MONTANA-DAKOTA UTILITIES CO.

Before the Public Service Commission of North Dakota

Case No. PU-22-194

Rebuttal Testimony
of
Darcy J. Neigum

Q. Would you please state your name and business address?

A. Yes. My name is Darcy J. Neigum and my business address is 400 North Fourth Street, Bismarck, North Dakota 58501.

Q. By whom are you employed and in what capacity?

A. I am the Director of System Operations and Planning for Montana-Dakota Utilities Co. (Montana-Dakota).

Q. Are you the same Darcy J. Neigum who filed direct testimony earlier in this proceeding?

A. Yes, I am.

Q. What is the purpose of your rebuttal testimony in this proceeding?

A. I am responding to the testimony submitted by Dr. Marie Fagan, London Economics International LLC, on behalf of the North Dakota Public Service Commission Advocacy Staff, regarding comments of Montana-Dakota's lack of detailed support regarding the Company's load and energy forecasts.

Q. What process does Montana-Dakota use to develop its long-term electric sales and demand forecasts?

A. Montana-Dakota uses econometric modeling for its twenty-year forecast of energy sales and demand and forecasts its energy sales separate from its demand. The econometric models are developed using the statistical software package SAS®.

An econometric model is a set of equations that expresses electricity use as a function of underlying factors such as income, price of electricity and alternate fuels, and weather.

Montana-Dakota develops individual sales forecasts for each state by customer class, which are combined for an overall Integrated System sales forecast.

System demand forecasts are developed on an overall Integrated System basis and then allocated back to the individual states.

Q. How often does Montana-Dakota update is long-term energy sales and demand forecast?

A. Annually.

Q. Did Montana-Dakota makes any changes to the methodology used to develop its energy sales and demand forecast from prior years?

A. No.

Q. Did Dr. Fagan ask for a copy of the report Montana-Dakota used to prepare the 2022-2041 Electric Load Forecast?

A. No.

Q. What data requests did Dr. Fagan ask about the Company's Electric Load Forecast.

A. Dr. Fagan asked for the following information regarding the Company's electric load forecast:

1. Copies of the load forecast summaries used in the Company's 2017 and 2019 Integrated Resource Plan.

2. Copy of the annual North Dakota energy and load forecasts used in the Company's rate case filing (Case No. PU-16-666) through at least 2026.

3. Results of all econometric models including measures of fit and Durbin-Watson statistic for every model used in the sales forecast as referenced on page 3, at lines 8-9 of the Prefiled Direct Testimony of Darcy Neigum which dealt with the grow rates of the Company's demand forecast.

4. Confirmation of the Company's future electric sales forecast growth rate referenced in the Prefiled Director Testimony of Darcy Neigum.

5. Breakdown of sales growth for the period 2015-2022.

Q. Did the Company provide answers to all of Dr. Fagan's data requests?

A. Yes.

Q. Did Dr. Fagan ask any follow-up questions regarding the responses to the data requests regarding the Company's load forecast?

A. No.

Q. Can you provide a copy of the Company's 2022-2041 Electric Load Forecast?

A. Yes, see Exhibit No. DJN-1 for the Electric Load Forecast 2022-2041.pdf.

Q. Does the Electric Load Forecast 2022-2041 describe the econometric process the Company utilizes to develop its energy and load forecast?

A. Yes, please see pages 45 through 52 for a description of that process.

Q. Can you provide the results of all econometric models including measures of fit and Durbin-Watson statistic for every model used in the development of the North Dakota electric sales forecast?

A. ND Residential Sales forecast:

. ND-Use Per Customer (UPC) was set at 9800 kWh.

. See Exhibit No. DJN-2 for the ND-ResAvgCustomerFCST-DistrictGrowthEst.pdf.

Added district forecast (fcst) numbers to 2019 yearend values.

. See Exhibit No. DJN-3 for the ND-ResidentialSalesFcst.pdf.

Straight calculation – product of Avg Cust Count * UPC.

ND Small C&I Sales forecast:

See Exhibit No. DJN-4 for the ND-SCImodeling-SAS.pdf"

SAS forecast with best model using Employment and Time.

See Exhibit No. DJN-5 for the ND-Summary-AdjustedSCIandLCI.pdf.

Forecast (fcst) values are then reduced by projected new DSM and historical DSM to give the final Small C&I fcst values.

ND Large C&I Sales forecast:

See Exhibit No. DJN-6 for the ND-GeneralLCImodeling-SAS.pdf.

SAS forecast with best model using Time.

See Exhibit No. DJN-7 for the ND-GeneralLCI-SASwAdjIntercept.pdf.

Applied an adjusted intercept to each fcst value

See Exhibit No. DJN-5 for the ND-Summary-AdjustedSCIandLCI.pdf.

Forecast (fcst) values are then reduced by projected new DSM, historical DSM, expected customer declines. This General LCI value is added to the 4 specific End Use customers' fcsts that the Company separately forecasts to give the final Large C&I fcst values.

ND Street Lighting Sales forecast:

See Exhibit No. DJN-8 for the ND-StLtg.pdf.

Set as the 2020 yearend actual through 2041.

ND Miscellaneous Sales forecast:

See Exhibit No. DJN-9 for the ND-OtherPublicSales-ModelResultfromExcel.pdf.

Excel regressed on time for 2021-2024 fcst, then steady 0.25% increase 2025 through 2041.

See Exhibit No. DJN-10 for the ND-MiscellaneousSalesFcst.pdf. Straight calculation – sum of Other Public, Interdepartmental (Set at 2019 value), and Company Consumption (Set at 2019 value).

Q. Did Dr. Fagan make any recommendations regarding use of the Company's energy sales or load forecast used in the rate case?

A. No, she did not.

Q. Does this conclude your rebuttal testimony?

A. Yes, it does.

Exhibit No. ____(DJN-1)

ELECTRIC LOAD FORECAST 2022-41

DECEMBER 31, 2021

MONTANA-DAKOTA UTILITIES CO.
A Subsidiary of MDU Resources Group, Inc.

MONTANA-DAKOTA UTILITIES CO.
ELECTRIC LOAD FORECAST
2022–2041

Prepared by
Montana-Dakota Utilities Co.
Electric System Operations & Planning Department

December 31, 2021

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Executive Summary

This report presents the 2022-2041 forecasts of Montana-Dakota Utilities Co.'s (Montana-Dakota) electric energy requirements and peak demands for the Integrated System of Montana, North Dakota, and South Dakota and for the Wyoming System. The forecasts are prepared by the Electric System Operations & Planning Department. An econometric methodology of forecasting is generally used as the starting point for Montana-Dakota's load forecasts.

INTEGRATED SYSTEM

Total annual energy for the Integrated System is projected to grow at an average rate of 1.06% per year for the next five years and at an average rate of 1.17% per year through 2041. Integrated System summer peak demand is projected to grow at an average rate of 1.13% per year for the next five years and an average rate of 1.13% per year through 2041 prior to any reductions due to demand response programs. Integrated System winter peak demand is projected to grow at an average rate of 1.05% per year for the next five years and an average rate of 1.17% per year through 2041.

As described in Montana-Dakota's 2021 Integrated Resource Plans (IRPs) filed with the North Dakota and Montana Public Service Commissions, Montana-Dakota has established a Demand-Side Management (DSM) goal of achieving an overall reduction of 0.34 percent of annual energy sales over the 20-year planning horizon of the IRPs using new and existing energy efficiency programs. Additionally, Montana-Dakota will pursue a demand response portfolio that includes the Commercial Demand Response program, which was launched in June 2012, as well as the continued promotion of the Company's current Interruptible Demand Response program. The effects of the demand-side management (DSM) programs that will be implemented in the Integrated System to achieve these goals are reflected in the sales and demand forecasts.

