
2020	42,406	41,436	50,722	30,453	411,467	30,529	60,797	38,097	39,014	42,569	49,115	50,740
2021	44,824	41,022	50,807	33,453	447,267	30,223	60,650	37,907	39,975	42,673	49,509	51,639
2022	44,824	40,612	50,935	33,499	452,811	29,921	61,503	37,717	40,945	42,580	48,251	51,260
2023	44,824	40,206	51,022	33,579	465,787	29,622	62,177	37,529	40,741	42,467	49,646	51,174
2024	44,824	39,804	51,149	33,654	471,180	29,326	62,646	37,341	40,537	42,332	49,881	50,831
2025	44,824	39,405	51,277	33,725	476,600	29,032	63,014	37,155	40,334	42,182	50,120	50,489
2026	44,824	39,011	51,365	33,791	482,044	28,742	63,287	36,969	40,133	42,014	50,366	50,145
2027	44,824	38,621	51,494	33,830	487,508	28,455	63,497	36,784	39,932	41,821	50,624	49,804
2028	44,824	38,235	51,587	33,867	492,990	28,170	63,688	36,600	39,732	41,608	50,882	49,462
2029	44,824	37,853	51,718	33,902	498,484	27,888	63,790	36,417	39,534	41,374	51,142	49,120
2030	44,824	37,474	51,808	33,913	503,991	27,609	63,911	36,235	39,336	41,125	51,386	48,776
2031	44,824	37,099	51,941	33,942	509,507	27,333	63,987	36,054	39,139	40,872	51,629	48,434
2032	44,824	36,728	52,032	33,968	515,031	27,060	64,029	35,873	38,943	40,581	51,861	48,089
2033	44,824	36,361	52,167	33,993	520,559	26,789	64,096	35,694	38,749	40,278	52,090	47,746
2034	44,824	35,998	52,259	34,016	526,092	26,522	64,108	35,516	38,555	39,953	52,313	47,400
2035	44,824	35,638	52,399	34,037	531,632	26,256	64,129	35,338	38,362	39,632	52,534	47,056
2036	44,824	35,281	52,492	34,057	537,177	25,994	64,126	35,161	38,170	39,281	52,749	46,710
2037	44,824	34,928	52,631	34,076	542,732	25,734	64,165	34,986	37,980	38,933	52,961	46,366
2038	44,824	34,579	52,725	34,075	548,290	25,476	64,140	34,811	37,790	38,555	53,169	46,019
2039	44,824	34,233	52,821	34,093	553,854	25,222	64,135	34,637	37,601	38,180	53,375	45,674
2040	44,824	33,891	52,961	34,109	559,422	24,969	64,103	34,463	37,413	37,778	53,577	45,328
2041	44,824	33,552	53,058	34,125	564,997	24,720	64,078	34,291	37,226	37,387	53,775	44,982
2042	44,824	33,217	53,201	34,142	570,582	24,473	64,087	34,120	37,040	36,986	53,971	44,638
2043	44,824	32,884	53,299	34,161	576,179	24,228	64,053	33,949	36,854	36,567	54,166	44,292
2044	44,824	32,556	53,443	34,181	581,794	23,986	64,008	33,779	36,670	36,164	54,358	43,948
2045	44,824	32,230	53,542	34,182	587,431	23,746	63,981	33,610	36,487	35,753	54,549	43,603
2046	44,824	31,908	53,642	34,202	593,093	23,508	63,934	33,442	36,304	35,324	54,739	43,260
2047	44,824	31,589	53,789	34,222	598,783	23,273	63,886	33,275	36,123	34,916	54,930	42,918
2048	44,824	31,273	53,890	34,244	604,506	23,040	63,866	33,109	35,942	34,504	55,120	42,577
2049	44,824	30,960	54,043	34,268	610,263	22,810	63,830	32,943	35,762	34,100	55,312	42,238
2050	44,824	30,650	54,145	34,292	616,058	22,582	63,776	32,778	35,584	33,700	55,503	41,899
Average Annual Growth Rates												
1991-2020	-0.6%	-2.8%	2.7%	0.2%	6.8%	-1.0%	1.7%	-0.4%	-1.0%	-0.4%	1.9%	-0.6%
2005-2020	-0.3%	-4.0%	3.4%	0.5%	1.0%	-2.0%	1.0%	-0.5%	-0.1%	-0.6%	0.2%	-2.2%
2010-2020	0.3%	-3.2%	-4.0%	3.0%	1.7%	-1.9%	-2.1%	-1.3%	-2.7%	-0.5%	-0.5%	-2.0%
2015-2020	-0.3%	-2.7%	-2.6%	1.6%	0.0%	-3.2%	0.1%	-2.1%	-2.6%	-0.7%	1.4%	-1.9%
2020-2025	1.1%	-1.0%	0.2%	2.1%	3.0%	-1.0%	0.7%	-0.5%	0.7%	-0.2%	0.4%	-0.1%
2020-2030	0.6%	-1.0%	0.2%	1.1%	2.0%	-1.0%	0.5%	-0.5%	0.1%	-0.3%	0.5%	-0.4%
2020-2040	0.3%	-1.0%	0.2%	0.6%	1.5%	-1.0%	0.3%	-0.5%	-0.2%	-0.6%	0.4%	-0.6%
2020-2050	0.2%	-1.0%	0.2%	0.4%	1.4%	-1.0%	0.2%	-0.5%	-0.3%	-0.8%	0.4%	-0.6%
2021-2050	0.0%	-1.0%	0.2%	0.1%	1.1%	-1.0%	0.2%	-0.5%	-0.4%	-0.8%	0.4%	-0.7%

Table 3.8

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

Year	Beltrami	Cass County	Clearwater- Cavalier	Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
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	57,183	207,963	4,729	6,654	106,401	21,045	15,506	14,984	24,368	14,167	36,285	509,285
2010	54,308	200,887	5,532	6,443	105,563	20,309	19,452	15,372	25,935	13,574	33,654	501,029
2011	58,001	196,001	5,585	6,455	98,448	20,516	19,715	14,866	18,835	13,161	28,792	480,377
2012	55,566	193,060	5,293	6,149	100,310	19,933	9,426	13,820	20,415	15,770	26,903	466,646
2013	61,427	208,382	6,012	6,700	104,415	21,638	17,655	15,537	23,716	15,564	33,463	514,510
2014	61,028	226,797	5,969	7,612	118,983	23,400	15,598	17,234	26,617	13,758	38,308	555,303
2015	55,768	208,428	5,458	6,816	106,926	20,856	14,899	14,861	23,688	13,550	34,450	505,700
2016	54,822	213,369	5,516	6,677	113,515	20,431	16,341	14,920	23,223	13,157	35,679	517,649
2017	59,341	226,593	5,758	6,577	111,395	21,020	14,816	14,823	23,638	12,352	37,188	533,500
2018	61,753	239,140	6,959	6,863	119,714	21,698	15,380	14,810	23,451	12,197	39,014	560,979
2019	62,952	241,223	5,327	6,901	119,700	22,156	14,545	15,540	23,746	12,580	37,981	562,651
2020	60,287	230,662	18,983	6,040	107,873	20,767	15,042	15,595	22,544	12,615	38,175	548,581
2021	64,569	234,458	19,054	6,650	117,259	20,862	15,527	15,625	23,351	12,796	38,476	568,626
2022	65,389	240,411	19,106	6,738	118,712	20,952	16,162	16,041	24,489	12,914	37,516	578,431
2023	66,182	246,303	19,144	6,825	122,114	21,039	16,675	16,361	24,715	13,018	38,636	591,012
2024	66,948	252,144	19,196	6,906	123,528	21,122	17,071	16,604	24,914	13,107	38,866	600,405
2025	67,685	257,940	19,247	6,982	124,949	21,201	17,392	16,786	25,085	13,186	39,108	609,562
2026	68,380	263,698	19,283	7,054	126,376	21,276	17,645	16,921	25,236	13,251	39,369	618,490
2027	69,034	269,423	19,335	7,093	127,808	21,348	17,851	17,018	25,372	13,299	39,650	627,231
2028	69,651	275,120	19,373	7,129	129,245	21,416	18,029	17,084	25,482	13,332	39,938	635,798
2029	70,232	280,791	19,426	7,161	130,686	21,481	18,161	17,123	25,575	13,350	40,231	644,217
2030	70,779	286,439	19,461	7,186	132,130	21,542	18,284	17,139	25,643	13,355	40,516	652,475
2031	71,295	292,068	19,514	7,211	133,576	21,600	18,381	17,136	25,704	13,351	40,800	660,638
2032	71,781	297,678	19,552	7,234	135,024	21,655	18,459	17,117	25,740	13,327	41,076	668,642
2033	72,239	303,270	19,603	7,254	136,473	21,706	18,539	17,082	25,762	13,292	41,348	676,570
2034	72,671	308,846	19,641	7,271	137,924	21,754	18,595	17,035	25,777	13,243	41,615	684,371
2035	73,079	314,406	19,693	7,287	139,376	21,799	18,647	16,978	25,776	13,188	41,877	692,107
2036	73,467	319,952	19,732	7,301	140,830	21,841	18,687	16,911	25,771	13,118	42,132	699,741
2037	73,835	325,485	19,786	7,315	142,286	21,880	18,735	16,835	25,756	13,043	42,383	707,339
2038	74,186	331,005	19,822	7,322	143,743	21,916	18,761	16,754	25,729	12,954	42,628	714,819
2039	74,521	336,512	19,860	7,334	145,202	21,949	18,792	16,665	25,695	12,860	42,868	722,258
2040	74,841	342,006	19,913	7,343	146,662	21,979	18,813	16,572	25,658	12,754	43,103	729,645
2041	75,151	347,488	19,951	7,353	148,123	22,007	18,832	16,476	25,626	12,649	43,334	736,990
2042	75,455	352,959	20,005	7,364	149,588	22,031	18,862	16,380	25,604	12,539	43,563	744,350
2043	75,755	358,419	20,042	7,378	151,055	22,053	18,874	16,284	25,582	12,421	43,791	751,655
2044	76,054	363,870	20,097	7,393	152,527	22,073	18,882	16,189	25,566	12,309	44,019	758,980
2045	76,352	369,314	20,133	7,405	154,005	22,089	18,893	16,096	25,549	12,194	44,247	766,276
2046	76,648	374,752	20,172	7,422	155,489	22,104	18,898	16,004	25,530	12,072	44,476	773,567
2047	76,947	380,187	20,229	7,438	156,981	22,115	18,902	15,915	25,517	11,957	44,707	780,895
2048	77,249	385,622	20,267	7,458	158,481	22,125	18,911	15,829	25,517	11,842	44,941	788,241
2049	77,558	391,058	20,322	7,479	159,991	22,131	18,914	15,747	25,524	11,730	45,179	795,633
2050	77,874	396,498	20,360	7,502	161,510	22,136	18,911	15,670	25,537	11,622	45,421	803,042
Average Annual Growth Rates												
1991-2020	2.2%	2.0%	9.2%	1.6%	0.5%	0.5%	2.3%	1.5%	0.9%	1.3%	5.1%	1.8%
2005-2020	1.0%	0.8%	16.5%	-1.4%	-0.5%	-0.2%	1.2%	0.8%	1.6%	-0.3%	2.2%	0.8%
2010-2020	1.0%	1.4%	13.1%	-0.6%	0.2%	0.2%	-2.5%	0.1%	-1.4%	-0.7%	1.3%	0.9%
2015-2020	1.6%	2.0%	28.3%	-2.4%	0.2%	-0.1%	0.2%	1.0%	-1.0%	-1.4%	2.1%	1.6%
2020-2025	2.3%	2.3%	0.3%	2.9%	3.0%	0.4%	2.9%	1.5%	2.2%	0.9%	0.5%	2.1%
2020-2030	1.6%	2.2%	0.2%	1.8%	2.0%	0.4%	2.0%	0.9%	1.3%	0.6%	0.6%	1.7%
2020-2040	1.1%	2.0%	0.2%	1.0%	1.5%	0.3%	1.1%	0.3%	0.6%	0.1%	0.6%	1.4%
2020-2050	0.9%	1.8%	0.2%	0.7%	1.4%	0.2%	0.8%	0.0%	0.4%	-0.3%	0.6%	1.3%
2021-2050	0.6%	1.8%	0.2%	0.4%	1.1%	0.2%	0.7%	0.0%	0.3%	-0.3%	0.6%	1.2%

3.2.5 Large Commercial Class Forecast

Minnkota members served 298 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 1,002,366 MWh in 2020 and were projected to grow to 1,319,622 MWh by 2050 due to expected growth from new loads and expansion opportunities within the existing customer base. Several very large data center loads are expected to energize in Nodak by 2022-23 however their impact is presented separately in Appendix G. 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 752 customers with energy sales of 8,741 MWh to this class in 2020. This class was projected based upon input from each member system. Energy sales are expected to decline at -0.1 percent per year over the projection horizon as customer gains are offset by efficient lighting upgrades.

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 2020. 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 8,605 MWh in 2020. Energy growth during 1991-2020 averaged 1.8 percent per year. The projection through 2050 was developed by leaving energy sales at the average of the past two years levels based on staff discussions.

Table 3.9

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

Year	Beltrami	Cass County	Clearwater- Cavalier	Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
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	16,873	212,274	-	2,227	227,257	13,181	1,328	9,362	10,011	30,521	8,857	531,891
2010	21,372	231,095	-	2,289	264,788	11,566	1,635	10,615	9,467	35,037	8,871	596,736
2011	19,408	289,505	-	1,941	399,677	12,143	1,585	10,912	10,878	39,693	10,938	796,678
2012	20,276	309,451	-	1,892	451,585	13,045	15,032	10,937	9,796	41,430	13,316	886,760
2013	21,407	328,908	-	1,724	464,915	13,897	22,301	11,815	11,024	44,515	14,147	934,654
2014	19,809	351,198	63	1,911	484,022	14,610	23,083	12,380	10,196	46,731	14,614	978,615
2015	20,777	371,153	591	1,764	495,883	14,396	23,407	11,016	12,063	44,239	15,530	1,010,819
2016	20,780	381,098	580	1,803	478,172	13,714	25,908	10,597	15,773	40,053	15,916	1,004,393
2017	16,530	406,356	626	3,503	533,480	13,761	24,253	9,911	14,612	38,465	15,852	1,077,347
2018	16,566	417,109	580	3,701	543,657	14,592	24,427	9,556	15,942	38,273	16,657	1,101,060
2019	15,342	415,946	700	3,902	508,889	15,584	24,524	8,533	14,600	37,152	15,896	1,061,068
2020	13,117	400,266	854	3,420	470,367	15,456	24,278	7,123	14,145	37,915	15,425	1,002,366
2021	12,696	428,367	850	3,420	477,153	15,461	24,278	7,128	15,430	37,918	18,221	1,040,921
2022	12,696	454,767	850	3,420	486,940	15,466	24,278	7,133	15,473	37,921	27,596	1,086,538
2023	12,696	467,767	850	3,420	487,531	15,470	24,278	7,137	15,515	37,923	28,596	1,101,184
2024	12,696	471,561	850	3,420	488,126	15,475	24,278	9,142	16,558	37,926	28,596	1,108,627
2025	12,696	475,430	850	3,420	491,722	15,979	24,278	9,147	16,602	37,929	28,596	1,116,649
2026	12,696	482,378	850	3,420	492,322	14,606	24,278	9,152	16,645	37,931	28,596	1,122,874
2027	12,696	486,404	850	3,420	492,924	13,922	24,278	9,156	16,689	37,934	28,596	1,126,869
2028	13,696	490,511	850	3,420	496,529	13,238	24,278	9,161	16,733	37,937	29,596	1,135,948
2029	13,696	497,700	850	3,420	497,136	13,243	24,278	9,166	17,778	37,939	29,596	1,144,801
2030	13,696	501,972	850	3,420	497,746	13,747	24,278	9,171	17,822	37,942	29,596	1,150,240
2031	13,696	506,330	850	3,420	501,359	13,752	24,278	9,175	17,867	37,945	29,596	1,158,268
2032	13,696	513,776	850	3,420	501,974	13,757	24,278	9,180	18,912	37,948	29,596	1,167,387
2033	13,696	518,310	850	3,420	502,592	13,762	24,278	9,185	18,958	37,950	29,596	1,172,597
2034	13,696	522,935	850	3,420	506,213	13,767	24,278	11,190	19,004	37,953	29,596	1,182,901
2035	13,696	530,652	850	4,420	506,837	14,271	24,278	11,194	20,050	38,956	29,596	1,194,800
2036	13,696	535,464	850	4,420	507,463	14,276	24,278	11,199	20,096	38,959	29,596	1,200,297
2037	13,696	540,372	850	4,420	511,092	14,281	24,278	11,204	20,143	38,961	29,596	1,208,893
2038	14,696	548,378	850	4,420	511,724	14,286	24,278	11,209	21,190	38,964	29,596	1,219,591
2039	14,696	553,484	850	4,420	512,359	14,291	24,278	11,214	21,237	38,967	29,596	1,225,392
2040	14,696	558,692	850	4,420	515,996	14,796	24,278	11,218	21,285	38,970	29,596	1,234,798
2041	14,696	567,005	850	4,420	516,637	14,801	24,278	11,223	22,333	38,973	29,596	1,244,811
2042	14,696	572,424	850	4,420	517,280	14,806	24,278	11,228	22,381	38,975	29,596	1,250,934
2043	14,696	577,951	850	4,420	520,926	14,811	24,278	11,233	22,430	38,978	29,596	1,260,168
2044	14,696	586,588	850	4,420	521,575	14,816	24,278	11,238	23,479	38,981	29,596	1,270,516
2045	14,696	592,339	850	4,420	522,226	15,321	24,278	11,242	23,528	38,984	29,596	1,277,480
2046	14,696	598,204	850	4,420	525,881	15,326	24,278	11,247	23,577	38,987	29,596	1,287,063
2047	14,696	604,187	850	4,420	526,538	15,332	24,278	11,252	24,627	38,990	29,596	1,294,766
2048	14,696	610,289	850	4,420	527,199	15,337	24,278	11,257	24,677	38,992	29,596	1,301,591
2049	14,696	616,514	850	4,420	530,862	15,342	24,278	11,262	24,728	38,995	29,596	1,311,543
2050	14,696	622,863	850	4,420	531,528	15,347	24,278	11,267	25,779	38,998	29,596	1,319,622
Average Annual Growth Rates												
1991-2020	4.9%	--	-6.3%	3.7%	8.1%	4.7%	--	--	--	4.6%	--	9.4%
2005-2020	-1.1%	8.2%	--	3.6%	7.2%	0.5%	20.0%	-0.6%	5.1%	1.0%	5.5%	6.8%
2010-2020	-4.8%	5.6%	--	4.1%	5.9%	2.9%	31.0%	-3.9%	4.1%	0.8%	5.7%	5.3%
2015-2020	-8.8%	1.5%	7.6%	14.2%	-1.1%	1.4%	0.7%	-8.4%	3.2%	-3.0%	-0.1%	-0.2%
2020-2025	-0.7%	3.5%	-0.1%	0.0%	0.9%	0.7%	0.0%	5.1%	3.3%	0.0%	13.1%	2.2%
2020-2030	0.4%	2.3%	0.0%	0.0%	0.6%	-1.2%	0.0%	2.6%	2.3%	0.0%	6.7%	1.4%
2020-2040	0.6%	1.7%	0.0%	1.3%	0.5%	-0.2%	0.0%	2.3%	2.1%	0.1%	3.3%	1.0%
2020-2050	0.4%	1.5%	0.0%	0.9%	0.4%	0.0%	0.0%	1.5%	2.0%	0.1%	2.2%	0.9%
2021-2050	0.5%	1.3%	0.0%	0.9%	0.4%	0.0%	0.0%	1.6%	1.8%	0.1%	1.7%	0.8%

Table 3.10

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

Year	Beltrami	Cass County	Clearwater-Cavalier	Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
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	392	7,425	-	-	-	138	-	54	122	57	446	8,633
2018	382	8,144	-	-	-	134	-	56	116	52	385	9,270
2019	385	7,693	-	-	-	130	-	84	108	48	359	8,808
2020	385	7,067	-	586	-	127	-	66	118	43	348	8,741
2021	386	7,063	-	586	-	126	-	66	118	43	346	8,736
2022	387	7,063	-	586	-	125	-	66	117	43	345	8,734
2023	389	7,063	-	586	-	125	-	66	117	43	343	8,731
2024	390	7,062	-	586	-	124	-	65	116	43	341	8,728
2025	391	7,060	-	586	-	124	-	65	116	43	340	8,724
2026	392	7,058	-	586	-	123	-	65	115	43	338	8,720
2027	393	7,055	-	586	-	122	-	64	114	43	336	8,714
2028	393	7,051	-	586	-	122	-	64	114	43	334	8,708
2029	394	7,047	-	586	-	121	-	64	113	43	333	8,702
2030	395	7,042	-	586	-	120	-	63	113	43	331	8,695
2031	396	7,037	-	586	-	120	-	63	112	43	329	8,687
2032	397	7,031	-	586	-	119	-	63	112	43	328	8,678
2033	397	7,024	-	586	-	119	-	63	111	43	326	8,669
2034	398	7,017	-	586	-	118	-	62	110	43	325	8,659
2035	399	7,009	-	586	-	117	-	62	110	43	323	8,649
2036	400	7,000	-	586	-	117	-	62	109	43	321	8,638
2037	400	6,992	-	586	-	116	-	61	109	43	320	8,627
2038	401	6,982	-	586	-	116	-	61	108	43	318	8,615
2039	401	6,972	-	586	-	115	-	61	108	43	317	8,603
2040	402	6,962	-	586	-	115	-	60	107	43	315	8,590
2041	402	6,951	-	586	-	114	-	60	107	43	313	8,576
2042	403	6,940	-	586	-	113	-	60	106	43	312	8,563
2043	403	6,928	-	586	-	113	-	59	106	43	310	8,549
2044	404	6,916	-	586	-	112	-	59	105	43	309	8,534
2045	404	6,903	-	586	-	112	-	59	105	43	307	8,518
2046	404	6,889	-	586	-	111	-	59	104	43	306	8,502
2047	405	6,876	-	586	-	111	-	58	103	43	304	8,486
2048	405	6,861	-	586	-	110	-	58	103	43	303	8,469
2049	405	6,847	-	586	-	110	-	58	102	43	301	8,452
2050	405	6,832	-	586	-	109	-	57	102	43	300	8,435
Average Annual Growth Rates												
1991-2020	0.2%	5.7%	--	--	-100.0%	0.0%	--	3.2%	-0.1%	0.2%	-0.8%	3.8%
2005-2020	0.9%	2.1%	--	--	--	-1.2%	--	11.9%	5.4%	-5.7%	-3.8%	2.0%
2010-2020	0.9%	-0.3%	--	--	--	-2.1%	--	19.0%	-6.0%	-9.2%	-4.8%	0.1%
2015-2020	14.0%	-4.2%	--	--	--	-2.9%	--	4.5%	-7.8%	-9.1%	-6.6%	-2.4%
2020-2025	0.3%	0.0%	--	0.0%	--	-0.5%	--	-0.4%	-0.5%	0.0%	-0.5%	0.0%
2020-2030	0.3%	0.0%	--	0.0%	--	-0.5%	--	-0.5%	-0.5%	0.0%	-0.5%	-0.1%
2020-2040	0.2%	-0.1%	--	0.0%	--	-0.5%	--	-0.5%	-0.5%	0.0%	-0.5%	-0.1%
2020-2050	0.2%	-0.1%	--	0.0%	--	-0.5%	--	-0.5%	-0.5%	0.0%	-0.5%	-0.1%
2021-2050	0.2%	-0.1%	--	0.0%	--	-0.5%	--	-0.5%	-0.5%	0.0%	-0.5%	-0.1%

Table 3.11

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

Year	Beltrami	Cass County	Clearwater- Cavalier	Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Sales
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	-	-	1,040	-	80,593	-	-	-	-	-	-	81,632
2018	-	-	751	-	91,070	-	-	-	-	-	-	91,821
2019	-	-	1,279	-	91,559	-	-	-	-	-	-	92,838
2020	-	-	714	-	91,662	-	-	-	-	-	-	92,375
2021	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2022	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2023	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2024	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2025	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2026	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2027	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2028	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2029	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2030	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2031	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2032	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2033	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2034	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2035	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2036	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2037	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2038	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2039	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2040	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2041	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2042	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2043	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2044	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2045	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2046	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2047	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2048	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2049	-	-	729	-	91,430	-	-	-	-	-	-	92,159
2050	-	-	729	-	91,430	-	-	-	-	-	-	92,159
Average Annual Growth Rates												
1991-2020	--	-100.0%	1.0%	--	-1.0%	--	--	--	--	--	--	-1.0%
2005-2020	--	--	-0.6%	--	2.5%	--	--	--	--	--	--	2.5%
2010-2020	--	--	-2.9%	--	-0.7%	--	--	--	--	--	--	-0.7%
2015-2020	--	--	-11.1%	--	-0.2%	--	--	--	--	--	--	-0.3%
2020-2025	--	--	0.4%	--	-0.1%	--	--	--	--	--	--	0.0%
2020-2030	--	--	0.2%	--	0.0%	--	--	--	--	--	--	0.0%
2020-2040	--	--	0.1%	--	0.0%	--	--	--	--	--	--	0.0%
2020-2050	--	--	0.1%	--	0.0%	--	--	--	--	--	--	0.0%
2021-2050	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%

Table 3.12

Resale-RUS Energy Forecasts By Member (MWh)
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass County</u>	<u>Cavalier</u>	<u>Clearwater- Polk</u>	<u>Nodak</u>	<u>North Star</u>	<u>PKM</u>	<u>Red Lake</u>	<u>Red River</u>	<u>Roseau</u>	<u>Wild Rice</u>	<u>Total Member Sales</u>
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	8,573	-	-	-	-	-	-	-	-	-	-	8,573
2017	8,437	-	-	-	-	-	-	-	-	-	-	8,437
2018	8,910	-	-	-	-	-	-	-	-	-	-	8,910
2019	8,947	-	-	-	-	-	-	-	-	-	-	8,947
2020	8,605	-	-	-	-	-	-	-	-	-	-	8,605
2021	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2022	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2023	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2024	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2025	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2026	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2027	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2028	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2029	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2030	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2031	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2032	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2033	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2034	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2035	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2036	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2037	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2038	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2039	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2040	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2041	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2042	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2043	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2044	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2045	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2046	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2047	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2048	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2049	8,695	-	-	-	-	-	-	-	-	-	-	8,695
2050	8,695	-	-	-	-	-	-	-	-	-	-	8,695
Average Annual Growth Rates												
1991-2020	1.8%	--	--	--	--	--	--	--	--	--	--	1.8%
2005-2020	0.7%	--	--	--	--	--	--	--	--	--	--	0.7%
2010-2020	0.9%	--	--	--	--	--	--	--	--	--	--	0.9%
2015-2020	0.3%	--	--	--	--	--	--	--	--	--	--	0.3%
2020-2025	0.2%	--	--	--	--	--	--	--	--	--	--	0.2%
2020-2030	0.1%	--	--	--	--	--	--	--	--	--	--	0.1%
2020-2040	0.1%	--	--	--	--	--	--	--	--	--	--	0.1%
2020-2050	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2021-2050	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%

3.3.9 Sales for Resale – Others Forecast

This class is served by four member systems: Beltrami Electric Cooperative, PKM Electric Cooperative, Red Lake Electric Cooperative, and Nodak Electric Cooperative. Energy sales accounted for 3 percent of total cooperative energy sales in 2020. 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. No growth is expected from this class over the forecast horizon.

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 541,675 MWh in 2021 to 600,746 MWh in 2050. This represents a 0.5 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 0.8 percent per year from 2021 to 2050. This compares to total system sales growth of 2.4 percent annually from 1991 to 2020. Sales are forecast to grow from 3,892,403 MWh in 2021 to 4,956,480 MWh in 2050.

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
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	110,407	-	-	-	2,937	-	12,412	8,695	-	-	-	134,450
2018	112,057	-	-	-	3,400	-	12,738	8,695	-	-	-	136,890
2019	110,083	-	70	-	3,413	-	12,412	9,275	-	-	-	135,253
2020	108,263	-	-	-	2,958	-	11,139	5,426	-	-	-	127,786
2021	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2022	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2023	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2024	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2025	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2026	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2027	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2028	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2029	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2030	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2031	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2032	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2033	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2034	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2035	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2036	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2037	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2038	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2039	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2040	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2041	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2042	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2043	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2044	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2045	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2046	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2047	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2048	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2049	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
2050	103,500	-	-	-	3,085	-	12,000	6,000	-	-	-	124,585
Average Annual Growth Rates												
1991-2020	1.2%	--	--	--	-0.5%	--	4.2%	--	--	--	--	1.5%
2005-2020	1.3%	--	--	--	3.2%	--	3.3%	--	-100.0%	--	--	1.6%
2010-2020	5.0%	--	--	--	-1.4%	--	-0.9%	-0.9%	--	--	--	3.8%
2015-2020	5.0%	--	--	--	0.7%	--	-5.4%	-9.5%	--	--	--	2.8%
2020-2025	-0.9%	--	--	--	0.8%	--	1.5%	2.0%	--	--	--	-0.5%
2020-2030	-0.4%	--	--	--	0.4%	--	0.7%	1.0%	--	--	--	-0.3%
2020-2040	-0.2%	--	--	--	0.2%	--	0.4%	0.5%	--	--	--	-0.1%
2020-2050	-0.1%	--	--	--	0.1%	--	0.2%	0.3%	--	--	--	-0.1%
2021-2050	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%

Table 3.14

Controlled Load Energy Forecast
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Total Controlled MWh</u>	<u>Total Sales MWh</u>	<u>/1</u>	<u>Percent of Total %</u>
2013	986,580	2,954,464		33.4%
2014	1,043,349	3,041,331		34.3%
2015	879,895	2,802,503		31.4%
2016	832,100	2,776,954		30.0%
2017	911,547	2,858,575		31.9%
2018	879,140	3,029,816		29.0%
2019	580,243	3,010,322		19.3%
2020	516,795	2,898,035		17.8%
2021	541,675	2,953,190		18.3%
2022	547,313	3,024,453		18.1%
2023	550,149	3,060,932		18.0%
2024	552,194	3,070,930		18.0%
2025	554,566	3,115,301		17.8%
2026	557,500	3,145,838		17.7%
2027	560,975	3,180,532		17.6%
2028	564,473	3,213,511		17.6%
2029	567,813	3,245,922		17.5%
2030	570,647	3,276,084		17.4%
2031	573,212	3,305,446		17.3%
2032	575,687	3,334,411		17.3%
2033	577,702	3,361,590		17.2%
2034	579,925	3,390,325		17.1%
2035	582,544	3,419,704		17.0%
2036	584,121	3,444,732		17.0%
2037	585,568	3,469,337		16.9%
2038	587,317	3,495,484		16.8%
2039	588,479	3,519,068		16.7%
2040	589,753	3,543,523		16.6%
2041	591,066	3,568,162		16.6%
2042	592,134	3,591,802		16.5%
2043	593,217	3,615,624		16.4%
2044	594,453	3,640,425		16.3%
2045	595,542	3,663,612		16.3%
2046	596,502	3,686,487		16.2%
2047	597,640	3,710,306		16.1%
2048	598,598	3,733,582		16.0%
2049	599,589	3,756,659		16.0%
2050	600,746	3,780,637		15.9%
Average Annual Growth Rates				
2015-2020	-10.1%	0.7%		
2020-2025	1.4%	1.5%		
2020-2030	1.0%	1.2%		
2020-2040	0.7%	1.0%		
2020-2050	0.5%	0.9%		

Table 3.15

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

<u>Year</u>	<u>Beltrami</u>	<u>Cass</u> <u>County</u>	<u>Cavalier</u>	<u>Clearwater-</u> <u>Polk</u>	<u>Nodak</u>	<u>North</u> <u>Star</u>	<u>PKM</u>	<u>Red</u> <u>Lake</u>	<u>Red</u> <u>River</u>	<u>Roseau</u>	<u>Wild</u> <u>Rice</u>	<u>Total</u> <u>Member</u> <u>Sales</u>	<u>MWh</u> <u>From</u> <u>2019 LF</u>
1991	280,044	380,362	37,123	49,179	532,557	73,092	79,390	93,231	104,406	110,910	148,940	1,889,235	
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	444,367	37,086	54,047	569,920	81,725	92,042	98,867	110,629	126,190	166,913	2,098,628	
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	627,331	33,100	65,210	646,317	105,090	88,487	118,386	114,507	155,378	206,093	2,569,930	
2002	440,069	684,093	34,097	69,652	674,172	112,970	88,790	117,405	118,458	163,033	214,663	2,717,402	
2003	432,582	697,652	32,539	70,319	677,109	113,504	89,253	114,924	117,351	161,438	216,371	2,723,041	
2004	441,562	710,585	35,139	71,385	692,030	116,222	93,109	115,003	118,164	163,140	227,203	2,783,541	
2005	445,591	763,948	32,760	71,295	690,390	113,877	89,917	116,713	121,048	162,389	231,313	2,839,241	
2006	459,432	806,518	30,378	71,696	744,130	112,464	87,500	115,596	117,341	157,169	230,856	2,933,080	
2007	463,761	865,042	33,218	73,562	807,038	113,256	100,621	122,045	123,401	160,834	246,248	3,109,028	
2008	482,541	936,819	37,158	78,835	830,296	121,112	93,147	130,833	130,373	170,070	261,894	3,273,077	
2009	471,704	968,569	38,757	79,673	849,026	119,622	104,936	134,563	142,476	165,792	271,553	3,346,672	
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	1,119,193	40,553	74,800	1,092,991	116,395	130,011	129,184	133,204	172,523	273,305	3,754,595	
2014	478,646	1,192,026	39,961	84,075	1,158,017	125,640	132,421	149,924	139,665	174,196	285,517	3,960,087	
2015	458,220	1,142,268	32,480	69,809	1,081,944	109,269	120,477	126,328	122,680	160,151	256,256	3,679,881	
2016	465,402	1,158,750	32,388	67,466	1,057,479	104,004	123,214	124,273	120,737	151,487	249,719	3,654,918	
2017	457,986	1,208,288	31,096	75,443	1,115,064	105,527	117,641	122,922	113,919	148,966	255,067	3,751,918	
2018	486,894	1,277,524	31,396	74,121	1,157,246	109,236	121,380	125,911	121,728	151,804	272,934	3,930,175	
2019	492,653	1,335,104	32,388	74,450	1,128,452	111,159	117,641	126,676	124,264	153,314	272,557	3,968,658	3,983,979
2020	477,771	1,256,561	35,145	71,477	1,069,438	106,410	118,192	121,552	118,768	149,772	263,347	3,788,433	4,088,381
2021	481,168	1,317,601	34,922	73,693	1,092,431	107,818	121,087	123,689	121,252	148,743	270,000	3,892,403	4,159,973
2022	483,852	1,362,982	35,007	73,526	1,108,130	108,851	122,009	124,825	123,401	151,352	279,826	3,973,761	4,210,511
2023	486,948	1,393,989	35,108	74,323	1,116,877	109,812	122,865	125,762	125,027	152,014	283,290	4,026,013	4,263,754
2024	489,895	1,415,562	35,315	75,351	1,123,449	110,735	123,616	128,587	127,128	152,651	284,581	4,066,869	4,308,784
2025	493,718	1,436,991	35,496	75,980	1,133,158	112,130	124,270	129,274	128,345	153,447	285,803	4,108,611	4,357,884
2026	496,928	1,461,283	35,573	76,543	1,139,981	111,322	124,766	129,902	129,235	154,056	287,416	4,147,006	4,406,171
2027	499,660	1,482,447	35,858	78,270	1,146,842	111,176	125,344	130,435	130,491	154,851	289,059	4,184,432	4,453,216
2028	503,040	1,503,489	36,154	78,919	1,156,488	110,986	125,923	130,917	131,782	155,850	291,638	4,225,186	4,508,124
2029	505,274	1,527,414	36,367	80,022	1,163,322	111,444	126,570	131,299	134,058	156,602	293,135	4,265,508	4,559,522
2030	507,364	1,548,227	36,552	80,566	1,170,212	112,368	126,931	131,642	135,026	157,282	294,439	4,300,609	4,607,907
2031	509,338	1,568,933	36,678	81,325	1,179,769	112,771	127,234	132,094	135,955	157,858	295,673	4,337,628	4,660,948
2032	511,201	1,592,535	36,772	81,763	1,186,029	113,143	127,353	132,521	137,655	158,537	296,747	4,374,256	4,708,108
2033	512,959	1,613,036	36,830	82,185	1,192,295	113,485	127,420	132,880	138,307	158,859	297,753	4,406,009	4,751,154
2034	514,636	1,633,441	36,872	82,595	1,201,643	113,797	127,442	135,226	138,947	159,159	298,680	4,442,437	4,805,776
2035	516,240	1,656,752	36,930	83,994	1,208,000	114,590	127,402	135,521	140,550	160,414	299,553	4,479,945	4,851,172
2036	517,797	1,676,972	37,016	84,390	1,214,885	114,820	127,491	135,432	141,003	160,847	300,373	4,511,025	4,893,570
2037	519,306	1,697,106	37,119	84,773	1,224,465	115,030	127,564	135,294	141,639	161,024	301,151	4,544,470	4,945,543
2038	521,757	1,720,157	37,198	85,149	1,231,098	115,213	127,649	135,155	143,081	161,196	301,879	4,579,530	4,993,628
2039	523,156	1,740,125	37,281	85,513	1,237,792	115,375	127,668	134,964	143,419	161,323	302,564	4,609,180	5,035,861
2040	524,528	1,760,015	37,376	85,882	1,247,720	116,030	127,697	134,783	143,804	161,450	303,228	4,642,513	5,087,836
2041	525,951	1,782,829	37,456	86,259	1,253,810	116,177	127,713	134,591	145,124	161,771	303,923	4,675,605	5,133,385
2042	527,438	1,802,571	37,558	86,653	1,259,956	116,343	127,754	134,448	145,540	161,890	304,657	4,704,808	5,176,229
2043	528,990	1,822,244	37,639	87,061	1,269,140	116,502	127,837	134,294	146,134	162,006	305,434	4,737,281	5,222,641
2044	530,574	1,844,852	37,744	87,477	1,275,651	116,674	127,869	134,174	147,497	162,193	306,234	4,770,940	5,269,676
2045	532,165	1,864,400	37,828	87,888	1,281,754	117,313	127,910	134,034	147,877	162,322	307,039	4,800,531	5,313,744
2046	533,768	1,883,892	37,914	88,306	1,290,963	117,459	127,962	133,924	148,268	162,668	307,854	4,832,978	5,360,820
2047	535,435	1,903,333	38,021	88,745	1,297,106	117,613	128,013	133,821	149,713	162,847	308,736	4,863,385	5,398,199
2048	537,197	1,922,729	38,112	89,195	1,303,259	117,761	128,081	133,764	150,206	163,073	309,679	4,893,055	5,443,082
2049	539,047	1,942,086	38,225	89,665	1,312,425	117,938	128,196	133,716	150,760	163,316	310,696	4,926,070	
2050	540,960	1,961,407	38,321	90,152	1,318,562	118,109	128,312	133,723	152,101	163,569	311,764	4,956,980	
Average Annual Growth Rates													
1991-2020	1.9%	4.2%	-0.2%	1.3%	2.4%	1.3%	1.4%	0.9%	0.4%	1.0%	2.0%	2.4%	--
2005-2020	0.5%	3.4%	0.5%	0.0%	3.0%	-0.5%	1.8%	0.3%	-0.1%	-0.5%	0.9%	1.9%	--
2010-2020	0.6%	2.8%	-0.6%	-0.3%	2.3%	-0.3%	0.7%	-0.6%	-1.8%	-0.6%	0.4%	1.5%	--
2015-2020	0.8%	1.9%	1.6%	0.5%	-0.2%	-0.5%	-0.4%	-0.8%	-0.6%	-1.3%	0.5%	0.6%	--
2020-2025	0.7%	2.7%	0.2%	1.2%	1.2%	1.1%	1.0%	1.2%	1.6%	0.5%	1.7%	1.6%	1.3%
2020-2030	0.6%	2.1%	0.4%	1.2%	0.9%	0.5%	0.7%	0.8%	1.3%	0.5%	1.1%	1.3%	1.2%
2020-2040	0.5%	1.7%	0.3%	0.9%	0.8%	0.4%	0.4%	0.5%	1.0%	0.4%	0.7%	1.0%	1.1%
2020-2050	0.4%	1.5%	0.3%	0.8%	0.7%	0.3%	0.3%	0.3%	0.8%	0.3%	0.6%	0.9%	
2021-2050	0.4%	1.4%	0.3%	0.7%	0.7%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	0.8%	