WYOMING SYSTEM

Total annual energy for the Wyoming System is projected to grow at an average rate of 0.73% per year for the next five years and at a rate of 0.55% per year through 2041. The Wyoming System summer peak demand is projected to grow at an average rate of 1.28% per year for the next five years and an average rate of 1.06% per year through 2041 while the winter peak demand is projected to grow at 0.69% per year for the next five years and an average rate of 0.52% per year through 2041. No new Demand-Side Management (DSM) programs are planned for the Wyoming System at this time.

Econometric Overview

Montana-Dakota uses econometric modeling as the starting point for its forecasts. The econometric models are developed using the statistical software package SAS®. In order to capture the unusual activity recently experienced as a result of the Bakken oil field, other forecasting methods and analyses also enter into the forecasting process for the Integrated System resulting in a combined analysis approach to the forecast.

An econometric model is a set of equations that expresses electricity use as a function of underlying factors such as income, price of electricity and alternate fuels, and weather.

The strengths of econometric forecasting models include:

- Econometric models explicitly measure the effects of underlying causes of trends and patterns.
- Econometric models provide statistical evaluation of forecast uncertainty.
- Econometric models utilize economic and demographic information that is easily understood.
- Econometric models can be readily re-estimated.

The econometric method combines economics theory and statistical techniques to produce a system of simultaneous equations. The method starts with estimating causal relationships between electric energy consumption (the dependent variable) and factors influencing electricity use (the independent variables). The relationship is estimated by applying regression analysis or other more sophisticated methods to time-series data. Once the relationships are established, inserting forecasts of the independent variables into the equation yields projections of the dependent variable.

A number of demographic and econometric variables were tested for fit in the process of developing both the Integrated System and Wyoming System forecasts. Various combinations of variables were tested for statistical significance when evaluating the data to be used in each equation. The following is a list of variables that were available for both the historical time period being analyzed and the forecasted time period:

Residential price of electricity
Small Commercial & Industrial price of electricity
Large Commercial & Industrial price of electricity
Residential price of alternate fuel (natural gas)
Commercial price of alternate fuel (natural gas)
Total Personal Income
Heating Degree Days (HDD) for Bismarck, ND; Aberdeen, SD; and Sheridan, WY
Cooling Degree Days (CDD) for Bismarck, ND; Aberdeen, SD; and Sheridan, WY

Number of Households
Employment by Sector
Total Retail Sales
Temperature at the time of peak for Bismarck, ND; Williston, ND; and Miles City, MT; for the Integrated System forecast and for Sheridan, WY for the Wyoming System forecast

The variables used in each resulting equation are noted in the narrative that follows for each sales sector forecast. The forecast process begins by estimating the full models and then removing variables for which the estimated coefficient either has the wrong sign or is not statistically significantly different from zero (using a p-value of 0.10).

Prior to the forecast developed in 2012, forecasts for the Integrated System had always been developed on a total Integrated System basis followed by allocations to the states of Montana, North Dakota, and South Dakota. The forecast published in this report is now the tenth consecutive year in which the forecasts were developed for each sales sector on a state-by-state basis rather than an Integrated System basis.

Data Sources

At the time this analysis was begun for the Integrated System (June 2021) and the Wyoming System (September 2021), the most recent year for which a complete set of weather and actual monthly sales by sector was available was 2020.

The data used in the development of the forecast that are available in-house include Montana-Dakota's rate projections, historical sales, energy, demand, losses, natural gas and electricity prices, and number of customers or bills.

In addition to the data available in-house, most of the economic and demographic data are obtained from Woods & Poole Economics, Inc. (W&P) of Washington, D.C. by county. The W&P data are apportioned and adjusted to represent the data for the Montana-Dakota service territory. Other data sources include the National Oceanic and Atmospheric Administration (NOAA), U.S. Census Bureau, and others.

The forecasts for the Integrated System and the Wyoming System are developed annually. Likewise, the W&P data by county are available annually from the regional model developed by W&P. W&P revises the regional model from one year to the next to reflect new computational techniques and new sources of regional economic and demographic information. Each year, W&P produces new projections based on an updated historical database and revised

assumptions. Therefore, the data provided by W&P captures the economic conditions in place at the time that the W&P forecasts are produced.

While national economic conditions can change quite quickly, data from W&P is provided once per year and therefore may not reflect the most current economic climate. For Montana-Dakota's service territory, this is not always a concern since this area is somewhat isolated from factors affecting the rest of the country; economic trends felt nationally usually take a year or two or more before their impact reaches this area. While the 2008 economic downturn was felt by the majority of the country, Montana-Dakota's service territory was enjoying a robust agricultural sector, intense oil field drilling activity, and increased energy usage resulting from high oil prices.

However, the impacts that occurred in 2020 related to COVID-19 were felt nationwide. Here is an excerpt from the U.S. Bureau of Labor Statists in their January 25, 2022, press release titled Regional and State Unemployment, 2021 Annual Average Summary: " Unemployment rates were lower in December in 42 states and the District of Columbia and stable in 8 states, the U.S. Bureau of Labor Statistics reported today. Forty-eight states and the District had jobless rate decreases from a year earlier and two states were little changed. The national unemployment rate, 3.9 percent, declined by 0.3 percentage point over the month and was 2.8 points lower than in December 2020." According to the U.S. Bureau of Labor Statistics (BLS) as of December 2021, Montana's unemployment rate is at 2.5 percent, North Dakota's unemployment is at 3.1 percent, South Dakota's unemployment rate is at 2.6, and Wyoming's unemployment rate is at 3.3 percent; all below the national rate of 3.9 percent.

The forecasts for the Integrated System and the Wyoming System in this publication reflect growth seen up through 2020.

Degree days are used to estimate how hot or cold the climate is and how much energy may be needed to keep buildings cool or warm. Heating degree days, HDDs, are calculated by subtracting the mean daily temperature from 65°F, and summing only positive values over a given period of time, while cooling degree days, CDDs, are calculated by subtracting 65°F from the mean daily temperature, and summing only positive values over a given period of time.

The HDD and CDD numbers used are annual values and the change in magnitude from one year to another is more relevant for representing warmer or cooler than normal weather in the analysis than the actual values. Since the forecasts are developed for each sales sector on a state by state basis rather than an Integrated System basis, HDDs and CDDs for sites in North Dakota, South Dakota, and Montana were considered for representation of degree days in Montana-Dakota's electric service territory in each state.

Bismarck and Mandan, ND account for approximately one-third of Montana-Dakota's Integrated System electric sales annually. Therefore, Bismarck HDDs and CDDs were used to represent Montana-Dakota's service territory in North Dakota. There are no NOAA National Climatic Data Center (NCDC) stations with complete local climatological data available in Montana that are in Montana-Dakota's electric service territory. It was decided that Bismarck HDDs and CDDs values would best represent the Montana-Dakota service territory in Montana as well.

There are also no NOAA NCDC stations in South Dakota that are in Montana-Dakota's electric service territory. After reviewing available data, it was decided that Aberdeen, SD HDDs and CDDs would be used to represent Montana-Dakota's service territory in South Dakota.

For the Wyoming System, HDDs and CDDs are from NOAA for Sheridan, WY.

Historical personal income per household is calculated to be total personal income divided by the number of households for those counties in which Montana-Dakota provides electric utility service. Historical personal income is available from the W&P data which come from the U.S. Department of Commerce. Historical households are also from the U.S. Department of Commerce. Forecasted personal income and number of households are projections provided by W&P.

Historical company data used in the development of the forecasts are included in Appendix A for the Integrated System and Appendix H for the Wyoming System. Appendices A-1 through A-4 list annual sales by customer class for Montana, North Dakota, South Dakota, and the Integrated System for the years 1966-2021, respectively. Appendix A-5 lists the seasonal peaks and load factors of the Integrated System for the years 1960-2021. Appendix A-6 lists demand by state at the time of the system peak for the summer and winter seasons. Similar information can be found in Appendix H for the Wyoming System.

Appendix B contains historical and forecasted values for the exogenous variables for the Integrated System and Appendix I contains the corresponding data for the Wyoming System.

Integrated System

Overview

From 2006-2011, econometric equations were used to develop long-range (20-year) electric load forecasts for Montana-Dakota's Integrated System, which is comprised of Montana-Dakota's service territories in Montana, North Dakota, and South Dakota. The total Integrated System sales by sector were then allocated to the individual states.

Beginning in 2012, the forecast was developed for each state individually – Montana, North Dakota, and South Dakota – and the forecasts by state were combined to arrive at the Integrated System forecast in total. The previously used methodology of allocating Integrated System sales to the states was becoming more difficult to accomplish while capturing the shifting percentage of sales in each state. This was a result of the higher growth recently experienced in North Dakota due to the Bakken oil field activity which is also beginning to impact Montana-Dakota's electric sales in Montana.

At the time this analysis was begun (June 2021), the most recent year for which a complete set of weather, prices, monthly sales by sector, and other historical information was available was for year-ending 2020. The equations developed used historical data available through 2020 and were designed to forecast the time period 2022-2041.

Montana-Dakota's Integrated System consists of the counties listed in the table below. These counties are located in eastern Montana, north-central South Dakota, and western and central North Dakota.

Counties by State in Montana-Dakota's Integrated System

Montana	South Dakota	North Dakota	
Custer	Campbell	Adams	Logan
Daniels	Corson	Bowman	McIntosh
Dawson	Edmunds	Burke	McKenzie
Fallon	Faulk	Burleigh	Mercer
Prairie	Harding	Dickey	Morton
Richland	McPherson	Divide	Mountrail
Roosevelt	Perkins	Dunn	Oliver
Rosebud	Potter	Emmons	Renville
Sheridan	Walworth	Golden Valley	Slope
Wibaux		Grant	Stark
		Hettinger	Williams
		Kidder	

Montana-Dakota also provides electric service to a small part of Brown County of South Dakota. However, Brown County is excluded from the database because it includes the town of Aberdeen which is not served by Montana-Dakota but which comprises the majority of the population for the county. Including Brown County would reflect too much of the economic activity that occurs in Aberdeen.

The same is true for Ward County in North Dakota. Montana-Dakota provides electric service to a small part of Ward County. However, Ward County is excluded from the database because it includes the town of Minot which does not receive electric service from Montana-Dakota but which comprises the majority of the population for the county. Including Ward County would reflect too much of the economic activity that occurs in Minot.

1. Forecast Methodology - Sales

The Montana, North Dakota, and South Dakota sales forecasts are disaggregated into five sales sectors:

- Residential sector.
- Small Commercial & Industrial (SC&I) sector. This sector consists of those commercial and industrial customers whose monthly peak demand averages less than 50 kilowatts over a year's time.
- Large Commercial & Industrial (LC&I) sector. This sector consists of those commercial and industrial customers whose monthly peak demand averages more than 50 kilowatts over a year's time.
- Street Lighting. This sector consists of energy for public street and highway lighting.
- Miscellaneous. This sector includes energy for sales to other public authorities, interdepartmental sales, and company use.

The LC&I sector was further broken down into five end-use categories which were forecasted individually. The remainder of the LC&I sales fall into a sixth category: General LC&I sales. The end-uses forecasted individually were as follows:

- North Dakota
    - Marathon (Tesoro) Corporation's Refinery sales
    - Dakota Westmoreland Corporation's Beulah Mine and North American Coal Corporation's Coyote Creek Mine sales
    - Sabin Metal Corporation's sales in Williston
- Montana
    - Westmoreland Coal Company – Savage Mine sales
    - Montana Oil Field sales

Econometric equations were tried initially in the development of the forecasted sales for the three primary customer categories by state – residential, SC&I, and General LC&I – while sales forecasts for the street lighting and miscellaneous sectors were developed primarily using linear regression. The final models used for each of the primary customer categories were a combination of econometrics and judgment. The sales forecasts for the five LC&I end-uses were developed using a combination of regressions and information available from Montana-Dakota's field personnel regarding these large customers.

The development of the sales forecasts for each of the five sales sectors is explained below.

1.1. Residential

The residential sales forecast is derived by developing a forecast of residential use per customer and a forecast of number of residential customers. The complete details of the projected residential use per customer and number of customers as well as the projected residential sales by state are given in Section 3 – Forecast Results.

RESIDENTIAL USE PER CUSTOMER

Higher electricity prices and lower income may result in less electricity use, while higher alternate fuel prices as well as colder than normal winters (more heating degree days) and hotter than normal summers (more cooling degree days) may result in more electricity consumption. Historical and forecasted values for these variables are available and were tested for statistical significance when developing the residential econometric equations for each state in previous years. The historical values for these variables are given in Appendix B.

North Dakota and Montana – The econometric process used in previous years allowed residential use per customer to depend on variables such as the residential price of electricity, alternate fuel prices for residential customers (natural gas), personal income per household, heating degree days, cooling degree days, number of households, and year. In recent years, use per Montana-Dakota residential customer has been directly affected by oil industry in their service territories. Therefore, modifications were made in the forecast for the last several years to Montana and North Dakota use per residential customers to reflect the use experienced from the surging Bakken activity. This year the final residential use per customer models for Montana and North Dakota will hold use per customer flat for the entire forecast period making average customer counts the primary driver for residential sales growth. The starting points for residential use per customer reflect uncertainties of continued COVID-19 influences.

South Dakota – The econometric process used in previous years allowed residential use per customer to depend on variables such as the residential price of electricity, alternate fuel prices for residential customers (natural gas), personal income per household, heating degree days, cooling degree days, number of households, and year. This year the final residential use per customer model will hold use per customer flat for the entire forecast period making average customer counts the primary driver for residential sales growth in South Dakota.

NUMBER OF RESIDENTIAL CUSTOMERS

The model initially developed for the number of customers (bills) for each state is as follows:

$$\ln(res\_bills_t) = a + b^{hhld} \times \ln(hholds_t) + e_t$$

In this equation, *a* and *b* are estimated parameters; e_t is the error term, the dependent variable is the natural log of the number of bills and the only explanatory variable is the natural log of the number of households.

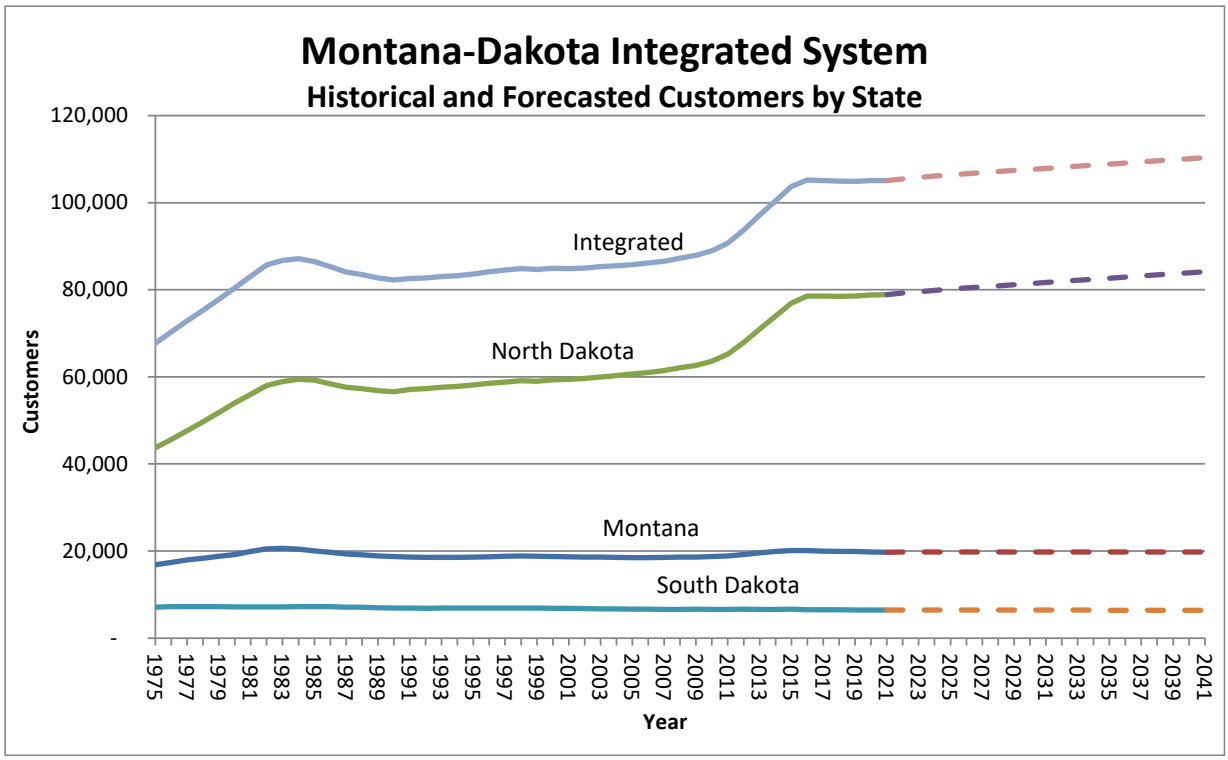
The forecast for number of customers by state was initially developed as described above. However, adjustments were made to the residential customer forecasts for North Dakota and Montana.