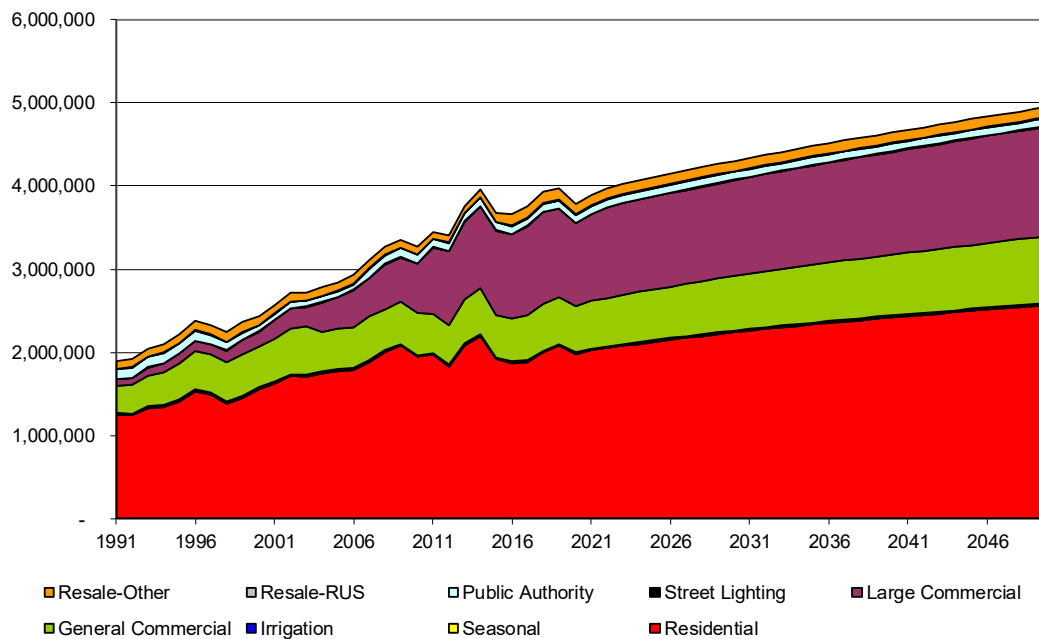
Table 3.16

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

<u>Year</u>	<u>Residential</u>	<u>Seasonal</u>	<u>Irrigation</u>	<u>General Commercial</u>	<u>Large Commercial</u>	<u>Street Lighting</u>	<u>Public Authority</u>	<u>Resale RUS</u>	<u>Resale Other</u>	<u>Total Member Sales</u>	<u>MWh From 2019 LF</u>
1991	1,247,575	11,334	11,301	328,645	74,218	2,997	125,094	5,103	82,966	1,889,235	
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	1,342,636	12,217	9,058	395,514	108,686	3,331	120,015	5,684	101,487	2,098,628	
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	1,623,580	14,055	8,563	515,475	227,082	5,042	67,092	6,775	102,265	2,569,930	
2002	1,714,172	15,300	9,776	548,374	240,961	6,049	68,285	7,157	107,328	2,717,402	
2003	1,708,840	14,504	13,198	572,574	234,877	5,508	66,876	7,279	99,385	2,723,041	
2004	1,744,548	14,277	11,228	479,293	350,852	5,951	66,184	7,802	103,406	2,783,541	
2005	1,777,231	13,619	8,417	486,723	374,596	6,468	64,102	7,696	100,390	2,839,241	
2006	1,788,260	10,558	17,417	487,291	441,912	6,815	64,479	7,618	108,731	2,933,080	
2007	1,882,154	10,027	12,052	525,457	457,721	7,222	106,080	8,012	100,301	3,109,028	
2008	2,003,239	10,072	13,595	492,404	534,995	7,587	105,857	7,990	97,338	3,273,077	
2009	2,079,990	8,784	11,672	509,285	531,891	8,066	103,905	8,119	84,960	3,346,672	
2010	1,948,468	8,010	10,058	501,029	596,736	8,684	99,078	7,860	87,777	3,267,699	
2011	1,969,410	8,138	7,081	480,377	796,678	9,247	90,651	7,931	78,967	3,448,481	
2012	1,832,850	8,056	17,400	466,646	886,760	9,558	93,782	7,069	83,171	3,405,291	
2013	2,089,027	8,842	17,319	514,510	934,654	9,739	98,569	8,316	73,618	3,754,595	
2014	2,195,605	8,975	11,274	555,303	978,615	9,973	97,591	9,003	93,747	3,960,087	
2015	1,917,457	8,184	14,074	505,700	1,010,819	9,895	93,811	8,461	111,481	3,679,881	
2016	1,869,693	8,035	12,304	517,649	1,004,393	9,740	89,487	8,573	135,043	3,654,918	
2017	1,881,983	8,500	17,434	533,500	1,077,347	8,633	81,632	8,437	134,450	3,751,918	
2018	1,995,903	9,249	16,093	560,979	1,101,060	9,270	91,821	8,910	136,890	3,930,175	
2019	2,078,772	9,461	10,861	562,651	1,061,068	8,808	92,838	8,947	135,253	3,968,658	3,983,979
2020	1,980,307	8,564	11,106	548,581	1,002,366	8,741	92,375	8,605	127,786	3,788,433	4,088,381
2021	2,025,934	8,918	13,829	568,626	1,040,921	8,736	92,159	8,695	124,585	3,892,403	4,159,973
2022	2,051,728	8,993	13,898	578,431	1,086,538	8,734	92,159	8,695	124,585	3,973,761	4,210,511
2023	2,076,632	9,069	13,947	591,012	1,101,184	8,731	92,159	8,695	124,585	4,026,013	4,263,754
2024	2,100,511	9,144	14,016	600,405	1,108,627	8,728	92,159	8,695	124,585	4,066,869	4,308,784
2025	2,124,953	9,219	14,064	609,562	1,116,649	8,724	92,159	8,695	124,585	4,108,611	4,357,884
2026	2,148,057	9,294	14,133	618,490	1,122,874	8,720	92,159	8,695	124,585	4,147,006	4,406,171
2027	2,172,610	9,388	14,182	627,231	1,126,869	8,714	92,159	8,695	124,585	4,184,432	4,453,216
2028	2,195,561	9,481	14,251	635,798	1,135,948	8,708	92,159	8,695	124,585	4,225,186	4,508,124
2029	2,218,476	9,574	14,299	644,217	1,144,801	8,702	92,159	8,695	124,585	4,265,508	4,559,522
2030	2,239,724	9,668	14,368	652,475	1,150,240	8,695	92,159	8,695	124,585	4,300,609	4,607,907
2031	2,260,418	9,761	14,417	660,638	1,158,268	8,687	92,159	8,695	124,585	4,337,628	4,660,948
2032	2,279,769	9,855	14,486	668,642	1,167,387	8,678	92,159	8,695	124,585	4,374,256	4,708,108
2033	2,298,252	9,949	14,535	676,570	1,172,597	8,669	92,159	8,695	124,585	4,406,009	4,751,154
2034	2,316,421	10,042	14,603	684,371	1,182,901	8,659	92,159	8,695	124,585	4,442,437	4,805,776
2035	2,334,163	10,135	14,652	692,107	1,194,800	8,649	92,159	8,695	124,585	4,479,945	4,851,172
2036	2,351,959	10,229	14,721	699,741	1,200,297	8,638	92,159	8,695	124,585	4,511,025	4,893,570
2037	2,369,080	10,322	14,770	707,339	1,208,893	8,627	92,159	8,695	124,585	4,544,470	4,945,543
2038	2,385,812	10,415	14,839	714,819	1,219,591	8,615	92,159	8,695	124,585	4,579,530	4,993,628
2039	2,402,094	10,508	14,887	722,258	1,225,392	8,603	92,159	8,695	124,585	4,609,180	5,035,861
2040	2,418,484	10,602	14,956	729,645	1,234,798	8,590	92,159	8,695	124,585	4,642,513	5,087,836
2041	2,434,088	10,695	15,005	736,990	1,244,811	8,576	92,159	8,695	124,585	4,675,605	5,133,385
2042	2,449,661	10,788	15,074	744,350	1,250,934	8,563	92,159	8,695	124,585	4,704,808	5,176,229
2043	2,465,467	10,881	15,122	751,655	1,260,168	8,549	92,159	8,695	124,585	4,737,281	5,222,641
2044	2,481,306	10,974	15,191	758,980	1,270,516	8,534	92,159	8,695	124,585	4,770,940	5,269,676
2045	2,496,510	11,067	15,240	766,276	1,277,480	8,518	92,159	8,695	124,585	4,800,531	5,313,744
2046	2,511,939	11,159	15,309	773,567	1,287,063	8,502	92,159	8,695	124,585	4,832,978	5,360,820
2047	2,527,171	11,271	15,358	780,895	1,294,766	8,486	92,159	8,695	124,585	4,863,385	5,398,199
2048	2,542,505	11,383	15,427	788,241	1,301,591	8,469	92,159	8,695	124,585	4,893,055	5,443,082
2049	2,558,033	11,495	15,475	795,633	1,311,543	8,452	92,159	8,695	124,585	4,926,070	
2050	2,573,291	11,607	15,544	803,042	1,319,622	8,435	92,159	8,695	124,585	4,956,980	
Average Annual Growth Rates											
1991-2020	1.6%	-1.0%	-0.1%	1.8%	9.4%	3.8%	-1.0%	1.8%	1.5%	2.4%	--
2005-2020	0.7%	-3.0%	1.9%	0.8%	6.8%	2.0%	2.5%	0.7%	1.6%	1.9%	--
2010-2020	0.2%	0.7%	1.0%	0.9%	5.3%	0.1%	-0.7%	0.9%	3.8%	1.5%	--
2015-2020	0.6%	0.9%	-4.6%	1.6%	-0.2%	-2.4%	-0.3%	0.3%	2.8%	0.6%	--
2020-2025	1.4%	1.5%	4.8%	2.1%	2.2%	0.0%	0.0%	0.2%	-0.5%	1.6%	1.3%
2020-2030	1.2%	1.2%	2.6%	1.7%	1.4%	-0.1%	0.0%	0.1%	-0.3%	1.3%	1.2%
2020-2040	1.0%	1.1%	1.5%	1.4%	1.0%	-0.1%	0.0%	0.1%	-0.1%	1.0%	1.1%
2020-2050	0.9%	1.0%	1.1%	1.3%	0.9%	-0.1%	0.0%	0.0%	-0.1%	0.9%	
2021-2050	0.8%	0.9%	0.4%	1.2%	0.8%	-0.1%	0.0%	0.0%	0.0%	0.8%	

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 2016-2020 period.

Total member systems' energy requirements, calculated as the sum of total sales and own use and losses, are projected to increase from 4,059,852 MWh in 2021 to 5,152,099 MWh in 2050 as shown in Table 3.17. This reflects a compound growth rate of 0.8 percent per year from 2021 through 2050. The total member sales and member requirements forecasts are driven, to a large extent, by the residential class forecast. This class comprised approximately 52 percent of member system 2020 sales and is expected to remain at that level through 2050.

Table 3.17

Energy Requirements Forecast By Member (MWh)
Minnkota Power Cooperative, Inc.

Year	Beltrami	Cass County	Clearwater- Cavalier	Polk	Nodak	North Star	PKM	Red Lake	Red River	Roseau	Wild Rice	Total Member Req.
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	3,100,300
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	492,441	1,251,903	34,196	75,987	1,146,820	112,623	125,715	133,343	124,513	156,203	277,094	3,930,838
2018	518,275	1,314,627	34,533	79,848	1,189,348	117,725	127,252	133,343	130,757	158,903	290,381	4,094,992
2019	513,068	1,328,581	35,474	80,490	1,162,299	118,463	125,715	135,768	131,002	160,728	289,131	4,080,720
2020	498,648	1,298,488	38,572	77,210	1,102,733	113,289	124,760	127,360	125,849	157,076	281,113	3,945,098
2021	507,167	1,365,389	38,329	79,555	1,122,745	115,227	128,408	131,572	128,309	155,918	287,234	4,059,852
2022	509,997	1,412,416	38,422	79,374	1,127,294	116,331	129,385	132,780	130,583	158,653	297,687	4,132,923
2023	513,259	1,444,548	38,533	80,234	1,136,192	117,358	130,293	133,777	132,303	159,347	301,373	4,187,216
2024	516,366	1,466,903	38,759	81,344	1,142,878	118,344	131,090	136,782	134,527	160,014	302,746	4,229,754
2025	520,395	1,489,109	38,958	82,023	1,152,754	119,835	131,783	137,514	135,815	160,850	304,045	4,273,082
2026	523,779	1,514,283	39,043	82,631	1,159,696	118,971	132,310	138,181	136,756	161,488	305,762	4,312,901
2027	526,658	1,536,215	39,356	84,495	1,166,675	118,816	132,922	138,748	138,086	162,321	307,510	4,351,801
2028	530,221	1,558,020	39,680	85,196	1,176,488	118,612	133,537	139,261	139,452	163,369	310,253	4,394,088
2029	532,576	1,582,812	39,915	86,387	1,183,441	119,102	134,222	139,667	141,861	164,157	311,846	4,435,985
2030	534,778	1,604,380	40,118	86,974	1,190,450	120,090	134,605	140,032	142,884	164,869	313,232	4,472,413
2031	536,860	1,625,837	40,256	87,793	1,200,172	120,520	134,927	140,513	143,867	165,473	314,546	4,510,764
2032	538,823	1,650,295	40,359	88,266	1,206,541	120,918	135,052	140,967	145,667	166,185	315,689	4,548,761
2033	540,676	1,671,540	40,422	88,721	1,212,915	121,284	135,123	141,349	146,357	166,522	316,759	4,581,668
2034	542,443	1,692,685	40,469	89,164	1,222,424	121,617	135,147	143,845	147,033	166,837	317,745	4,619,408
2035	544,135	1,716,841	40,532	90,674	1,228,891	122,464	135,105	144,158	148,730	168,153	318,674	4,658,356
2036	545,775	1,737,795	40,627	91,102	1,235,895	122,710	135,199	144,064	149,210	168,606	319,545	4,690,527
2037	547,366	1,758,659	40,740	91,516	1,245,641	122,934	135,277	143,916	149,883	168,791	320,373	4,725,096
2038	549,949	1,782,546	40,827	91,921	1,252,389	123,130	135,366	143,769	151,408	168,972	321,147	4,761,424
2039	551,424	1,803,239	40,918	92,315	1,259,198	123,304	135,386	143,566	151,766	169,106	321,876	4,792,097
2040	552,870	1,823,850	41,022	92,712	1,269,298	124,003	135,418	143,373	152,174	169,238	322,583	4,826,541
2041	554,370	1,847,491	41,110	93,119	1,275,494	124,160	135,435	143,169	153,570	169,575	323,322	4,860,816
2042	555,937	1,867,949	41,222	93,545	1,281,746	124,338	135,478	143,017	154,010	169,700	324,103	4,891,045
2043	557,573	1,888,336	41,311	93,985	1,291,088	124,508	135,566	142,853	154,639	169,821	324,930	4,924,610
2044	559,243	1,911,764	41,426	94,435	1,297,712	124,692	135,600	142,725	156,082	170,017	325,781	4,959,476
2045	560,919	1,932,021	41,518	94,879	1,303,921	125,375	135,644	142,576	156,484	170,152	326,637	4,990,126
2046	562,610	1,952,220	41,612	95,330	1,313,289	125,531	135,699	142,459	156,897	170,515	327,505	5,023,664
2047	564,367	1,972,366	41,730	95,803	1,319,538	125,695	135,753	142,350	158,427	170,703	328,443	5,055,174
2048	566,223	1,992,465	41,830	96,289	1,325,798	125,853	135,825	142,289	158,948	170,939	329,446	5,085,905
2049	568,174	2,012,524	41,954	96,797	1,335,122	126,042	135,947	142,238	159,535	171,194	330,528	5,120,054
2050	570,190	2,032,546	42,059	97,322	1,341,365	126,225	136,069	142,246	160,953	171,459	331,664	5,152,099
Average Annual Growth Rates												
1991-2020	1.8%	4.1%	-0.1%	1.2%	2.4%	1.2%	1.3%	0.8%	0.4%	0.9%	1.8%	2.3%
2005-2020	0.4%	3.3%	0.5%	0.0%	2.8%	-0.6%	1.6%	0.1%	-0.2%	-0.5%	0.8%	1.8%
2010-2020	0.5%	2.8%	-0.6%	-0.3%	2.2%	-0.3%	1.1%	-0.8%	-1.4%	-0.5%	0.1%	1.4%
2015-2020	0.6%	1.9%	1.4%	0.4%	-0.2%	-0.6%	-0.7%	-0.9%	-0.9%	-1.2%	0.3%	0.5%
2020-2025	0.9%	2.8%	0.2%	1.2%	0.9%	1.1%	1.1%	1.5%	1.5%	0.5%	1.6%	1.6%
2020-2030	0.7%	2.1%	0.4%	1.2%	0.8%	0.6%	0.8%	1.0%	1.3%	0.5%	1.1%	1.3%
2020-2040	0.5%	1.7%	0.3%	0.9%	0.7%	0.5%	0.4%	0.6%	1.0%	0.4%	0.7%	1.0%
2020-2050	0.4%	1.5%	0.3%	0.8%	0.7%	0.4%	0.3%	0.4%	0.8%	0.3%	0.6%	0.9%
2021-2050	0.4%	1.4%	0.3%	0.7%	0.6%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	0.8%

Table 3.18 presents total customers by member, while Table 3.19 presents customers by revenue class. Total customers are projected to increase from 144,665 in 2021 to 192,656 in 2050. This represents an average annual growth rate of 1.0 percent per year from 2021 through 2050. This is the slower than the 2.1 percent per year experienced over the 1991 through 2020 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 decrease at -0.1 percent per year over the forecast period of 2021-2050. This compares to the -0.6 percent rate observed over the historic period of 2005 through 2020.

3.3.3 Minnkota Transmission Losses

Minnkota transmission losses have been projected at 1.5 percent based on staff discussions and incorporate adjustments in the calculation of losses starting in 2017 as own-use facility service was transferred to Nodak.

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 4,575,208 MWh in 2021 to 5,675,823 MWh in 2050. This reflects a compound growth rate of 0.7 percent per year from 2021 through 2050. 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.

<u>Year</u>	<u>Beltrami</u>	<u>Cass</u> <u>County</u>	<u>Clearwater-</u> <u>Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North</u> <u>Star</u>	<u>PKM</u>	<u>Red</u> <u>Lake</u>	<u>Red</u> <u>River</u>	<u>Roseau</u>	<u>Wild</u> <u>Rice</u>	<u>Total</u> <u>Members</u>
1991	12,860	13,149	1,562	3,288	13,947	5,138	3,694	4,674	4,180	4,983	10,629	78,105
1992	13,197	13,855	1,557	3,326	14,025	5,248	3,690	4,673	4,175	5,089	10,783	79,619
1993	13,571	14,644	1,556	3,390	14,146	5,326	3,705	4,701	4,217	5,149	10,985	81,390
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	5,385	4,828	6,444	14,114	133,580
2017	20,856	48,406	1,487	4,379	19,669	6,513	3,815	5,472	4,584	6,428	14,185	135,794
2018	21,019	49,891	1,562	4,405	19,931	6,549	3,852	5,536	4,617	6,499	14,319	138,178
2019	21,218	51,372	1,496	4,382	20,190	6,596	3,815	5,601	4,653	6,547	14,360	140,230
2020	21,503	52,688	1,601	4,405	20,411	6,655	3,900	5,652	4,689	6,592	14,422	142,517
2021	21,756	54,001	1,612	4,451	20,661	6,700	3,937	5,689	4,742	6,595	14,523	144,665
2022	21,983	55,319	1,620	4,491	20,913	6,767	3,968	5,729	4,799	6,646	14,607	146,844
2023	22,198	56,565	1,628	4,529	21,164	6,832	3,996	5,763	4,848	6,692	14,681	148,895
2024	22,402	57,801	1,636	4,565	21,415	6,894	4,020	5,793	4,895	6,735	14,747	150,902
2025	22,597	59,030	1,642	4,598	21,667	6,955	4,041	5,817	4,938	6,779	14,807	152,872
2026	22,748	60,252	1,644	4,617	21,918	6,993	4,055	5,840	4,970	6,815	14,887	154,739
2027	22,892	61,466	1,645	4,633	22,169	7,030	4,068	5,858	5,000	6,851	14,962	156,573
2028	23,031	62,673	1,645	4,647	22,421	7,062	4,079	5,875	5,028	6,884	15,033	158,377
2029	23,159	63,874	1,645	4,660	22,672	7,093	4,087	5,887	5,054	6,914	15,097	160,144
2030	23,280	65,068	1,645	4,671	22,923	7,123	4,094	5,898	5,077	6,941	15,157	161,876
2031	23,393	66,254	1,644	4,681	23,150	7,150	4,100	5,906	5,098	6,966	15,212	163,555
2032	23,501	67,435	1,643	4,689	23,376	7,175	4,104	5,912	5,119	6,989	15,263	165,205
2033	23,602	68,608	1,641	4,696	23,602	7,198	4,107	5,915	5,136	7,010	15,310	166,825
2034	23,699	69,775	1,639	4,702	23,829	7,219	4,108	5,918	5,153	7,029	15,354	168,426
2035	23,792	70,936	1,637	4,709	24,055	7,240	4,109	5,918	5,169	7,047	15,395	170,008
2036	23,883	72,090	1,635	4,714	24,281	7,259	4,109	5,917	5,183	7,063	15,435	171,570
2037	23,972	73,238	1,633	4,719	24,508	7,278	4,108	5,914	5,196	7,078	15,473	173,117
2038	24,058	74,380	1,630	4,723	24,734	7,294	4,107	5,912	5,209	7,092	15,508	174,648
2039	24,140	75,515	1,627	4,727	24,960	7,310	4,105	5,907	5,220	7,104	15,542	176,157
2040	24,221	76,644	1,624	4,730	25,187	7,327	4,102	5,902	5,231	7,116	15,575	177,660
2041	24,306	77,768	1,622	4,735	25,388	7,342	4,100	5,897	5,243	7,129	15,610	179,140
2042	24,396	78,885	1,619	4,740	25,589	7,360	4,099	5,894	5,255	7,143	15,648	180,629
2043	24,491	79,996	1,617	4,746	25,790	7,377	4,099	5,891	5,269	7,158	15,688	182,122
2044	24,588	81,102	1,615	4,753	25,991	7,396	4,098	5,889	5,283	7,174	15,731	183,620
2045	24,685	82,202	1,612	4,760	26,192	7,413	4,098	5,887	5,297	7,190	15,773	185,110
2046	24,783	83,295	1,610	4,767	26,393	7,431	4,097	5,886	5,311	7,206	15,816	186,597
2047	24,886	84,384	1,609	4,775	26,594	7,450	4,098	5,885	5,327	7,225	15,862	188,095
2048	24,995	85,467	1,607	4,784	26,795	7,469	4,099	5,886	5,344	7,245	15,912	189,603
2049	25,110	86,544	1,606	4,794	26,996	7,490	4,102	5,888	5,362	7,268	15,965	191,124
2050	25,229	87,617	1,605	4,805	27,197	7,511	4,105	5,892	5,382	7,292	16,022	192,656

Average Annual Growth Rates

1991-2020	1.8%	4.9%	0.1%	1.0%	1.3%	0.9%	0.2%	0.7%	0.4%	1.0%	1.1%	2.1%
2005-2020	0.9%	4.2%	0.8%	0.4%	1.5%	0.4%	0.5%	0.8%	0.1%	0.4%	0.6%	1.9%
2010-2020	0.6%	4.2%	1.0%	0.0%	1.7%	0.4%	0.8%	0.8%	0.0%	0.4%	0.5%	1.9%
2015-2020	0.9%	3.7%	1.3%	0.2%	1.6%	0.7%	0.7%	1.2%	-0.8%	0.6%	0.6%	1.8%
2020-2025	1.0%	2.3%	0.5%	0.9%	1.2%	0.9%	0.7%	0.6%	1.0%	0.6%	0.5%	1.4%
2020-2030	0.8%	2.1%	0.3%	0.6%	1.2%	0.7%	0.5%	0.4%	0.8%	0.5%	0.5%	1.3%
2020-2040	0.6%	1.9%	0.1%	0.4%	1.1%	0.5%	0.3%	0.2%	0.5%	0.4%	0.4%	1.1%
2020-2050	0.5%	1.7%	0.0%	0.3%	1.0%	0.4%	0.2%	0.1%	0.5%	0.3%	0.4%	1.0%
2021-2050	0.5%	1.7%	0.0%	0.3%	1.0%	0.4%	0.1%	0.1%	0.4%	0.3%	0.3%	1.0%

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
1991	66,291	5,613	325	5,413	53	286	113	1	10	78,105
1992	67,471	5,714	374	5,580	55	301	113	1	10	79,619
1993	68,964	5,761	396	5,776	57	312	112	1	11	81,390
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	7,889	160	553	29	1	11	116,781
2010	107,232	1,475	430	8,088	179	569	29	1	11	118,015
2011	108,776	1,417	426	8,236	207	590	28	1	11	119,691
2012	110,691	1,355	434	8,407	218	610	27	1	11	121,753
2013	112,116	1,294	446	8,496	221	619	25	1	11	123,229
2014	114,820	1,224	462	8,752	224	625	26	1	11	126,145
2015	118,404	1,193	490	9,046	252	638	33	1	11	130,068
2016	121,603	1,168	509	9,353	253	649	34	1	10	133,580
2017	123,510	1,138	518	9,662	259	670	27	1	10	135,794
2018	125,625	1,120	521	9,910	283	681	27	1	10	138,178
2019	127,357	1,092	526	10,218	293	698	34	1	11	140,230
2020	129,033	1,057	524	10,812	298	752	29	1	11	142,517
2021	131,006	1,015	529	11,012	305	758	29	1	11	144,665
2022	132,909	1,004	532	11,284	310	764	29	1	11	146,844
2023	134,695	993	534	11,549	314	770	29	1	11	148,895
2024	136,437	982	537	11,812	318	776	29	1	11	150,902
2025	138,144	971	539	12,073	322	782	29	1	11	152,872
2026	139,749	960	542	12,334	325	788	29	1	11	154,739
2027	141,323	950	544	12,594	327	794	29	1	11	156,573
2028	142,864	940	547	12,854	331	800	29	1	11	158,377
2029	144,368	930	549	13,115	335	806	29	1	11	160,144
2030	145,837	920	552	13,377	338	812	29	1	11	161,876
2031	147,251	910	554	13,640	341	818	29	1	11	163,555
2032	148,634	900	557	13,904	345	824	29	1	11	165,205
2033	149,988	890	559	14,170	347	830	29	1	11	166,825
2034	151,318	880	562	14,438	351	836	29	1	11	168,426
2035	152,626	870	564	14,708	358	842	29	1	11	170,008
2036	153,914	860	567	14,981	360	848	29	1	11	171,570
2037	155,185	850	569	15,255	363	854	29	1	11	173,117
2038	156,434	840	572	15,533	368	860	29	1	11	174,648
2039	157,663	830	574	15,813	370	866	29	1	11	176,157
2040	158,879	820	577	16,097	374	872	29	1	11	177,660
2041	160,071	810	579	16,384	378	878	29	1	11	179,140
2042	161,267	800	582	16,675	380	884	29	1	11	180,629
2043	162,465	790	584	16,970	382	890	29	1	11	182,122
2044	163,660	780	587	17,270	386	896	29	1	11	183,620
2045	164,845	770	589	17,574	389	902	29	1	11	185,110
2046	166,023	760	592	17,882	391	908	29	1	11	186,597
2047	167,206	751	594	18,195	394	914	29	1	11	188,095
2048	168,394	742	597	18,513	396	920	29	1	11	189,603
2049	169,591	733	599	18,837	398	926	29	1	11	191,124
2050	170,791	724	602	19,166	401	932	29	1	11	192,656
Average Annual Growth Rates										
1991-2020	2.3%	-5.6%	1.7%	2.4%	6.1%	3.4%	-4.6%	0.0%	0.3%	2.1%
2005-2020	2.0%	-8.9%	1.7%	3.0%	7.2%	3.8%	0.4%	0.0%	0.3%	1.9%
2010-2020	1.9%	-3.3%	2.0%	2.9%	5.2%	2.8%	0.0%	0.0%	-0.2%	1.9%
2015-2020	1.7%	-2.4%	1.4%	3.6%	3.4%	3.3%	-2.8%	0.0%	0.0%	1.8%
2020-2025	1.4%	-1.7%	0.6%	2.2%	1.6%	0.8%	0.0%	0.0%	0.3%	1.4%
2020-2030	1.2%	-1.4%	0.5%	2.2%	1.3%	0.8%	0.0%	0.0%	0.2%	1.3%
2020-2040	1.0%	-1.3%	0.5%	2.0%	1.1%	0.7%	0.0%	0.0%	0.1%	1.1%
2020-2050	0.9%	-1.3%	0.5%	1.9%	1.0%	0.7%	0.0%	0.0%	0.1%	1.0%
2021-2050	0.9%	-1.2%	0.4%	1.9%	0.9%	0.7%	0.0%	0.0%	0.0%	1.0%

Table 3.20

NMPA Sales Summary
Northern Municipal Power Agency

<u>Year</u>	<u>Retail</u> <u>MWh Sales</u>	<u>Losses</u>	<u>Percent %</u>	<u>NMPA</u> <u>Purchases</u>
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	438,414	18,409	4.0%	456,823
2016	429,926	18,521	4.1%	448,447
2017	422,737	19,944	4.5%	442,681
2018	436,371	16,331	3.6%	452,702
2019	427,993	18,018	4.0%	446,011
2020	425,347	15,199	3.5%	440,546
2021	436,575	16,955	3.7%	453,530
2022	438,702	16,948	3.7%	455,650
2023	440,490	16,964	3.7%	457,454
2024	441,998	16,975	3.7%	458,973
2025	443,161	16,985	3.7%	460,146
2026	444,068	16,994	3.7%	461,062
2027	444,793	17,001	3.7%	461,793
2028	445,288	17,006	3.7%	462,293
2029	445,433	17,009	3.7%	462,442
2030	445,441	17,011	3.7%	462,451
2031	445,235	17,012	3.7%	462,247
2032	444,842	17,010	3.7%	461,852
2033	444,252	17,008	3.7%	461,261
2034	443,534	17,005	3.7%	460,539
2035	442,643	17,001	3.7%	459,645
2036	441,716	16,997	3.7%	458,713
2037	440,659	16,993	3.7%	457,652
2038	439,561	16,987	3.7%	456,548
2039	438,296	16,981	3.7%	455,277
2040	437,021	16,975	3.7%	453,996
2041	435,808	16,970	3.7%	452,778
2042	434,728	16,965	3.8%	451,693
2043	433,672	16,961	3.8%	450,634
2044	432,743	16,958	3.8%	449,701
2045	431,761	16,955	3.8%	448,716
2046	430,845	16,952	3.8%	447,797
2047	430,056	16,949	3.8%	447,005
2048	429,319	16,947	3.8%	446,266
2049	428,730	16,947	3.8%	445,677
2050	428,318	16,947	3.8%	445,265
Average Annual Growth Rates				
2005-2020	-0.5%	-2.5%		-0.6%
2010-2020	-0.4%	-2.5%		-0.5%
2015-2020	-0.6%	-3.8%		-0.7%
2020-2025	0.8%	2.2%		0.9%
2020-2030	0.5%	1.1%		0.5%
2020-2040	0.1%	0.6%		0.2%
2020-2050	0.0%	0.4%		0.0%
2021-2050	-0.1%	0.0%		-0.1%

Table 3.21

Joint System Energy Requirements
MWh

<u>Year</u>	<u>Total Member Energy Requirements</u>	<u>Minnkota Losses</u>	<u>CAFS</u>	<u>Minnkota Total Requirements</u>	<u>NMPA Energy Requirements</u>	<u>Joint System Energy Requirements</u>
1991	2,018,791	216,791	21,494	2,257,076	372,491	2,629,567
1992	2,017,999	315,258	47,384	2,380,641	363,032	2,743,673
1993	2,160,868	257,865	48,628	2,467,361	382,175	2,849,536
1994	2,228,292	268,455	50,341	2,547,088	372,754	2,919,842
1995	2,352,345	300,501	48,367	2,701,213	391,546	3,092,759
1996	2,488,710	335,722	47,402	2,871,834	407,465	3,279,299
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	3,930,838	87,064 /3	-	4,017,902	442,681	4,460,583
2018	4,094,992	101,136	-	4,196,128	452,702	4,648,830
2019	4,080,720	49,062	-	4,129,782	446,011	4,575,793
2020	3,945,098	56,406	-	4,001,504	440,546	4,442,050
2021	4,059,852	61,825	-	4,121,677	453,530	4,575,208
2022	4,132,923	62,938	-	4,195,861	455,650	4,651,511
2023	4,187,216	63,765	-	4,250,981	457,454	4,708,435
2024	4,229,754	64,413	-	4,294,167	458,973	4,753,140
2025	4,273,082	65,072	-	4,338,154	460,146	4,798,300
2026	4,312,901	65,679	-	4,378,580	461,062	4,839,641
2027	4,351,801	66,271	-	4,418,072	461,793	4,879,866
2028	4,394,088	66,915	-	4,461,003	462,293	4,923,296
2029	4,435,985	67,553	-	4,503,538	462,442	4,965,980
2030	4,472,413	68,108	-	4,540,521	462,451	5,002,972
2031	4,510,764	68,692	-	4,579,455	462,247	5,041,702
2032	4,548,761	69,270	-	4,618,031	461,852	5,079,884
2033	4,581,668	69,772	-	4,651,439	461,261	5,112,700
2034	4,619,408	70,346	-	4,689,754	460,539	5,150,293
2035	4,658,356	70,939	-	4,729,295	459,645	5,188,940
2036	4,690,527	71,429	-	4,761,956	458,713	5,220,669
2037	4,725,096	71,956	-	4,797,052	457,652	5,254,704
2038	4,761,424	72,509	-	4,833,933	456,548	5,290,481
2039	4,792,097	72,976	-	4,865,073	455,277	5,320,350
2040	4,826,541	73,501	-	4,900,042	453,996	5,354,038
2041	4,860,816	74,023	-	4,934,838	452,778	5,387,616
2042	4,891,045	74,483	-	4,965,527	451,693	5,417,220
2043	4,924,610	74,994	-	4,999,604	450,634	5,450,238
2044	4,959,476	75,525	-	5,035,001	449,701	5,484,702
2045	4,990,126	75,992	-	5,066,117	448,716	5,514,833
2046	5,023,664	76,503	-	5,100,167	447,797	5,547,964
2047	5,055,174	76,982	-	5,132,157	447,005	5,579,161
2048	5,085,905	77,450	-	5,163,355	446,266	5,609,622
2049	5,120,054	77,970	-	5,198,024	445,677	5,643,701
2050	5,152,099	78,458	-	5,230,558	445,265	5,675,823

Average Annual Growth Rates

1991-2020	2.3%	-4.5%	-100.0%	2.0%	0.6%	1.8%
2005-2020	1.8%	-7.1%	-100.0%	1.5%	-0.6%	1.3%
2010-2020	1.4%	-11.9%	--	1.0%	-0.5%	0.8%
2015-2020	0.5%	-23.5%	--	-0.3%	-0.7%	-0.3%
2020-2025	1.6%	2.9%	--	1.6%	0.9%	1.6%
2020-2030	1.3%	1.9%	--	1.3%	0.5%	1.2%
2020-2040	1.0%	1.3%	--	1.0%	0.2%	0.9%
2020-2050	0.9%	1.1%	--	0.9%	0.0%	0.8%
2021-2050	0.8%	0.8%	--	0.8%	-0.1%	0.7%

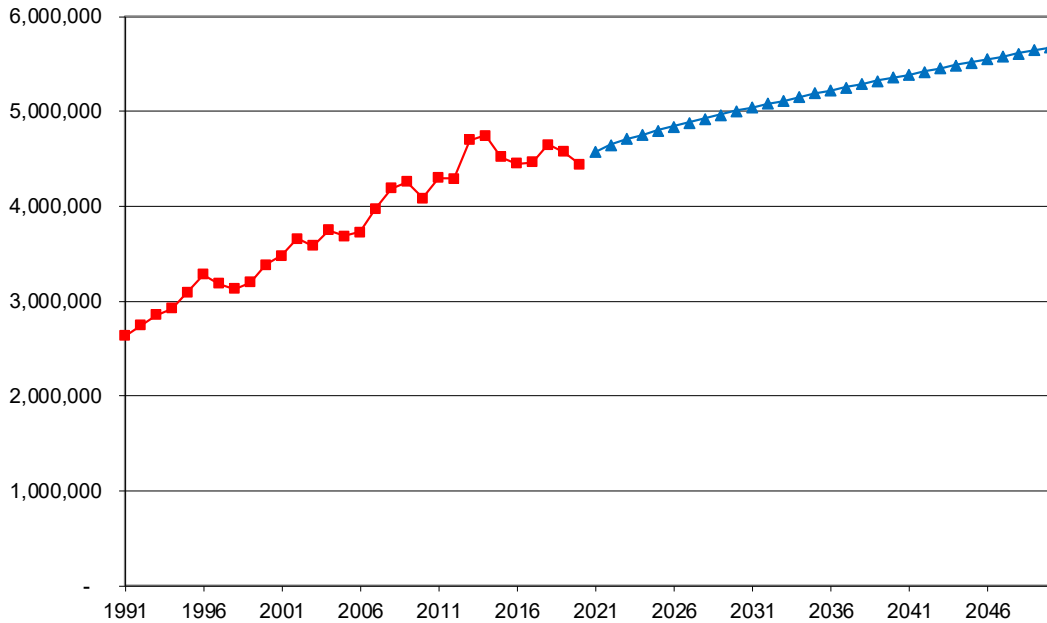
/1 Losses reduced due to calculation adjustment - future loss % set at 1.5%

/2 Transferred to Nodak starting in 2006

/3 MPC HQ now served by Nodak

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 58 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 955 MW in 2021 to 1,115 MW by 2050. This is a 0.5 percent per year average annual increase during the forecast period of 2021-2050. The summer and winter peaks are expected to grow at roughly the same rate over the projection horizon.