In North Dakota, growth in residential customers for 2021 through 2026 was set based on information provided by the company's division personnel as well as on recently experienced residential customer growth trends. Montana-Dakota's division personnel have information available to them regarding the expected construction of new apartments and the addition of residential housing subdivisions. In the following years, residential customer growth was allowed to continue at the rate set in 2026.

For Montana, customer growth for 2021 and beyond was set to the approximate residential customer growth currently experienced.

In South Dakota, the residential customer forecast continues to be based on the household forecast from W&P.

Historical and forecasted customers (bills) by state and in total are plotted on the following chart while the values are given in Appendix B-6.



1.2. Small Commercial & Industrial

Small commercial & industrial (SC&I) sales could potentially depend on variables such as the SC&I price of electricity, alternate fuel prices for SC&I customers (natural gas), employment, heating degree days, cooling degree days, and year. Higher electricity prices may result in less electricity use, while higher alternate fuel prices and higher employment as well as colder than normal winters (more heating degree days) and hotter than normal summers (more cooling degree days) may result in more electricity consumption. Historical and forecasted values for these variables are available and were tested for statistical significance in developing the SC&I econometric equations by state. The historical and forecasted values for these variables are given in Appendix B.

In contrast to the residential sales forecast which uses two models for each state to project residential sales (a use per residential customer model and a residential customer numbers model), a single model for each state is used to forecast small commercial & industrial (SC&I) sales. The final models by state are as follows:

North Dakota:

$$\ln(sci\_kwh_t) = a + b^{Emp} \times \ln(emp\_no\_farm\_mining_t) + e_t$$

where:

ln	= natural logarithm;
sci_kwh_t	= small comm & industrial sales; and
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining.

In this equation, *a* and *b* are estimated parameters; e_t is the error term.

Montana:

$$\ln(sci\_kwh_t) = a + b^{Emp} \times \ln(emp\_no\_farm\_mining_t) + b^{Yr} \times year_t + e_t$$

where:

ln	= natural logarithm;
sci_kwh_t	= small commercial & industrial sales;
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining; and
$year_t$	= year (1996-2020), which serves as a time trend variable.

In this equation, *a* and the *b*'s are estimated parameters; e_t is the error term.

South Dakota:

$$\ln(sci\_kwh_t) = a + b^{HDD} \times HDD_t + b^{Yr} \times year_t + e_t$$

where:

ln	= natural logarithm;
sci_kwh_t	= small commercial & industrial sales;
HDD_t	= heating degree days; and
$year_t$	= year (1996-2020), which serves as a time trend variable.

In this equation, *a* and *b* are estimated parameters; e_t is the error term.

The Personal Consumption Expenditure Deflator, whose values are given on Appendix B-5, was used to place small commercial and industrial electricity prices and firm natural gas prices into real dollar terms.

Employment numbers are available from W&P for the historical time period from the U.S. Department of Commerce, Bureau of Economic Analysis. Employment projections for the counties served by Montana-Dakota are made by W&P. However, due to the Bakken oil field activity in North Dakota and Montana, it is anticipated that employment will differ from what was projected by W&P.

Since residential customer number forecasts had been developed for North Dakota and Montana reflecting the rate of growth due to the Bakken activity as described in Section 1.1, it was decided that a relationship between residential customer numbers and employment should be established in order that the SC&I sales forecast would correspond to the residential customer number forecast and the growth in employment and residential customers would then be directly correlated. Regressions were run on 25-year ratios of historical employment (total employment less farming and mining) to residential customers. The forecasted ratio produced from this regression was applied to the adjusted residential customer forecasts for both North Dakota and Montana to arrive at the adjusted employment forecasts for each state. Historical employment as well as employment as forecasted by W&P and as adjusted is given on Appendix B-7.

1.3. Large Commercial & Industrial

The sales forecasts for five LC&I end-uses (Marathon (Tesoro) Refineries, Westmoreland and Dakota Westmoreland Coal, Sabin Metals and Montana Oil Fields) were developed using information available from Montana-Dakota's field personnel regarding these large customers.

1.3.1. General LC&I

General LC&I sales (sales to all other LC&I customers that are not to the Marathon refineries, Westmoreland coal mines, Sabin Metals or Montana Oil Fields) could depend on variables such as the LC&I price of electricity, alternate fuel prices for LC&I customers (natural gas), heating degree days, cooling degree days, employment, and year. Higher electricity prices can result in less electricity use, while higher alternate fuel prices and higher employment as well as colder than normal winters (more heating degree days) and hotter than normal summers (more cooling degree days) could result in more electricity consumption. Historical and forecasted values for these variables are available and were tested for statistical significance in developing the General LC&I econometric equations by state.

As with SC&I sales, General LC&I sales are forecasted using a single model. The forecast process began in each state by estimating the full models and then removing variables for which the estimated coefficient either has the wrong sign or is not statistically significant. The Personal Consumption Expenditure Deflator, whose values are given on Appendix B-5, was used to place large commercial and industrial electricity prices and firm natural gas prices into real dollar terms.

The final models for Montana, North Dakota, and South Dakota were identical with the only statistically significant variable being the time-trend variable.

The final model for all three states is as follows:

$$\ln(lci\_kwh_t) = a + b^{yr} \times year_t + e_t$$

where:

ln	= natural logarithm;
lci_kwh_t	= large commercial & industrial sales;
$year_t$	= year (1996-2020), which serves as a time trend variable.

In this equation, *a* and *b* are estimated parameters; e_t is the error term.

After the General LC&I sales are projected by state using the equation developed as outlined above, adjustments are made to the projected sales in each state to reflect additional load growth that is expected due to any additional new General LC&I customers that may have been added in 2021. Information regarding the specific LC&I customers that come online is provided by Montana-Dakota's field personnel who have contact with and closely monitor these customers. There were no additions in 2021, for Montana, North Dakota, or South Dakotas' modeled forecasts. However, a reduction adjustment was made to North Dakota's General LC&I due to the shutdown of a large customer during 2020.

1.4. Street Lighting

The sales forecast for the street lighting sector (public street and highway lighting) for both North Dakota and Montana started with their actual 2020 levels and then are held constant for the remainder of the forecast. South Dakota's forecast started with their actual 2020 level with an adjustment for the LED changes that were completed in 2020, and then are held constant for the remainder of the forecast.