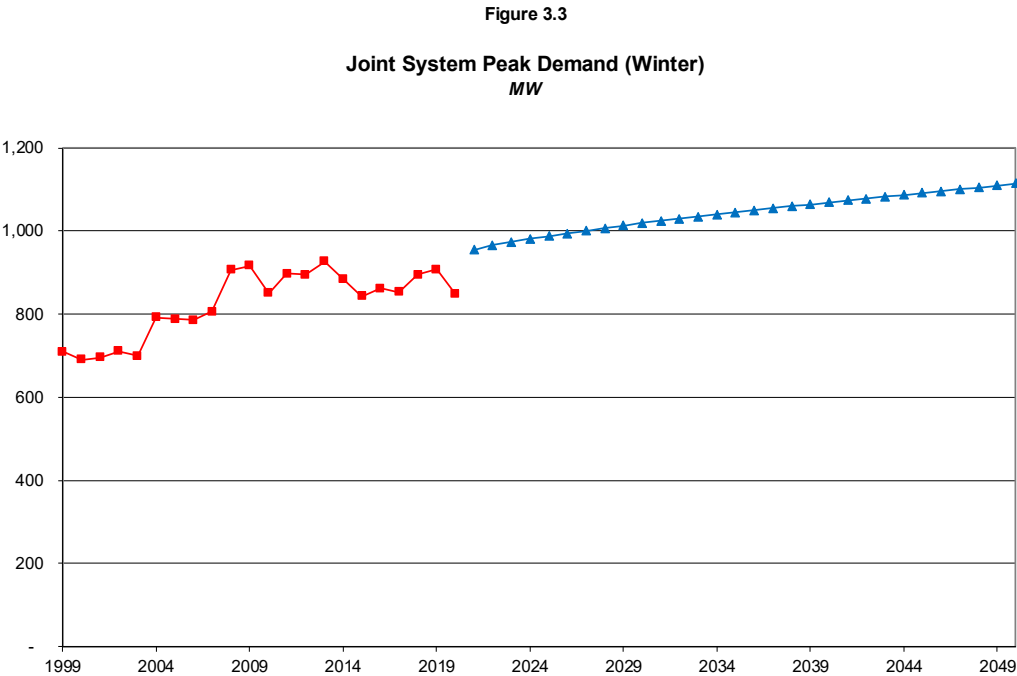
Table 3.22

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	853	646	853	60%
2018	895	646	895	59%
2019	908	647	908	58%
2020	848	691	848	60%
2021	955	736	955	55%
2022	966	749	966	55%
2023	974	756	974	55%
2024	981	762	981	55%
2025	988	768	988	55%
2026	994	774	994	56%
2027	1,000	779	1,000	56%
2028	1,007	785	1,007	56%
2029	1,014	791	1,014	56%
2030	1,019	796	1,019	56%
2031	1,024	801	1,024	56%
2032	1,030	806	1,030	56%
2033	1,034	811	1,034	56%
2034	1,040	816	1,040	57%
2035	1,045	821	1,045	57%
2036	1,050	825	1,050	57%
2037	1,055	829	1,055	57%
2038	1,060	834	1,060	57%
2039	1,064	838	1,064	57%
2040	1,069	843	1,069	57%
2041	1,074	847	1,074	57%
2042	1,078	851	1,078	57%
2043	1,083	855	1,083	57%
2044	1,087	860	1,087	58%
2045	1,092	864	1,092	58%
2046	1,096	868	1,096	58%
2047	1,101	872	1,101	58%
2048	1,105	876	1,105	58%
2049	1,110	880	1,110	58%
2050	1,115	884	1,115	58%
Average Annual Growth Rates				
2005-2020	0.5%	2.4%	0.5%	
2010-2020	0.0%	1.9%	0.0%	
2015-2020	0.1%	1.9%	0.1%	
2020-2025	3.1%	2.1%	3.1%	
2020-2030	1.9%	1.4%	1.9%	
2020-2040	1.2%	1.0%	1.2%	
2020-2050	0.9%	0.8%	0.9%	
2021-2050	0.5%	0.6%	0.5%	

Old Approach: Based on MAPP Form 3 Peak with WAPA allocations

Current Method (2014 on): MPC Sum (aggregation of MPC billing meters)



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 2050. 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 1,050 to 1,201 MW by 2050, 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:

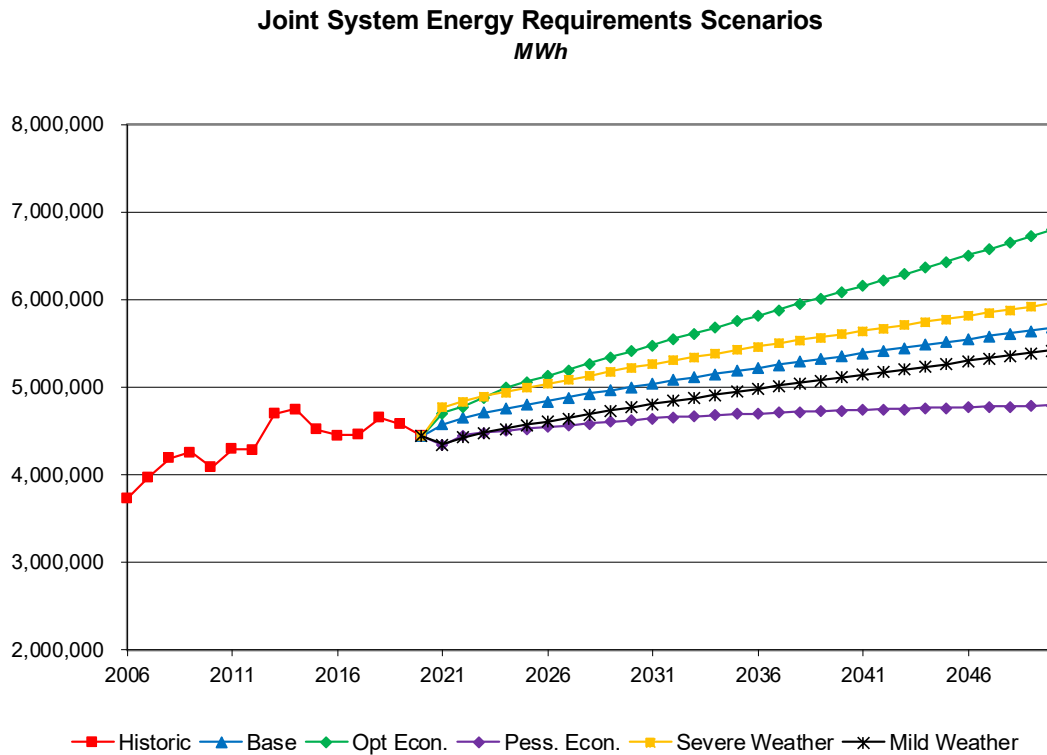
- A rolling five- or ten-year average annual growth rate is calculated for the historic economic or demographic series depending on the historic volatility of the series.
- The standard deviation of this series is calculated.
- The projected growth rate is perturbed by plus or minus one historic standard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

Table 4.1

Joint System Energy Requirements Scenarios
MWh

<u>Year</u>	<u>Base /1 Energy Requirements</u>	<u>Optimistic Economic</u>	<u>Pessimistic Economic</u>	<u>Extreme Weather</u>	<u>Mild Weather</u>
1991	2,629,567				
1992	2,743,673				
1993	2,849,536				
1994	2,919,842				
1995	3,092,759				
1996	3,279,299				
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				
2017	4,460,583				
2018	4,648,830				
2019	4,575,793				
2020	4,442,050	4,442,050	4,442,050	4,442,050	4,442,050
2021	4,575,208	4,699,838	4,340,750	4,769,146	4,341,729
2022	4,651,511	4,777,842	4,448,095	4,837,543	4,429,239
2023	4,708,435	4,882,246	4,482,373	4,897,153	4,482,954
2024	4,753,140	4,992,689	4,504,728	4,944,336	4,524,700
2025	4,798,300	5,062,131	4,526,622	4,992,036	4,566,822
2026	4,839,641	5,128,208	4,545,124	5,035,676	4,605,396
2027	4,879,866	5,195,843	4,564,313	5,080,745	4,644,884
2028	4,923,296	5,268,903	4,586,547	5,129,986	4,688,619
2029	4,965,980	5,343,472	4,609,175	5,179,787	4,732,784
2030	5,002,972	5,410,333	4,624,264	5,221,520	4,769,377
2031	5,041,702	5,480,258	4,640,693	5,265,273	4,808,087
2032	5,079,884	5,549,219	4,655,474	5,307,132	4,845,343
2033	5,112,700	5,612,915	4,665,048	5,343,437	4,877,174
2034	5,150,293	5,681,899	4,677,914	5,383,862	4,913,312
2035	5,188,940	5,752,645	4,691,714	5,425,300	4,950,558
2036	5,220,669	5,816,549	4,699,040	5,459,779	4,980,939
2037	5,254,704	5,883,613	4,707,942	5,496,531	5,013,657
2038	5,290,481	5,953,330	4,718,500	5,534,944	5,048,203
2039	5,320,350	6,017,209	4,723,553	5,567,420	5,076,868
2040	5,354,038	6,085,889	4,731,604	5,603,734	5,109,323
2041	5,387,616	6,155,209	4,739,668	5,639,868	5,141,779
2042	5,417,220	6,220,832	4,743,986	5,672,060	5,170,251
2043	5,450,238	6,290,915	4,750,981	5,707,693	5,202,125
2044	5,484,702	6,363,247	4,759,409	5,744,742	5,235,495
2045	5,514,833	6,431,544	4,763,812	5,777,469	5,264,530
2046	5,547,964	6,503,826	4,770,496	5,813,178	5,296,578
2047	5,579,161	6,574,688	4,775,577	5,846,953	5,326,723
2048	5,609,622	6,645,512	4,779,890	5,880,016	5,356,135
2049	5,643,701	6,721,033	4,787,024	5,916,737	5,389,148
2050	5,675,823	6,795,162	4,792,601	5,951,484	5,420,250
Average Annual Growth Rates					
1991-2020	1.8%				
2005-2020	1.3%				
2010-2020	0.8%				
2015-2020	-0.3%				
2020-2025	1.6%	2.6%	0.4%	2.4%	0.6%
2020-2030	1.2%	2.0%	0.4%	1.6%	0.7%
2020-2040	0.9%	1.6%	0.3%	1.2%	0.7%
2020-2050	0.8%	1.4%	0.3%	1.0%	0.7%
2021-2050	0.7%	1.3%	0.3%	0.8%	0.8%
2050 Index	1.00	1.20	0.84	1.05	0.95
/1 Assumes normal weather and basecase economic assumptions					

Figure 4.1



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.

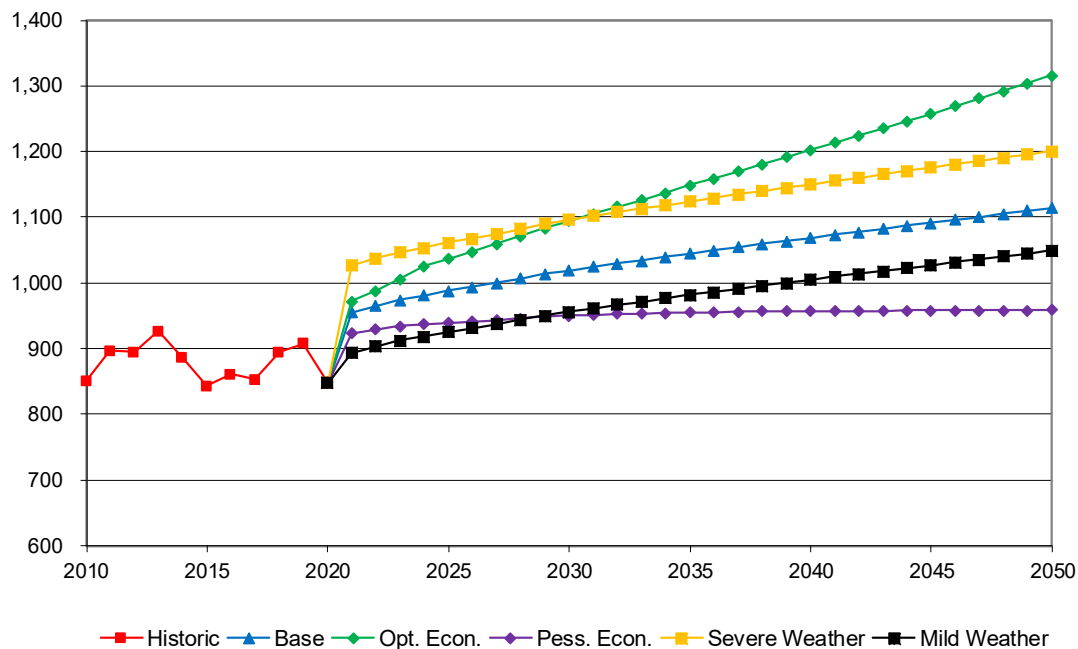
Table 4.2

Joint System Peak Demand Scenarios
MW

<u>Year</u>	(Annual) <u>Winter</u> <u>Peak</u>	<u>Optimistic</u> <u>Economic</u>	<u>Pessimistic</u> <u>Economic</u>	<u>Extreme</u> <u>Weather</u>	<u>Mild</u> <u>Weather</u>	<u>Summer</u> <u>Peak</u>	<u>Optimistic</u> <u>Economic</u>	<u>Pessimistic</u> <u>Economic</u>	<u>Extreme</u> <u>Weather</u>	<u>Mild</u> <u>Weather</u>
2003	699					514				
2004	792					447				
2005	788					482				
2006	786					505				
2007	806					521				
2008	906					512				
2009	917					506				
2010	851					574				
2011	897					574				
2012	895					597				
2013	926					603				
2014	885					598				
2015	843					630				
2016	862					614				
2017	853					646				
2018	895					646				
2019	908					647				
2020	848	848	848	848	848	691	691	691	691	691
2021	955	972	924	1,027	894	736	749	712	792	689
2022	966	988	930	1,037	904	749	766	721	804	701
2023	974	1,006	934	1,047	913	756	781	725	813	708
2024	981	1,026	937	1,054	919	762	797	728	819	714
2025	988	1,037	940	1,061	925	768	807	731	825	720
2026	994	1,048	942	1,068	931	774	816	733	831	725
2027	1,000	1,059	944	1,075	937	779	825	735	837	730
2028	1,007	1,072	946	1,083	944	785	836	738	844	736
2029	1,014	1,084	949	1,090	951	791	846	741	851	742
2030	1,019	1,095	950	1,096	956	796	855	742	856	747
2031	1,024	1,106	952	1,103	962	801	865	744	862	752
2032	1,030	1,117	953	1,108	967	806	874	746	868	757
2033	1,034	1,127	953	1,113	972	811	883	747	872	761
2034	1,040	1,138	954	1,119	977	816	892	749	878	766
2035	1,045	1,149	956	1,125	982	821	902	750	883	771
2036	1,050	1,159	956	1,130	987	825	911	751	888	775
2037	1,055	1,170	956	1,135	991	829	920	752	893	780
2038	1,060	1,181	957	1,141	996	834	930	753	898	784
2039	1,064	1,192	957	1,145	1,001	838	939	754	902	788
2040	1,069	1,203	957	1,151	1,005	843	948	755	907	792
2041	1,074	1,214	958	1,156	1,010	847	957	756	912	797
2042	1,078	1,224	958	1,160	1,014	851	966	756	916	800
2043	1,083	1,235	958	1,166	1,018	855	976	757	921	805
2044	1,087	1,247	958	1,171	1,023	860	986	758	926	809
2045	1,092	1,258	958	1,176	1,027	864	995	758	930	813
2046	1,096	1,270	958	1,181	1,032	868	1,005	759	935	817
2047	1,101	1,281	959	1,186	1,036	872	1,015	759	939	821
2048	1,105	1,292	958	1,190	1,040	876	1,024	760	944	825
2049	1,110	1,304	959	1,196	1,045	880	1,034	760	948	829
2050	1,115	1,316	959	1,201	1,050	884	1,044	761	953	833
Average Annual Growth Rates										
2003-2020	1.1%					1.8%				
2010-2020	0.0%					1.9%				
2015-2020	0.1%					1.9%				
2020-2025	3.1%	4.1%	2.1%	4.6%	1.8%	2.1%	3.1%	1.1%	3.6%	0.8%
2020-2030	1.9%	2.6%	1.1%	2.6%	1.2%	1.4%	2.2%	0.7%	2.2%	0.8%
2020-2040	1.2%	1.8%	0.6%	1.5%	0.9%	1.0%	1.6%	0.4%	1.4%	0.7%
2020-2050	0.9%	1.5%	0.4%	1.2%	0.7%	0.8%	1.4%	0.3%	1.1%	0.6%
2021-2050	0.5%	1.1%	0.1%	0.5%	0.6%	0.6%	1.2%	0.2%	0.6%	0.7%
2050 Index	1.00	1.18	0.86	1.08	0.94	1.00	1.18	0.86	1.08	0.94

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 -16 to +20 percent by 2050, 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 959 to 1,316 MW by 2050, 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 (2025, 2030, 2035, 2040, 2045, and 2050) 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 -13 to +17 percent in 2050. This scenario is presented in Table 4.3 and Figure 4.3.

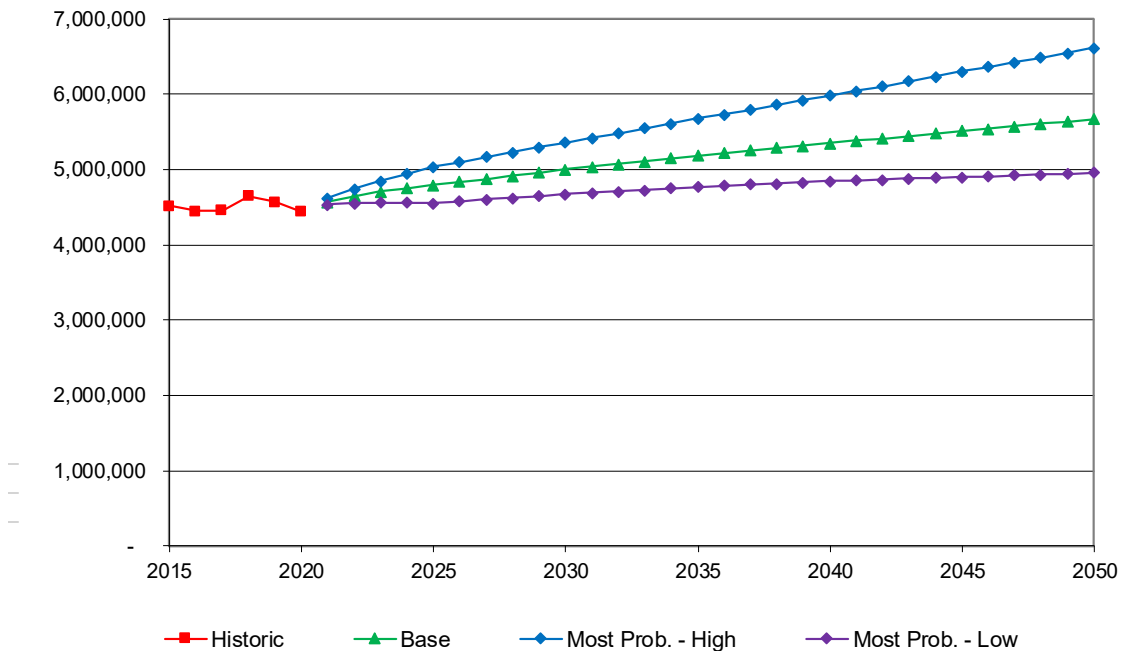
Table 4.3

Joint System Forecast - Most Probable Ranges

<u>Year</u>	<u>Base MWh</u>	<u>Most Prob. High</u>	<u>Most Prob. Low</u>	<u>Winter MW</u>	<u>Most Prob. High</u>	<u>Most Prob. Low</u>	<u>Summer MW</u>	<u>Most Prob. High</u>	<u>Most Prob. Low</u>
1991	2,629,567								
1992	2,743,673								
1993	2,849,536								
1994	2,919,842								
1995	3,092,759								
1996	3,279,299								
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			788			482		
2006	3,728,998			786			505		
2007	3,972,935			806			521		
2008	4,186,372			906			512		
2009	4,253,722			917			506		
2010	4,086,381			851			574		
2011	4,294,722			897			574		
2012	4,288,782			895			597		
2013	4,693,790			926			603		
2014	4,745,458			885			598		
2015	4,517,747			843			630		
2016	4,451,508			862			614		
2017	4,460,583			853			646		
2018	4,648,830			895			646		
2019	4,575,793			908			647		
2020	4,442,050	4,442,050	4,442,050	848	848	848	691	691	691
2021	4,575,208	4,628,227	4,535,219	955	965	946	736	744	729
2022	4,651,511	4,744,541	4,558,481	966	985	946	749	764	734
2023	4,708,435	4,849,688	4,567,182	974	1,004	945	756	779	734
2024	4,753,140	4,943,265	4,563,014	981	1,021	942	762	793	724
2025	4,798,300	5,043,058	4,556,297	988	1,047	937	768	815	730
2026	4,839,641	5,105,483	4,580,248	994	1,055	940	774	821	734
2027	4,879,866	5,168,351	4,604,030	1,000	1,062	944	779	828	737
2028	4,923,296	5,232,476	4,628,363	1,007	1,071	948	785	834	741
2029	4,965,980	5,297,125	4,652,587	1,014	1,079	951	791	841	744
2030	5,002,972	5,361,397	4,675,911	1,019	1,087	955	796	847	748
2031	5,041,702	5,423,891	4,695,237	1,024	1,096	958	801	856	750
2032	5,079,884	5,486,911	4,714,468	1,030	1,105	960	806	865	751
2033	5,112,700	5,549,579	4,732,854	1,034	1,115	963	811	874	753
2034	5,150,293	5,613,769	4,751,994	1,040	1,124	966	816	883	755
2035	5,188,940	5,678,801	4,771,295	1,045	1,134	968	821	892	757
2036	5,220,669	5,738,904	4,787,004	1,050	1,144	969	825	900	759
2037	5,254,704	5,800,000	4,803,059	1,055	1,155	969	829	908	761
2038	5,290,481	5,861,989	4,819,368	1,060	1,165	970	834	916	763
2039	5,320,350	5,923,482	4,834,786	1,064	1,176	970	838	924	765
2040	5,354,038	5,986,259	4,850,772	1,069	1,187	971	843	932	767
2041	5,387,616	6,049,279	4,861,017	1,074	1,196	971	847	941	768
2042	5,417,220	6,112,168	4,870,650	1,078	1,206	972	851	949	769
2043	5,450,238	6,176,277	4,880,750	1,083	1,215	973	855	957	770
2044	5,484,702	6,241,254	4,891,024	1,087	1,225	973	860	966	771
2045	5,514,833	6,306,054	4,900,651	1,092	1,235	974	864	974	771
2046	5,547,964	6,367,641	4,913,020	1,096	1,246	975	868	983	773
2047	5,579,161	6,429,412	4,925,101	1,101	1,257	976	872	993	774
2048	5,609,622	6,491,589	4,937,064	1,105	1,268	977	876	1,002	775
2049	5,643,701	6,554,967	4,949,510	1,110	1,280	978	880	1,011	776
2050	5,675,823	6,618,541	4,961,670	1,115	1,291	979	884	1,021	777
Average Annual Growth Rates									
1991-2020	1.8%			--			--		
2005-2020	1.3%			0.5%			2.4%		
2010-2020	0.8%			0.0%			1.9%		
2015-2020	-0.3%			0.1%			1.9%		
2020-2025	1.6%	2.6%	0.5%	3.1%	4.3%	2.0%	2.1%	3.4%	1.1%
2020-2030	1.2%	1.9%	0.5%	1.9%	2.5%	1.2%	1.4%	2.1%	0.8%
2020-2040	0.9%	1.5%	0.4%	1.2%	1.7%	0.7%	1.0%	1.5%	0.5%
2020-2050	0.8%	1.3%	0.4%	0.9%	1.4%	0.5%	0.8%	1.3%	0.4%
2021-2050	0.7%	1.2%	0.3%	0.5%	1.0%	0.1%	0.6%	1.1%	0.2%
2050 Index	1.00	1.17	0.87	1.00	1.16	0.88	1.00	1.15	0.88

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). Smaller Minnesota and all North Dakota members are exempt from this requirement.

Table 4.4

Joint System Retail Energy Forecasts (kWh) - CIP Scenario
Joint System

<u>Year</u>	<u>Base Retail Forecast</u>	<u>/1</u>	<u>CIP Requirement Forecast</u>	<u>/2</u>	<u>Adjusted Retail Forecast</u>	<u>/3</u>
2000	2,859,765,949					
2001	3,009,139,019					
2002	3,167,876,012					
2003	3,171,772,344					
2004	3,237,968,057					
2005	3,296,638,386					
2006	3,395,904,400					
2007	3,573,892,566					
2008	3,731,948,209					
2009	3,796,592,035					
2010	3,709,481,446					
2011	3,890,908,441					
2012	3,828,166,152					
2013	4,201,427,145		38,547,846		4,239,974,991	
2014	4,418,082,499		49,534,178		4,467,616,677	
2015	4,118,294,522		61,444,137		4,179,738,659	
2016	4,084,843,530		75,137,568		4,159,981,098	
2017	4,174,655,113		89,188,373		4,263,843,486	
2018	4,366,545,635		103,252,527		4,469,798,162	
2019	4,396,650,966		113,740,062		4,510,391,028	
2020	4,213,779,886		120,866,847		4,334,646,733	
2021	4,328,978,723		121,857,244		4,450,835,967	
2022	4,412,462,581		122,859,236		4,535,321,817	
2023	4,466,503,191		123,872,971		4,590,376,162	
2024	4,508,866,913		124,898,602		4,633,765,516	
2025	4,551,771,382		125,936,284		4,677,707,666	
2026	4,591,074,437		126,986,172		4,718,060,609	
2027	4,629,225,340		128,048,425		4,757,273,765	
2028	4,670,473,570		129,123,204		4,799,596,774	
2029	4,710,941,210		130,210,672		4,841,151,883	
2030	4,746,049,210		131,310,996		4,877,360,206	
2031	4,782,863,313		132,424,343		4,915,287,656	
2032	4,819,098,428		133,550,884		4,952,649,312	
2033	4,850,261,266		134,690,792		4,984,952,058	
2034	4,885,970,646		135,844,243		5,021,814,889	
2035	4,922,588,628		137,011,415		5,059,600,043	
2036	4,952,740,555		138,192,488		5,090,933,043	
2037	4,985,129,439		139,387,648		5,124,517,087	
2038	5,019,090,728		140,597,080		5,159,687,807	
2039	5,047,476,366		141,820,972		5,189,297,339	
2040	5,079,534,053		143,059,518		5,222,593,571	
2041	5,111,412,934		144,312,912		5,255,725,846	
2042	5,139,535,637		145,581,351		5,285,116,988	
2043	5,170,953,234		146,865,037		5,317,818,271	
2044	5,203,683,005		148,164,173		5,351,847,178	
2045	5,232,292,200		149,478,965		5,381,771,166	
2046	5,263,822,836		150,809,625		5,414,632,460	
2047	5,293,440,150		152,156,364		5,445,596,514	
2048	5,322,374,224		153,519,398		5,475,893,622	
2049	5,354,799,715		154,898,949		5,509,698,664	
2050	5,385,297,296		156,295,238		5,541,592,534	

Average Annual Growth Rates

2005-2020	2.6%	--	--
2010-2020	1.3%	--	--
2015-2020	0.5%	14.5%	0.7%
2020-2025	1.6%	0.8%	1.5%
2020-2030	1.2%	0.8%	1.2%
2020-2040	0.9%	0.8%	0.9%
2020-2050	0.8%	0.9%	0.8%
2021-2050	0.8%	0.9%	0.8%

/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

[reserved for Board resolution]

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., these 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: 08/31/21 Time: 11:53

Sample (adjusted): 1997 2020

Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16213.94	3245.026	4.996552	0.0001
TEMPW	0.897916	0.504257	1.780671	0.0902
D01ON_REV	1998.080	261.1046	7.652411	0.0000
D10ON	-793.3480	248.7801	-3.188954	0.0046
R-squared	0.826644	Mean dependent var		22933.58
Adjusted R-squared	0.800641	S.D. dependent var		727.6058
S.E. of regression	324.8737	Akaike info criterion		14.55576
Sum squared resid	2110859.	Schwarz criterion		14.75210
Log likelihood	-170.6691	Hannan-Quinn criter.		14.60785
F-statistic	31.78983	Durbin-Watson stat		2.009391
Prob(F-statistic)	0.000000			

Dependent Variable: FOSSTON+FOSSTONCIP

Method: Least Squares

Date: 08/31/21 Time: 11:50

Sample (adjusted): 2000 2020

Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8380.045	6054.069	1.384201	0.1842
HDD	1.250846	0.300322	4.165015	0.0006
D20	-3143.448	974.1446	-3.226880	0.0050
HHW	4.180082	1.555543	2.687217	0.0156
R-squared	0.668330	Mean dependent var		35416.19
Adjusted R-squared	0.609800	S.D. dependent var		1423.238
S.E. of regression	889.0394	Akaike info criterion		16.58780
Sum squared resid	13436647	Schwarz criterion		16.78676
Log likelihood	-170.1719	Hannan-Quinn criter.		16.63098
F-statistic	11.41860	Durbin-Watson stat		1.329806
Prob(F-statistic)	0.000243			

Dependent Variable: GRAFTON_MWH

Method: Least Squares

Date: 08/31/21 Time: 11:57

Sample (adjusted): 1995 2020

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	64594.09	6424.971	10.05360	0.0000
HDD	0.821352	0.683396	1.201868	0.2422
D97	-13796.70	2542.472	-5.426489	0.0000
D08ON	-14354.69	977.7404	-14.68149	0.0000
R-squared	0.910428	Mean dependent var		64558.54
Adjusted R-squared	0.898214	S.D. dependent var		7655.455
S.E. of regression	2442.392	Akaike info criterion		18.57998
Sum squared resid	1.31E+08	Schwarz criterion		18.77353
Log likelihood	-237.5398	Hannan-Quinn criter.		18.63572
F-statistic	74.53766	Durbin-Watson stat		0.562491
Prob(F-statistic)	0.000000			

Dependent Variable: HALSTAD_MWH+HALSTAD_CIP

Method: Least Squares

Date: 08/31/21 Time: 12:02

Sample (adjusted): 1995 2020

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3688.599	1881.628	1.960324	0.0627
HDD	0.365860	0.102515	3.568850	0.0017
HHW	0.906341	0.565157	1.603698	0.1230
D20	-1304.103	437.6182	-2.980002	0.0069
R-squared	0.493322	Mean dependent var		9365.577
Adjusted R-squared	0.424230	S.D. dependent var		534.7278
S.E. of regression	405.7489	Akaike info criterion		14.98998
Sum squared resid	3621907.	Schwarz criterion		15.18354
Log likelihood	-190.8698	Hannan-Quinn criter.		15.04572
F-statistic	7.140035	Durbin-Watson stat		0.867259
Prob(F-statistic)	0.001598			

Dependent Variable: HAWLEY_MWH+HAWLEY_CIP

Method: Least Squares

Date: 08/31/21 Time: 12:05

Sample (adjusted): 1995 2020

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-20208.69	3411.059	-5.924462	0.0000
HDD+CDD	0.204973	0.193802	1.057640	0.3012
HHW	4.096016	0.285517	14.34594	0.0000
R-squared	0.899690	Mean dependent var		20059.73
Adjusted R-squared	0.890967	S.D. dependent var		2216.028
S.E. of regression	731.7342	Akaike info criterion		16.13688
Sum squared resid	12315003	Schwarz criterion		16.28204
Log likelihood	-206.7794	Hannan-Quinn criter.		16.17868
F-statistic	103.1447	Durbin-Watson stat		0.766599
Prob(F-statistic)	0.000000			

Dependent Variable: PARKRIVER_MWH
 Method: Least Squares
 Date: 08/31/21 Time: 11:58
 Sample (adjusted): 1995 2020
 Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4095.513	2695.436	1.519425	0.1436
HDD	0.672606	0.161334	4.169022	0.0004
CDD	1.963396	1.027016	1.911748	0.0697
CEMPW	1.927029	0.732587	2.630442	0.0156
FEMPW	2.017411	0.513287	3.930376	0.0008
R-squared	0.673549	Mean dependent var		20392.58
Adjusted R-squared	0.611368	S.D. dependent var		817.5000
S.E. of regression	509.6325	Akaike info criterion		15.47630
Sum squared resid	5454231.	Schwarz criterion		15.71824
Log likelihood	-196.1919	Hannan-Quinn criter.		15.54597
F-statistic	10.83205	Durbin-Watson stat		1.664576
Prob(F-statistic)	0.000063			

Dependent Variable: ROSEAU_MWH+ROSEAUCIP
 Method: Least Squares
 Date: 08/31/21 Time: 12:08
 Sample (adjusted): 1995 2020
 Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13875.65	15177.08	-0.914250	0.3705
HDD+CDD	1.057785	0.356954	2.963365	0.0072
HHW	9.297399	2.840568	3.273078	0.0035
D12ON	-2441.602	714.5826	-3.416823	0.0025
R-squared	0.471128	Mean dependent var		43351.58
Adjusted R-squared	0.399009	S.D. dependent var		1606.551
S.E. of regression	1245.456	Akaike info criterion		17.23303
Sum squared resid	34125516	Schwarz criterion		17.42658
Log likelihood	-220.0294	Hannan-Quinn criter.		17.28877
F-statistic	6.532664	Durbin-Watson stat		0.590215
Prob(F-statistic)	0.002512			