1.5. Miscellaneous

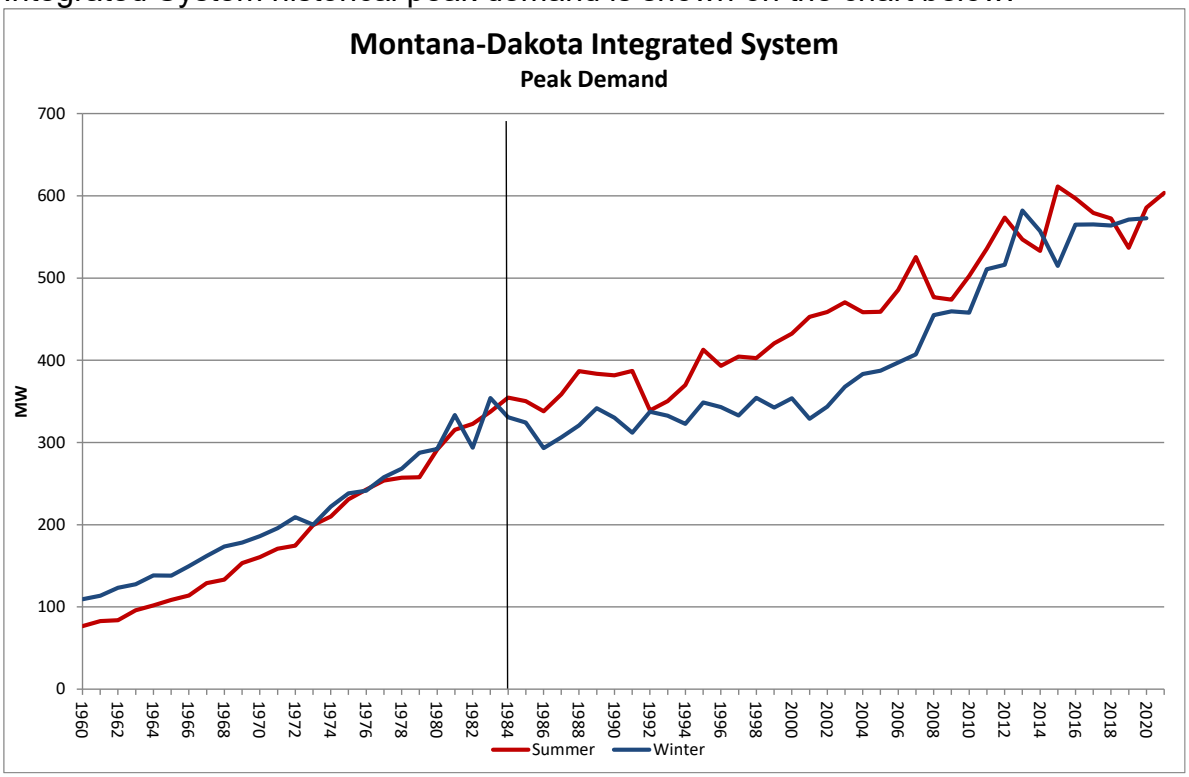
The miscellaneous sales sector is made up of sales for the following three end-uses:

1. Interdepartmental Sales – gas utility use of electricity
2. Other Public Sales – sales to government authorities which includes municipal pumping and some city sales (these sales are served under special contracts that are applicable only to public authorities)
3. Company Use - Montana-Dakota offices

The forecasts for Interdepartmental Sales and Company Use for each state were held constant at the actual 2020 levels. The forecast for Other Public Sales was also held constant at the actual 2020 level for South Dakota, while the Other Public Sales forecast for both North Dakota and Montana were based on a linear regression on actual 2001-2020 sales in each state.

2. Forecast Methodology – Peak Demand

Integrated System historical peak demand is shown on the chart below.



Montana-Dakota was a winter peaking utility prior to 1984. From about 1973 to 1983, the spread between the winter and summer peaks began to narrow and in 1984 Montana-Dakota became a summer peaking utility. From Montana-Dakota's Residential Energy Use Surveys and other available information, it is known that air conditioning has become more prevalent over time and air conditioning load has driven much of the increase in summer peak demand. Recently, the winter peak has been growing at a faster rate again due to the addition of more space heating load and unseasonably cooler summers. The gap between winter and summer seasonal peaks has narrowed once more with an occasional winter peak being higher than summer for years 2013, 2014 and 2019.

The Integrated System peak demand forecast is developed on a total system basis; it is not disaggregated by state or by sector. The summer peak demand forecast was developed through the use of an econometric model. Peak day/hour temperature, annual cooling degree days, total system sales for the year including losses (annual requirements), and a time-trend variable (year) were tested as the independent variables in the econometric model.

For peak day temperature, Montana-Dakota has available the historical hourly temperatures for three major load centers: Bismarck, ND; Williston, ND; and Miles City, MT. Weighted average temperatures for Bismarck (70%), Miles City (15%) and Williston (15%) at the time of the system peak were used as the peak day temperature. This weighting method has been tested and used in the past in the company's short-term demand forecast as well as in other informal in-house analyses. The inclusion of cooling degree days in the model is based on the fact that Montana-Dakota is a summer peaking utility and that hotter summers create more hot days on which high peaks may be set and may also serve as a proxy for heat buildup leading up to the peak.

Because of the nature of the econometric models, the historical summer peak demand data were adjusted to reflect customer load interruptions due to Interruptible Rate 38/39 and/or forced distribution outages that occurred at the time of the summer peak. The historical summer peak value thus represents the peak as it would have occurred had there not been any interruptions. Interruptions to the load for customers served on Large Power Demand Response Rate 38 and/or Interruptible Large Power Service Rate 39 typically occur at the time of the system peak. Also, a forced distribution outage occurred at the time of the summer peak in 2002 and voltage reductions were implemented at the time of the summer peaks in 2006 and 2007.

The summer peak demand model is as follows:

$$peak\_load_t = a + (b^{CDD} \times CDD_t) + (b^{PTemp} \times peak\_temp_t) + (b^{Sales} \times system\_kwh_t) + (b^{yr} \times year_t) + e_t$$

where:

$peak\_load_t$	= summer peak demand;
CDD_t	= cooling degree days;
$peak\_temp_t$	= weighted average temp at time of summer peak;
$system\_kwh_t$	= annual energy requirements; and
$year_t$	= year (1991-2020), which serves as a time trend variable.

In this equation, *a* and the *b*'s are estimated parameters; e_t is the error term.

The winter peak demand forecast is developed in a manner similar to the summer peak demand forecast except that HDDs were tested for statistical significance in the model rather than CDDs. It was found that HDDs are not statistically significant. The same historical period of time was used in developing the winter peak demand model that was used in the development of the summer peak demand model: 1991-2020.

For the winter peak demand forecast, several other variables were tested to see if they play a statistically significant role in the determination of the winter peak. The variables tested were the number of minutes of daylight on the day of the winter peak, the number of days between the winter peak and the winter solstice, and a variable for a Christmas lighting switch to indicate whether or not Christmas lighting was in use at the time of the winter peak (Christmas lighting is "on" if the peak occurs within two weeks prior to Christmas and one week after, and the Christmas lighting switch is "off" if the winter peak occurs outside of that window.) It was found that modeling whether or not Christmas lighting is on at the time of the winter peak has not been statistically significant for the last five years.

The winter peak demand model is as follows:

$$peak\_load_t = a + b^{PTemp} \times peak\_temp_t + b^{Sales} \times system\_kwh_t$$

where:

$peak\_load_t$	= winter peak demand;
$peak\_temp_t$	= weighted average temp at time of winter peak; and
$system\_kwh_t$	= annual energy requirements.

In this equation, *a* and the *b*'s are estimated parameters; e_t is the error term.

3. Forecast Results – Sales and Demand

The forecast methodology for both sales and demand as described in Sections 1 and 2 above results in the initial sales forecasts by sales class for each state and the initial demand forecast. Reductions to the sales forecasts by class and by state and to the demand forecast are made to reflect Demand-Side Management programs that are being implemented. Once these reductions are reflected in the sales forecasts, the total of the sales forecasts by class are adjusted by the loss factor to arrive at the final forecast of energy requirements.

3.1. Demand-Side Management (DSM) Reductions

As reflected in the 2021 Integrated Resource Plans (IRP) filed with the North Dakota and Montana Public Service Commissions, Montana-Dakota has included reductions for both energy efficiency and demand response levels over the 20-year planning period of the IRPs. The specific programs used to attain the goals may change over the planning period but will include both energy efficiency and demand response programs that are deemed cost effective.

Energy efficiency programs focus on energy reductions (kWh) and will have some reduction in peak demand (kW). Demand response programs focus on peak demand reductions and may be called upon during peaking conditions and system emergencies. The forecasted reductions based on the expected energy efficiency and demand response programs for energy and peak demand are reflected in the forecast and those amounts are summarized below:

- DSM Energy savings
  - 0.34 percent of annual sales for 2022 through 2040, achieved by growing from 0.13% of total sales in 2021, to 0.43% of total sales by 2030 through 2040, for an overall savings of 0.34% for the 20-year forecast horizon.

- Peak Demand savings
  - Demand Response programs of 43.9 MW for 2022, to 60.0 MW by 2025 through 2040 for the commercial sales sector.
  - Energy Efficiency programs of 0.59 MW in 2022 and 0.70 MW by 2040.

The forecasted reduction in energy and peak demand resulting from the above programs is reflected in the forecast.

3.2. Losses

The sales forecasts reflect the energy delivered to Montana-Dakota's customers' meters. The total amount of electricity generated at the power plants to meet Montana-Dakota's customers' energy needs is greater than what is delivered to the meters and is called the 'Total Energy Requirements.' The difference between the sales and energy requirements reflects the losses that occur within the transmission and distribution system.

The annual energy losses percentage, defined as a fraction of the total annual energy requirements, has varied from year to year. Therefore, these loss percentages are averaged over a ten-year time period. The average value for the past ten years is 7.841%. Using this value for all future years for each state, the total energy requirements are calculated for each year during the study period.

3.3. Final Energy Requirements Forecast

The forecasted sales and system peak demand are first adjusted to reflect the effects of the DSM programs that are being implemented as explained in Section 3.1 and then adjusted for losses as outlined in Section 3.2 to calculate the total energy requirements and peak demand forecast. This is the amount of energy and capacity that needs to be generated or purchased to meet Montana-Dakota's customers' energy needs.

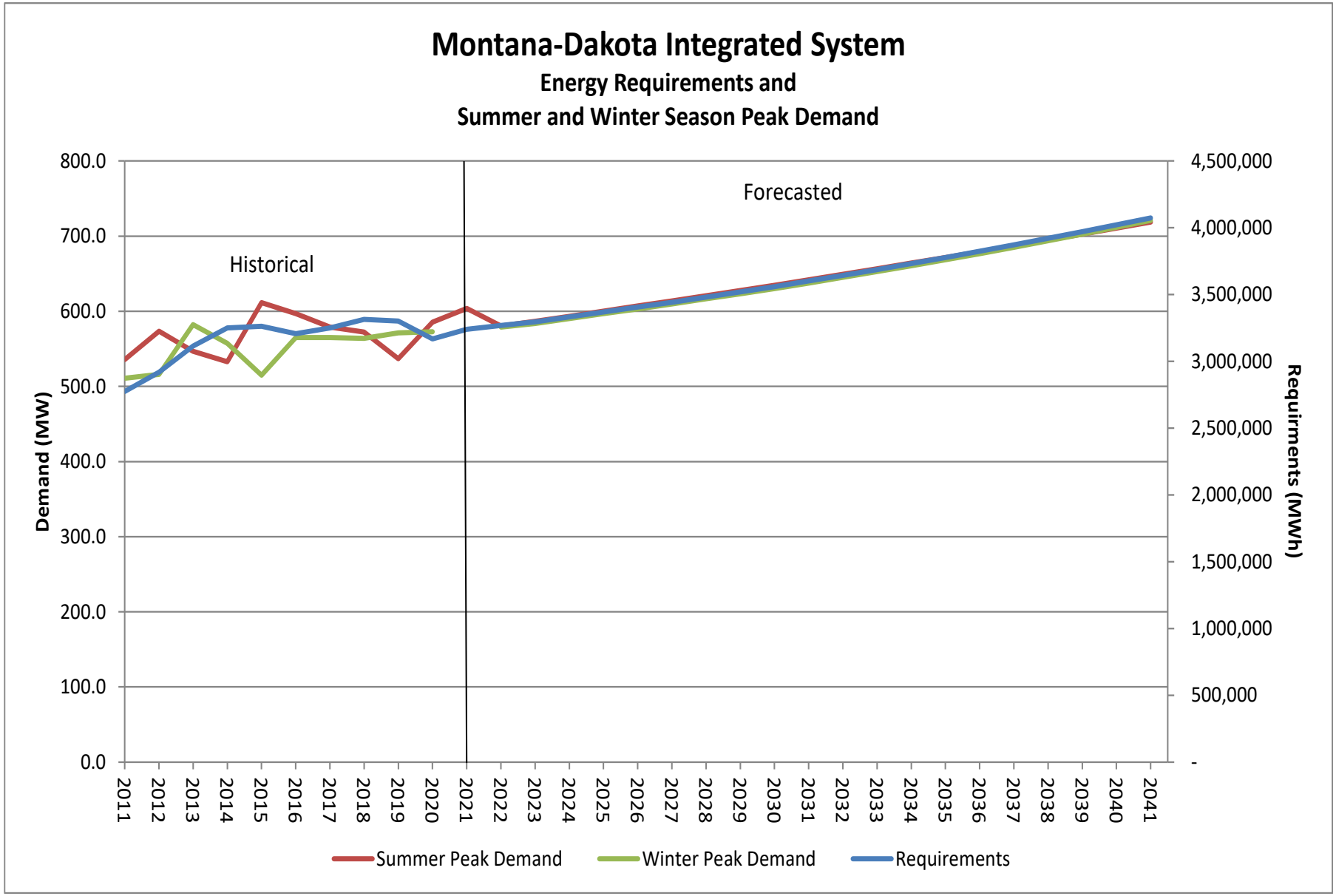
The final forecast results are presented on the following several pages. A table summarizing the Integrated System energy requirements and seasonal peak demand is given first, followed by a graph with historical and forecasted seasonal peak demand and energy requirements. A table summarizing historical and forecasted sales by sales sector for Montana, North Dakota, South Dakota, and the Integrated System in total is given next, followed by a graph of the Integrated System data. A table detailing the historical and forecasted residential sales, customers, and use per customer by state is given next. The last page of this section is a similar table for the Integrated System in total.

Refer to Appendices C-1 through C-7 for graphs of the historical and forecasted sales by sector.

Montana-Dakota Utilities Co.
Historical and Forecasted Energy and Demand
Integrated System
Reflecting Demand-Side Management Programs from 2021 IRP
Calendar Month Basis