Dependent Variable: TRF+TRFCIP

Method: Least Squares

Date: 08/31/21 Time: 12:21

Sample (adjusted): 1995 2020

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-269235.6	48436.77	-5.558496	0.0000
HDD	2.951326	0.846155	3.487925	0.0022
CDD	10.77580	6.357027	1.695101	0.1048
SEMPW	32.91729	9.863840	3.337168	0.0031
HHW	85.55194	16.63006	5.144415	0.0000
R-squared	0.926740	Mean dependent var		137461.8
Adjusted R-squared	0.912786	S.D. dependent var		10940.26
S.E. of regression	3230.887	Akaike info criterion		19.16994
Sum squared resid	2.19E+08	Schwarz criterion		19.41188
Log likelihood	-244.2092	Hannan-Quinn criter.		19.23961
F-statistic	66.41252	Durbin-Watson stat		1.233571
Prob(F-statistic)	0.000000			

Dependent Variable: WARREN_MWH+WARRENCIP

Method: Least Squares

Date: 08/31/21 Time: 12:18

Sample (adjusted): 1995 2020

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7850.388	1311.734	5.984739	0.0000
HDD	0.680581	0.117871	5.773961	0.0000
CDD	3.856005	0.794930	4.850750	0.0001
TPI12W(-1)	10.72643	1.608406	6.668983	0.0000
R-squared	0.802710	Mean dependent var		19180.04
Adjusted R-squared	0.775807	S.D. dependent var		876.9317
S.E. of regression	415.2184	Akaike info criterion		15.03612
Sum squared resid	3792938.	Schwarz criterion		15.22968
Log likelihood	-191.4696	Hannan-Quinn criter.		15.09186
F-statistic	29.83706	Durbin-Watson stat		0.851563
Prob(F-statistic)	0.000000			

Dependent Variable: WARROAD_MWH

Method: Least Squares

Date: 08/31/21 Time: 12:09

Sample (adjusted): 1995 2020

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-60642.36	17813.84	-3.404227	0.0025
HDD+CDD	0.705333	0.418969	1.683498	0.1064
HHW	21.71279	3.334068	6.512402	0.0000
D12ON	-1959.415	838.7291	-2.336172	0.0290
R-squared	0.705016	Mean dependent var		56265.23
Adjusted R-squared	0.664791	S.D. dependent var		2524.873
S.E. of regression	1461.832	Akaike info criterion		17.55341
Sum squared resid	47012975	Schwarz criterion		17.74696
Log likelihood	-224.1943	Hannan-Quinn criter.		17.60914
F-statistic	17.52676	Durbin-Watson stat		0.850700
Prob(F-statistic)	0.000005			

APPENDIX C
SYSTEM DATABASE

Date	1. RESIDENTIAL			2. SEASONAL RESIDENTIAL			3. IRRIGATION			4. COMM. & IND. (<1000 kVA)			5. COMM
	a. Consumers	b. KWHs	c. Revenue	a. Consumers	b. KWHs	c. Revenue	a. Consumers	b. KWHs	c. Revenue	a. Consumers	b. KWHs	c. Revenue	a. Consumers
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	297,013,578	15,771,806	119
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	328,082,924	17,344,962	85
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	351,092,324	19,059,798	88
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	375,189,447	20,215,356	85
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	407,579,610	21,453,665	146
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	446,298,289	22,821,092	88
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	452,419,179	23,344,054	88
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	456,757,299	23,756,029	95
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	472,458,894	24,530,030	267
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	431,223,712	22,646,071	299
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	445,355,368	22,422,093	367
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	486,038,676	25,491,814	300
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	482,426,344	25,556,508	322
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	495,281,517	27,780,395	336
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	522,595,540	30,104,725	330
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	570,500,653	32,389,206	343
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	569,512,248	35,029,610	427
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	609,808,912	38,380,741	475
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	627,863,515	43,094,600	488
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	647,086,507	51,408,821	398
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	643,106,562	57,279,039	404
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	627,781,412	59,811,392	525
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	677,622,227	64,398,873	557
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	732,571,625	70,006,396	559
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	739,930,895	72,428,170	428
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	766,195,070	77,427,699	427
2017	123,511	1,881,982,940	227,070,118	1,138	8,500,337	1,641,506	518	17,433,622	2,162,366	9,750	815,512,291	85,071,867	171
2018	125,626	1,995,902,873	247,268,179	1,120	9,248,862	1,783,798	521	16,092,891	2,047,831	10,010	842,249,100	88,586,093	184
2019	127,357	2,078,772,027	248,247,776	1,092	9,460,869	1,772,622	526	10,861,433	1,615,258	10,163	807,604,974	85,830,688	348
2020	129,033	1,980,306,719	250,939,663	1,057	8,564,417	1,655,155	524	11,106,479	1,600,022	10,748	794,036,671	85,156,595	362

Date	. & IND. (>1000 kVA)		6. PUBLIC STREET & HIGHWAY			7. OTHER SALES TO PUBL. AUTH.			8. SALE FOR RESALE-RUS BORR.			9. SALES FOR RESALE-OTHE	
	b.	c.	a.	b.	c.	a.	b.	c.	a.	b.	c.	a.	b.
	KWHs	Revenue	Consumers	KWHs	Revenue	Consumer	KWHs	Revenue	Consumers	KWHs	Revenue	Consumers	KWHs
1991	105,849,945	4,049,327	295	2,997,490	234,826	113	125,094,271	5,600,382	1	5,103,000	219,862	10	82,965,796
1992	100,569,016	3,687,933	310	2,905,578	238,753	113	121,864,420	5,501,200	1	5,377,657	231,858	10	91,793,051
1993	115,888,395	4,068,379	318	3,160,076	244,841	112	121,565,040	5,566,185	1	5,650,555	227,825	12	94,449,803
1994	129,010,344	4,334,229	335	3,331,127	254,101	112	120,015,271	5,453,962	1	5,684,380	226,947	12	101,486,923
1995	147,616,018	5,170,940	344	3,523,712	268,639	113	120,798,190	5,378,182	1	5,791,798	228,208	12	101,701,636
1996	131,271,622	4,319,075	365	3,676,078	286,476	111	122,293,301	5,524,311	1	6,281,174	236,378	12	113,028,048
1997	132,131,676	4,249,487	378	3,821,017	290,861	111	107,107,265	5,105,499	1	6,526,134	243,579	12	113,306,922
1998	157,405,856	5,025,783	388	4,010,050	317,645	111	92,781,196	4,479,980	1	6,197,288	238,712	12	120,032,819
1999	197,917,692	7,543,132	407	4,383,320	325,348	103	86,969,917	3,787,971	1	6,515,407	239,648	13	116,986,481
2000	230,810,531	8,777,206	429	4,623,499	353,563	87	70,311,740	2,848,481	1	6,672,212	240,581	13	104,219,617
2001	297,667,888	11,434,014	395	5,042,322	366,084	25	67,092,420	2,612,662	1	6,774,788	241,830	13	102,265,091
2002	302,602,373	11,754,415	403	6,048,951	454,675	26	68,284,807	2,699,193	1	7,157,112	252,664	12	107,327,932
2003	322,124,181	13,367,870	370	5,507,857	399,227	28	66,875,948	2,724,460	1	7,278,572	261,418	11	99,385,372
2004	334,801,299	14,632,900	410	5,950,752	425,494	28	66,184,235	2,902,178	1	7,802,182	294,135	11	103,405,778
2005	338,649,316	15,893,875	427	6,468,180	464,964	28	64,102,100	2,854,893	1	7,696,019	307,746	10	100,389,760
2006	357,375,711	15,963,021	448	6,814,781	512,133	26	64,478,575	2,864,028	1	7,618,370	309,741	10	108,730,684
2007	413,666,263	19,627,677	509	7,221,696	569,853	28	106,080,393	4,255,957	1	8,011,705	341,467	10	100,301,386
2008	417,589,622	20,446,952	534	7,587,199	604,696	29	105,857,388	4,347,462	1	7,989,728	362,025	11	97,338,150
2009	413,312,549	22,521,005	553	8,066,195	649,759	29	103,904,716	4,511,797	1	8,118,785	408,183	11	84,959,823
2010	450,677,697	27,901,398	569	8,684,129	728,601	29	99,078,156	4,979,646	1	7,860,022	452,421	11	87,776,805
2011	633,948,572	43,405,361	590	9,246,792	910,726	28	90,651,423	5,871,870	1	7,930,660	568,120	11	78,966,687
2012	725,624,175	54,481,670	610	9,558,017	1,042,720	27	93,781,544	6,634,622	1	7,068,507	581,458	11	83,171,073
2013	771,541,500	58,060,212	619	9,739,152	1,054,131	25	98,569,028	6,299,887	1	8,316,494	703,521	11	73,618,137
2014	801,346,967	60,671,830	625	9,972,645	1,076,708	26	97,591,236	6,291,834	1	9,003,400	540,107	11	93,747,434
2015	776,587,891	60,544,012	638	9,895,011	1,086,123	33	93,810,754	6,115,523	1	8,460,850	670,818	11	111,480,554
2016	755,847,341	62,426,155	649	9,739,522	1,123,439	34	89,487,361	6,106,282	1	8,573,124	693,806	10	135,042,659
2017	795,335,477	65,329,266	670	8,633,452	1,124,182	27	81,632,476	5,903,875	1	8,437,465	721,420	10	134,450,346
2018	819,789,710	67,763,125	681	9,270,080	1,125,859	27	91,820,839	6,347,895	1	8,910,367	740,915	10	136,889,831
2019	816,113,932	68,762,065	698	8,807,745	1,096,780	34	92,837,764	6,465,292	1	8,947,064	756,261	11	135,252,533
2020	756,910,660	64,630,890	752	8,741,303	1,101,701	29	92,375,310	6,435,240	1	8,604,808	721,055	11	127,786,499

	RS	10.	11.	12.	13.	14.	15.	16.	17.	18.	19. Peak KW Input
Date	c. Revenue	Total Consumers	Total KWHs	Total Revenue	Other Elec Revenue	KWHs Own Use	Total KWHs Purchased	Total KWHs Generated	Power Cost	Interchange KWHs - Net	(Coincident or Non-Coincident)
1991	3,407,585	78,105	1,889,234,772	103,081,733	3,283,698	1,921,753	2,018,791,437	0	359,635,301	0	502,853
1992	3,721,215	79,619	1,915,538,881	106,783,170	3,393,669	1,833,084	2,017,999,077	0	363,739,731	0	480,179
1993	3,773,159	81,390	2,042,635,851	112,832,227	705,274	2,110,472	2,160,868,404	0	67,336,898	0	521,262
1994	3,953,678	83,194	2,098,627,943	116,427,900	861,980	2,069,718	2,228,292,118	0	68,555,446	0	547,956
1995	3,959,671	85,055	2,218,296,646	120,601,378	870,484	2,216,488	2,352,345,157	0	70,457,447	0	566,188
1996	4,061,950	86,966	2,382,226,475	125,889,979	846,747	2,390,393	2,488,709,763	0	73,284,161	0	602,441
1997	4,045,137	88,673	#N/A	124,226,151	787,429	2,447,135	2,456,133,009	0	72,686,475	0	580,161
1998	4,356,986	90,511	2,243,844,812	122,688,324	894,986	2,330,084	2,347,967,688	0	72,116,507	0	574,397
1999	4,248,609	92,349	2,360,969,217	129,299,656	1,088,284	2,413,889	2,473,173,826	0	73,007,397	0	614,527
2000	3,835,345	94,409	2,436,015,949	133,386,210	1,051,445	2,400,963	2,553,456,063	0	74,226,637	0	648,104
2001	4,025,031	96,636	2,570,395,722	140,497,067	670,273	2,883,341	2,692,023,962	0	77,553,094	0	629,531
2002	4,273,888	98,927	2,716,707,696	151,075,663	767,674	3,723,219	2,865,733,827	0	86,470,217	0	614,268
2003	4,291,349	101,693	2,720,140,734	157,913,511	1,079,654	3,734,977	2,860,849,278	0	91,601,769	0	640,058
2004	4,591,494	104,925	2,783,478,988	168,481,602	1,170,448	4,335,914	2,930,437,198	0	102,186,806	0	693,822
2005	4,947,968	107,928	2,839,167,808	178,493,142	1,311,372	4,451,840	2,997,936,193	0	107,891,489	0	722,593
2006	5,386,520	110,819	2,931,753,217	185,513,003	1,305,690	3,882,043	3,080,882,004	0	111,627,258	0	704,871
2007	5,043,216	113,369	3,109,027,566	204,959,180	1,433,968	3,822,352	3,269,299,708	0	125,324,070	0	716,615
2008	5,229,105	115,293	3,273,077,209	220,623,737	1,544,972	4,166,528	3,460,221,100	0	139,215,284	0	760,694
2009	4,369,324	116,711	3,346,671,509	243,620,693	1,521,822	4,224,715	3,518,961,371	0	158,545,292	0	760,694
2010	4,792,735	118,002	3,267,699,450	270,328,561	1,906,590	4,239,650	3,425,668,796	0	183,152,404	0	760,694
2011	4,693,108	119,191	3,448,480,718	316,310,954	1,851,827	4,109,474	3,602,110,274	0	234,097,872	0	
2012	5,081,378	120,983	3,405,291,054	335,849,394	1,770,895	6,436,308	3,556,036,304	0	243,475,402	0	
2013	4,407,613	123,227	3,742,668,912	364,299,240	(1,202,275)	7,490,907	3,910,199,522	0	258,957,726	0	
2014	5,649,704	127,807	3,958,625,138	384,916,626	(1,349,383)	7,676,049	4,040,336,674	0	270,549,010	0	
2015	7,301,678	130,068	3,643,139,258	372,335,449	2,259,502	6,512,772	3,845,597,041	0	277,236,315	0	
2016	8,749,497	133,342	3,660,207,677	384,981,859	1,926,539	8,466,688	3,812,156,031	0	284,816,774	96,615	
2017	8,897,723	135,814	3,761,674,817	400,872,086	1,865,913	6,334,623	3,930,838,145	0	290,027,378	0	
2018	8,901,097	138,178	3,930,172,553	424,732,678	1,869,950	6,498,371	4,094,992,234	0	303,313,856	0	
2019	9,167,192	140,229	3,968,658,341	423,713,932	1,995,852	7,012,586	4,080,720,107	0	303,351,168	0	
2020	7,811,682	142,517	3,788,432,866	420,052,003	783,350	6,580,710	3,945,097,994	0	292,692,488	0	

APPENDIX D

MONTHLY PEAK DEMAND

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

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2010.01	JointSys	2010	1			799,209	409,054,790	809,237		January
2010.02	JointSys	2010	2			761,389	390,627,890	754,911		February
2010.03	JointSys	2010	3			643,607	294,120,332	707,793		March
2010.04	JointSys	2010	4			533,339	261,721,946	633,422		April
2010.05	JointSys	2010	5			477,101	222,954,136	498,902		May
2010.06	JointSys	2010	6			437,818	211,000,013	448,796		June
2010.07	JointSys	2010	7			495,227	223,443,274	511,929		July
2010.08	JointSys	2010	8			540,445	242,984,253	559,067		August
2010.09	JointSys	2010	9			403,825	233,538,074	559,394		September
2010.10	JointSys	2010	10			581,338	228,268,670	552,610		October
2010.11	JointSys	2010	11			692,729	302,255,226	635,193		November
2010.12	JointSys	2010	12			773,153	405,700,192	769,360		December
2011.01	JointSys	2011	1			843,260	423,641,731	815,636		January
2011.02	JointSys	2011	2			818,012	403,262,105	841,839		February
2011.03	JointSys	2011	3			730,303	346,676,392	768,951		March
2011.04	JointSys	2011	4			565,518	304,143,344	646,998		April
2011.05	JointSys	2011	5			529,614	244,851,590	569,181		May
2011.06	JointSys	2011	6			532,906	222,423,805	492,827		June
2011.07	JointSys	2011	7			545,941	239,524,039	577,265		July
2011.08	JointSys	2011	8			541,317	251,783,606	567,082		August
2011.09	JointSys	2011	9			508,547	255,332,514	575,129		September
2011.10	JointSys	2011	10			571,322	241,436,455	590,102		October
2011.11	JointSys	2011	11			690,935	314,348,845	697,856		November
2011.12	JointSys	2011	12			738,100	354,685,848	761,717		December
2012.01	JointSys	2012	1			844,816	379,894,383	843,463		January
2012.02	JointSys	2012	2			815,763	390,422,092	814,113		February
2012.03	JointSys	2012	3			689,047	310,798,859	709,591		March
2012.04	JointSys	2012	4			564,420	261,287,186	566,210		April
2012.05	JointSys	2012	5			444,917	227,219,000	524,686		May
2012.06	JointSys	2012	6			504,280	232,556,041	509,437		June
2012.07	JointSys	2012	7			567,805	258,171,331	579,155		July
2012.08	JointSys	2012	8			564,386	273,040,016	616,259		August
2012.09	JointSys	2012	9			493,981	254,990,721	581,966		September
2012.10	JointSys	2012	10			598,064	261,565,959	617,159		October
2012.11	JointSys	2012	11			718,592	325,278,774	694,352		November
2012.12	JointSys	2012	12			792,869	380,811,942	765,454		December
2013.01	JointSys	2013	1			902,967	427,545,041	798,605		January
2013.02	JointSys	2013	2			821,140	427,691,889	883,406		February
2013.03	JointSys	2013	3			729,031	342,414,635	790,486		March
2013.04	JointSys	2013	4			654,208	335,845,596	735,915		April
2013.05	JointSys	2013	5			558,040	259,140,558	600,198		May
2013.06	JointSys	2013	6			505,951	232,703,082	522,394		June
2013.07	JointSys	2013	7			561,876	251,638,839	586,514		July
2013.08	JointSys	2013	8			608,212	243,471,118	558,214		August
2013.09	JointSys	2013	9			561,083	275,153,126	623,310		September
2013.10	JointSys	2013	10			680,083	260,056,366	616,270		October
2013.11	JointSys	2013	11			752,754	376,024,346	786,981		November
2013.12	JointSys	2013	12			868,172	478,514,926	889,940		December
2014.01	JointSys	2014	1			869,474	456,706,031	903,107		January
2014.02	JointSys	2014	2			858,313	414,822,543	856,984		February
2014.03	JointSys	2014	3			826,608	390,361,376	844,125		March
2014.04	JointSys	2014	4			708,105	313,405,848	698,970		April
2014.05	JointSys	2014	5			539,652	281,000,049	593,983		May
2014.06	JointSys	2014	6			508,474	246,484,585	538,252		June
2014.07	JointSys	2014	7			600,587	268,425,932	599,391		July
2014.08	JointSys	2014	8			562,621	271,955,540	573,160		August
2014.09	JointSys	2014	9			551,535	275,764,720	580,700		September
2014.10	JointSys	2014	10			683,029	313,661,849	694,694		October
2014.11	JointSys	2014	11			793,334	396,066,810	850,733		November
2014.12	JointSys	2014	12			830,381	411,681,391	874,632		December
2015.01	JointSys	2015	1			885,124	429,299,105	887,423		January
2015.02	JointSys	2015	2			863,681	409,384,939	864,438		February
2015.03	JointSys	2015	3			810,420	345,485,128	803,167		March
2015.04	JointSys	2015	4			599,569	281,593,929	639,459		April
2015.05	JointSys	2015	5			521,934	257,032,223	563,626		May
2015.06	JointSys	2015	6			515,207	247,711,866	540,350		June
2015.07	JointSys	2015	7			596,165	281,181,408	607,961		July
2015.08	JointSys	2015	8			626,827	292,282,003	652,367		August
2015.09	JointSys	2015	9			629,646	265,959,042	632,692		September
2015.10	JointSys	2015	10			514,295	295,016,273	631,973		October
2015.11	JointSys	2015	11			581,384	329,617,102	723,401		November

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

month	coopid	yr	mon	day	hr	MPC	CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2015.12	JointSys	2015	12			743,764	403,530,728	760,394			December
2016.01	JointSys	2016	1			842,900	426,705,178	858,479			January
2016.02	JointSys	2016	2			755,956	364,095,670	782,734			February
2016.03	JointSys	2016	3			710,700	320,891,253	688,246			March
2016.04	JointSys	2016	4			600,942	284,346,240	613,145			April
2016.05	JointSys	2016	5			472,784	241,900,509	571,366			May
2016.06	JointSys	2016	6			552,184	248,884,933	586,657			June
2016.07	JointSys	2016	7			611,288	277,134,988	611,861			July
2016.08	JointSys	2016	8			617,610	294,965,365	657,716			August
2016.09	JointSys	2016	9			543,890	259,433,543	561,617			September
2016.10	JointSys	2016	10			623,838	316,316,050	657,789			October
2016.11	JointSys	2016	11			674,013	337,586,191	715,288			November
2016.12	JointSys	2016	12			817,834	432,784,774	855,378			December
2017.01	JointSys	2017	1			867,284	423,442,573	874,266			January
2017.02	JointSys	2017	2			789,749	354,589,272	798,753			February
2017.03	JointSys	2017	3			781,104	368,065,124	755,154			March
2017.04	JointSys	2017	4			594,993	297,082,025	636,439			April
2017.05	JointSys	2017	5			522,999	271,876,132	557,701			May
2017.06	JointSys	2017	6			561,939	268,651,956	578,823			June
2017.07	JointSys	2017	7			645,859	298,189,211	635,836			July
2017.08	JointSys	2017	8			577,461	277,830,757	629,730			August
2017.09	JointSys	2017	9			589,290	263,496,961	608,091			September
2017.10	JointSys	2017	10			688,532	316,424,839	701,492			October
2017.11	JointSys	2017	11			770,475	367,097,741	787,091			November
2017.12	JointSys	2017	12			853,143	424,091,554	861,970			December
2018.01	JointSys	2018	1			847,741	435,000,159	875,828			January
2018.02	JointSys	2018	2			815,556	393,741,208	798,890			February
2018.03	JointSys	2018	3			686,561	353,897,582	686,704			March
2018.04	JointSys	2018	4			695,472	315,039,160	699,184			April
2018.05	JointSys	2018	5			593,717	280,510,540	624,023			May
2018.06	JointSys	2018	6			598,106	280,776,871	619,816			June
2018.07	JointSys	2018	7			610,493	297,975,739	638,808			July
2018.08	JointSys	2018	8			642,193	296,821,913	662,896			August
2018.09	JointSys	2018	9			557,694	269,143,592	622,848			September
2018.10	JointSys	2018	10			628,496	342,434,679	683,601			October
2018.11	JointSys	2018	11			768,753	406,472,361	807,241			November
2018.12	JointSys	2018	12			741,117	421,641,114	843,216			December
2019.01	JointSys	2019	1			816,067	459,133,886	837,424		0.97	January
2019.02	JointSys	2019	2			743,622	412,508,142	769,240		0.97	February
2019.03	JointSys	2019	3			729,442	377,216,273	731,600		1.00	March
2019.04	JointSys	2019	4			559,369	309,504,174	579,284		0.97	April
2019.05	JointSys	2019	5			498,908	286,645,966	539,105		0.93	May
2019.06	JointSys	2019	6			529,014	272,694,692	548,167		0.97	June
2019.07	JointSys	2019	7			543,094	301,170,029	564,454		0.96	July
2019.08	JointSys	2019	8			528,766	286,929,568	568,431		0.93	August
2019.09	JointSys	2019	9			545,403	277,050,104	560,229		0.97	September
2019.10	JointSys	2019	10			598,751	323,320,606	612,251		0.98	October
2019.11	JointSys	2019	11			619,650	372,653,883	708,915		0.87	November
2019.12	JointSys	2019	12			780,366	428,943,082	786,006		0.99	December
2020.01	JointSys	2020	1			732,058	421,707,531	758,284		0.97	January
2020.02	JointSys	2020	2			744,880	381,295,425	752,886		0.99	February
2020.03	JointSys	2020	3			624,949	360,173,839	634,772		0.98	March
2020.04	JointSys	2020	4			549,727	301,850,826	570,120		0.96	April
2020.05	JointSys	2020	5			455,511	267,614,590	494,961		0.92	May
2020.06	JointSys	2020	6			556,700	282,245,586	586,966		0.95	June
2020.07	JointSys	2020	7			593,765	308,998,498	614,227		0.97	July
2020.08	JointSys	2020	8			552,049	295,808,809	581,162		0.95	August
2020.09	JointSys	2020	9			483,169	266,186,745	518,122		0.93	September
2020.10	JointSys	2020	10			612,485	331,226,159	620,194		0.99	October
2020.11	JointSys	2020	11			594,276	345,672,347	620,245		0.96	November
2020.12	JointSys	2020	12			714,152	398,577,085	735,043		0.97	December
2021.01		2021	1			879,020	489,336,664	969,761		0.91	January
2021.02		2021	2			794,758	440,378,180	853,191		0.93	February
2021.03		2021	3			759,159	402,264,833	797,850		0.95	March
2021.04		2021	4			619,339	340,744,378	683,975		0.91	April
2021.05		2021	5			546,175	307,084,752	651,060		0.84	May
2021.06		2021	6			571,080	306,495,331	643,275		0.89	June
2021.07		2021	7			632,820	336,204,669	696,590		0.91	July
2021.08		2021	8			617,590	329,175,283	708,125		0.87	August
2021.09		2021	9			548,903	302,126,793	624,916		0.88	September
2021.10		2021	10			690,338	368,646,270	769,953		0.90	October

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

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2021.11		2021	11			732,527	413,204,051	811,169	0.90	November
2021.12		2021	12			826,713	464,737,070	910,464	0.91	December
2022.01		2022	1			888,573	496,491,409	980,435	0.91	January
2022.02		2022	2			807,153	448,955,415	866,489	0.93	February
2022.03		2022	3			770,727	409,866,208	809,954	0.95	March
2022.04		2022	4			628,899	347,158,048	694,422	0.91	April
2022.05		2022	5			554,731	313,006,949	661,186	0.84	May
2022.06		2022	6			580,578	312,496,788	653,752	0.89	June
2022.07		2022	7			643,329	342,860,350	707,893	0.91	July
2022.08		2022	8			627,791	335,614,154	719,515	0.87	August
2022.09		2022	9			557,708	307,832,230	634,551	0.88	September
2022.10		2022	10			701,050	375,534,448	781,752	0.90	October
2022.11		2022	11			743,757	421,059,234	823,547	0.90	November
2022.12		2022	12			843,091	475,577,624	928,616	0.91	December
2023.01		2023	1			896,642	502,478,795	989,479	0.91	January
2023.02		2023	2			814,688	454,502,864	874,617	0.93	February
2023.03		2023	3			777,803	414,836,650	817,396	0.95	March
2023.04		2023	4			634,851	351,373,866	700,959	0.91	April
2023.05		2023	5			560,129	316,927,501	667,604	0.84	May
2023.06		2023	6			586,627	316,482,020	660,424	0.89	June
2023.07		2023	7			649,982	347,256,180	715,043	0.91	July
2023.08		2023	8			634,242	339,868,865	726,723	0.87	August
2023.09		2023	9			563,334	311,628,926	640,723	0.88	September
2023.10		2023	10			707,720	380,082,451	789,153	0.90	October
2023.11		2023	11			750,617	426,166,941	831,157	0.90	November
2023.12		2023	12			850,816	481,261,512	937,239	0.91	December
2024.01		2024	1			903,012	507,239,425	996,580	0.91	January
2024.02		2024	2			820,589	458,876,478	880,965	0.93	February
2024.03		2024	3			783,378	418,759,223	823,235	0.95	March
2024.04		2024	4			639,548	354,702,843	706,123	0.91	April
2024.05		2024	5			564,345	319,982,153	672,601	0.84	May
2024.06		2024	6			591,275	319,562,055	665,560	0.89	June
2024.07		2024	7			655,092	350,647,067	720,548	0.91	July
2024.08		2024	8			639,229	343,179,807	732,324	0.87	August
2024.09		2024	9			567,712	314,604,913	645,551	0.88	September
2024.10		2024	10			712,956	383,670,394	794,981	0.90	October
2024.11		2024	11			756,032	430,202,428	837,167	0.90	November
2024.12		2024	12			856,901	485,781,525	943,979	0.91	December
2025.01		2025	1			909,280	512,003,845	1,003,605	0.91	January
2025.02		2025	2			826,410	463,261,096	887,260	0.93	February
2025.03		2025	3			788,899	422,726,956	829,065	0.95	March
2025.04		2025	4			644,209	358,074,340	711,270	0.91	April
2025.05		2025	5			568,578	323,100,209	677,653	0.84	May
2025.06		2025	6			595,955	322,719,058	670,757	0.89	June
2025.07		2025	7			660,228	354,113,351	726,111	0.91	July
2025.08		2025	8			644,218	346,543,088	737,942	0.87	August
2025.09		2025	9			572,110	317,638,955	650,439	0.88	September
2025.10		2025	10			718,169	387,306,353	800,796	0.90	October
2025.11		2025	11			761,372	434,255,704	843,107	0.90	November
2025.12		2025	12			862,901	490,311,436	950,677	0.91	December
2026.01		2026	1			915,001	516,291,613	1,010,047	0.91	January
2026.02		2026	2			831,784	467,255,454	893,076	0.93	February
2026.03		2026	3			793,958	426,319,989	834,403	0.95	March
2026.04		2026	4			648,520	361,145,291	716,025	0.91	April
2026.05		2026	5			572,528	325,984,702	682,354	0.84	May
2026.06		2026	6			600,430	325,664,463	675,690	0.89	June
2026.07		2026	7			665,131	357,352,602	731,369	0.91	July
2026.08		2026	8			648,967	349,674,881	743,240	0.87	August
2026.09		2026	9			576,258	320,427,723	654,976	0.88	September
2026.10		2026	10			722,992	390,615,237	806,151	0.90	October
2026.11		2026	11			766,278	437,943,366	848,555	0.90	November
2026.12		2026	12			868,385	494,371,652	956,851	0.91	December
2027.01		2027	1			920,646	520,510,454	1,016,370	0.91	January
2027.02		2027	2			837,040	471,154,227	898,744	0.93	February
2027.03		2027	3			798,930	429,831,684	839,636	0.95	March
2027.04		2027	4			652,709	364,130,727	720,643	0.91	April
2027.05		2027	5			576,337	328,753,765	686,897	0.84	May
2027.06		2027	6			604,651	328,470,570	680,361	0.89	June
2027.07		2027	7			669,781	360,441,211	736,369	0.91	July
2027.08		2027	8			653,481	352,672,236	748,306	0.87	August
2027.09		2027	9			580,220	323,120,666	659,357	0.88	September

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

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2027.10		2027	10			727,698	393,842,691	811,384	0.90	October
2027.11		2027	11			771,105	441,553,469	853,910	0.90	November
2027.12		2027	12			873,792	498,381,034	962,886	0.91	December
2028.01		2028	1			926,783	525,060,246	1,023,243	0.91	January
2028.02		2028	2			842,724	475,341,841	904,888	0.93	February
2028.03		2028	3			804,339	433,625,164	845,346	0.95	March
2028.04		2028	4			657,253	367,359,251	725,661	0.91	April
2028.05		2028	5			580,472	331,743,608	691,840	0.84	May
2028.06		2028	6			609,208	331,504,062	685,423	0.89	June
2028.07		2028	7			674,796	363,774,150	741,804	0.91	July
2028.08		2028	8			658,351	355,910,798	753,814	0.87	August
2028.09		2028	9			584,511	326,039,704	664,132	0.88	September
2028.10		2028	10			732,834	397,348,288	817,120	0.90	October
2028.11		2028	11			776,358	445,456,262	859,760	0.90	November
2028.12		2028	12			879,684	502,718,041	969,477	0.91	December
2029.01		2029	1			932,715	529,554,220	1,029,914	0.91	January
2029.02		2029	2			848,252	479,498,090	910,857	0.93	February
2029.03		2029	3			809,533	437,354,409	850,810	0.95	March
2029.04		2029	4			661,638	370,523,539	730,491	0.91	April
2029.05		2029	5			584,464	334,690,562	696,600	0.84	May
2029.06		2029	6			613,682	334,500,070	690,357	0.89	June
2029.07		2029	7			679,705	367,072,919	747,070	0.91	July
2029.08		2029	8			663,121	359,112,186	759,150	0.87	August
2029.09		2029	9			588,694	328,902,723	668,731	0.88	September
2029.10		2029	10			737,770	400,783,521	822,639	0.90	October
2029.11		2029	11			781,399	449,295,215	865,384	0.90	November
2029.12		2029	12			885,374	506,991,031	975,821	0.91	December
2030.01		2030	1			937,691	533,411,143	1,035,521	0.91	January
2030.02		2030	2			852,915	483,078,811	915,907	0.93	February
2030.03		2030	3			813,923	440,573,191	855,450	0.95	March
2030.04		2030	4			665,369	373,257,631	734,605	0.91	April
2030.05		2030	5			587,874	337,245,608	700,671	0.84	May
2030.06		2030	6			617,520	337,103,292	694,598	0.89	June
2030.07		2030	7			683,909	369,937,203	751,594	0.91	July
2030.08		2030	8			667,201	361,885,636	763,720	0.87	August
2030.09		2030	9			592,275	331,384,435	672,672	0.88	September
2030.10		2030	10			741,954	403,740,167	827,298	0.90	October
2030.11		2030	11			785,652	452,588,873	870,118	0.90	November
2030.12		2030	12			890,144	510,649,167	981,169	0.91	December
2031.01		2031	1			942,768	537,429,306	1,041,248	0.91	January
2031.02		2031	2			857,677	486,798,572	921,074	0.93	February
2031.03		2031	3			818,482	443,943,972	860,275	0.95	March
2031.04		2031	4			669,316	376,128,432	738,962	0.91	April
2031.05		2031	5			591,506	339,932,169	705,014	0.84	May
2031.06		2031	6			621,597	339,846,000	699,104	0.89	June
2031.07		2031	7			688,373	372,947,919	756,406	0.91	July
2031.08		2031	8			671,534	364,805,505	768,589	0.87	August
2031.09		2031	9			596,092	334,006,701	676,889	0.88	September
2031.10		2031	10			746,412	406,862,039	832,272	0.90	October
2031.11		2031	11			790,089	456,039,984	875,065	0.90	November
2031.12		2031	12			895,053	514,474,356	986,689	0.91	December
2032.01		2032	1			947,714	541,395,664	1,046,845	0.91	January
2032.02		2032	2			862,351	490,496,152	926,139	0.93	February
2032.03		2032	3			822,894	447,254,658	864,929	0.95	March
2032.04		2032	4			673,152	378,946,143	743,190	0.91	April
2032.05		2032	5			595,033	342,583,063	709,217	0.84	May
2032.06		2032	6			625,622	342,558,249	703,527	0.89	June
2032.07		2032	7			692,770	375,932,590	761,110	0.91	July
2032.08		2032	8			675,802	367,692,394	773,333	0.87	August
2032.09		2032	9			599,820	336,570,647	680,956	0.88	September
2032.10		2032	10			750,719	409,911,484	837,075	0.90	October
2032.11		2032	11			794,385	459,435,902	879,858	0.90	November
2032.12		2032	12			899,821	518,230,752	992,044	0.91	December
2033.01		2033	1			951,848	544,786,735	1,051,529	0.91	January
2033.02		2033	2			866,280	493,666,593	930,405	0.93	February
2033.03		2033	3			826,620	450,101,879	868,872	0.95	March
2033.04		2033	4			676,422	381,374,046	746,796	0.91	April
2033.05		2033	5			598,055	344,875,389	712,822	0.84	May
2033.06		2033	6			629,083	344,908,090	707,334	0.89	June
2033.07		2033	7			696,548	378,517,424	765,156	0.91	July
2033.08		2033	8			679,461	370,186,422	777,403	0.87	August