	Total Energy Requirements (net of DSM and EE)		Summer Peak - MW				Winter Peak 2/				Demand Response	
Year	MWh	% Change	Total Demand Before any DSM or EE	Energy Efficiency (EE)	Demand Net of EE 1/	% Change	Total Demand Before any DSM or EE	Energy Efficiency (EE)	Demand Net of EE 1/	% Change	Rate 38/39 Interrupt Loads	Commercial Demand Response
2011	2,776,082				535.8				510.8			
2012	2,919,752	5.18%			573.6	7.05%			516.2	1.06%		
2013	3,115,064	6.69%			546.9	-4.65%			582.1	12.77%		
2014	3,250,683	4.35%			533.0	-2.54%			557.2	-4.28%		
2015	3,263,271	0.39%			611.5	14.73%			514.9	-7.59%		
2016	3,206,737	-1.73%			596.8	-2.40%			564.9	9.71%		
2017	3,251,539	1.40%			579.1	-2.97%			565.1	0.03%		
2018	3,313,387	1.90%			572.4	-1.16%			563.8	-0.22%		
2019	3,301,537	-0.36%			536.9	-6.20%			571.1	1.29%		
2020	3,169,086	-4.01%			585.6	9.07%			572.7	0.28%		
2021	3,240,600	2.26%			603.7	3.09%	not yet available					
2022	3,268,281	0.85%	581.2	0.6	580.6	-3.83%	579.7	0.6	579.1		18.9	30.0
2023	3,295,191	0.82%	587.2	0.6	586.6	1.03%	584.4	0.6	583.8	0.81%	18.9	35.0
2024	3,332,536	1.13%	594.0	0.6	593.4	1.16%	591.0	0.6	590.4	1.13%	20.0	39.0
2025	3,368,899	1.09%	600.8	0.6	600.2	1.14%	597.4	0.6	596.8	1.08%	20.0	40.0
2026	3,406,236	1.11%	607.6	0.6	607.0	1.13%	603.9	0.6	603.3	1.09%	20.0	40.0
2027	3,442,001	1.05%	614.4	0.6	613.8	1.12%	610.2	0.6	609.6	1.04%	20.0	40.0
2028	3,480,993	1.13%	621.4	0.6	620.8	1.14%	617.1	0.6	616.5	1.13%	20.0	40.0
2029	3,519,277	1.10%	628.3	0.6	627.7	1.11%	623.8	0.6	623.2	1.09%	20.0	40.0
2030	3,560,020	1.16%	635.4	0.6	634.8	1.13%	631.0	0.6	630.4	1.15%	20.0	40.0
2031	3,601,688	1.17%	642.6	0.7	641.9	1.13%	638.3	0.6	637.7	1.16%	20.0	40.0
2032	3,644,302	1.18%	649.9	0.7	649.2	1.14%	645.8	0.6	645.2	1.18%	20.0	40.0
2033	3,687,881	1.20%	657.3	0.7	656.6	1.14%	653.5	0.6	652.9	1.19%	20.0	40.0
2034	3,732,453	1.21%	664.8	0.7	664.1	1.14%	661.3	0.7	660.6	1.19%	20.0	40.0
2035	3,778,035	1.22%	672.3	0.7	671.6	1.13%	669.3	0.7	668.6	1.21%	20.0	40.0
2036	3,824,664	1.23%	679.9	0.7	679.2	1.13%	677.5	0.7	676.8	1.23%	20.0	40.0
2037	3,872,363	1.25%	687.7	0.7	687.0	1.15%	685.9	0.7	685.2	1.24%	20.0	40.0
2038	3,921,169	1.26%	695.5	0.7	694.8	1.13%	694.5	0.7	693.8	1.25%	20.0	40.0
2039	3,971,093	1.27%	703.4	0.7	702.7	1.14%	703.3	0.7	702.6	1.27%	20.0	40.0
2040	4,022,285	1.29%	711.4	0.7	710.7	1.14%	712.3	0.7	711.6	1.28%	20.0	40.0
2041	4,074,668	1.30%	719.5	0.7	718.8	1.14%	721.5	0.7	720.8	1.29%	20.0	40.0

1/ Historical demand reported is system actual demand.
2/ Winter Peak is for Nov-Dec of current year and Jan-Apr of following year.


Montana-Dakota Integrated System
Energy Requirements and
Summer and Winter Season Peak Demand
Historical
Forecasted
Demand (MW)
Requirments (MWh)
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
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2028
2029
2030
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2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
Summer Peak Demand
Winter Peak Demand
Requirements

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
Montana
Billing Month Basis
Reflecting Demand-Side Programs

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2011	185,153		119,643		427,887		7,089		7,789		747,561	
2012	187,635	1.34%	132,714	10.93%	420,459	-1.74%	7,106	0.24%	8,134	4.43%	756,048	1.14%
2013	194,907	3.88%	128,003	-3.55%	438,918	4.39%	7,028	-1.09%	7,742	-4.82%	776,598	2.72%
2014	200,088	2.66%	137,799	7.65%	451,687	2.91%	7,108	1.13%	7,901	2.05%	804,583	3.60%
2015	191,420	-4.33%	135,202	-1.88%	473,740	4.88%	7,103	-0.07%	7,991	1.14%	815,456	1.35%
2016	184,296	-3.72%	131,690	-2.60%	474,496	0.16%	7,102	-0.01%	7,517	-5.93%	805,101	-1.27%
2017	188,743	2.41%	133,595	1.45%	469,138	-1.13%	7,035	-0.94%	7,409	-1.44%	805,920	0.10%
2018	192,080	1.77%	138,485	3.66%	469,653	0.11%	4,451	-36.73%	6,303	-14.93%	810,972	0.63%
2019	185,319	-3.52%	133,950	-3.27%	455,960	-2.92%	3,049	-31.51%	6,171	-2.09%	784,449	-3.27%
2020	184,785	-0.29%	125,023	-6.66%	421,234	-7.62%	3,077	0.93%	6,424	4.10%	740,543	-5.60%
2021	184,910	0.07%	129,676	3.72%	421,853	0.15%	2,942	-4.39%	7,253	12.90%	746,634	0.82%
2022	184,785	-0.07%	129,389	-0.22%	434,257	2.94%	3,077	4.59%	6,370	-12.17%	757,878	1.51%
2023	184,785	0.00%	131,336	1.50%	453,655	4.47%	3,077	0.00%	6,342	-0.44%	779,195	2.81%
2024	184,785	0.00%	133,457	1.62%	455,006	0.30%	3,077	0.00%	6,315	-0.43%	782,639	0.44%
2025	184,785	0.00%	135,605	1.61%	456,943	0.43%	3,077	0.00%	6,287	-0.44%	786,698	0.52%
2026	184,785	0.00%	137,785	1.61%	458,904	0.43%	3,077	0.00%	6,260	-0.43%	790,811	0.52%
2027	184,785	0.00%	139,851	1.50%	460,326	0.31%	3,077	0.00%	6,233	-0.43%	794,272	0.44%
2028	184,785	0.00%	142,093	1.60%	462,334	0.44%	3,077	0.00%	6,205	-0.45%	798,494	0.53%
2029	184,785	0.00%	144,373	1.60%	464,367	0.44%	3,077	0.00%	6,178	-0.44%	802,780	0.54%
2030	184,785	0.00%	146,682	1.60%	466,426	0.44%	3,077	0.00%	6,150	-0.45%	807,119	0.54%
2031	184,785	0.00%	149,024	1.60%	468,510	0.45%	3,077	0.00%	6,123	-0.44%	811,519	0.55%
2032	184,785	0.00%	151,406	1.60%	470,620	0.45%	3,077	0.00%	6,095	-0.46%	815,983	0.55%
2033	184,785	0.00%	153,818	1.59%	472,756	0.45%	3,077	0.00%	6,068	-0.44%	820,504	0.55%
2034	184,785	0.00%	156,271	1.59%	474,919	0.46%	3,077	0.00%	6,040	-0.46%	825,092	0.56%
2035	184,785	0.00%	158,754	1.59%	477,109	0.46%	3,077	0.00%	6,013	-0.45%	829,738	0.56%
2036	184,785	0.00%	161,274	1.59%	479,327	0.46%	3,077	0.00%	5,986	-0.45%	834,448	0.57%
2037	184,785	0.00%	163,836	1.59%	481,571	0.47%	3,077	0.00%	5,958	-0.47%	839,227	0.57%
2038	184,785	0.00%	166,430	1.58%	483,844	0.47%	3,077	0.00%	5,931	-0.45%	844,067	0.58%
2039	184,785	0.00%	169,067	1.58%	486,145	0.48%	3,077	0.00%	5,903	-0.47%	848,978	0.58%
2040	184,785	0.00%	171,744	1.58%	488,480	0.48%	3,077	0.00%	5,876	-0.46%	853,962	0.59%
2041	184,785	0.00%	174,459	1.58%	490,844	0.48%	3,077	0.00%	5,848	-0.48%	859,013	0.59%
2011-2021 Average Yearly Growth (10 Years History)		-0.29%		0.27%		0.11%		-9.68%		-2.25%		-0.05%
2016-2021 Average Yearly Growth (5 Years History)		-0.24%		-0.88%		-2.65%		-18.75%		-1.78%		-1.88%
2022-2027 Average Yearly Growth (5 Years)		0.00%		1.58%		0.95%		0.00%		-0.43%		0.81%
2022-2032 Average Yearly Growth (10 Years)		0.00%		1.59%		0.59%		0.00%		-0.44%		0.62%
2022-2041 Average Yearly Growth (19 Years)		0.00%		1.59%		0.50%		0.00%		-0.45%		0.58%