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

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2033.09		2033	9			603,018	338,787,370	684,446	0.88	September
2033.10		2033	10			754,383	412,531,884	841,143	0.90	October
2033.11		2033	11			798,012	462,345,691	883,893	0.90	November
2033.12		2033	12			903,812	521,438,594	996,550	0.91	December
2034.01		2034	1			956,730	548,675,133	1,057,023	0.91	January
2034.02		2034	2			870,864	497,271,889	935,378	0.93	February
2034.03		2034	3			831,010	453,361,949	873,509	0.95	March
2034.04		2034	4			680,243	384,158,887	751,007	0.91	April
2034.05		2034	5			601,556	347,478,731	716,985	0.84	May
2034.06		2034	6			633,025	347,568,009	711,677	0.89	June
2034.07		2034	7			700,851	381,436,416	769,790	0.91	July
2034.08		2034	8			683,653	373,026,752	782,107	0.87	August
2034.09		2034	9			606,707	341,331,328	688,497	0.88	September
2034.10		2034	10			758,673	415,549,346	845,912	0.90	October
2034.11		2034	11			802,287	465,681,574	888,646	0.90	November
2034.12		2034	12			908,524	525,128,917	1,001,852	0.91	December
2035.01		2035	1			961,767	552,709,630	1,062,698	0.91	January
2035.02		2035	2			875,611	501,029,275	940,507	0.93	February
2035.03		2035	3			835,495	456,726,070	878,225	0.95	March
2035.04		2035	4			684,104	387,013,970	755,253	0.91	April
2035.05		2035	5			605,093	350,150,719	721,193	0.84	May
2035.06		2035	6			637,015	350,291,467	716,060	0.89	June
2035.07		2035	7			705,224	384,435,016	774,460	0.91	July
2035.08		2035	8			687,902	375,926,918	786,816	0.87	August
2035.09		2035	9			610,417	343,912,402	692,553	0.88	September
2035.10		2035	10			763,004	418,627,086	850,714	0.90	October
2035.11		2035	11			806,644	469,122,559	893,478	0.90	November
2035.12		2035	12			913,363	528,949,377	1,007,265	0.91	December
2036.01		2036	1			965,982	555,949,119	1,067,479	0.90	January
2036.02		2036	2			879,578	504,063,349	944,821	0.93	February
2036.03		2036	3			839,196	459,459,790	882,156	0.95	March
2036.04		2036	4			687,241	389,347,238	758,717	0.91	April
2036.05		2036	5			607,994	352,365,082	724,663	0.84	May
2036.06		2036	6			640,341	352,567,738	719,721	0.89	June
2036.07		2036	7			708,848	386,936,009	778,343	0.91	July
2036.08		2036	8			691,411	378,339,195	790,728	0.87	August
2036.09		2036	9			613,498	346,059,063	695,922	0.88	September
2036.10		2036	10			766,528	421,155,313	854,639	0.90	October
2036.11		2036	11			810,213	471,913,074	897,457	0.90	November
2036.12		2036	12			917,397	532,016,753	1,011,832	0.91	December
2037.01		2037	1			970,543	559,422,621	1,072,655	0.90	January
2037.02		2037	2			883,843	507,298,453	949,470	0.93	February
2037.03		2037	3			843,208	462,398,506	886,427	0.95	March
2037.04		2037	4			690,641	391,857,821	762,478	0.91	April
2037.05		2037	5			611,146	354,745,217	728,447	0.84	May
2037.06		2037	6			643,931	355,016,617	723,683	0.89	June
2037.07		2037	7			712,758	389,620,468	782,552	0.91	July
2037.08		2037	8			695,197	380,933,892	794,976	0.87	August
2037.09		2037	9			616,846	348,381,740	699,609	0.88	September
2037.10		2037	10			770,377	423,896,896	858,952	0.90	October
2037.11		2037	11			814,084	474,915,314	901,794	0.90	November
2037.12		2037	12			921,782	535,321,685	1,016,797	0.91	December
2038.01		2038	1			975,276	563,097,606	1,078,021	0.90	January
2038.02		2038	2			888,287	510,732,129	954,296	0.93	February
2038.03		2038	3			847,340	465,481,620	890,800	0.95	March
2038.04		2038	4			694,143	394,489,584	766,347	0.91	April
2038.05		2038	5			614,373	357,236,451	732,305	0.84	May
2038.06		2038	6			647,633	357,572,709	727,754	0.89	June
2038.07		2038	7			716,790	392,429,989	786,865	0.91	July
2038.08		2038	8			699,100	383,640,442	799,305	0.87	August
2038.09		2038	9			620,265	350,784,046	703,339	0.88	September
2038.10		2038	10			774,302	426,741,239	863,340	0.90	October
2038.11		2038	11			818,071	478,070,454	906,253	0.90	November
2038.12		2038	12			926,311	538,799,501	1,021,899	0.91	December
2039.01		2039	1			979,185	566,144,282	1,082,469	0.90	January
2039.02		2039	2			891,979	513,593,823	958,317	0.93	February
2039.03		2039	3			850,778	468,059,858	894,458	0.95	March
2039.04		2039	4			697,071	396,692,964	769,583	0.91	April
2039.05		2039	5			617,093	359,338,211	735,563	0.84	May
2039.06		2039	6			650,774	359,739,475	731,210	0.89	June
2039.07		2039	7			720,207	394,810,486	790,521	0.91	July

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

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2039.08		2039	8			702,403	385,932,360	802,982	0.87	August
2039.09		2039	9			623,167	352,819,854	706,505	0.88	September
2039.10		2039	10			777,592	429,130,359	867,007	0.90	October
2039.11		2039	11			821,385	480,700,559	909,953	0.90	November
2039.12		2039	12			930,057	541,682,120	1,026,152	0.91	December
2040.01		2040	1			983,607	569,568,924	1,087,491	0.90	January
2040.02		2040	2			896,119	516,785,183	962,834	0.93	February
2040.03		2040	3			854,673	470,960,637	898,610	0.95	March
2040.04		2040	4			700,375	399,169,053	773,238	0.91	April
2040.05		2040	5			620,159	361,686,709	739,246	0.84	May
2040.06		2040	6			654,269	362,156,557	735,067	0.89	June
2040.07		2040	7			724,010	397,459,821	794,617	0.91	July
2040.08		2040	8			706,085	388,491,264	807,114	0.87	August
2040.09		2040	9			626,426	355,112,528	710,097	0.88	September
2040.10		2040	10			781,329	431,832,237	871,191	0.90	October
2040.11		2040	11			825,137	483,656,170	914,156	0.90	November
2040.12		2040	12			934,307	544,939,420	1,030,968	0.91	December
2041.01		2041	1			988,004	572,990,981	1,092,491	0.90	January
2041.02		2041	2			900,262	519,994,979	967,336	0.93	February
2041.03		2041	3			858,513	473,836,799	902,677	0.95	March
2041.04		2041	4			703,634	401,622,354	776,835	0.91	April
2041.05		2041	5			623,174	364,021,501	742,850	0.84	May
2041.06		2041	6			657,753	364,560,409	738,890	0.89	June
2041.07		2041	7			727,802	400,103,558	798,662	0.91	July
2041.08		2041	8			709,757	391,039,597	811,185	0.87	August
2041.09		2041	9			629,642	357,368,135	713,592	0.88	September
2041.10		2041	10			784,995	434,494,605	875,288	0.90	October
2041.11		2041	11			828,844	486,601,697	918,304	0.90	November
2041.12		2041	12			938,519	548,177,376	1,035,724	0.91	December
2042.01		2042	1			991,819	575,987,946	1,096,827	0.90	January
2042.02		2042	2			903,863	522,809,255	971,256	0.93	February
2042.03		2042	3			861,863	476,367,858	906,238	0.95	March
2042.04		2042	4			706,485	403,784,394	779,984	0.91	April
2042.05		2042	5			625,817	366,080,641	746,015	0.84	May
2042.06		2042	6			660,804	366,680,833	742,246	0.89	June
2042.07		2042	7			731,122	402,434,471	802,214	0.91	July
2042.08		2042	8			712,967	393,283,748	814,756	0.88	August
2042.09		2042	9			632,459	359,360,635	716,664	0.88	September
2042.10		2042	10			788,194	436,835,878	878,851	0.90	October
2042.11		2042	11			832,074	489,185,484	921,909	0.90	November
2042.12		2042	12			942,171	551,011,337	1,039,864	0.91	December
2043.01		2043	1			996,172	579,342,338	1,101,764	0.90	January
2043.02		2043	2			907,933	525,934,181	975,691	0.93	February
2043.03		2043	3			865,693	479,205,718	910,313	0.95	March
2043.04		2043	4			709,729	406,209,263	783,573	0.91	April
2043.05		2043	5			628,826	368,379,665	749,627	0.84	May
2043.06		2043	6			664,232	369,045,957	746,028	0.89	June
2043.07		2043	7			734,857	405,027,578	806,232	0.91	July
2043.08		2043	8			716,581	395,788,619	818,808	0.88	August
2043.09		2043	9			635,653	361,601,725	720,180	0.88	September
2043.10		2043	10			791,865	439,480,934	882,963	0.90	October
2043.11		2043	11			835,769	492,084,511	926,046	0.90	November
2043.12		2043	12			946,356	554,202,089	1,044,601	0.91	December
2044.01		2044	1			1,000,682	582,856,220	1,106,885	0.90	January
2044.02		2044	2			904,818	529,221,829	972,393	0.93	February
2044.03		2044	3			869,631	482,156,096	914,484	0.95	March
2044.04		2044	4			711,151	408,725,541	785,143	0.91	April
2044.05		2044	5			631,909	370,767,525	753,315	0.84	May
2044.06		2044	6			665,983	371,501,082	747,908	0.89	June
2044.07		2044	7			738,718	407,727,210	810,359	0.91	July
2044.08		2044	8			720,320	398,392,335	822,963	0.88	August
2044.09		2044	9			637,215	363,911,520	721,810	0.88	September
2044.10		2044	10			795,621	442,212,902	887,165	0.90	October
2044.11		2044	11			837,316	495,107,595	927,804	0.90	November
2044.12		2044	12			950,678	557,530,354	1,049,475	0.91	December
2045.01		2045	1			1,004,576	585,944,769	1,111,300	0.90	January
2045.02		2045	2			908,514	532,116,342	976,410	0.93	February
2045.03		2045	3			873,047	484,756,993	918,110	0.95	March
2045.04		2045	4			714,055	410,942,410	788,348	0.91	April
2045.05		2045	5			634,586	372,869,396	756,517	0.84	May
2045.06		2045	6			669,060	373,659,831	751,297	0.89	June

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

month	coopid	yr	mon	day	hr	MPC CoPeak	monthlykwh	NCPeak	NC Div. Ratio	Month
2045.07		2045	7			742,067	410,101,695	813,948	0.91	July
2045.08		2045	8			723,559	400,677,392	826,565	0.88	August
2045.09		2045	9			640,059	365,942,828	724,919	0.88	September
2045.10		2045	10			798,864	444,606,106	890,772	0.90	October
2045.11		2045	11			840,615	497,758,399	931,479	0.90	November
2045.12		2045	12			954,401	560,450,384	1,053,681	0.91	December
2046.01		2046	1			1,008,939	589,308,113	1,116,244	0.90	January
2046.02		2046	2			912,621	535,250,358	980,882	0.93	February
2046.03		2046	3			876,890	487,604,187	922,199	0.95	March
2046.04		2046	4			717,313	413,375,286	791,951	0.91	April
2046.05		2046	5			637,598	375,173,245	760,129	0.84	May
2046.06		2046	6			672,485	376,027,996	755,079	0.89	June
2046.07		2046	7			745,795	412,697,844	817,962	0.91	July
2046.08		2046	8			727,169	403,186,193	830,616	0.88	August
2046.09		2046	9			643,255	368,189,079	728,442	0.88	September
2046.10		2046	10			802,539	447,256,013	894,880	0.90	October
2046.11		2046	11			844,330	500,664,196	935,630	0.90	November
2046.12		2046	12			958,590	563,648,019	1,058,426	0.91	December
2047.01		2047	1			1,013,053	592,502,972	1,120,900	0.90	January
2047.02		2047	2			916,490	538,226,558	985,080	0.93	February
2047.03		2047	3			880,477	490,279,601	925,992	0.95	March
2047.04		2047	4			720,345	415,655,354	795,300	0.91	April
2047.05		2047	5			640,385	377,325,409	763,465	0.84	May
2047.06		2047	6			675,667	378,234,748	758,582	0.89	June
2047.07		2047	7			749,261	415,123,866	821,676	0.91	July
2047.08		2047	8			730,527	405,528,363	834,357	0.88	August
2047.09		2047	9			646,209	370,272,742	731,677	0.88	September
2047.10		2047	10			805,950	449,732,587	898,702	0.90	October
2047.11		2047	11			847,804	503,409,157	939,520	0.90	November
2047.12		2047	12			962,534	566,679,551	1,062,857	0.91	December
2048.01		2048	1			1,017,021	595,613,425	1,125,392	0.90	January
2048.02		2048	2			920,242	541,137,429	989,154	0.93	February
2048.03		2048	3			883,958	492,898,746	929,683	0.95	March
2048.04		2048	4			723,296	417,890,827	798,558	0.91	April
2048.05		2048	5			643,105	379,442,090	766,717	0.84	May
2048.06		2048	6			678,780	380,407,341	762,012	0.89	June
2048.07		2048	7			752,654	417,512,636	825,314	0.91	July
2048.08		2048	8			733,809	407,830,092	838,013	0.88	August
2048.09		2048	9			649,091	372,320,110	734,832	0.88	September
2048.10		2048	10			809,254	452,148,611	902,379	0.90	October
2048.11		2048	11			851,169	506,085,073	943,268	0.90	November
2048.12		2048	12			966,329	569,623,150	1,067,144	0.91	December
2049.01		2049	1			1,021,516	599,081,471	1,130,474	0.90	January
2049.02		2049	2			924,456	544,360,279	993,737	0.93	February
2049.03		2049	3			887,910	495,825,386	933,883	0.95	March
2049.04		2049	4			726,636	420,389,555	802,251	0.91	April
2049.05		2049	5			646,184	381,798,654	770,410	0.84	May
2049.06		2049	6			682,262	382,824,102	765,862	0.89	June
2049.07		2049	7			756,452	420,163,248	829,410	0.91	July
2049.08		2049	8			737,487	410,392,700	842,147	0.88	August
2049.09		2049	9			652,345	374,617,634	738,427	0.88	September
2049.10		2049	10			813,022	454,868,666	906,594	0.90	October
2049.11		2049	11			854,991	509,076,140	947,539	0.90	November
2049.12		2049	12			970,645	572,922,445	1,072,016	0.91	December
2050.01		2050	1			1,025,764	602,378,061	1,135,267	0.90	January
2050.02		2050	2			928,438	547,426,342	998,051	0.93	February
2050.03		2050	3			891,615	498,582,237	937,795	0.95	March
2050.04		2050	4			729,756	422,737,976	805,695	0.91	April
2050.05		2050	5			649,045	384,006,933	773,830	0.84	May
2050.06		2050	6			685,508	385,083,074	769,439	0.89	June
2050.07		2050	7			759,997	422,647,448	833,213	0.91	July
2050.08		2050	8			740,921	412,791,822	845,976	0.88	August
2050.09		2050	9			655,362	376,754,720	741,737	0.88	September
2050.10		2050	10			816,529	457,413,106	910,514	0.90	October
2050.11		2050	11			858,577	511,904,136	951,545	0.90	November
2050.12		2050	12			974,712	576,050,491	1,076,579	0.91	December

APPENDIX E

COMPARISON WITH PREVIOUS FORECASTS

Appendix E

Comparison to Previous PRS Forecasts

Appendix E presents Minnkota's 2021 Load Forecast results compared to the projections developed for the 1995-2019 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 2018. 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 in 2009 and bottoming out with the 2017 forecast. 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. The 2019 cycle saw an uptick in the growth rate, while the 2021 forecast is much stronger due to the large data centers being added.

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 2021 forecast projects member system energy requirements to grow at 1.1 percent per year for 2021 through 2030.

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]

Minkola 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	2019 Forecast	2021 Forecast
1996	2,336,274	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710
1997	2,404,069	2,481,196	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710	2,488,710
1998	2,456,116	2,676,129	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133	2,456,133
1999	2,500,447	2,691,542	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968	2,347,968
2000	2,522,639	2,741,590	2,492,504	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174	2,473,174
2001	2,576,011	2,800,605	2,550,020	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456	2,553,456
2002	2,637,983	2,860,605	2,620,172	2,719,707	2,692,024	2,692,024	2,692,024	2,692,024	2,692,024	2,692,024	2,692,024	2,692,024	2,692,024	2,692,024
2003	2,684,275	2,812,795	2,678,977	2,814,857	2,865,734	2,865,734	2,865,734	2,865,734	2,865,734	2,865,734	2,865,734	2,865,734	2,865,734	2,865,734
2004	2,744,549	3,021,109	2,741,503	2,842,662	2,923,230	2,930,437	2,930,437	2,930,437	2,930,437	2,930,437	2,930,437	2,930,437	2,930,437	2,930,437
2005		2,877,840	2,806,651	2,901,868	2,980,973	2,980,973	2,980,973	2,980,973	2,980,973	2,980,973	2,980,973	2,980,973	2,980,973	2,980,973
2006		3,027,646	2,950,995	3,060,589	3,146,281	3,146,281	3,146,281	3,146,281	3,146,281	3,146,281	3,146,281	3,146,281	3,146,281	3,146,281
2007		3,106,103	3,027,646	3,137,355	3,226,635	3,226,635	3,226,635	3,226,635	3,226,635	3,226,635	3,226,635	3,226,635	3,226,635	3,226,635
2008				3,297,268	3,330,112	3,330,112	3,330,112	3,330,112	3,330,112	3,330,112	3,330,112	3,330,112	3,330,112	3,330,112
2009				3,384,043	3,414,350	3,414,350	3,414,350	3,414,350	3,414,350	3,414,350	3,414,350	3,414,350	3,414,350	3,414,350
2010					3,502,807	3,502,807	3,502,807	3,502,807	3,502,807	3,502,807	3,502,807	3,502,807	3,502,807	3,502,807
2011					3,599,109	3,599,109	3,599,109	3,599,109	3,599,109	3,599,109	3,599,109	3,599,109	3,599,109	3,599,109
2012						3,676,966	3,676,966	3,676,966	3,676,966	3,676,966	3,676,966	3,676,966	3,676,966	3,676,966
2013							3,768,532	3,768,532	3,768,532	3,768,532	3,768,532	3,768,532	3,768,532	3,768,532
2014							3,849,531	3,849,531	3,849,531	3,849,531	3,849,531	3,849,531	3,849,531	3,849,531
2015							3,926,635	3,926,635	3,926,635	3,926,635	3,926,635	3,926,635	3,926,635	3,926,635
2016							4,007,562	4,007,562	4,007,562	4,007,562	4,007,562	4,007,562	4,007,562	4,007,562
2017							4,081,638	4,081,638	4,081,638	4,081,638	4,081,638	4,081,638	4,081,638	4,081,638
2018							4,162,169	4,162,169	4,162,169	4,162,169	4,162,169	4,162,169	4,162,169	4,162,169
2019							4,236,106	4,236,106	4,236,106	4,236,106	4,236,106	4,236,106	4,236,106	4,236,106
2020							4,323,620	4,323,620	4,323,620	4,323,620	4,323,620	4,323,620	4,323,620	4,323,620
2021							4,409,881	4,409,881	4,409,881	4,409,881	4,409,881	4,409,881	4,409,881	4,409,881
2022							4,497,790	4,497,790	4,497,790	4,497,790	4,497,790	4,497,790	4,497,790	4,497,790
2023							4,584,762	4,584,762	4,584,762	4,584,762	4,584,762	4,584,762	4,584,762	4,584,762
2024							4,672,975	4,672,975	4,672,975	4,672,975	4,672,975	4,672,975	4,672,975	4,672,975
2025							4,762,975	4,762,975	4,762,975	4,762,975	4,762,975	4,762,975	4,762,975	4,762,975
2026							4,854,762	4,854,762	4,854,762	4,854,762	4,854,762	4,854,762	4,854,762	4,854,762
2027							4,948,574	4,948,574	4,948,574	4,948,574	4,948,574	4,948,574	4,948,574	4,948,574
2028							5,043,266	5,043,266	5,043,266	5,043,266	5,043,266	5,043,266	5,043,266	5,043,266
2029							5,138,507	5,138,507	5,138,507	5,138,507	5,138,507	5,138,507	5,138,507	5,138,507
2030							5,234,242	5,234,242	5,234,242	5,234,242	5,234,242	5,234,242	5,234,242	5,234,242
2031							5,330,004	5,330,004	5,330,004	5,330,004	5,330,004	5,330,004	5,330,004	5,330,004
2032							5,426,881	5,426,881	5,426,881	5,426,881	5,426,881	5,426,881	5,426,881	5,426,881
2033							5,524,735	5,524,735	5,524,735	5,524,735	5,524,735	5,524,735	5,524,735	5,524,735
2034							5,623,620	5,623,620	5,623,620	5,623,620	5,623,620	5,623,620	5,623,620	5,623,620
2035							5,723,514	5,723,514	5,723,514	5,723,514	5,723,514	5,723,514	5,723,514	5,723,514
2036							5,823,408	5,823,408	5,823,408	5,823,408	5,823,408	5,823,408	5,823,408	5,823,408
2037							5,923,302	5,923,302	5,923,302	5,923,302	5,923,302	5,923,302	5,923,302	5,923,302
2038							6,023,196	6,023,196	6,023,196	6,023,196	6,023,196	6,023,196	6,023,196	6,023,196
2039							6,123,089	6,123,089	6,123,089	6,123,089	6,123,089	6,123,089	6,123,089	6,123,089
2040							6,222,982	6,222,982	6,222,982	6,222,982	6,222,982	6,222,982	6,222,982	6,222,982
2041							6,322,875	6,322,875	6,322,875	6,322,875	6,322,875	6,322,875	6,322,875	6,322,875
2042							6,422,768	6,422,768	6,422,768	6,422,768	6,422,768	6,422,768	6,422,768	6,422,768
2043							6,522,661	6,522,661	6,522,661	6,522,661	6,522,661	6,522,661	6,522,661	6,522,661
2044							6,622,554	6,622,554	6,622,554	6,622,554	6,622,554	6,622,554	6,622,554	6,622,554
2045							6,722,447	6,722,447	6,722,447	6,722,447	6,722,447	6,722,447	6,722,447	6,722,447
2046							6,822,340	6,822,340	6,822,340	6,822,340	6,822,340	6,822,340	6,822,340	6,822,340
2047							6,922,233	6,922,233	6,922,233	6,922,233	6,922,233	6,922,233	6,922,233	6,922,233
2048							7,022,126	7,022,126	7,022,126	7,022,126	7,022,126	7,022,126	7,022,126	7,022,126
2049							7,122,019	7,122,019	7,122,019	7,122,019	7,122,019	7,122,019	7,122,019	7,122,019
2050							7,221,912	7,221,912	7,221,912	7,221,912	7,221,912	7,221,912	7,221,912	7,221,912

Average Annual Growth Rates

2000-2020	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%	-100.0%
2010-2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2015-2020	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020-2025	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020-2030	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020-2040	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2020-2050	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-Yr Forecast	-	2.4%	2.5%	2.5%	2.3%	2.6%	3.3%	2.5%	1.7%	1.7%	1.7%	1.2%	1.4%	1.1%

[1] Includes Member Own-Use and Losses. Excludes CAFS, NMPP 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.

<u>Year</u>	<u>Beltrami</u>	<u>Cass County</u>	<u>Clearwater-Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North Star</u>	<u>PKM</u>	<u>Red Lake</u>	<u>Red River</u>	<u>Roseau</u>	<u>Wild Rice</u>	<u>Total Member Own-Use/Losses</u>
1991	14,822	19,246	2,391	5,327	28,551	7,610	6,389	7,691	7,992	9,224	20,315	129,557
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	20,171	2,999	5,313	28,453	7,359	7,744	7,677	8,513	8,284	16,458	129,664
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	26,704	198	4,857	32,383	7,550	2,472	(311)	6,721	8,857	15,455	122,094
2002	18,851	23,854	3,128	6,084	32,713	9,885	9,047	8,008	8,354	7,827	20,581	148,332
2003	21,260	20,864	3,290	6,273	27,834	9,024	6,464	8,062	7,664	7,785	19,288	137,808
2004	23,066	30,922	3,647	5,642	28,005	11,003	9,118	8,195	7,482	8,418	11,398	146,896
2005	24,047	31,054	3,067	6,333	34,849	9,489	8,386	7,906	7,730	7,837	17,996	158,695
2006	24,771	29,941	2,847	5,713	27,140	8,472	6,201	7,184	7,234	7,614	20,685	147,802
2007	27,297	31,261	3,685	6,819	28,100	11,617	5,118	7,912	9,157	9,214	20,092	160,272
2008	28,541	35,456	3,733	7,149	33,838	8,986	16,002	10,875	10,635	8,963	22,966	187,144
2009	26,078	34,390	3,778	5,909	35,189	8,170	10,521	8,077	8,183	7,061	24,934	172,290
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	39,086	1,119	11,086	34,100	7,731	9,385	8,718	9,869	6,099	22,691	175,441
2014	18,869	11,241	4,013	(146)	34,100	8,563	3,921	(3,537)	6,165	7,226	19,347	109,761
2015	25,452	38,399	3,432	5,998	31,911	7,503	9,063	7,008	8,799	6,977	21,174	165,716
2016	21,495	36,111	3,087	6,845	31,604	7,111	7,562	6,972	8,096	7,383	20,972	157,238
2017	34,455	43,616	3,100	544	31,756	7,096	8,074	10,421	10,594	7,237	22,028	178,920
2018	31,381	37,104	3,137	5,727	32,102	8,489	5,872	7,431	9,029	7,099	17,446	164,818
2019	20,414	(6,522)	3,087	6,040	33,847	7,304	8,074	9,092	6,738	7,414	16,574	112,062
2020	20,877	41,927	3,427	5,733	33,295	6,879	6,568	5,809	7,081	7,304	17,766	156,665
2021	25,999	47,789	3,406	5,861	30,314	7,409	7,321	7,883	7,057	7,175	17,234	167,449
2022	26,144	49,435	3,415	5,848	19,164	7,480	7,377	7,956	7,182	7,301	17,861	159,162
2023	26,312	50,559	3,425	5,911	19,315	7,546	7,428	8,015	7,277	7,333	18,082	161,203
2024	26,471	51,342	3,445	5,993	19,429	7,609	7,474	8,195	7,399	7,364	18,165	162,885
2025	26,677	52,119	3,462	6,043	19,597	7,705	7,513	8,239	7,470	7,402	18,243	164,471
2026	26,851	53,000	3,470	6,088	19,715	7,650	7,543	8,279	7,522	7,432	18,346	165,894
2027	26,998	53,768	3,498	6,225	19,833	7,640	7,578	8,313	7,595	7,470	18,451	167,369
2028	27,181	54,531	3,527	6,277	20,000	7,627	7,613	8,344	7,670	7,518	18,615	168,902
2029	27,302	55,398	3,547	6,364	20,118	7,658	7,652	8,368	7,802	7,554	18,711	170,477
2030	27,415	56,153	3,565	6,408	20,238	7,722	7,674	8,390	7,859	7,587	18,794	171,804
2031	27,521	56,904	3,578	6,468	20,403	7,749	7,693	8,419	7,913	7,615	18,873	173,136
2032	27,622	57,760	3,587	6,503	20,511	7,775	7,700	8,446	8,012	7,648	18,941	174,505
2033	27,717	58,504	3,593	6,536	20,620	7,798	7,704	8,469	8,050	7,663	19,006	175,659
2034	27,808	59,244	3,597	6,569	20,781	7,820	7,705	8,619	8,087	7,678	19,065	176,971
2035	27,894	60,089	3,602	6,680	20,891	7,874	7,703	8,637	8,180	7,738	19,120	178,411
2036	27,978	60,823	3,611	6,712	21,010	7,890	7,708	8,632	8,207	7,759	19,173	179,502
2037	28,060	61,553	3,621	6,742	21,176	7,904	7,712	8,623	8,244	7,768	19,222	180,625
2038	28,192	62,389	3,628	6,772	21,291	7,917	7,718	8,614	8,327	7,776	19,269	181,894
2039	28,268	63,113	3,637	6,801	21,406	7,928	7,719	8,602	8,347	7,782	19,313	182,916
2040	28,342	63,835	3,646	6,830	21,578	7,973	7,721	8,590	8,370	7,788	19,355	184,028
2041	28,419	64,662	3,654	6,860	21,683	7,983	7,721	8,578	8,446	7,804	19,399	185,211
2042	28,499	65,378	3,664	6,892	21,790	7,995	7,724	8,569	8,471	7,810	19,446	186,237
2043	28,583	66,092	3,671	6,924	21,948	8,006	7,729	8,559	8,505	7,815	19,496	187,329
2044	28,669	66,912	3,682	6,957	22,061	8,017	7,731	8,551	8,584	7,824	19,547	188,536
2045	28,755	67,621	3,690	6,990	22,167	8,061	7,733	8,543	8,607	7,830	19,598	189,595
2046	28,841	68,328	3,698	7,023	22,326	8,071	7,737	8,536	8,629	7,847	19,650	190,687
2047	28,932	69,033	3,709	7,058	22,432	8,082	7,740	8,529	8,713	7,856	19,707	191,790
2048	29,027	69,736	3,718	7,094	22,539	8,092	7,744	8,525	8,742	7,867	19,767	192,850
2049	29,127	70,438	3,729	7,131	22,697	8,104	7,751	8,522	8,774	7,878	19,832	193,984
2050	29,230	71,139	3,738	7,170	22,803	8,116	7,758	8,523	8,852	7,890	19,900	195,120

Average Annual Growth Rates

1991-2020	1.2%	2.7%	1.2%	0.3%	0.5%	-0.3%	0.1%	-1.0%	-0.4%	-0.8%	-0.5%	0.7%
2005-2020	-0.9%	2.0%	0.7%	-0.7%	-0.3%	-2.1%	-1.6%	-2.0%	-0.6%	-0.5%	-0.1%	-0.1%
2010-2020	-1.4%	0.5%	-0.6%	-1.5%	0.8%	-1.3%	10.5%	-3.4%	6.5%	-0.2%	-2.7%	-0.1%
2015-2020	-3.9%	1.8%	0.0%	-0.9%	0.9%	-1.7%	-6.2%	-3.7%	-4.3%	0.9%	-3.4%	-1.1%
2020-2025	5.0%	4.4%	0.2%	1.1%	-10.1%	2.3%	2.7%	7.2%	1.1%	0.3%	0.5%	1.0%
2020-2030	2.8%	3.0%	0.4%	1.1%	-4.9%	1.2%	1.6%	3.7%	1.0%	0.4%	0.6%	0.9%
2020-2040	1.5%	2.1%	0.3%	0.9%	-2.1%	0.7%	0.8%	2.0%	0.8%	0.3%	0.4%	0.8%
2020-2050	1.1%	1.8%	0.3%	0.7%	-1.3%	0.6%	0.6%	1.3%	0.7%	0.3%	0.4%	0.7%
2021-2050	0.4%	1.4%	0.3%	0.7%	-1.0%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	0.5%

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

<u>Year</u>	<u>Residential</u>	<u>Seasonal</u>	<u>Irrigation</u>	<u>Small Commercial</u>	<u>Large Commercial</u>	<u>Street Lighting</u>	<u>Public Authority</u>	<u>Resale RUS</u>	<u>Resale Other</u>	<u>Total Member Sales</u>	<u>MWh From 2019</u>
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	190,192	92,359	1,421	-	8,119	80,975	1,490,320	
2010	1,032,259	8,010	2,136	189,046	100,852	1,423	-	7,860	84,359	1,425,946	
2011	1,034,957	8,138	1,664	180,342	107,497	1,413	-	7,931	75,683	1,417,625	
2012	965,369	8,056	2,331	167,982	125,724	1,387	-	7,069	79,838	1,357,755	
2013	1,075,089	8,842	2,155	195,701	140,831	1,385	-	8,316	69,539	1,501,859	
2014	1,111,954	8,975	2,351	203,554	143,333	1,390	-	9,003	89,522	1,570,083	
2015	965,739	8,184	2,969	184,887	143,193	1,136	-	8,461	108,620	1,423,189	
2016	923,176	8,035	3,214	185,248	144,544	1,183	-	8,573	132,327	1,406,301	
2017	917,760	8,500	3,411	189,755	136,886	1,209	-	8,437	131,513	1,397,471	
2018	972,668	9,249	3,685	195,167	139,714	1,126	-	8,910	133,490	1,464,009	
2019	986,316	9,461	3,174	196,401	135,533	1,115	-	8,947	131,770	1,472,716	1,457,942
2020	959,453	8,564	2,221	191,063	130,879	1,674	-	8,605	124,828	1,427,289	1,505,970
2021	970,713	8,918	3,544	197,855	134,552	1,672	-	8,695	121,500	1,447,449	1,517,778
2022	979,018	8,993	3,583	200,202	143,981	1,670	-	8,695	121,500	1,467,641	1,523,977
2023	987,020	9,069	3,601	203,450	145,036	1,668	-	8,695	121,500	1,480,039	1,529,550
2024	994,271	9,144	3,640	205,537	148,091	1,666	-	8,695	121,500	1,492,544	1,537,169
2025	1,002,158	9,219	3,659	207,426	148,646	1,664	-	8,695	121,500	1,502,967	1,541,320
2026	1,008,864	9,294	3,698	209,133	147,324	1,662	-	8,695	121,500	1,510,169	1,545,288
2027	1,016,972	9,388	3,717	210,664	146,691	1,659	-	8,695	121,500	1,519,286	1,550,141
2028	1,023,848	9,481	3,756	212,060	148,059	1,657	-	8,695	121,500	1,529,055	1,557,100
2029	1,030,778	9,574	3,774	213,315	149,115	1,655	-	8,695	121,500	1,538,405	1,561,048
2030	1,036,172	9,668	3,813	214,445	149,672	1,652	-	8,695	121,500	1,545,617	1,566,148
2031	1,041,602	9,761	3,832	215,479	149,729	1,650	-	8,695	121,500	1,552,248	1,570,039
2032	1,046,177	9,855	3,871	216,389	150,787	1,648	-	8,695	121,500	1,558,921	1,574,121
2033	1,050,103	9,949	3,889	217,223	150,845	1,645	-	8,695	121,500	1,563,848	1,578,308
2034	1,053,809	10,042	3,928	217,961	152,903	1,643	-	8,695	121,500	1,570,481	1,585,361
2035	1,057,255	10,135	3,947	218,631	156,461	1,641	-	8,695	121,500	1,578,264	1,589,181
2036	1,060,357	10,229	3,986	219,227	156,520	1,638	-	8,695	121,500	1,582,152	1,592,980
2037	1,063,262	10,322	4,005	219,782	156,580	1,636	-	8,695	121,500	1,585,780	1,596,660
2038	1,065,903	10,415	4,043	220,249	158,639	1,633	-	8,695	121,500	1,591,077	1,603,598
2039	1,068,203	10,508	4,062	220,684	158,699	1,631	-	8,695	121,500	1,593,982	1,607,419
2040	1,070,554	10,602	4,101	221,063	159,259	1,628	-	8,695	121,500	1,597,402	1,611,185
2041	1,073,126	10,695	4,120	221,428	160,320	1,626	-	8,695	121,500	1,601,509	1,615,017
2042	1,075,779	10,788	4,159	221,798	160,381	1,623	-	8,695	121,500	1,604,723	1,618,641
2043	1,078,803	10,881	4,177	222,139	160,442	1,621	-	8,695	121,500	1,608,257	1,622,113
2044	1,081,701	10,974	4,216	222,486	161,503	1,618	-	8,695	121,500	1,612,693	1,625,579
2045	1,084,547	11,067	4,235	222,825	162,065	1,616	-	8,695	121,500	1,616,549	1,629,005
2046	1,087,688	11,159	4,274	223,153	162,128	1,613	-	8,695	121,500	1,620,209	1,632,546
2047	1,090,868	11,271	4,292	223,497	163,190	1,610	-	8,695	121,500	1,624,924	1,635,800
2048	1,094,313	11,383	4,331	223,871	163,253	1,608	-	8,695	121,500	1,628,955	1,639,071
2049	1,098,110	11,495	4,350	224,262	163,317	1,605	-	8,695	121,500	1,633,334	
2050	1,101,843	11,607	4,389	224,673	164,380	1,603	-	8,695	121,500	1,638,690	
Average Annual Growth Rates											
2000-2020	0.5%	-2.3%	0.1%	1.3%	3.0%	1.4%	--	1.3%	1.1%	0.8%	--
2005-2020	-0.1%	-3.0%	2.2%	1.0%	2.7%	1.8%	--	0.7%	1.6%	0.4%	--
2010-2020	-0.7%	0.7%	0.4%	0.1%	2.6%	1.6%	--	0.9%	4.0%	0.0%	--
2015-2020	-0.1%	0.9%	-5.6%	0.7%	-1.8%	8.1%	--	0.3%	2.8%	0.1%	--
2020-2025	0.9%	1.5%	10.5%	1.7%	2.6%	-0.1%	--	0.2%	-0.5%	1.0%	0.5%
2020-2030	0.8%	1.2%	5.6%	1.2%	1.4%	-0.1%	--	0.1%	-0.3%	0.8%	0.4%
2020-2040	0.5%	1.1%	3.1%	0.7%	1.0%	-0.1%	--	0.1%	-0.1%	0.6%	0.3%
2020-2050	0.5%	1.0%	2.3%	0.5%	0.8%	-0.1%	--	0.0%	-0.1%	0.5%	
2021-2050	0.4%	0.9%	0.7%	0.4%	0.7%	-0.1%	--	0.0%	0.0%	0.4%	

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

<u>Year</u>	<u>Residential</u>	<u>Seasonal</u>	<u>Irrigation</u>	<u>Small Commercial</u>	<u>Large Commercial</u>	<u>Street Lighting</u>	<u>Public Authority</u>	<u>Resale RUS</u>	<u>Resale Other</u>	<u>Total Member Sales</u>	<u>MWh From 2019 PRS</u>
2000	697,854	997	7,837	327,528	114,471	3,356	70,312	-	2,948	1,225,304	
2001	707,798	-	6,761	365,889	152,812	3,666	67,092	-	2,731	1,306,749	
2002	752,278	685	8,304	392,406	162,420	4,633	68,285	-	3,351	1,392,362	
2003	755,342	-	11,241	412,103	154,511	4,105	66,876	-	3,122	1,407,300	
2004	771,952	-	9,175	315,302	266,894	4,613	66,184	-	3,632	1,437,753	
2005	801,084	-	6,809	321,114	286,965	5,186	64,102	-	1,838	1,487,098	
2006	810,929	-	15,791	324,331	356,530	5,459	64,479	-	3,507	1,581,026	
2007	861,146	-	9,859	352,397	366,478	5,834	106,080	-	3,505	1,705,299	
2008	926,566	-	11,547	313,806	436,539	6,151	105,857	-	3,807	1,804,272	
2009	973,126	-	10,067	319,093	439,531	6,645	103,905	-	3,985	1,856,352	
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	1,013,938	-	15,165	318,809	793,823	8,354	98,569	-	4,079	2,252,737	
2014	1,083,651	-	8,923	351,749	835,283	8,583	97,591	-	4,226	2,390,005	
2015	951,718	-	11,105	320,812	867,627	8,759	93,811	-	2,860	2,256,692	
2016	946,517	-	9,089	332,401	859,849	8,556	89,487	-	2,716	2,248,616	
2017	964,223	-	14,023	343,745	940,462	7,425	81,632	-	2,937	2,354,447	
2018	1,023,234	-	12,408	365,812	961,346	8,144	91,821	-	3,400	2,466,165	
2019	1,082,456	-	7,688	366,250	925,535	7,693	92,838	-	3,483	2,495,943	2,465,653
2020	1,020,853	-	8,885	357,517	871,487	7,067	92,375	-	2,958	2,361,144	2,497,695
2021	1,055,221	-	10,285	370,771	906,369	7,063	92,159	-	3,085	2,444,954	2,528,321
2022	1,072,711	-	10,315	378,229	942,556	7,063	92,159	-	3,085	2,506,119	2,566,787
2023	1,089,611	-	10,345	387,562	956,148	7,063	92,159	-	3,085	2,545,974	2,601,342
2024	1,106,240	-	10,375	394,868	960,536	7,062	92,159	-	3,085	2,574,326	2,636,627
2025	1,122,795	-	10,405	402,136	968,003	7,060	92,159	-	3,085	2,605,644	2,675,760
2026	1,139,193	-	10,435	409,357	975,549	7,058	92,159	-	3,085	2,636,838	2,715,970
2027	1,155,638	-	10,465	416,567	980,178	7,055	92,159	-	3,085	2,665,147	2,754,125
2028	1,171,713	-	10,495	423,738	987,889	7,051	92,159	-	3,085	2,696,131	2,800,457
2029	1,187,699	-	10,525	430,902	995,685	7,047	92,159	-	3,085	2,727,103	2,843,052
2030	1,203,552	-	10,555	438,030	1,000,568	7,042	92,159	-	3,085	2,754,991	2,883,328
2031	1,218,816	-	10,585	445,158	1,008,539	7,037	92,159	-	3,085	2,785,380	2,927,278
2032	1,233,592	-	10,615	452,253	1,016,600	7,031	92,159	-	3,085	2,815,336	2,975,852
2033	1,248,149	-	10,645	459,347	1,021,752	7,024	92,159	-	3,085	2,842,161	3,017,525
2034	1,262,611	-	10,675	466,411	1,029,998	7,017	92,159	-	3,085	2,871,956	3,067,194
2035	1,276,908	-	10,705	473,476	1,038,339	7,009	92,159	-	3,085	2,901,681	3,111,933
2036	1,291,602	-	10,735	480,514	1,043,777	7,000	92,159	-	3,085	2,928,873	3,159,569
2037	1,305,818	-	10,765	487,557	1,052,314	6,992	92,159	-	3,085	2,958,690	3,206,669
2038	1,319,909	-	10,795	494,570	1,060,952	6,982	92,159	-	3,085	2,988,453	3,258,961
2039	1,333,890	-	10,825	501,573	1,066,693	6,972	92,159	-	3,085	3,015,198	3,303,278
2040	1,347,930	-	10,855	508,581	1,075,539	6,962	92,159	-	3,085	3,045,112	3,350,861
2041	1,360,962	-	10,885	515,563	1,084,491	6,951	92,159	-	3,085	3,074,096	3,399,135
2042	1,373,881	-	10,915	522,552	1,090,553	6,940	92,159	-	3,085	3,100,085	3,444,373
2043	1,386,664	-	10,945	529,516	1,099,726	6,928	92,159	-	3,085	3,129,023	3,493,103
2044	1,399,605	-	10,975	536,494	1,109,013	6,916	92,159	-	3,085	3,158,247	3,542,666
2045	1,411,963	-	11,005	543,452	1,115,415	6,903	92,159	-	3,085	3,183,982	3,583,969
2046	1,424,251	-	11,035	550,414	1,124,935	6,889	92,159	-	3,085	3,212,769	3,634,059
2047	1,436,302	-	11,065	557,398	1,131,575	6,876	92,159	-	3,085	3,238,461	3,675,508
2048	1,448,191	-	11,095	564,370	1,138,338	6,861	92,159	-	3,085	3,264,101	3,722,958
2049	1,459,923	-	11,125	571,370	1,148,226	6,847	92,159	-	3,085	3,292,736	
2050	1,471,448	-	11,155	578,368	1,155,241	6,832	92,159	-	3,085	3,318,290	
Average Annual Growth Rates											
2000-2020	1.9%	-100.0%	0.6%	0.4%	10.7%	3.8%	1.4%	--	0.0%	3.3%	--
2005-2020	1.6%	--	1.8%	0.7%	7.7%	2.1%	2.5%	--	3.2%	3.1%	--
2010-2020	1.1%	--	1.2%	1.4%	5.8%	-0.3%	-0.7%	--	-1.4%	2.5%	--
2015-2020	1.4%	--	-4.4%	2.2%	0.1%	-4.2%	-0.3%	--	0.7%	0.9%	--
2020-2025	1.9%	--	3.2%	2.4%	2.1%	0.0%	0.0%	--	0.8%	2.0%	1.4%
2020-2030	1.7%	--	1.7%	2.1%	1.4%	0.0%	0.0%	--	0.4%	1.6%	1.4%
2020-2040	1.4%	--	1.0%	1.8%	1.1%	-0.1%	0.0%	--	0.2%	1.3%	1.5%
2020-2050	1.2%	--	0.8%	1.6%	0.9%	-0.1%	0.0%	--	0.1%	1.1%	
2021-2050	1.2%	--	0.3%	1.5%	0.8%	-0.1%	0.0%	--	0.0%	1.1%	

Member Forecasts By Class-MN

<u>Year</u>	<u>Residential</u>	<u>Seasonal</u>	<u>Irrigation</u>	<u>General Commercial</u>	<u>Large Commercial</u>	<u>Street Lighting</u>	<u>Public Authority</u>	<u>Resale RUS</u>	<u>Resale Other</u>	<u>Total Members</u>
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	4,187	51	144	-	1	9	64,232
2010	58,455	1,475	88	4,226	56	149	-	1	9	64,460
2011	58,645	1,417	86	4,262	71	157	-	1	9	64,648
2012	58,836	1,355	84	4,268	77	166	-	1	9	64,795
2013	59,083	1,294	88	4,274	74	166	-	1	9	64,990
2014	59,444	1,224	95	4,303	74	167	-	1	9	65,318
2015	59,836	1,193	104	4,305	96	174	-	1	9	65,717
2016	60,253	1,168	113	4,321	96	185	-	1	8	66,145
2017	60,320	1,138	118	4,343	100	203	-	1	8	66,231
2018	60,817	1,120	121	4,397	118	213	-	1	8	66,794
2019	61,077	1,092	122	4,526	121	225	-	1	8	67,171
2020	61,635	1,057	123	4,608	120	265	-	1	9	67,817
2021	62,192	1,015	127	4,659	123	266	-	1	9	68,392
2022	62,730	1,004	129	4,727	124	267	-	1	9	68,991
2023	63,228	993	130	4,786	124	268	-	1	9	69,538
2024	63,692	982	132	4,840	126	269	-	1	9	70,050
2025	64,132	971	133	4,890	127	270	-	1	9	70,533
2026	64,485	960	135	4,937	127	271	-	1	9	70,925
2027	64,818	950	136	4,980	127	272	-	1	9	71,293
2028	65,128	940	138	5,021	128	273	-	1	9	71,637
2029	65,411	930	139	5,059	129	274	-	1	9	71,952
2030	65,669	920	141	5,095	130	275	-	1	9	72,240
2031	65,909	910	142	5,129	130	276	-	1	9	72,506
2032	66,128	900	144	5,161	131	277	-	1	9	72,751
2033	66,328	890	145	5,192	131	278	-	1	9	72,973
2034	66,514	880	147	5,220	132	279	-	1	9	73,182
2035	66,688	870	148	5,248	136	280	-	1	9	73,379
2036	66,854	860	150	5,274	136	281	-	1	9	73,564
2037	67,011	850	151	5,299	136	282	-	1	9	73,738
2038	67,157	840	153	5,323	138	283	-	1	9	73,903
2039	67,293	830	154	5,345	138	284	-	1	9	74,054
2040	67,427	820	156	5,367	139	285	-	1	9	74,204
2041	67,571	810	157	5,389	140	286	-	1	9	74,362
2042	67,729	800	159	5,411	140	287	-	1	9	74,536
2043	67,898	790	160	5,433	140	288	-	1	9	74,719
2044	68,076	780	162	5,455	141	289	-	1	9	74,912
2045	68,252	770	163	5,477	142	290	-	1	9	75,103
2046	68,431	760	165	5,499	142	291	-	1	9	75,298
2047	68,625	751	166	5,521	143	292	-	1	9	75,508
2048	68,834	742	168	5,544	143	293	-	1	9	75,734
2049	69,062	733	169	5,568	143	294	-	1	9	75,978
2050	69,302	724	171	5,592	144	295	-	1	9	76,237
Average Annual Growth Rates										
1991-2020	1.4%	-5.3%	1.4%	2.1%	8.6%	3.8%	--	0.0%	0.3%	1.1%
2005-2020	1.0%	-8.9%	3.1%	1.2%	8.4%	5.2%	--	0.0%	0.4%	0.6%
2010-2020	0.5%	-3.3%	3.3%	0.9%	7.9%	5.9%	--	0.0%	-0.2%	0.5%
2015-2020	0.6%	-2.4%	3.4%	1.4%	4.6%	8.8%	--	0.0%	0.0%	0.6%
2020-2025	0.8%	-1.7%	1.6%	1.2%	1.1%	0.4%	--	0.0%	0.4%	0.8%
2020-2030	0.6%	-1.4%	1.4%	1.0%	0.8%	0.4%	--	0.0%	0.2%	0.6%
2020-2040	0.5%	-1.3%	1.2%	0.8%	0.7%	0.4%	--	0.0%	0.1%	0.5%
2020-2050	0.4%	-1.3%	1.1%	0.6%	0.6%	0.4%	--	0.0%	0.1%	0.4%
2021-2050	0.4%	-1.2%	1.0%	0.6%	0.5%	0.4%	--	0.0%	0.0%	0.4%

Member Forecasts By Class-ND
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Residential</u>	<u>Seasonal</u>	<u>Irrigation</u>	<u>General Commercial</u>	<u>Large Commercial</u>	<u>Street Lighting</u>	<u>Public Authority</u>	<u>Resale RUS</u>	<u>Resale Other</u>	<u>Total Members</u>
1991	24,660	479	243	2,923	42	196	113	-	2	28,657
1992	25,305	476	278	3,011	42	210	113	-	2	29,437
1993	26,104	454	289	3,121	42	221	112	-	2	30,345
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	4,741	156	465	33	-	2	64,350
2016	61,349	-	397	5,032	157	464	34	-	2	67,435
2017	63,190	-	400	5,318	159	467	27	-	2	69,563
2018	64,808	-	401	5,514	165	468	27	-	2	71,384
2019	66,280	-	404	5,692	172	473	34	-	3	73,058
2020	67,399	-	402	6,203	178	487	29	-	2	74,699
2021	68,814	-	402	6,353	182	492	29	-	2	76,274
2022	70,178	-	403	6,557	186	497	29	-	2	77,852
2023	71,467	-	404	6,763	190	502	29	-	2	79,357
2024	72,745	-	405	6,972	192	507	29	-	2	80,852
2025	74,012	-	406	7,183	195	512	29	-	2	82,339
2026	75,264	-	407	7,397	198	517	29	-	2	83,814
2027	76,505	-	408	7,614	200	522	29	-	2	85,280
2028	77,737	-	409	7,833	203	527	29	-	2	86,740
2029	78,957	-	410	8,056	206	532	29	-	2	88,192
2030	80,167	-	411	8,281	208	537	29	-	2	89,636
2031	81,342	-	412	8,510	211	542	29	-	2	91,049
2032	82,507	-	413	8,743	214	547	29	-	2	92,454
2033	83,660	-	414	8,978	216	552	29	-	2	93,852
2034	84,804	-	415	9,218	219	557	29	-	2	95,244
2035	85,938	-	416	9,460	222	562	29	-	2	96,629
2036	87,061	-	417	9,707	224	567	29	-	2	98,006
2037	88,174	-	418	9,957	227	572	29	-	2	99,379
2038	89,277	-	419	10,210	230	577	29	-	2	100,744
2039	90,370	-	420	10,468	232	582	29	-	2	102,103
2040	91,452	-	421	10,730	235	587	29	-	2	103,456
2041	92,500	-	422	10,995	238	592	29	-	2	104,778
2042	93,538	-	423	11,264	240	597	29	-	2	106,093
2043	94,566	-	424	11,538	242	602	29	-	2	107,403
2044	95,585	-	425	11,815	245	607	29	-	2	108,708
2045	96,593	-	426	12,097	247	612	29	-	2	110,006
2046	97,592	-	427	12,383	249	617	29	-	2	111,299
2047	98,581	-	428	12,674	251	622	29	-	2	112,586
2048	99,560	-	429	12,969	253	627	29	-	2	113,869
2049	100,529	-	430	13,269	255	632	29	-	2	115,146
2050	101,489	-	431	13,574	257	637	29	-	2	116,419
Average Annual Growth Rates										
1991-2020	3.5%	-100.0%	1.7%	2.6%	5.1%	3.2%	-4.6%	--	0.0%	3.4%
2005-2020	3.1%	--	1.3%	4.8%	6.5%	3.2%	0.4%	--	0.0%	3.3%
2010-2020	3.3%	--	1.6%	4.9%	3.8%	1.5%	0.0%	--	0.0%	3.4%
2015-2020	2.8%	--	0.8%	5.5%	2.7%	1.0%	-2.8%	--	0.0%	3.0%
2020-2025	1.9%	--	0.2%	3.0%	1.8%	1.0%	0.0%	--	0.0%	2.0%
2020-2030	1.8%	--	0.2%	2.9%	1.6%	1.0%	0.0%	--	0.0%	1.8%
2020-2040	1.5%	--	0.2%	2.8%	1.4%	0.9%	0.0%	--	0.0%	1.6%
2020-2050	1.4%	--	0.2%	2.6%	1.2%	0.9%	0.0%	--	0.0%	1.5%
2021-2050	1.3%	--	0.2%	2.7%	1.2%	0.9%	0.0%	--	0.0%	1.5%

Seasonal Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass</u> <u>County</u>	<u>Clearwater-</u> <u>Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North</u> <u>Star</u>	<u>PKM</u>	<u>Red</u> <u>Lake</u>	<u>Red</u> <u>River</u>	<u>Roseau</u>	<u>Wild</u> <u>Rice</u>	<u>Total</u> <u>Members</u>
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	-	-	-	-	-	727	-	-	-	410	-	1,138
2018	-	-	-	-	-	700	-	-	-	420	-	1,120
2019	-	-	-	-	-	667	-	-	-	425	-	1,092
2020	-	-	-	-	-	628	-	-	-	429	-	1,057
2021	-	-	-	-	-	585	-	-	-	430	-	1,015
2022	-	-	-	-	-	570	-	-	-	434	-	1,004
2023	-	-	-	-	-	555	-	-	-	438	-	993
2024	-	-	-	-	-	540	-	-	-	442	-	982
2025	-	-	-	-	-	525	-	-	-	446	-	971
2026	-	-	-	-	-	510	-	-	-	450	-	960
2027	-	-	-	-	-	495	-	-	-	455	-	950
2028	-	-	-	-	-	480	-	-	-	460	-	940
2029	-	-	-	-	-	465	-	-	-	465	-	930
2030	-	-	-	-	-	450	-	-	-	470	-	920
2031	-	-	-	-	-	435	-	-	-	475	-	910
2032	-	-	-	-	-	420	-	-	-	480	-	900
2033	-	-	-	-	-	405	-	-	-	485	-	890
2034	-	-	-	-	-	390	-	-	-	490	-	880
2035	-	-	-	-	-	375	-	-	-	495	-	870
2036	-	-	-	-	-	360	-	-	-	500	-	860
2037	-	-	-	-	-	345	-	-	-	505	-	850
2038	-	-	-	-	-	330	-	-	-	510	-	840
2039	-	-	-	-	-	315	-	-	-	515	-	830
2040	-	-	-	-	-	300	-	-	-	520	-	820
2041	-	-	-	-	-	285	-	-	-	525	-	810
2042	-	-	-	-	-	270	-	-	-	530	-	800
2043	-	-	-	-	-	255	-	-	-	535	-	790
2044	-	-	-	-	-	240	-	-	-	540	-	780
2045	-	-	-	-	-	225	-	-	-	545	-	770
2046	-	-	-	-	-	210	-	-	-	550	-	760
2047	-	-	-	-	-	195	-	-	-	556	-	751
2048	-	-	-	-	-	180	-	-	-	562	-	742
2049	-	-	-	-	-	165	-	-	-	568	-	733
2050	-	-	-	-	-	150	-	-	-	574	-	724
Average Annual Growth Rates												
1991-2020	-100.0%	--	--	-100.0%	-100.0%	-2.1%	--	--	--	2.7%	-100.0%	-5.6%
2005-2020	-100.0%	--	--	--	--	-5.6%	--	--	--	1.5%	-100.0%	-8.9%
2010-2020	--	--	--	--	--	-5.4%	--	--	--	1.3%	--	-3.3%
2015-2020	--	--	--	--	--	-4.6%	--	--	--	1.4%	--	-2.4%
2020-2025	--	--	--	--	--	-3.5%	--	--	--	0.8%	--	-1.7%
2020-2030	--	--	--	--	--	-3.3%	--	--	--	0.9%	--	-1.4%
2020-2040	--	--	--	--	--	-3.6%	--	--	--	1.0%	--	-1.3%
2020-2050	--	--	--	--	--	-4.7%	--	--	--	1.0%	--	-1.3%
2021-2050	--	--	--	--	--	-4.6%	--	--	--	1.0%	--	-1.2%

Irrigation Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass County</u>	<u>Clearwater-Cavalier</u>	<u>Polk</u>	<u>Nodak</u>	<u>North Star</u>	<u>PKM</u>	<u>Red Lake</u>	<u>Red River</u>	<u>Roseau</u>	<u>Wild Rice</u>	<u>Total Members</u>
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	19	205	-	15	195	-	20	27	5	-	32	518
2018	18	206	-	15	194	-	20	30	5	-	33	521
2019	18	207	-	15	197	-	20	30	6	-	34	526
2020	18	203	-	16	198	-	17	32	6	-	35	524
2021	18	203	-	18	199	-	17	32	6	-	36	529
2022	18	203	-	18	200	-	17	33	6	-	37	532
2023	18	203	-	18	201	-	17	33	6	-	38	534
2024	18	203	-	18	202	-	17	34	6	-	39	537
2025	18	203	-	18	203	-	17	34	6	-	40	539
2026	18	203	-	18	204	-	17	35	6	-	41	542
2027	18	203	-	18	205	-	17	35	6	-	42	544
2028	18	203	-	18	206	-	17	36	6	-	43	547
2029	18	203	-	18	207	-	17	36	6	-	44	549
2030	18	203	-	18	208	-	17	37	6	-	45	552
2031	18	203	-	18	209	-	17	37	6	-	46	554
2032	18	203	-	18	210	-	17	38	6	-	47	557
2033	18	203	-	18	211	-	17	38	6	-	48	559
2034	18	203	-	18	212	-	17	39	6	-	49	562
2035	18	203	-	18	213	-	17	39	6	-	50	564
2036	18	203	-	18	214	-	17	40	6	-	51	567
2037	18	203	-	18	215	-	17	40	6	-	52	569
2038	18	203	-	18	216	-	17	41	6	-	53	572
2039	18	203	-	18	217	-	17	41	6	-	54	574
2040	18	203	-	18	218	-	17	42	6	-	55	577
2041	18	203	-	18	219	-	17	42	6	-	56	579
2042	18	203	-	18	220	-	17	43	6	-	57	582
2043	18	203	-	18	221	-	17	43	6	-	58	584
2044	18	203	-	18	222	-	17	44	6	-	59	587
2045	18	203	-	18	223	-	17	44	6	-	60	589
2046	18	203	-	18	224	-	17	45	6	-	61	592
2047	18	203	-	18	225	-	17	45	6	-	62	594
2048	18	203	-	18	226	-	17	46	6	-	63	597
2049	18	203	-	18	227	-	17	46	6	-	64	599
2050	18	203	-	18	228	-	17	47	6	-	65	602
Average Annual Growth Rates												
1991-2020	-0.8%	0.9%	--	-0.9%	2.9%	--	2.9%	4.6%	-3.4%	--	5.7%	1.7%
2005-2020	-0.8%	0.5%	--	1.5%	2.3%	--	1.6%	7.3%	-3.2%	--	8.1%	1.7%
2010-2020	0.1%	0.7%	--	-0.7%	2.7%	--	-4.0%	11.1%	-1.5%	--	12.3%	2.0%
2015-2020	0.3%	0.4%	--	3.1%	1.2%	--	-7.9%	11.8%	2.7%	--	7.5%	1.4%
2020-2025	0.0%	0.0%	--	2.5%	0.5%	--	0.6%	1.5%	0.0%	--	2.7%	0.6%
2020-2030	0.0%	0.0%	--	1.2%	0.5%	--	0.3%	1.6%	0.0%	--	2.5%	0.5%
2020-2040	0.0%	0.0%	--	0.6%	0.5%	--	0.1%	1.4%	0.0%	--	2.3%	0.5%
2020-2050	0.0%	0.0%	--	0.4%	0.5%	--	0.1%	1.3%	0.0%	--	2.1%	0.5%
2021-2050	0.0%	0.0%	--	0.0%	0.5%	--	0.0%	1.3%	0.0%	--	2.1%	0.4%

Street Lighting Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Cass</u>		<u>Clearwater-</u>		<u>Nodak</u>	<u>North</u>		<u>Red</u>	<u>Red</u>	<u>Wild</u>		<u>Total</u>
	<u>Beltrami</u>	<u>County</u>	<u>Cavalier</u>	<u>Polk</u>		<u>Star</u>	<u>PKM</u>	<u>Lake</u>	<u>River</u>	<u>Roseau</u>	<u>Rice</u>	
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	89	467	-	-	-	25	-	23	15	5	46	670
2018	92	468	-	-	-	25	-	28	18	5	45	681
2019	94	473	-	-	-	25	-	34	23	5	44	698
2020	94	487	-	40	-	25	-	34	24	4	44	752
2021	95	492	-	40	-	25	-	34	24	4	44	758
2022	96	497	-	40	-	25	-	34	24	4	44	764
2023	97	502	-	40	-	25	-	34	24	4	44	770
2024	98	507	-	40	-	25	-	34	24	4	44	776
2025	99	512	-	40	-	25	-	34	24	4	44	782
2026	100	517	-	40	-	25	-	34	24	4	44	788
2027	101	522	-	40	-	25	-	34	24	4	44	794
2028	102	527	-	40	-	25	-	34	24	4	44	800
2029	103	532	-	40	-	25	-	34	24	4	44	806
2030	104	537	-	40	-	25	-	34	24	4	44	812
2031	105	542	-	40	-	25	-	34	24	4	44	818
2032	106	547	-	40	-	25	-	34	24	4	44	824
2033	107	552	-	40	-	25	-	34	24	4	44	830
2034	108	557	-	40	-	25	-	34	24	4	44	836
2035	109	562	-	40	-	25	-	34	24	4	44	842
2036	110	567	-	40	-	25	-	34	24	4	44	848
2037	111	572	-	40	-	25	-	34	24	4	44	854
2038	112	577	-	40	-	25	-	34	24	4	44	860
2039	113	582	-	40	-	25	-	34	24	4	44	866
2040	114	587	-	40	-	25	-	34	24	4	44	872
2041	115	592	-	40	-	25	-	34	24	4	44	878
2042	116	597	-	40	-	25	-	34	24	4	44	884
2043	117	602	-	40	-	25	-	34	24	4	44	890
2044	118	607	-	40	-	25	-	34	24	4	44	896
2045	119	612	-	40	-	25	-	34	24	4	44	902
2046	120	617	-	40	-	25	-	34	24	4	44	908
2047	121	622	-	40	-	25	-	34	24	4	44	914
2048	122	627	-	40	-	25	-	34	24	4	44	920
2049	123	632	-	40	-	25	-	34	24	4	44	926
2050	124	637	-	40	-	25	-	34	24	4	44	932
Average Annual Growth Rates												
1991-2020	4.3%	5.1%	--	--	-100.0%	1.2%	--	10.2%	7.4%	2.4%	0.5%	3.4%
2005-2020	8.3%	3.2%	--	--	--	0.1%	--	15.3%	2.7%	4.7%	-0.6%	3.8%
2010-2020	5.7%	1.5%	--	--	--	0.5%	--	23.8%	4.1%	0.0%	-0.7%	2.8%
2015-2020	7.3%	1.0%	--	--	--	1.7%	--	16.4%	6.1%	-4.4%	-1.0%	3.3%
2020-2025	1.0%	1.0%	--	0.0%	--	0.0%	--	0.1%	0.0%	0.0%	0.0%	0.8%
2020-2030	1.0%	1.0%	--	0.0%	--	0.0%	--	0.0%	0.0%	0.0%	0.0%	0.8%
2020-2040	1.0%	0.9%	--	0.0%	--	0.0%	--	0.0%	0.0%	0.0%	0.0%	0.7%
2020-2050	0.9%	0.9%	--	0.0%	--	0.0%	--	0.0%	0.0%	0.0%	0.0%	0.7%
2021-2050	0.9%	0.9%	--	0.0%	--	0.0%	--	0.0%	0.0%	0.0%	0.0%	0.7%

Public Authority Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass County</u>	<u>Cavalier</u>	<u>Clearwater-Polk</u>	<u>Nodak</u>	<u>North Star</u>	<u>PKM</u>	<u>Red Lake</u>	<u>Red River</u>	<u>Roseau</u>	<u>Wild Rice</u>	<u>Total Members</u>
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	-	-	25	-	2	-	-	-	-	-	-	27
2018	-	-	25	-	2	-	-	-	-	-	-	27
2019	-	-	32	-	2	-	-	-	-	-	-	34
2020	-	-	27	-	2	-	-	-	-	-	-	29
2021	-	-	27	-	2	-	-	-	-	-	-	29
2022	-	-	27	-	2	-	-	-	-	-	-	29
2023	-	-	27	-	2	-	-	-	-	-	-	29
2024	-	-	27	-	2	-	-	-	-	-	-	29
2025	-	-	27	-	2	-	-	-	-	-	-	29
2026	-	-	27	-	2	-	-	-	-	-	-	29
2027	-	-	27	-	2	-	-	-	-	-	-	29
2028	-	-	27	-	2	-	-	-	-	-	-	29
2029	-	-	27	-	2	-	-	-	-	-	-	29
2030	-	-	27	-	2	-	-	-	-	-	-	29
2031	-	-	27	-	2	-	-	-	-	-	-	29
2032	-	-	27	-	2	-	-	-	-	-	-	29
2033	-	-	27	-	2	-	-	-	-	-	-	29
2034	-	-	27	-	2	-	-	-	-	-	-	29
2035	-	-	27	-	2	-	-	-	-	-	-	29
2036	-	-	27	-	2	-	-	-	-	-	-	29
2037	-	-	27	-	2	-	-	-	-	-	-	29
2038	-	-	27	-	2	-	-	-	-	-	-	29
2039	-	-	27	-	2	-	-	-	-	-	-	29
2040	-	-	27	-	2	-	-	-	-	-	-	29
2041	-	-	27	-	2	-	-	-	-	-	-	29
2042	-	-	27	-	2	-	-	-	-	-	-	29
2043	-	-	27	-	2	-	-	-	-	-	-	29
2044	-	-	27	-	2	-	-	-	-	-	-	29
2045	-	-	27	-	2	-	-	-	-	-	-	29
2046	-	-	27	-	2	-	-	-	-	-	-	29
2047	-	-	27	-	2	-	-	-	-	-	-	29
2048	-	-	27	-	2	-	-	-	-	-	-	29
2049	-	-	27	-	2	-	-	-	-	-	-	29
2050	-	-	27	-	2	-	-	-	-	-	-	29
Average Annual Growth Rates												
1991-2020	--	-100.0%	-0.2%	--	-11.7%	--	--	--	--	--	--	-4.6%
2005-2020	--	--	0.1%	--	4.7%	--	--	--	--	--	--	0.4%
2010-2020	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2015-2020	--	--	-3.0%	--	0.0%	--	--	--	--	--	--	-2.8%
2020-2025	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2020-2030	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2020-2040	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2020-2050	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%
2021-2050	--	--	0.0%	--	0.0%	--	--	--	--	--	--	0.0%

Resale-RUS Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

		Cass		Clearwater-		North		Red	Red		Wild	Total
Year	Beltrami	County	Cavalier	Polk	Nodak	Star	PKM	Lake	River	Roseau	Rice	Members
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
2047	1	-	-	-	-	-	-	-	-	-	-	1
2048	1	-	-	-	-	-	-	-	-	-	-	1
2049	1	-	-	-	-	-	-	-	-	-	-	1
2050	1	-	-	-	-	-	-	-	-	-	-	1
Average Annual Growth Rates												
1991-2020	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2005-2020	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2010-2020	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2015-2020	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2020-2025	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2020-2030	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2020-2040	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2020-2050	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%
2021-2050	0.0%	--	--	--	--	--	--	--	--	--	--	0.0%

Resale-Other Customer Forecasts By Member
Minnkota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass</u> <u>County</u>	<u>Cavalier</u>	<u>Clearwater-</u> <u>Polk</u>	<u>Nodak</u>	<u>North</u> <u>Star</u>	<u>PKM</u>	<u>Red</u> <u>Lake</u>	<u>Red</u> <u>River</u>	<u>Roseau</u>	<u>Wild</u> <u>Rice</u>	<u>Total</u> <u>Members</u>
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	-	1	-	2	-	2	1	-	-	-	11
2020	5	-	-	-	2	-	2	2	-	-	-	11
2021	5	-	-	-	2	-	2	2	-	-	-	11
2022	5	-	-	-	2	-	2	2	-	-	-	11
2023	5	-	-	-	2	-	2	2	-	-	-	11
2024	5	-	-	-	2	-	2	2	-	-	-	11
2025	5	-	-	-	2	-	2	2	-	-	-	11
2026	5	-	-	-	2	-	2	2	-	-	-	11
2027	5	-	-	-	2	-	2	2	-	-	-	11
2028	5	-	-	-	2	-	2	2	-	-	-	11
2029	5	-	-	-	2	-	2	2	-	-	-	11
2030	5	-	-	-	2	-	2	2	-	-	-	11
2031	5	-	-	-	2	-	2	2	-	-	-	11
2032	5	-	-	-	2	-	2	2	-	-	-	11
2033	5	-	-	-	2	-	2	2	-	-	-	11
2034	5	-	-	-	2	-	2	2	-	-	-	11
2035	5	-	-	-	2	-	2	2	-	-	-	11
2036	5	-	-	-	2	-	2	2	-	-	-	11
2037	5	-	-	-	2	-	2	2	-	-	-	11
2038	5	-	-	-	2	-	2	2	-	-	-	11
2039	5	-	-	-	2	-	2	2	-	-	-	11
2040	5	-	-	-	2	-	2	2	-	-	-	11
2041	5	-	-	-	2	-	2	2	-	-	-	11
2042	5	-	-	-	2	-	2	2	-	-	-	11
2043	5	-	-	-	2	-	2	2	-	-	-	11
2044	5	-	-	-	2	-	2	2	-	-	-	11
2045	5	-	-	-	2	-	2	2	-	-	-	11
2046	5	-	-	-	2	-	2	2	-	-	-	11
2047	5	-	-	-	2	-	2	2	-	-	-	11
2048	5	-	-	-	2	-	2	2	-	-	-	11
2049	5	-	-	-	2	-	2	2	-	-	-	11
2050	5	-	-	-	2	-	2	2	-	-	-	11
<hr/>												
Average Annual Growth Rates												
1991-2020	-0.6%	--	--	--	0.0%	--	0.0%	--	--	--	--	0.3%
2005-2020	-1.2%	--	--	--	0.0%	--	0.0%	--	-100.0%	--	--	0.3%
2010-2020	-1.8%	--	--	--	0.0%	--	0.0%	6.2%	--	--	--	-0.2%
2015-2020	-3.0%	--	--	--	0.0%	--	0.0%	12.9%	--	--	--	0.0%
2020-2025	0.0%	--	--	--	0.0%	--	0.0%	1.8%	--	--	--	0.3%
2020-2030	0.0%	--	--	--	0.0%	--	0.0%	0.9%	--	--	--	0.2%
2020-2040	0.0%	--	--	--	0.0%	--	0.0%	0.4%	--	--	--	0.1%
2020-2050	0.0%	--	--	--	0.0%	--	0.0%	0.3%	--	--	--	0.1%
2021-2050	0.0%	--	--	--	0.0%	--	0.0%	0.0%	--	--	--	0.0%

Retail Base Forecast By Member (kWh) /1
Joint System

Year	Beltrami	Cass		Clearwater-		North	Red	Red	Wild	MPC		NMPA	Joint System
		County	Cavaller	Polk	Nodak					Retail Base	Forecast		
1991	280,044,430	380,362,398	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	1,889,234,772	
1992	292,592,340	375,660,533	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	1,915,538,881	
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	444,367,254	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	2,098,627,943	
1995	333,512,748	484,229,967	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	2,218,296,646	407,069,000
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
1997	370,009,518	522,370,266	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	2,328,595,513	402,992,000
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
1999	377,374,165	552,599,631	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
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
2001	410,028,826	627,331,469	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	2,569,930,019	439,209,000
2002	440,089,053	684,092,978	34,097,108	69,652,376	674,172,220	112,969,581	88,790,172	117,404,798	118,458,403	163,032,649	214,662,676	2,717,402,012	450,474,000
2003	432,581,783	697,652,564	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	2,723,041,344	448,731,000
2004	441,562,048	710,584,921	35,138,826	71,384,535	692,029,653	116,222,273	93,108,512	115,003,119	118,164,202	163,199,864	227,203,104	2,783,541,057	454,427,000
2005	445,590,952	763,947,930	32,760,407	71,295,429	690,389,973	113,876,648	89,917,232	116,713,026	121,047,823	162,388,670	211,313,296	2,839,241,386	457,397,000
2006	459,431,656	806,517,660	30,378,122	71,696,415	744,130,196	112,464,269	87,500,360	115,695,514	117,340,692	157,168,525	230,856,160	2,933,079,569	462,824,831
2007	463,761,382	865,042,467	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	3,109,027,566	464,865,000
2008	482,540,766	936,818,628	37,951,527	78,835,007	830,295,681	121,112,345	93,147,321	130,832,879	130,372,885	170,069,749	261,894,421	3,273,077,209	458,871,000
2009	471,704,395	968,569,455	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	3,346,671,509	449,920,526
2010	448,640,701	949,128,606	37,377,240	73,306,796	855,247,294	109,176,084	99,684,367	129,688,012	141,704,852	158,447,787	254,297,711	3,267,699,450	441,781,996
2011	444,438,966	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
2012	422,288,512	1,003,599,206	31,738,649	68,722,831	1,012,198,480	105,138,167	114,717,068	122,666,187	117,236,217	166,396,187	240,559,476	3,405,291,054	422,875,098
2013	472,437,710	1,119,192,807	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	3,574,595,196	446,831,949
2014	478,645,659	1,192,026,035	39,961,105	84,074,810	1,158,017,372	125,639,787	132,420,779	149,824,017	139,664,645	174,195,806	285,517,177	3,960,087,192	474,182,495
2015	458,219,667	1,142,268,015	32,479,897	69,808,867	1,081,943,820	109,268,707	120,277,039	126,328,292	122,679,710	160,150,871	256,256,036	3,679,880,921	438,413,601
2016	465,401,742	1,158,749,715	32,387,625	67,466,499	1,057,478,859	104,003,534	123,213,628	124,772,808	120,736,711	151,487,200	249,719,356	3,654,917,677	429,925,853
2017	457,986,107	1,208,287,509	31,095,752	75,442,919	1,115,063,956	105,527,407	117,640,753	122,921,978	113,918,983	148,968,353	255,066,689	3,751,918,406	422,736,707
2018	486,894,339	1,277,523,697	31,395,860	74,120,634	1,157,245,851	109,236,049	121,379,957	125,911,302	121,728,348	151,804,190	272,934,326	3,930,174,553	436,371,082
2019	492,653,402	1,335,103,518	32,387,625	74,450,157	1,128,451,660	111,159,290	117,640,753	126,676,447	124,264,437	153,314,361	272,566,691	3,968,658,341	427,992,625
2020	477,771,045	1,256,561,103	35,145,283	71,476,737	1,069,437,843	106,410,124	118,192,225	121,551,780	118,768,138	149,772,006	263,346,582	3,788,432,866	425,347,020
2021	481,167,682	1,317,600,719	34,922,464	73,693,414	1,092,430,823	107,817,963	121,087,213	123,688,986	121,251,651	148,742,710	269,999,831	3,892,403,456	436,575,268
2022	483,852,307	1,362,981,911	35,007,027	73,526,155	1,108,130,343	108,850,980	122,008,774	124,822,666	123,401,263	151,351,556	279,825,783	3,973,760,725	438,701,856
2023	486,947,524	1,393,988,771	35,108,214	74,322,755	1,116,876,652	109,811,801	122,864,667	125,761,837	125,026,520	152,013,775	283,290,295	4,026,012,810	440,490,380
2024	489,895,161	1,415,561,610	35,314,681	75,350,860	1,123,449,314	110,734,811	123,616,118	128,587,007	127,127,823	152,650,649	284,581,313	4,066,869,347	441,997,566
2025	493,717,671	1,436,990,516	35,495,796	75,980,193	1,133,157,606	112,129,529	124,269,927	129,274,332	128,345,241	153,447,268	285,802,634	4,108,610,713	443,160,669
2026	496,927,844	1,461,283,284	35,573,281	76,543,496	1,139,981,241	111,321,815	124,766,484	129,901,536	129,234,840	154,056,448	287,416,177	4,147,006,446	444,067,991
2027	499,659,507	1,482,447,183	35,857,823	78,269,689	1,146,841,690	111,176,205	125,344,162	130,434,719	130,491,163	154,850,889	289,059,432	4,184,432,462	444,792,878
2028	503,039,792	1,503,488,826	36,153,774	78,918,903	1,156,488,001	110,985,810	125,923,321	130,917,258	131,781,920	155,850,424	291,637,563	4,225,185,694	445,287,876
2029	505,273,972	1,527,413,660	36,367,207	80,022,208	1,163,322,318	111,444,413	126,570,099	131,298,780	134,058,392	156,602,289	293,134,954	4,265,598,300	445,432,910
2030	507,363,583	1,548,226,887	36,552,230	80,566,429	1,170,212,118	112,368,342	126,930,521	131,642,244	135,025,751	157,281,956	294,438,524	4,300,608,584	445,440,626
2031	509,338,494	1,568,932,606	36,677,816	81,325,106	1,179,769,328	112,770,531	127,234,464	132,093,974	135,954,573	157,857,834	295,673,331	4,337,628,047	445,235,265
2032	511,200,567	1,592,534,528	36,771,669	81,763,280	1,186,029,352	113,143,118	127,352,785	132,521,251	137,655,229	158,537,093	296,747,303	4,374,256,175	444,842,253
2033	512,958,586	1,613,036,002	36,829,905	82,184,612	1,192,295,289	113,485,412	127,419,689	132,880,010	138,307,454	158,858,794	297,753,147	4,408,008,899	444,252,367
2034	514,635,524	1,633,440,724	36,872,384	82,594,836	1,201,643,061	113,797,025	127,442,061	135,226,192	138,946,552	159,158,747	298,679,866	4,442,436,972	443,533,674
2035	516,240,442	1,656,751,511	36,929,649	83,993,677	1,207,999,847	114,589,807	127,401,975	135,520,535	140,550,193	160,414,314	299,553,192	4,479,945,139	442,643,489
2036	517,796,582	1,676,972,074	37,015,952	84,389,923	1,214,884,608	114,819,816	127,490,937	135,432,193	141,003,008	160,846,876	300,372,672	4,511,024,642	441,715,913
2037	519,306,094	1,697,106,322	37,119,273	84,773,220	1,224,464,774	115,029,667	127,564,045	135,293,506	141,639,104	161,023,759	301,150,718	4,544,470,482	440,658,957
2038	521,756,542	1,720,156,569	37,198,125	85,148,577	1,231,097,935	115,212,831	127,648,888	135,155,295	143,080,649	161,196,094	301,878,551	4,579,530,057	439,560,671
2039	523,156,253	1,740,125,319	37,280,998	85,513,404	1,237,791,863	115,375,374	127,667,503	134,963,951	143,418,695	161,323,353	302,563,742	4,609,180,453	438,295,913
2040	524,527,843	1,760,015,188	37,376,408	85,881,562	1,247,719,908	116,030,071	127,697,269	134,782,649	143,804,130	161,450,018	303,228,189	4,642,513,236	437,020,817
2041	525,951,412	1,782,829,263	37,456,440	86,258,705	1,253,810,397	116,177,133	127,713,083	134,590,652	145,123,996	161,770,918	303,922,792	4,675,604,791	435,808,143
2042	527,437,580	1,802,571,265	37,557,956	86,653,446	1,259,955,912	116,343,021	127,753,879	134,448,400	145,539,545	161,890,151	304,656,891	4,704,808,045	434,727,592
2043	528,989,516	1,822,244,295	37,639,468	87,060,882	1,269,139,598	116,501,967	127,837,087	134,293,994	146,133,906	162,005,890	305,434,236	4,737,280,841	433,672,393
2044	530,574,259	1,844,852,379	37,744,148	87,477,192	1,275,650,600	116,674,305	127,869,490	134,173,848	147,497,076	162,192,969	306,233,995	4,770,940,262	432,742,743

CIP Reduction Forecast By Member (kWh)
Minnesota Power Cooperative, Inc.

<u>Year</u>	<u>Beltrami</u>	<u>Cass</u> <u>County</u>	<u>Clearwater-</u> <u>Cavaller</u>	<u>Polk</u>	<u>Nodak</u>	<u>North</u> <u>Star</u>	<u>PKM</u>	<u>Red</u> <u>Lake</u>	<u>Red</u> <u>River</u>	<u>Roseau</u>	<u>Wild</u> <u>Rice</u>	<u>MPC</u> <u>CIP Req.</u> <u>Forecast</u>	<u>NMPA</u>	<u>Joint System</u> <u>CIP Req.</u> <u>Forecast /1</u>
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	547,801	3,265,266
2010	2,376,309	-	-	553,268	-	532,270	2,278,967	893,994	779,308	1,037,573	1,461,068	9,912,757	1,956,193	11,868,950
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	16,594,661	-	-	3,694,312	-	4,759,067	11,758,983	6,587,414	6,355,718	9,262,749	11,332,876	70,345,780	18,842,593	89,188,373
2018	19,666,309	-	-	3,694,312	-	5,669,870	11,758,983	6,587,414	8,003,574	12,235,771	12,938,862	80,555,095	22,697,432	103,252,527
2019	22,372,747	-	-	3,694,312	-	7,727,527	11,758,983	6,587,414	8,003,574	13,836,277	15,019,117	88,999,951	24,740,111	113,740,062
2020	24,683,948	-	-	3,694,312	-	8,451,511	11,758,983	6,587,414	8,003,574	15,099,576	16,816,537	95,095,855	25,770,992	120,866,847
2021	24,930,787	-	-	3,694,312	-	8,620,541	11,758,983	6,587,414	8,003,574	15,250,572	16,984,702	95,830,886	26,026,358	121,857,244
2022	25,180,095	-	-	3,694,312	-	8,792,952	11,758,983	6,587,414	8,003,574	15,403,077	17,154,549	96,574,957	26,284,278	122,859,236
2023	25,431,896	-	-	3,694,312	-	8,968,811	11,758,983	6,587,414	8,003,574	15,557,108	17,326,095	97,328,194	26,544,777	123,872,971
2024	25,686,215	-	-	3,694,312	-	9,148,187	11,758,983	6,587,414	8,003,574	15,712,679	17,499,356	98,090,721	26,807,882	124,898,602
2025	25,943,077	-	-	3,694,312	-	9,331,151	11,758,983	6,587,414	8,003,574	15,869,806	17,674,349	98,862,667	27,073,617	125,936,284
2026	26,202,508	-	-	3,694,312	-	9,517,774	11,758,983	6,587,414	8,003,574	16,028,504	17,851,093	99,644,162	27,342,009	126,986,172
2027	26,464,533	-	-	3,694,312	-	9,708,130	11,758,983	6,587,414	8,003,574	16,188,789	18,029,604	100,435,339	27,613,086	128,048,425
2028	26,729,179	-	-	3,694,312	-	9,902,292	11,758,983	6,587,414	8,003,574	16,350,677	18,209,900	101,236,331	27,886,873	129,123,204
2029	26,996,470	-	-	3,694,312	-	10,100,338	11,758,983	6,587,414	8,003,574	16,514,184	18,391,999	102,047,274	28,163,398	130,210,672
2030	27,266,435	-	-	3,694,312	-	10,302,345	11,758,983	6,587,414	8,003,574	16,679,326	18,575,919	102,868,307	28,442,689	131,310,996
2031	27,539,099	-	-	3,694,312	-	10,508,392	11,758,983	6,587,414	8,003,574	16,846,119	18,761,678	103,699,571	28,724,772	132,424,343
2032	27,814,490	-	-	3,694,312	-	10,718,559	11,758,983	6,587,414	8,003,574	17,014,580	18,949,295	104,541,208	29,009,676	133,550,884
2033	28,092,635	-	-	3,694,312	-	10,932,931	11,758,983	6,587,414	8,003,574	17,184,726	19,138,788	105,393,363	29,297,429	134,690,792
2034	28,373,562	-	-	3,694,312	-	11,151,589	11,758,983	6,587,414	8,003,574	17,356,573	19,330,176	106,256,183	29,588,060	135,844,243
2035	28,657,297	-	-	3,694,312	-	11,374,621	11,758,983	6,587,414	8,003,574	17,530,139	19,523,477	107,129,818	29,881,597	137,011,415
2036	28,943,780	-	-	3,694,312	-	11,602,113	11,758,983	6,587,414	8,003,574	17,705,440	19,718,712	108,014,419	30,178,069	138,192,488
2037	29,233,309	-	-	3,694,312	-	11,834,156	11,758,983	6,587,414	8,003,574	17,882,495	19,915,899	108,910,142	30,477,506	139,387,648
2038	29,525,642	-	-	3,694,312	-	12,070,839	11,758,983	6,587,414	8,003,574	18,061,320	20,115,058	109,817,142	30,779,938	140,597,080
2039	29,820,899	-	-	3,694,312	-	12,312,256	11,758,983	6,587,414	8,003,574	18,241,933	20,316,209	110,735,579	31,085,393	141,820,972
2040	30,119,107	-	-	3,694,312	-	12,558,501	11,758,983	6,587,414	8,003,574	18,424,352	20,519,371	111,665,614	31,393,904	143,059,518
2041	30,420,299	-	-	3,694,312	-	12,809,671	11,758,983	6,587,414	8,003,574	18,608,596	20,724,565	112,607,413	31,705,499	144,312,912
2042	30,724,502	-	-	3,694,312	-	13,065,864	11,758,983	6,587,414	8,003,574	18,794,682	20,931,810	113,561,141	32,020,211	145,581,351
2043	31,031,747	-	-	3,694,312	-	13,327,181	11,758,983	6,587,414	8,003,574	18,982,629	21,141,128	114,526,968	32,338,069	146,865,037
2044	31,342,064	-	-	3,694,312	-	13,593,725	11,758,983	6,587,414	8,003,574	19,172,455	21,352,540	115,505,067	32,659,106	148,164,173
2045	31,655,485	-	-	3,694,312	-	13,865,600	11,758,983	6,587,414	8,003,574	19,364,179	21,566,065	116,495,612	32,983,354	149,478,965
2046	31,972,040	-	-	3,694,312	-	14,142,912	11,758,983	6,587,414	8,003,574	19,557,821	21,781,726	117,498,781	33,310,844	150,809,625
2047	32,291,760	-	-	3,694,312	-	14,425,770	11,758,983	6,587,414	8,003,574	19,753,399	21,999,543	118,514,755	33,641,608	152,156,364
2048	32,614,678	-	-	3,694,312	-	14,714,285	11,758,983	6,587,414	8,003,574	19,950,933	22,219,538	119,543,718	33,975,681	153,519,398
2049	32,940,824	-	-	3,694,312	-	15,008,571	11,758,983	6,587,414	8,003,574	20,150,443	22,441,734	120,585,855	34,313,094	154,898,949
2050	33,270,233	-	-	3,694,312	-	15,308,742	11,758,983	6,587,414	8,003,574	20,351,947	22,666,151	121,641,356	34,653,881	156,295,238
Average Annual Growth Rates														
2005-2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2010-2020	26.4%	--	--	20.9%	--	31.9%	17.8%	22.1%	26.2%	30.7%	27.7%	25.4%	29.4%	26.1%
2015-2020	17.3%	--	--	7.6%	--	21.4%	6.5%	9.4%	14.0%	18.9%	13.5%	14.1%	15.9%	14.5%
2020-2025	1.0%	--	--	0.0%	--	2.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.8%	1.0%	0.8%
2020-2030	1.0%	--	--	0.0%	--	2.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.8%	1.0%	0.8%
2020-2040	1.0%	--	--	0.0%	--	2.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.8%	1.0%	0.8%
2020-2050	1.0%	--	--	0.0%	--	2.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.8%	1.0%	0.9%
2021-2050	1.0%	--	--	0.0%	--	2.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.8%	1.0%	0.9%

/1 Retail - excludes losses

NO CIP-Adjusted Retail Base Forecast By Member (KWh) /1 /2
Minnesota Power Cooperative, Inc.

Year	Belt/rami	Cass County	Cavalier County	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
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	627,331,469	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	2,569,930,019	439,209,000	3,009,138,019
2002	440,069,053	684,092,978	34,097,106	69,652,376	674,172,220	112,969,581	88,790,172	117,404,798	118,456,403	163,032,649	214,662,676	2,717,402,012	450,474,000	3,167,876,012
2003	432,581,783	697,692,354	32,536,945	70,318,907	677,108,888	113,503,719	89,253,312	114,923,699	117,350,534	161,437,747	216,371,250	2,723,041,344	448,731,000	3,171,772,344
2004	441,562,048	710,884,021	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	2,783,541,057	454,427,000	3,237,968,057
2005	445,590,952	763,947,930	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	2,839,241,386	457,397,000	3,296,638,386
2006	459,431,656	806,517,680	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	2,933,079,569	462,824,831	3,395,904,400
2007	463,761,382	865,042,467	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	3,109,027,566	464,865,000	3,573,892,566
2008	482,540,766	936,818,628	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	3,273,077,209	458,871,000	3,731,948,209
2009	471,704,395	968,569,455	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	3,346,671,509	449,920,526	3,796,592,035
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	1,119,192,807	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	3,754,595,196	446,831,949	4,201,427,145
2014	478,645,659	1,192,026,035	39,961,105	84,074,810	1,158,017,372	125,639,787	132,420,779	149,924,187	139,664,645	174,195,806	285,517,177	3,960,087,192	457,995,307	4,418,082,499
2015	458,219,667	1,142,268,015	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	3,679,880,921	438,413,601	4,118,294,522
2016	465,401,742	1,158,749,715	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	3,654,917,677	429,825,853	4,084,843,530
2017	474,580,768	1,208,287,509	31,095,752	79,137,231	1,115,063,956	10,286,474	129,399,736	129,509,392	120,274,701	158,229,102	266,399,565	3,822,264,186	422,736,707	4,245,000,893
2018	506,560,648	1,277,523,697	31,395,860	77,814,946	1,157,245,851	114,905,919	133,138,940	132,498,716	129,731,922	164,039,961	285,873,188	4,010,729,648	436,371,082	4,447,100,730
2019	515,028,149	1,335,103,518	32,387,625	78,144,469	1,128,451,660	118,886,817	129,399,736	133,263,861	132,268,011	167,150,638	287,575,808	4,057,658,292	427,992,625	4,485,650,917
2020	502,454,993	1,296,561,103	35,145,283	75,171,049	1,069,437,943	114,861,635	129,951,208	128,198,194	126,771,712	164,871,582	280,163,119	3,893,528,721	426,347,020	4,308,875,741
2021	506,098,470	1,317,600,719	34,922,464	77,387,726	1,092,430,823	116,438,504	132,846,196	130,276,400	129,255,225	163,993,281	286,984,533	3,988,234,341	436,575,268	4,424,809,609
2022	509,032,402	1,362,981,911	35,007,027	77,220,467	1,108,130,343	117,643,932	133,767,757	131,412,400	131,404,837	166,754,634	296,980,333	4,070,335,682	430,701,858	4,509,037,538
2023	512,379,421	1,393,988,771	35,108,214	78,017,067	1,116,876,652	118,780,612	134,623,650	132,349,251	133,030,094	167,570,883	300,616,390	4,123,341,004	440,480,380	4,563,831,384
2024	515,581,376	1,415,561,610	35,314,681	79,045,172	1,123,449,314	119,882,968	135,375,101	135,174,421	135,131,397	168,363,328	302,080,669	4,164,960,968	441,997,566	4,606,957,634
2025	519,660,748	1,436,990,516	35,495,796	79,674,505	1,133,157,060	121,460,680	138,028,910	135,961,746	136,348,815	169,317,074	303,476,983	4,207,473,380	443,160,669	4,650,634,049
2026	523,130,352	1,461,283,284	35,573,281	80,237,808	1,139,981,241	120,839,589	136,525,467	136,488,937	137,238,414	170,084,953	305,267,269	4,246,650,608	444,067,991	4,690,718,600
2027	526,124,041	1,482,447,183	35,857,823	81,964,001	1,146,841,690	120,884,335	137,103,145	137,022,133	138,494,737	171,039,678	307,089,036	4,284,867,801	444,792,876	4,729,660,679
2028	529,768,971	1,503,488,926	36,153,774	82,613,215	1,156,488,001	120,888,102	137,682,304	137,504,672	139,785,494	172,201,101	309,847,463	4,326,422,025	445,287,876	4,771,709,901
2029	532,270,442	1,527,413,660	36,367,207	83,716,520	1,163,322,318	121,544,751	138,329,082	137,886,194	142,061,966	173,116,483	311,526,953	4,367,555,574	445,432,910	4,812,988,484
2030	534,630,018	1,548,226,887	36,552,230	84,260,741	1,170,212,118	122,670,686	138,689,504	138,229,658	143,029,325	173,961,281	313,014,443	4,403,476,892	445,440,626	4,848,917,517
2031	536,877,584	1,568,932,606	36,677,816	85,019,418	1,179,769,328	123,278,923	138,993,447	138,681,388	143,958,147	174,703,953	314,435,009	4,441,327,619	445,235,265	4,886,562,884
2032	539,015,057	1,592,534,528	36,771,669	85,457,592	1,186,029,352	123,861,678	139,111,768	139,108,665	145,658,803	175,551,673	315,696,598	4,478,797,383	444,842,253	4,923,639,636
2033	541,051,221	1,613,036,002	36,829,905	85,878,924	1,192,295,289	124,418,343	139,178,672	139,467,424	146,311,028	176,043,520	316,891,935	4,511,402,262	444,252,367	4,955,654,629
2034	543,009,086	1,633,440,724	36,872,384	86,289,148	1,201,643,061	124,948,614	139,201,044	141,813,606	146,950,127	176,515,320	318,010,041	4,548,693,155	443,533,674	4,992,226,829
2035	544,897,739	1,656,751,511	36,929,649	87,687,989	1,207,999,847	125,964,428	139,160,958	142,107,949	148,553,767	177,944,452	319,076,669	4,587,074,957	442,643,489	5,029,718,446
2036	546,740,453	1,676,972,074	37,015,952	88,084,235	1,214,884,608	126,421,930	139,249,920	142,019,607	149,006,582	178,552,316	320,091,385	4,619,039,061	441,715,913	5,060,754,974
2037	548,539,403	1,697,106,322	37,119,273	88,467,532	1,224,464,774	126,863,823	139,323,028	141,880,920	149,642,678	178,906,254	321,066,617	4,653,380,624	440,658,957	5,094,039,581
2038	551,282,184	1,720,156,569	37,196,125	88,842,889	1,231,087,935	127,293,670	139,407,871	141,742,709	151,084,223	179,257,414	321,993,609	4,689,347,199	439,580,671	5,126,907,670
2039	552,977,151	1,740,125,319	37,280,968	89,207,716	1,237,791,963	127,687,630	139,426,486	141,551,365	151,422,269	179,565,285	322,879,951	4,719,016,032	438,285,913	5,158,211,945
2040	554,646,950	1,760,015,188	37,376,408	89,575,874	1,247,719,908	128,588,572	139,456,252	141,370,063	151,807,704	179,874,370	323,747,560	4,754,178,851	437,020,817	5,191,199,667
2041	556,371,711	1,782,829,263	37,456,440	89,953,017	1,253,810,397	128,986,804	139,472,066	141,178,066	153,127,570	180,379,514	324,647,357	4,788,212,203	435,808,143	5,224,020,347
2042	558,162,081	1,802,571,265	37,557,956	90,347,758	1,259,955,912	129,408,885	139,512,862	141,035,814	153,543,119	180,684,833	325,588,702	4,818,369,186	434,727,592	5,253,096,778
2043	560,021,263	1,822,244,295	37,639,468	90,755,194	1,269,139,598	129,829,149	139,596,070	140,881,408	154,137,480	180,988,519	326,575,365	4,851,807,809	433,672,393	5,285,480,202
2044	561,916,323	1,844,852,379	37,744,148	91,171,504	1,275,660,600	130,268,030	139,628,473	140,761,262	155,500,650	181,365,424	327,586,535	4,886,445,329	432,742,743	5,319,188,072
2045	563,820,117	1,864,399,876	37,828,313	91,582,795	1,281,754,040	131,178,860	139,669,284	140,621,224	155,880,620	181,686,109	328,605,301	4,917,026,538	431,761,274	5,348,787,812
2046	565,740,215	1,883,891,835	37,914,062	92,000,515	1,290,962,914	131,602,218	139,721,174	140,511,030	156,271,197	182,225,384	329,636,026	4,950,476,571	430,845,046	5,381,321,617
2047	567,727,137	1,903,333,209	38,021,496	92,439,137	1,297,105,838	132,038,628	139,772,318	140,408,646	157,716,754	182,600,365	330,735,844	4,981,899,737	430,055,533	5,411,954,905
2048	569,811,254	1,922,729,131	38,111,940	92,889,276	1,303,259,484	132,474,854	139,839,841	140,351,255	158,209,380	183,023,657	331,898,802	5,012,598,872	429,319,069	5,441,917,941
2049	571,987,769	1,942,085,590	38,225,363	93,359,667	1,312,424,926	132,946,103	139,955,476	140,303,238	158,763,849	183,465,971	333,137,989	5,046,655,940	428,729,630	5,475,385,570
2050	574,220,954	1,961,407,276	38,32											

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	24,479	20,494	31,941	51,997	9,015	20,286	19,348	38,833	8,445	140,208	16,417	56,951	438,414
2016	24,664	20,401	31,469	50,409	8,236	19,298	18,878	38,251	6,987	137,333	17,156	56,845	429,926
2017	24,563	20,432	30,187	49,942	8,218	19,419	18,695	36,897	6,004	133,144	18,921	56,313	422,737
2018	25,640	20,941	30,795	52,177	8,840	20,262	19,291	37,981	8,182	138,469	15,848	57,945	436,371
2019	24,015	20,733	30,140	50,491	8,397	19,976	18,613	37,585	7,906	134,769	17,856	57,512	427,993
2020	22,848	19,795	27,947	49,816	7,618	19,148	19,112	35,539	7,210	141,878	15,502	58,934	425,347
2021	24,363	20,368	30,922	52,470	8,303	19,309	18,901	38,607	6,882	141,546	15,806	59,097	436,575
2022	24,363	20,368	30,967	52,470	8,322	19,542	18,899	38,735	6,847	143,064	15,630	59,494	438,702
2023	24,363	20,373	31,004	52,470	8,339	19,754	18,893	38,821	6,813	144,218	15,652	59,790	440,490
2024	24,363	20,374	31,028	52,470	8,355	19,944	18,885	38,877	6,779	145,228	15,675	60,019	441,998
2025	24,363	20,374	31,047	52,470	8,369	20,113	18,882	38,910	6,745	145,998	15,697	60,191	443,161
2026	24,363	20,376	31,062	52,470	8,383	20,271	18,874	38,914	6,711	146,628	15,720	60,297	444,068
2027	24,363	20,377	31,068	52,470	8,395	20,413	18,872	38,904	6,678	147,143	15,742	60,368	444,793
2028	24,363	20,375	31,070	52,470	8,406	20,546	18,865	38,871	6,644	147,526	15,764	60,388	445,288
2029	24,363	20,373	31,067	52,470	8,416	20,658	18,859	38,818	6,611	147,655	15,785	60,357	445,433
2030	24,363	20,372	31,059	52,470	8,425	20,761	18,852	38,740	6,578	147,743	15,807	60,272	445,441
2031	24,363	20,365	31,047	52,470	8,433	20,854	18,850	38,649	6,545	147,676	15,828	60,155	445,235
2032	24,363	20,359	31,030	52,470	8,440	20,933	18,842	38,536	6,512	147,522	15,849	59,986	444,842
2033	24,363	20,355	31,009	52,470	8,447	21,005	18,839	38,413	6,480	147,208	15,869	59,794	444,252
2034	24,363	20,350	30,986	52,470	8,452	21,068	18,831	38,271	6,447	146,848	15,889	59,557	443,534
2035	24,363	20,343	30,960	52,470	8,458	21,127	18,826	38,120	6,415	146,352	15,909	59,301	442,643
2036	24,363	20,338	30,936	52,470	8,462	21,181	18,821	37,960	6,383	145,847	15,928	59,026	441,716
2037	24,363	20,329	30,908	52,470	8,467	21,236	18,817	37,794	6,351	145,243	15,947	58,735	440,659
2038	24,363	20,319	30,880	52,470	8,471	21,283	18,811	37,613	6,319	144,657	15,965	58,411	439,561
2039	24,363	20,309	30,847	52,470	8,474	21,328	18,809	37,424	6,288	143,934	15,983	58,068	438,296
2040	24,363	20,300	30,817	52,470	8,477	21,372	18,803	37,234	6,256	143,204	16,000	57,724	437,021
2041	24,363	20,289	30,790	52,470	8,481	21,422	18,799	37,045	6,225	142,525	16,017	57,382	435,808
2042	24,363	20,279	30,764	52,470	8,485	21,483	18,793	36,870	6,194	141,918	16,033	57,076	434,728
2043	24,363	20,267	30,741	52,470	8,490	21,550	18,788	36,701	6,163	141,305	16,048	56,786	433,672
2044	24,363	20,253	30,722	52,470	8,495	21,624	18,784	36,538	6,132	140,787	16,063	56,511	432,743
2045	24,363	20,242	30,702	52,470	8,500	21,696	18,779	36,370	6,102	140,234	16,078	56,225	431,761
2046	24,363	20,232	30,679	52,470	8,505	21,772	18,776	36,208	6,071	139,723	16,092	55,954	430,845
2047	24,363	20,216	30,662	52,470	8,511	21,856	18,771	36,059	6,041	139,285	16,106	55,716	430,056
2048	24,363	20,204	30,646	52,470	8,518	21,947	18,767	35,911	6,010	138,883	16,119	55,481	429,319
2049	24,363	20,191	30,633	52,470	8,525	22,049	18,763	35,784	5,980	138,541	16,132	55,297	428,730
2050	24,363	20,176	30,624	52,470	8,532	22,158	18,759	35,664	5,951	138,341	16,145	55,133	428,318

/1 Data is estimated

Average Annual Growth Rates

2005-2020	-1.0%	-0.8%	-1.1%	-2.1%	-1.1%	0.2%	-0.1%	-1.0%	-1.4%	0.2%	0.5%	0.2%	-0.5%
2010-2020	-1.3%	-1.0%	-1.5%	-0.5%	-1.9%	-0.6%	-0.3%	-1.8%	-2.4%	0.3%	-0.5%	0.8%	-0.4%
2015-2020	-1.4%	-0.7%	-2.6%	-0.9%	-3.3%	-1.1%	-0.2%	-1.8%	-3.1%	0.2%	-1.1%	0.7%	-0.6%
2020-2025	1.3%	0.6%	2.1%	1.0%	1.9%	1.0%	-0.2%	1.8%	-1.3%	0.6%	0.3%	0.4%	0.8%
2020-2030	0.6%	0.3%	1.1%	0.5%	1.0%	0.8%	-0.1%	0.9%	-0.9%	0.4%	0.2%	0.2%	0.5%
2020-2040	0.3%	0.1%	0.5%	0.3%	0.5%	0.6%	-0.1%	0.2%	-0.7%	0.0%	0.2%	-0.1%	0.1%
2020-2050	0.2%	0.1%	0.3%	0.2%	0.4%	0.5%	-0.1%	0.0%	-0.6%	-0.1%	0.1%	-0.2%	0.0%
2021-2050	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	0.0%	-0.3%	-0.5%	-0.1%	0.1%	-0.2%	-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	26,740	21,752	32,406	55,197	8,704	20,855	19,883	38,841	8,054	134,795	17,848	57,606	442,681
2018	27,350	22,235	33,134	56,400	9,129	21,433	20,052	39,201	8,018	138,858	18,322	58,570	452,702
2019	26,010	22,093	32,245	55,241	8,717	20,898	20,089	38,543	7,595	137,772	18,119	58,689	446,011
2020	25,023	21,021	29,958	53,511	8,073	20,274	19,656	36,661	7,519	141,624	17,758	59,468	440,546
2021	26,314	21,622	33,192	57,891	8,655	20,555	19,879	39,768	7,600	140,806	17,684	59,566	453,530
2022	26,314	21,622	33,240	57,891	8,675	20,803	19,877	39,900	7,562	142,315	17,486	59,966	455,650
2023	26,314	21,627	33,279	57,891	8,692	21,029	19,869	39,988	7,524	143,463	17,511	60,264	457,454
2024	26,314	21,628	33,305	57,891	8,709	21,231	19,862	40,047	7,487	144,468	17,537	60,495	458,973
2025	26,314	21,628	33,326	57,891	8,724	21,411	19,858	40,080	7,449	145,234	17,562	60,669	460,146
2026	26,314	21,630	33,341	57,891	8,737	21,579	19,850	40,085	7,412	145,861	17,587	60,775	461,062
2027	26,314	21,631	33,348	57,891	8,750	21,731	19,848	40,074	7,375	146,373	17,611	60,847	461,793
2028	26,314	21,629	33,350	57,891	8,762	21,872	19,840	40,041	7,338	146,754	17,636	60,867	462,293
2029	26,314	21,627	33,347	57,891	8,772	21,992	19,834	39,985	7,301	146,882	17,660	60,836	462,442
2030	26,314	21,625	33,339	57,891	8,781	22,101	19,827	39,906	7,265	146,970	17,684	60,750	462,451
2031	26,314	21,619	33,325	57,891	8,790	22,200	19,825	39,812	7,228	146,903	17,708	60,632	462,247
2032	26,314	21,612	33,307	57,891	8,798	22,284	19,816	39,695	7,192	146,749	17,731	60,462	461,852
2033	26,314	21,608	33,284	57,891	8,804	22,361	19,813	39,569	7,156	146,438	17,754	60,268	461,261
2034	26,314	21,602	33,261	57,891	8,810	22,428	19,805	39,422	7,121	146,079	17,776	60,030	460,539
2035	26,314	21,595	33,232	57,891	8,816	22,490	19,800	39,266	7,085	145,586	17,798	59,771	459,645
2036	26,314	21,589	33,207	57,891	8,821	22,549	19,795	39,102	7,050	145,084	17,820	59,494	458,713
2037	26,314	21,580	33,177	57,891	8,825	22,607	19,790	38,931	7,014	144,482	17,841	59,201	457,652
2038	26,314	21,569	33,146	57,891	8,829	22,656	19,784	38,745	6,979	143,899	17,861	58,874	456,548
2039	26,314	21,559	33,111	57,891	8,833	22,704	19,782	38,550	6,944	143,180	17,881	58,528	455,277
2040	26,314	21,550	33,079	57,891	8,836	22,751	19,775	38,354	6,910	142,454	17,900	58,182	453,996
2041	26,314	21,538	33,050	57,891	8,840	22,805	19,771	38,159	6,875	141,779	17,919	57,837	452,778
2042	26,314	21,527	33,022	57,891	8,845	22,869	19,764	37,979	6,841	141,176	17,937	57,529	451,693
2043	26,314	21,514	32,998	57,891	8,850	22,941	19,759	37,805	6,806	140,566	17,954	57,236	450,634
2044	26,314	21,500	32,977	57,891	8,855	23,020	19,755	37,637	6,772	140,050	17,971	56,959	449,701
2045	26,314	21,488	32,955	57,891	8,860	23,097	19,750	37,464	6,739	139,500	17,987	56,671	448,716
2046	26,314	21,477	32,930	57,891	8,865	23,178	19,747	37,297	6,705	138,992	18,003	56,398	447,797
2047	26,314	21,460	32,912	57,891	8,871	23,267	19,741	37,144	6,671	138,556	18,019	56,158	447,005
2048	26,314	21,447	32,895	57,891	8,878	23,364	19,738	36,991	6,638	138,156	18,034	55,921	446,266
2049	26,314	21,434	32,881	57,891	8,886	23,473	19,734	36,860	6,605	137,816	18,048	55,736	445,677
2050	26,314	21,418	32,872	57,891	8,894	23,588	19,729	36,737	6,572	137,617	18,063	55,570	445,265

Average Annual Growth Rates

2005-2020	-1.0%	-0.8%	-1.1%	-2.1%	-1.0%	0.2%	0.1%	-1.2%	-1.5%	0.1%	-0.5%	0.1%	-0.6%
2010-2020	-1.3%	-0.8%	-1.6%	-0.9%	-1.7%	-0.4%	-0.5%	-1.8%	-2.4%	0.3%	-0.6%	0.8%	-0.5%
2015-2020	-1.3%	-0.7%	-2.6%	-1.7%	-2.1%	-1.2%	-0.6%	-1.9%	-3.0%	0.4%	-1.1%	0.5%	-0.7%
2020-2025	1.0%	0.6%	2.2%	1.6%	1.6%	1.1%	0.2%	1.8%	-0.2%	0.5%	-0.2%	0.4%	0.9%
2020-2030	0.5%	0.3%	1.1%	0.8%	0.8%	0.9%	0.1%	0.9%	-0.3%	0.4%	0.0%	0.2%	0.5%
2020-2040	0.3%	0.1%	0.5%	0.4%	0.5%	0.6%	0.0%	0.2%	-0.4%	0.0%	0.0%	-0.1%	0.2%
2020-2050	0.2%	0.1%	0.3%	0.3%	0.3%	0.5%	0.0%	0.0%	-0.4%	-0.1%	0.1%	-0.2%	0.0%
2021-2050	0.0%	0.0%	0.0%	0.0%	0.1%	0.5%	0.0%	-0.3%	-0.5%	-0.1%	0.1%	-0.2%	-0.1%

NMPA Participant Energy Purchases by State (MWh)
Northern Municipal Power Agency

<u>Year</u>	<u>Participants'</u>		<u>Total</u> <u>MWh</u>
	<u>Minnesota</u>	<u>North Dakota</u>	
	<u>Members</u>	<u>Members</u>	
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	367,601	75,080	442,681
2018	376,250	76,452	452,702
2019	370,681	75,330	446,011
2020	367,379	73,167	440,546
2021	375,761	77,770	453,530
2022	377,883	77,767	455,650
2023	379,694	77,760	457,454
2024	381,220	77,753	458,973
2025	382,397	77,749	460,146
2026	383,321	77,740	461,062
2027	384,055	77,738	461,793
2028	384,562	77,731	462,293
2029	384,717	77,725	462,442
2030	384,734	77,717	462,451
2031	384,531	77,716	462,247
2032	384,145	77,707	461,852
2033	383,557	77,704	461,261
2034	382,843	77,696	460,539
2035	381,954	77,691	459,645
2036	381,028	77,685	458,713
2037	379,971	77,681	457,652
2038	378,873	77,675	456,548
2039	377,605	77,672	455,277
2040	376,330	77,666	453,996
2041	375,116	77,662	452,778
2042	374,037	77,655	451,693
2043	372,984	77,650	450,634
2044	372,055	77,646	449,701
2045	371,075	77,641	448,716
2046	370,159	77,638	447,797
2047	369,373	77,632	447,005
2048	368,638	77,628	446,266
2049	368,053	77,624	445,677
2050	367,645	77,620	445,265

Average Annual Growth Rates

2005-2020	-0.3%	-1.6%	-0.6%
2010-2020	-0.4%	-0.8%	-0.5%
2015-2020	-0.6%	-1.4%	-0.7%
2020-2025	0.8%	1.2%	0.9%
2020-2030	0.5%	0.6%	0.5%
2020-2040	0.1%	0.3%	0.2%
2020-2050	0.0%	0.2%	0.0%
2021-2050	-0.1%	0.0%	-0.1%

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

Retail Energy Forecasts (MWh) - CIP Scenario
NMPA

	MN Base Retail	CIP Requirement	Adjusted Retail
<u>Year</u>	<u>Forecast /1</u>	<u>Forecast /2</u>	<u>Forecast /3</u>
1996	337,662	-	337,662
1997	334,375	-	334,375
1998	326,296	-	326,296
1999	335,957	-	335,957
2000	337,253	-	337,253
2001	351,543	-	351,543
2002	363,281	-	363,281
2003	361,865	-	361,865
2004	367,138	-	367,138
2005	369,726	-	369,726
2006	376,121	-	376,121
2007	380,716	-	380,716
2008	382,398	-	382,398
2009	376,990	548	377,537
2010	369,458	1,956	371,414
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	367,069	12,322	379,390
2016	360,639	15,844	376,484
2017	354,099	18,843	372,942
2018	364,902	22,697	387,600
2019	358,888	24,740	383,628
2020	356,419	25,771	382,190
2021	365,204	26,026	391,230
2022	367,333	26,284	393,617
2023	369,128	26,545	395,673
2024	370,642	26,808	397,450
2025	371,809	27,074	398,883
2026	372,724	27,342	400,066
2027	373,451	27,613	401,064
2028	373,953	27,887	401,840
2029	374,104	28,163	402,268
2030	374,119	28,443	402,562
2031	373,915	28,725	402,640
2032	373,530	29,010	402,540
2033	372,943	29,297	402,241
2034	372,232	29,588	401,820
2035	371,347	29,882	401,229
2036	370,425	30,178	400,603
2037	369,372	30,478	399,850
2038	368,279	30,780	399,059
2039	367,017	31,085	398,102
2040	365,748	31,394	397,142
2041	364,539	31,705	396,245
2042	363,465	32,020	395,485
2043	362,415	32,338	394,753
2044	361,489	32,659	394,148
2045	360,512	32,983	393,496
2046	359,599	33,311	392,910
2047	358,815	33,642	392,457
2048	358,082	33,976	392,058
2049	357,496	34,313	391,810
2050	357,088	34,654	391,742

Average Annual Growth Rates

2005-2020	-0.2%	--	0.2%
2010-2020	-0.4%	29.4%	0.3%
2015-2020	-0.6%	15.9%	0.1%
2020-2025	0.8%	1.0%	0.9%
2020-2030	0.5%	1.0%	0.5%
2020-2040	0.1%	1.0%	0.2%
2020-2050	0.0%	1.0%	0.1%
2021-2050	-0.1%	1.0%	0.0%

/1 Base-case load forecast - member system retail sales - INCLUD

/2 Annual reduction - 1.5% reduction in 3-Yr moving average for CIF

Only MN munis adjusted

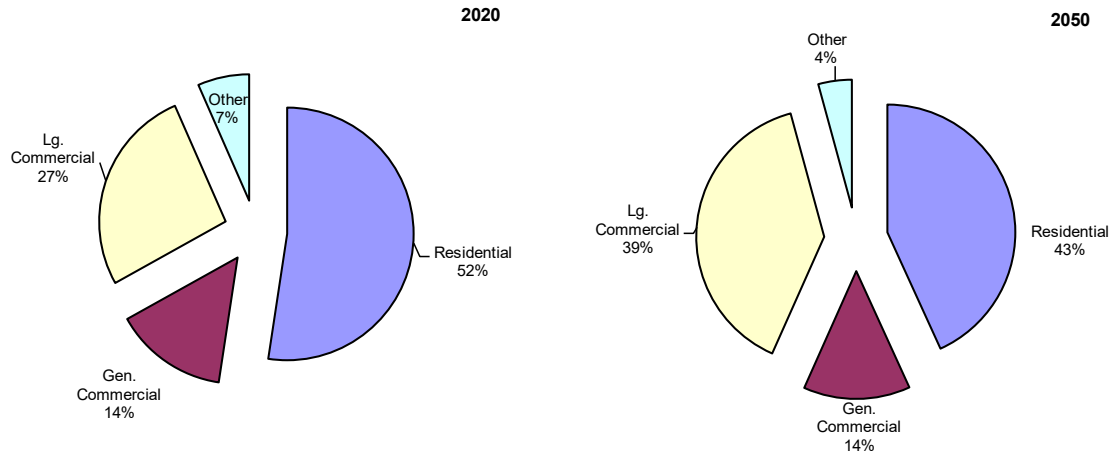
/3 Forecast EXCLUDES CIP requirement

APPENDIX G

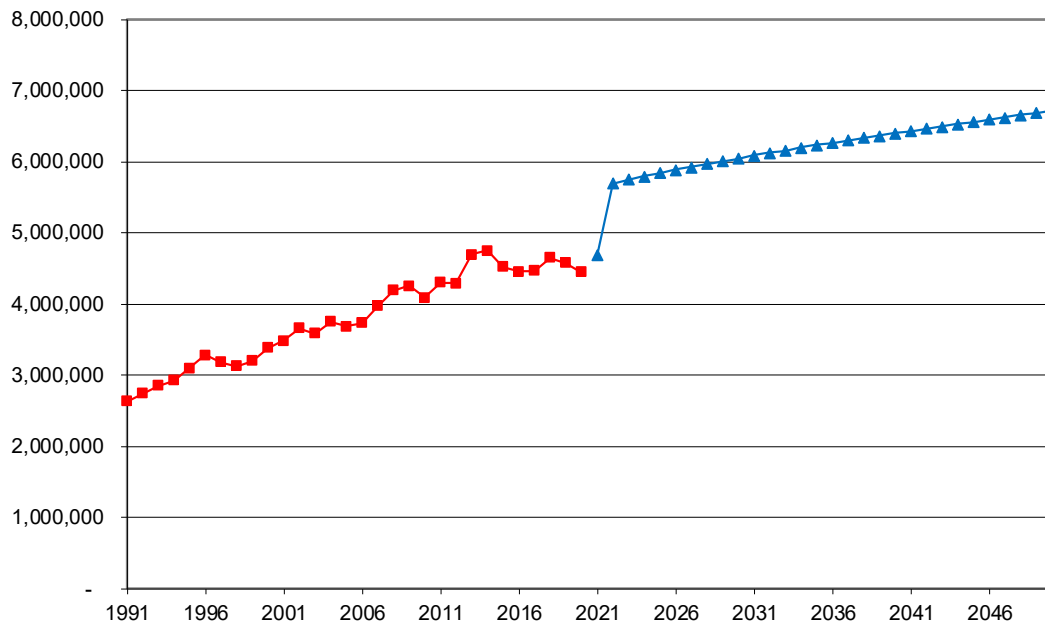
EXECUTIVE SUMMARY TABLES ADJUSTED INTERRUPTIBLE DATA MINING / PROCESSING LOADS INCLUDED

The following adjusted charts and tables present the Executive Summary exhibits with the projected impact of Minnkota's interruptible data mining/processing loads. Reporting requirements differ between RUS, MISO, and member systems and the municipal systems (NMPA) therefore both sets of tables are needed. The NERC Addendum (LFS with modifying resources) is used for MISO and Module E reporting, therefore the NERC Addendum will reference the charts below.

Member System Forecast Summary Minnkota Power Cooperative, Inc.



Joint System Energy Requirements MWh



Energy Requirements Forecast By Member (MWh)
Minnkota Power Cooperative, Inc.

											Total
		Cass		Clearwater-		North		Red	Red	Wild	Member
Year	Beltrami	County	Cavalier	Polk	Nodak	Star	PKM	Lake	River	Roseau	Req.
1991	294,866	399,608	39,514	54,506	561,108	80,702	85,779	100,922	112,398	120,133	2,018,791
1992	306,013	391,512	40,335	53,646	558,385	81,325	88,381	98,440	109,170	121,723	2,017,999
1993	322,062	431,930	40,907	57,789	594,490	86,892	94,150	106,161	118,693	128,905	2,160,868
1994	333,536	464,539	40,085	59,361	598,372	89,084	99,786	106,544	119,141	134,473	2,228,292
1995	352,961	502,471	40,696	61,879	628,078	93,675	103,413	110,693	122,331	145,104	2,352,345
1996	378,510	550,901	41,070	65,726	640,632	100,078	110,497	116,287	126,950	154,416	2,488,710
1997	384,747	553,030	37,193	66,044	619,448	100,839	102,688	114,331	121,708	152,173	2,456,133
1998	377,632	537,927	32,600	62,827	590,096	95,999	97,756	104,594	112,298	144,035	2,347,968
1999	395,283	572,812	33,954	66,447	610,216	104,452	104,877	108,974	115,022	154,154	2,473,174
2000	411,569	610,225	32,379	68,638	623,603	109,263	93,411	112,993	117,016	160,945	2,553,456
2001	427,237	654,036	33,298	70,067	678,700	112,640	90,959	118,076	121,228	164,235	2,692,024
2002	458,920	707,947	37,225	75,737	706,885	122,854	97,837	125,412	126,812	170,860	2,865,734
2003	453,842	718,517	35,829	76,592	704,943	122,528	95,717	122,986	125,015	169,222	2,860,849
2004	464,628	741,507	38,786	77,027	720,035	127,225	102,226	123,199	125,647	171,558	2,930,437
2005	469,637	795,002	35,828	77,629	725,239	123,366	98,303	124,619	128,778	170,226	2,997,936
2006	484,203	836,459	33,225	77,409	771,270	120,936	93,702	122,779	124,575	164,782	3,080,882
2007	491,058	896,303	36,903	80,381	835,138	124,873	105,739	129,957	132,558	170,049	3,269,300
2008	511,081	972,275	40,891	85,984	864,134	130,098	109,149	141,707	141,008	179,033	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	3,518,967
2010	473,732	988,915	41,023	79,963	885,889	117,026	112,104	137,927	145,475	165,930	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	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	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	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	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	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	3,812,156
2017	492,441	1,251,903	34,196	75,987	1,146,820	112,623	125,715	133,343	124,513	156,203	3,930,838
2018	518,275	1,314,627	34,533	79,848	1,189,348	117,725	127,252	133,343	130,757	158,903	4,094,992
2019	513,068	1,328,581	35,474	80,490	1,162,299	118,463	125,715	135,768	131,002	160,728	4,080,720
2020	498,648	1,298,488	38,572	77,210	1,102,733	113,289	124,760	127,360	125,849	157,076	3,945,098
2021	507,167	1,365,389	38,329	79,555	1,230,659	115,227	128,408	131,572	128,309	155,918	4,167,766
2022	509,997	1,412,416	38,422	79,374	1,254,761	116,331	129,385	132,780	130,583	158,653	5,160,390
2023	513,259	1,444,548	38,533	80,234	1,263,659	117,358	130,293	133,777	132,303	159,347	5,214,683
2024	516,366	1,466,903	38,759	81,344	1,270,345	118,344	131,090	136,782	134,527	160,014	5,257,221
2025	520,395	1,489,109	38,958	82,023	1,280,221	119,835	131,783	137,514	135,815	160,850	5,300,548
2026	523,779	1,514,283	39,043	82,631	1,287,163	118,971	132,310	138,181	136,756	161,488	5,340,368
2027	526,658	1,536,215	39,356	84,495	1,294,142	118,816	132,922	138,748	138,086	162,321	5,379,268
2028	530,221	1,558,020	39,680	85,196	1,293,955	118,612	133,537	139,261	139,452	163,369	5,421,555
2029	532,576	1,582,812	39,915	86,387	1,291,908	119,102	134,222	139,667	141,861	164,157	5,463,452
2030	534,778	1,604,380	40,118	86,974	1,291,917	120,090	134,605	140,032	142,884	164,869	5,499,880
2031	536,860	1,625,837	40,256	87,793	1,292,639	120,520	134,927	140,513	143,867	165,473	5,538,230
2032	538,823	1,650,295	40,359	88,266	1,294,007	120,918	135,052	140,967	145,667	166,185	5,576,228
2033	540,676	1,671,540	40,422	88,721	1,294,382	121,284	135,123	141,349	146,357	166,522	5,609,135
2034	542,443	1,692,685	40,469	89,164	1,294,891	121,617	135,147	143,845	147,033	166,837	5,646,875
2035	544,135	1,716,841	40,532	90,674	1,295,358	122,464	135,105	144,158	148,730	168,153	5,685,823
2036	545,775	1,737,795	40,627	91,102	1,296,362	122,710	135,199	144,064	149,210	168,606	5,717,994
2037	547,366	1,758,659	40,740	91,516	1,297,108	122,934	135,277	143,916	149,883	168,791	5,752,563
2038	549,949	1,782,546	40,827	91,921	1,297,855	123,130	135,366	143,769	151,408	168,972	5,788,891
2039	551,424	1,803,239	40,918	92,315	1,298,665	123,304	135,386	143,566	151,766	169,106	5,819,563
2040	552,870	1,823,850	41,022	92,712	1,299,765	124,003	135,418	143,373	152,174	169,238	5,854,008
2041	554,370	1,847,491	41,110	93,119	1,302,961	124,160	135,435	143,169	153,570	169,575	5,888,283
2042	555,937	1,867,949	41,222	93,545	1,309,213	124,338	135,478	143,017	154,010	169,700	5,918,512
2043	557,573	1,888,336	41,311	93,985	1,318,555	124,508	135,566	142,853	154,639	169,821	5,952,077
2044	559,243	1,911,764	41,426	94,435	1,325,179	124,692	135,600	142,725	156,082	170,017	5,986,943
2045	560,919	1,932,021	41,518	94,879	1,331,388	125,375	135,644	142,576	156,484	170,152	6,017,593
2046	562,610	1,952,220	41,612	95,330	1,340,756	125,531	135,699	142,459	156,897	170,515	6,051,131
2047	564,367	1,972,366	41,730	95,803	1,347,005	125,695	135,753	142,350	158,427	170,703	6,082,641
2048	566,223	1,992,465	41,830	96,289	1,353,265	125,853	135,825	142,289	158,948	170,939	6,113,372
2049	568,174	2,012,524	41,954	96,797	1,362,589	126,042	135,947	142,238	159,535	171,194	6,147,521
2050	570,190	2,032,546	42,059	97,322	1,368,832	126,225	136,069	142,246	160,953	171,459	6,179,566

Average Annual Growth Rates

1991-2020	1.8%	4.1%	-0.1%	1.2%	2.4%	1.2%	1.3%	0.8%	0.4%	0.9%	1.8%	2.3%
2005-2020	0.4%	3.3%	0.5%	0.0%	2.8%	-0.6%	1.6%	0.1%	-0.2%	-0.5%	0.8%	1.8%
2010-2020	0.5%	2.8%	-0.6%	-0.3%	2.2%	-0.3%	1.1%	-0.8%	-1.4%	-0.5%	0.1%	1.4%
2015-2020	0.6%	1.9%	1.4%	0.4%	-0.2%	-0.6%	-0.7%	-0.9%	-0.9%	-1.2%	0.3%	0.5%
2020-2025	0.9%	2.8%	0.2%	1.2%	14.6%	1.1%	1.1%	1.5%	1.5%	0.5%	1.6%	6.1%
2020-2030	0.7%	2.1%	0.4%	1.2%	7.2%	0.6%	0.8%	1.0%	1.3%	0.5%	1.1%	3.4%
2020-2040	0.5%	1.7%	0.3%	0.9%	3.7%	0.5%	0.4%	0.6%	1.0%	0.4%	0.7%	2.0%
2020-2050	0.4%	1.5%	0.3%	0.8%	2.6%	0.4%	0.3%	0.4%	0.8%	0.3%	0.6%	1.5%
2021-2050	0.4%	1.4%	0.3%	0.7%	2.3%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	1.4%

Wholesale Sales To Member Systems and NMPA (MWh)

Joint System /1

Year	Beltrami	Cass	Clearwater-	Polk	Nodak	North	PKM	Red	Red	Roseau	Wild	CAFS /2	Minnkota	NMPA	Joint
		County	Cavalier			Star		Lake	River		Rice		Sales	Sales	System
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	372,491	2,412,776
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	363,032	2,428,415
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	382,175	2,591,671
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	372,754	2,651,387
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	391,546	2,792,258
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	407,465	2,943,577
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	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	492,441	1,251,903	34,196	75,987	1,146,820	112,623	125,715	133,343	124,513	156,203	277,094	-	3,930,838	442,681	4,373,519
2018	518,275	1,314,627	34,533	79,848	1,189,348	117,725	127,252	133,343	130,757	158,903	290,381	-	4,094,992	452,702	4,547,694
2019	513,068	1,328,581	35,474	80,490	1,162,299	118,463	125,715	135,768	131,002	160,728	289,131	-	4,080,720	446,011	4,526,731
2020	498,648	1,298,488	38,572	77,210	1,102,733	113,289	124,760	127,360	125,849	157,076	281,113	-	3,945,098	440,546	4,385,644
2021	507,167	1,365,389	38,329	79,555	1,230,659	115,227	128,408	131,572	128,309	155,918	287,234	-	4,167,766	453,530	4,621,296
2022	509,997	1,412,416	38,422	79,374	2,154,761	116,331	129,385	132,780	130,583	158,653	297,687	-	5,160,390	455,650	5,616,040
2023	513,259	1,444,548	38,533	80,234	2,163,659	117,358	130,293	133,777	132,303	159,347	301,373	-	5,214,683	457,454	5,672,137
2024	516,366	1,466,903	38,759	81,344	2,170,345	118,344	131,090	136,782	134,527	160,014	302,746	-	5,257,221	458,973	5,716,194
2025	520,395	1,489,109	38,958	82,023	2,180,221	119,835	131,783	137,514	135,815	160,850	304,045	-	5,300,548	460,146	5,760,695
2026	523,779	1,514,283	39,043	82,631	2,187,163	118,971	132,310	138,181	136,756	161,488	305,762	-	5,340,368	461,062	5,801,430
2027	526,658	1,536,215	39,356	84,495	2,194,142	118,816	132,922	138,748	138,086	162,321	307,510	-	5,379,268	461,793	5,841,061
2028	530,221	1,558,020	39,680	85,196	2,203,955	118,612	133,537	139,261	139,452	163,369	310,253	-	5,421,555	462,293	5,883,848
2029	532,576	1,582,812	39,915	86,387	2,210,908	119,102	134,222	139,667	141,861	164,157	311,846	-	5,463,452	462,442	5,925,894
2030	534,778	1,604,380	40,118	86,974	2,217,917	120,090	134,605	140,032	142,884	164,869	313,232	-	5,499,880	462,451	5,962,331
2031	536,860	1,625,837	40,256	87,793	2,227,639	120,520	134,927	140,513	143,867	165,473	314,546	-	5,538,230	462,247	6,000,477
2032	538,823	1,650,295	40,359	88,266	2,234,007	120,918	135,052	140,967	145,667	166,185	315,689	-	5,576,228	461,852	6,038,080
2033	540,676	1,671,540	40,422	88,721	2,240,382	121,284	135,123	141,349	146,357	166,522	316,759	-	5,609,135	461,261	6,070,396
2034	542,443	1,692,685	40,469	89,164	2,249,891	121,617	135,147	143,845	147,033	166,837	317,745	-	5,646,875	460,539	6,107,414
2035	544,135	1,716,841	40,532	90,674	2,256,358	122,464	135,105	144,158	148,730	168,153	318,674	-	5,685,823	459,645	6,145,468
2036	545,775	1,737,795	40,627	91,102	2,263,362	122,710	135,199	144,064	149,210	168,606	319,545	-	5,717,994	458,713	6,176,707
2037	547,366	1,758,659	40,740	91,516	2,273,108	122,934	135,277	143,916	149,883	168,791	320,373	-	5,752,563	457,652	6,210,215
2038	549,949	1,782,546	40,827	91,921	2,279,855	123,130	135,366	143,769	151,408	168,972	321,147	-	5,788,891	456,548	6,245,438
2039	551,424	1,803,239	40,918	92,315	2,286,665	123,304	135,386	143,566	151,766	169,106	321,876	-	5,819,563	455,277	6,274,841
2040	552,870	1,823,850	41,022	92,712	2,296,765	124,003	135,418	143,373	152,174	169,238	322,583	-	5,854,008	453,996	6,308,004
2041	554,370	1,847,491	41,110	93,119	2,302,961	124,160	135,435	143,169	153,570	169,575	323,322	-	5,888,283	452,778	6,341,061
2042	555,937	1,867,949	41,222	93,545	2,309,213	124,338	135,478	143,017	154,010	169,700	324,103	-	5,918,512	451,693	6,370,204
2043	557,573	1,888,336	41,311	93,985	2,318,555	124,508	135,566	142,853	154,639	169,821	324,930	-	5,952,077	450,634	6,402,711
2044	559,243	1,911,764	41,426	94,435	2,325,179	124,692	135,600	142,725	156,082	170,017	325,781	-	5,986,943	449,701	6,436,644
2045	560,919	1,932,021	41,518	94,879	2,331,388	125,375	135,644	142,576	156,484	170,152	326,637	-	6,017,593	448,716	6,466,309
2046	562,610	1,952,220	41,612	95,330	2,340,756	125,531	135,699	142,459	156,897	170,515	327,505	-	6,051,131	447,797	6,498,928
2047	564,367	1,972,366	41,730	95,803	2,347,005	125,695	135,753	142,350	158,427	170,703	328,443	-	6,082,641	447,005	6,529,646
2048	566,223	1,992,465	41,830	96,289	2,353,265	125,853	135,825	142,289	158,948	170,939	329,446	-	6,113,372	446,266	6,559,638
2049	568,174	2,012,524	41,954	96,797	2,362,589	126,042	135,947	142,238	159,535	171,194	330,528	-	6,147,521	445,677	6,593,198
2050	570,190	2,032,546	42,059	97,322	2,368,832	126,225	136,069	142,246	160,953	171,459	331,664	-	6,179,566	445,265	6,624,831

Average Annual Growth Rates

1991-2020	1.8%	4.1%	-0.1%	1.2%	2.4%	1.2%	1.3%	0.8%	0.4%	0.9%	1.8%	-100.0%	2.3%	0.6%	2.1%
2005-2020	0.4%	3.3%	0.5%	0.0%	2.8%	-0.6%	1.6%	0.1%	-0.2%	-0.5%	0.8%	-100.0%	1.8%	-0.6%	1.5%
2010-2020	0.5%	2.8%	-0.6%	-0.3%	2.2%	-0.3%	1.1%	-0.8%	-1.4%	-0.5%	0.1%	--	1.4%	-0.5%	1.2%
2015-2020	0.6%	1.9%	1.4%	0.4%	-0.2%	-0.6%	-0.7%	-0.9%	-0.9%	-1.2%	0.3%	--	0.5%	-0.7%	0.4%
2020-2025	0.9%	2.8%	0.2%	1.2%	14.6%	1.1%	1.1%	1.5%	1.5%	0.5%	1.6%	--	6.1%	0.9%	5.6%
2020-2030	0.7%	2.1%	0.4%	1.2%	7.2%	0.6%	0.8%	1.0%	1.3%	0.5%	1.1%	--	3.4%	0.5%	3.1%
2020-2040	0.5%	1.7%	0.3%	0.9%	3.7%	0.5%	0.4%	0.6%	1.0%	0.4%	0.7%	--	2.0%	0.2%	1.8%
2020-2050	0.4%	1.5%	0.3%	0.8%	2.6%	0.4%	0.3%	0.4%	0.8%	0.3%	0.6%	--	1.5%	0.0%	1.4%
2021-2050	0.4%	1.4%	0.3%	0.7%	2.3%	0.3%	0.2%	0.3%	0.8%	0.3%	0.5%	--	1.4%	-0.1%	1.2%

Joint System Energy Requirements
MWh

<u>Year</u>	<u>Total Member Energy Requirements</u>	<u>Minnkota Losses</u>	<u>CAFS</u>	<u>Minnkota Total Requirements</u>	<u>NMPA Energy Requirements</u>	<u>Joint System Energy Requirements</u>
1991	2,018,791	216,791	21,494	2,257,076	372,491	2,629,567
1992	2,017,999	315,258	47,384	2,380,641	363,032	2,743,673
1993	2,160,868	257,865	48,628	2,467,361	382,175	2,849,536
1994	2,228,292	268,455	50,341	2,547,088	372,754	2,919,842
1995	2,352,345	300,501	48,367	2,701,213	391,546	3,092,759
1996	2,488,710	335,722	47,402	2,871,834	407,465	3,279,299
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	3,930,838	87,064 /3	-	4,017,902	442,681	4,460,583
2018	4,094,992	101,136	-	4,196,128	452,702	4,648,830
2019	4,080,720	49,062	-	4,129,782	446,011	4,575,793
2020	3,945,098	56,406	-	4,001,504	440,546	4,442,050
2021	4,167,766	63,469	-	4,231,234	453,530	4,684,765
2022	5,160,390	78,585	-	5,238,974	455,650	5,694,625
2023	5,214,683	79,411	-	5,294,095	457,454	5,751,549
2024	5,257,221	80,059	-	5,337,281	458,973	5,796,253
2025	5,300,548	80,719	-	5,381,267	460,146	5,841,414
2026	5,340,368	81,325	-	5,421,693	461,062	5,882,755
2027	5,379,268	81,918	-	5,461,186	461,793	5,922,979
2028	5,421,555	82,562	-	5,504,117	462,293	5,966,410
2029	5,463,452	83,200	-	5,546,652	462,442	6,009,094
2030	5,499,880	83,755	-	5,583,635	462,451	6,046,086
2031	5,538,230	84,339	-	5,622,569	462,247	6,084,816
2032	5,576,228	84,917	-	5,661,145	461,852	6,122,997
2033	5,609,135	85,418	-	5,694,553	461,261	6,155,814
2034	5,646,875	85,993	-	5,732,868	460,539	6,193,407
2035	5,685,823	86,586	-	5,772,409	459,645	6,232,054
2036	5,717,994	87,076	-	5,805,070	458,713	6,263,783
2037	5,752,563	87,602	-	5,840,165	457,652	6,297,817
2038	5,788,891	88,156	-	5,877,046	456,548	6,333,594
2039	5,819,563	88,623	-	5,908,186	455,277	6,363,463
2040	5,854,008	89,147	-	5,943,156	453,996	6,397,152
2041	5,888,283	89,669	-	5,977,952	452,778	6,430,730
2042	5,918,512	90,130	-	6,008,641	451,693	6,460,334
2043	5,952,077	90,641	-	6,042,718	450,634	6,493,351
2044	5,986,943	91,172	-	6,078,115	449,701	6,527,816
2045	6,017,593	91,638	-	6,109,231	448,716	6,557,947
2046	6,051,131	92,149	-	6,143,281	447,797	6,591,077
2047	6,082,641	92,629	-	6,175,270	447,005	6,622,275
2048	6,113,372	93,097	-	6,206,469	446,266	6,652,735
2049	6,147,521	93,617	-	6,241,138	445,677	6,686,815
2050	6,179,566	94,105	-	6,273,671	445,265	6,718,936

Average Annual Growth Rates

1991-2020	2.3%	-4.5%	-100.0%	2.0%	0.6%	1.8%
2005-2020	1.8%	-7.1%	-100.0%	1.5%	-0.6%	1.3%
2010-2020	1.4%	-11.9%	--	1.0%	-0.5%	0.8%
2015-2020	0.5%	-23.5%	--	-0.3%	-0.7%	-0.3%
2020-2025	6.1%	7.4%	--	6.1%	0.9%	5.6%
2020-2030	3.4%	4.0%	--	3.4%	0.5%	3.1%
2020-2040	2.0%	2.3%	--	2.0%	0.2%	1.8%
2020-2050	1.5%	1.7%	--	1.5%	0.0%	1.4%
2021-2050	1.4%	1.4%	--	1.4%	-0.1%	1.3%

/1 Losses reduced due to calculation adjustment - future loss % set at 1.5%

/2 Transferred to Nodak starting in 2006

/3 MPC HQ now served by Nodak

Joint System Peak Demand
MW

<u>Year</u>	<u>Winter Peak Demand</u>	<u>Summer Peak Demand</u>	<u>Annual Peak Demand</u>	<u>Load Factor %</u>
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	853	646	853	60%
2018	895	646	895	59%
2019	908	647	908	58%
2020	848	691	848	60%
2021	970	753	970	55%
2022	1,100	904	1,100	59%
2023	1,109	911	1,109	59%
2024	1,116	917	1,116	59%
2025	1,122	923	1,122	59%
2026	1,129	929	1,129	59%
2027	1,135	934	1,135	60%
2028	1,142	940	1,142	60%
2029	1,148	946	1,148	60%
2030	1,153	951	1,153	60%
2031	1,159	956	1,159	60%
2032	1,164	961	1,164	60%
2033	1,169	965	1,169	60%
2034	1,174	970	1,174	60%
2035	1,180	975	1,180	60%
2036	1,184	979	1,184	60%
2037	1,189	984	1,189	60%
2038	1,194	988	1,194	61%
2039	1,199	992	1,199	61%
2040	1,203	997	1,203	61%
2041	1,208	1,001	1,208	61%
2042	1,212	1,005	1,212	61%
2043	1,217	1,009	1,217	61%
2044	1,222	1,014	1,222	61%
2045	1,226	1,018	1,226	61%
2046	1,231	1,022	1,231	61%
2047	1,236	1,026	1,236	61%
2048	1,240	1,030	1,240	61%
2049	1,245	1,034	1,245	61%
2050	1,249	1,038	1,249	61%

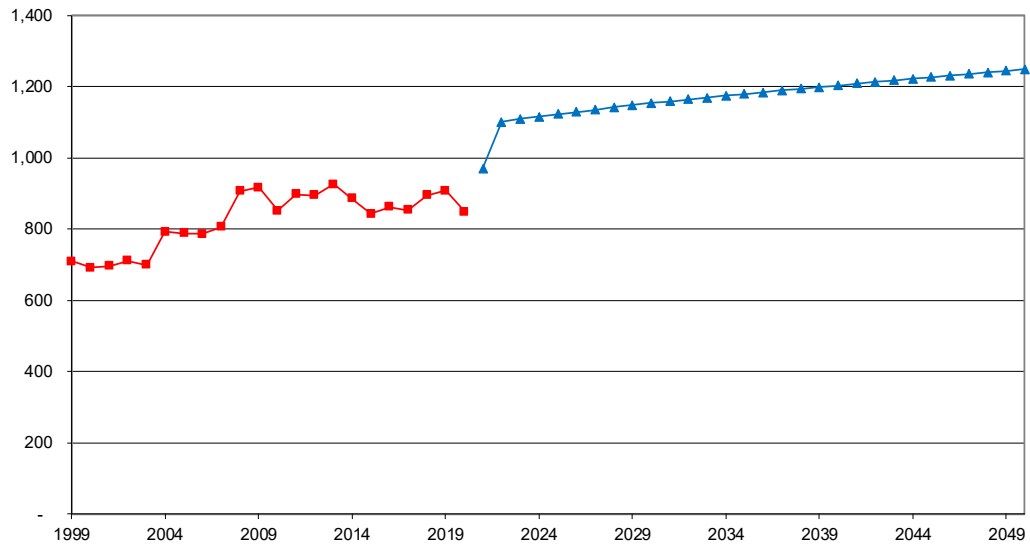
Average Annual Growth Rates

2005-2020	0.5%	2.4%	0.5%
2010-2020	0.0%	1.9%	0.0%
2015-2020	0.1%	1.9%	0.1%
2020-2025	5.8%	6.0%	5.8%
2020-2030	3.1%	3.2%	3.1%
2020-2040	1.8%	1.8%	1.8%
2020-2050	1.3%	1.4%	1.3%
2021-2050	0.9%	1.1%	0.9%

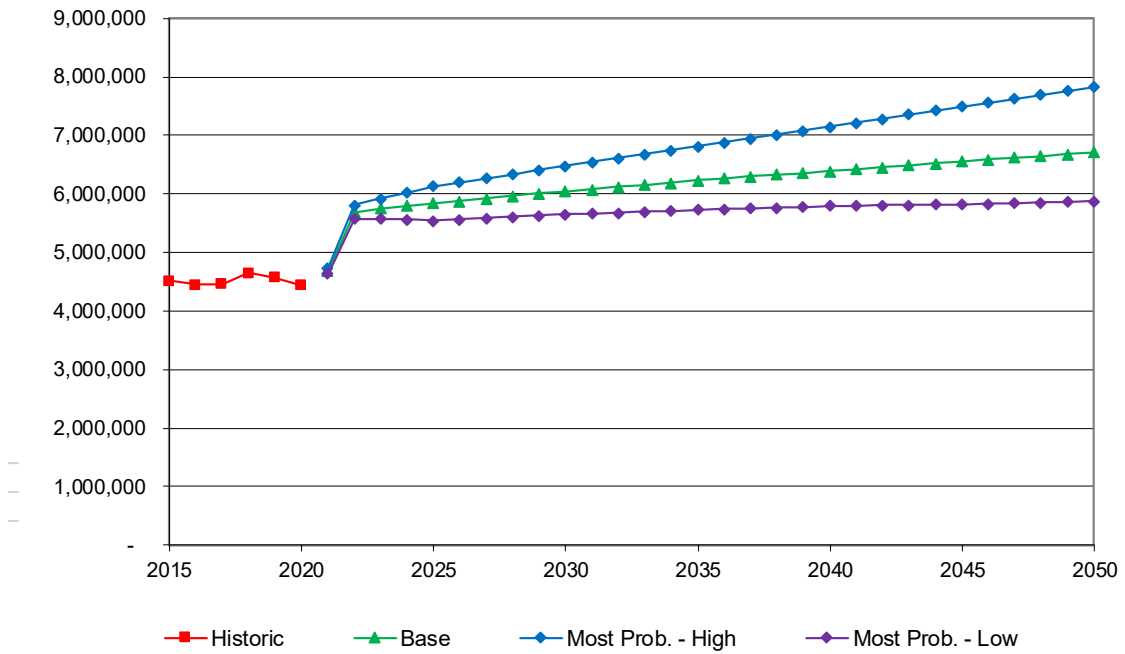
Old Approach: Based on MAPP Form 3 Peak with WAPA allocations

Current Method (2014 on): MPC Sum (aggregation of MPC billing meters)

Joint System Peak Demand (Winter)
MW



Joint System Forecast - Most Probable Ranges
MWh



APPENDIX H

Governing Boards' Resolutions

Approving IRP

Exhibit C

**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 2022 Integrated Resource Plan (IRP) with Minnkota personnel, does hereby approve the said IRP.

CERTIFICATION OF SECRETARY

I, Murl Nord, Secretary of the Beltrami Electric Cooperative, Inc., 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 its meeting, at which a quorum was present, held on May 23, 2022 and that said Resolution now appears in the records of the Minute Book without changes or alterations.

-SEAL-

BY:


Murl Nord, Secretary

Resolution No. 22-04-04

**RESOLUTION
CASS COUNTY ELECTRIC COOPERATIVE INC.
APPROVAL OF 2022 INTEGRATED RESOURCE PLAN**

WHEREAS, the 2022 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, TERRY KRATT, 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 26th day of April 2022 at which meeting a quorum was present.

SEAL


Secretary

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 2022 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 25th day of April 2022 at which a quorum was present.

IN WITNESS WHEREOF, I have subscribed my name to this document on April 25, 2022.



Steve Hart, Secretary

RESOLUTION

BE IT RESOLVED that the Board of Directors of Clearwater-Polk Electric Cooperative, Inc., after discussion and review of the Joint System 2022 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve said IRP.

CERTIFICATION

I, Kimberly Solberg, 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 27th day of April 2022, at which a quorum was present and that the above portion of the minutes has not been modified or rescinded.



Signature of the Secretary



Date

MINNKOTA POWER COOPERATIVE, INC.
GRAND FORKS, NORTH DAKOTA

RESOLUTION NO. 3653

WHEREAS, Minnkota Power Cooperative, Inc. (Minnkota) is required to submit an Integrated Resource Plan (IRP) to the Minnesota Public Utilities Commission by July 1, 2022, on behalf of itself and Northern Municipal Power Agency (Northern).

WHEREAS, there has been full public participation in and specific approval of the 2022 IRP by Minnkota's Class A Member Cooperatives and Northern.

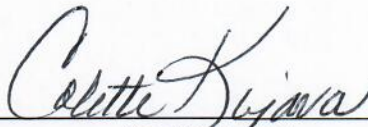
WHEREAS, Minnkota's Board of Directors has reviewed the IRP and the process by which it has been developed.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of Minnkota Power Cooperative, Inc., does hereby approve the 2022 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 26th day of May, 2022, 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 26th day of May, 2022.


Secretary

SEAL

RESOLUTION

WHEREAS, The 2022 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 Chris West and seconded by Dan Trosen, it was:

RESOLVED, That the Board of Directors of Northern Municipal Power Agency does hereby approve the IRP as presented at the April 20, 2022 Board Meeting.

**NODAK ELECTRIC COOPERATIVE, INC.
Grand Forks, North Dakota**

RESOLUTION No. 1742

**NODAK ELECTRIC COOPERATIVE, INC.
APPROVAL OF 2022 INTEGRATED RESOURCE PLAN**

WHEREAS, the 2022 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 Brag, 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 June 7, 2022. 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 June 2022.

David Brag

David Brag, Secretary/Treasurer

(Seal)



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

2022 INTEGRATED RESOURCE PLAN RESOLUTION

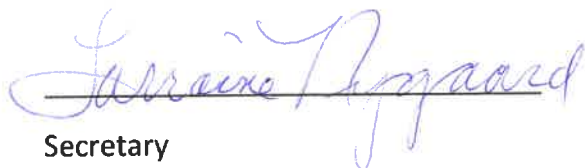
WHEREAS, the 2022 Integrated Resource Plan (IRP) has been prepared for the Joint System by Minnkota Power Cooperative, Inc. and

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


Secretary

3-30-22
Date


Chairman

3-30-22
Date





P.O. Box 108
406 North Minnesota Street
Warren, MN 56762-0108

RESOLUTION

“WHEREAS, the 2022 Integrated Resource Plan (IRP) has been prepared for the Joint System of 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 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 April 26, 2022, 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 26th day of April 2022.


Wayne Malm
Secretary/Treasurer

Corporate Seal



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 25th day of May, 2022, that the Board of Directors of Red Lake Electric Cooperative, after discussion and review of the Joint System 2022 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said IRP.

Signed:

Mark Hanson Board Secretary
Mark Hanson

Witnessed:

Stacy Blawat Board President
Stacy Blawat



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, Paul Baukol, 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 Monday, April 25, 2022, 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 25th day of April, 2022.

4/25/2022

(Date)

Paul M Baukol

Paul Baukol, Secretary/Treasurer
Red River Valley Cooperative Power Association

ROSEAU ELECTRIC COOPERATIVE, INC
BOARD RESOLUTION
APPROVING THE JOINT SYSTEM 2022 INTEGRATED RESOURCE PLAN

BE IT RESOLVED that the Board of Directors of Roseau Electric Cooperative, Inc., after discussion and review of the Joint System 2022 Integrated Resource Plan (IRP) with Minnkota staff personnel, does hereby approve the said IRP.

CERTIFICATE OF SECRETARY-TREASURER

I, Mike Wahl, 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 27th day of April, 2022, 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 27 day of April, 2022.

(Seal)


(Signature of Secretary-Treasurer)



502 North Main
PO Box 438
Mahnomen, MN 56557-0438
Telephone: (800) 244-5709
FAX: (218) 935-2519

**WILD RICE ELECTRIC COOPERATIVE, INC.
MAHNOMEN, MINNESOTA**

RESOLUTION

WHEREAS, the 2022 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 31st day of May, 2022, at which meeting a quorum was present.

Mark Habedank, Secretary

SEAL



Minnkota Power
COOPERATIVE

A Touchstone Energy® Cooperative



April 1, 2022 to April 1, 2023

Minnkota Wholesale Power Rate Schedule

**PUBLIC DOCUMENT – TRADE SECRET DATA HAS BEEN
EXCISED**

**Minnkota Power Cooperative, Inc.
Grand Forks, North Dakota**

April 1, 2022

[TRADE SECRET DATA BEGINS....]

[...TRADE SECRET DATA ENDS]