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
North Dakota
Billing Month Basis
Reflecting Demand-Side Programs

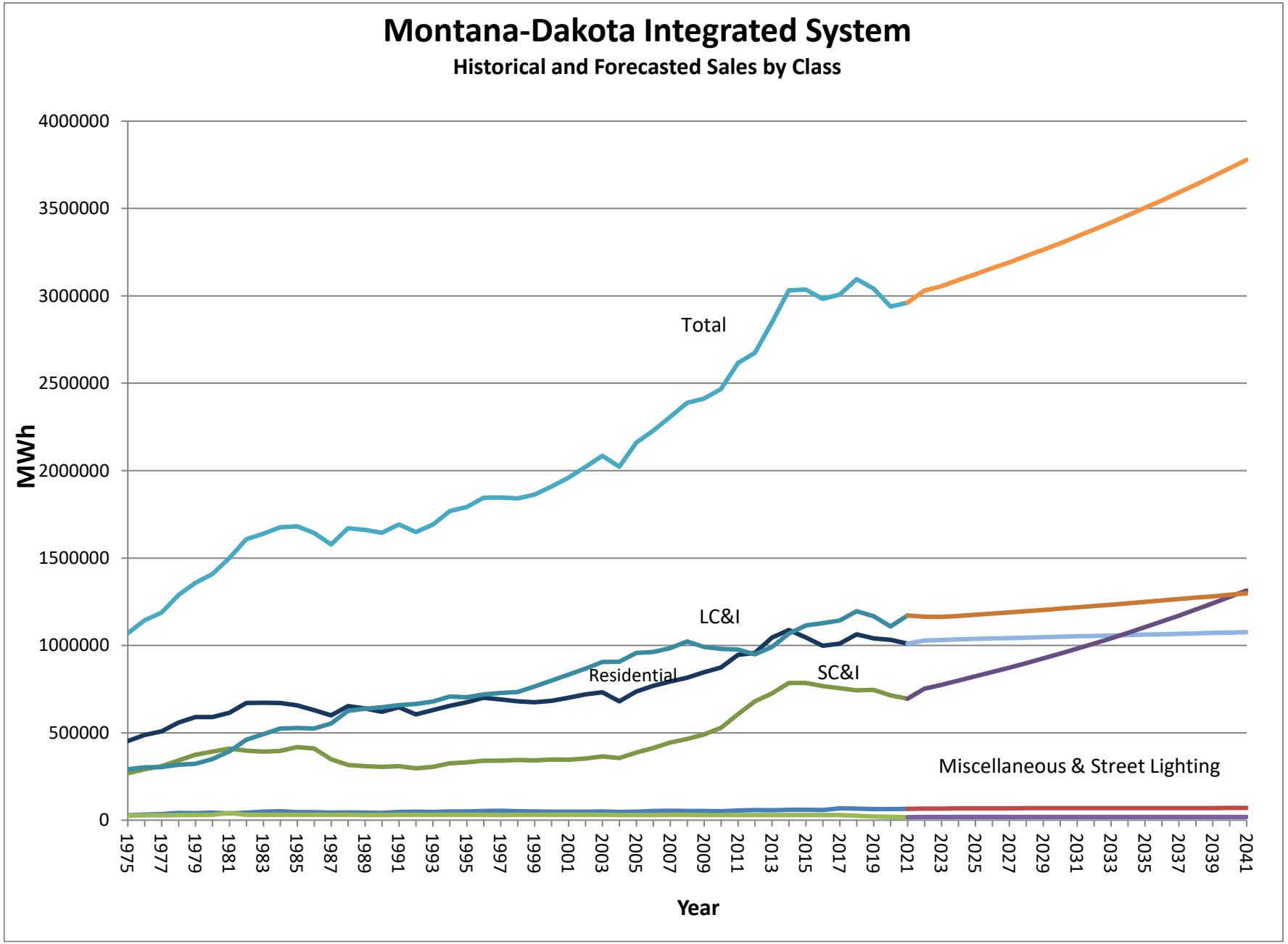
	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2011	687,465		450,098		514,238		20,059		46,265		1,718,125	
2012	700,451	1.89%	512,566	13.88%	492,981	-4.13%	20,076	0.08%	48,519	4.87%	1,774,593	3.29%
2013	774,916	10.63%	559,839	9.22%	516,813	4.83%	19,895	-0.90%	47,406	-2.29%	1,918,869	8.13%
2014	812,654	4.87%	609,044	8.79%	579,346	12.10%	20,015	0.60%	50,790	7.14%	2,071,849	7.97%
2015	784,977	-3.41%	614,126	0.83%	603,879	4.23%	20,313	1.49%	50,730	-0.12%	2,074,025	0.11%
2016	746,374	-4.92%	599,694	-2.35%	617,934	2.33%	20,387	0.36%	49,560	-2.31%	2,033,949	-1.93%
2017	754,400	1.08%	585,174	-2.42%	638,719	3.36%	20,042	-1.69%	59,021	19.09%	2,057,356	1.15%
2018	799,661	6.00%	565,692	-3.33%	690,345	8.08%	19,569	-2.36%	58,278	-1.26%	2,133,545	3.70%
2019	784,808	-1.86%	573,956	1.46%	675,579	-2.14%	16,733	-14.49%	56,260	-3.46%	2,107,336	-1.23%
2020	779,619	-0.66%	552,682	-3.71%	652,236	-3.46%	13,957	-16.59%	55,728	-0.95%	2,054,222	-2.52%
2021	759,330	-2.60%	530,068	-4.09%	716,278	9.82%	13,753	-1.46%	55,962	0.42%	2,075,392	1.03%
2022	776,520	2.26%	585,375	10.43%	693,564	-3.17%	13,957	1.48%	58,116	3.85%	2,127,532	2.51%
2023	779,509	0.38%	606,029	3.53%	671,577	-3.17%	13,957	0.00%	59,261	1.97%	2,130,334	0.13%
2024	782,498	0.38%	627,646	3.57%	676,182	0.69%	13,957	0.00%	60,407	1.93%	2,160,690	1.42%
2025	785,536	0.39%	649,351	3.46%	680,096	0.58%	13,957	0.00%	60,546	0.23%	2,189,486	1.33%
2026	787,986	0.31%	671,704	3.44%	684,806	0.69%	13,957	0.00%	60,684	0.23%	2,219,138	1.35%
2027	790,436	0.31%	694,069	3.33%	688,783	0.58%	13,957	0.00%	60,824	0.23%	2,248,069	1.30%
2028	792,886	0.31%	717,779	3.42%	693,568	0.69%	13,957	0.00%	60,963	0.23%	2,279,153	1.38%
2029	795,336	0.31%	741,520	3.31%	697,603	0.58%	13,957	0.00%	61,103	0.23%	2,309,519	1.33%
2030	797,786	0.31%	766,667	3.39%	702,464	0.70%	13,957	0.00%	61,244	0.23%	2,342,118	1.41%
2031	800,236	0.31%	792,573	3.38%	707,367	0.70%	13,957	0.00%	61,384	0.23%	2,375,517	1.43%
2032	802,686	0.31%	819,249	3.37%	712,312	0.70%	13,957	0.00%	61,525	0.23%	2,409,729	1.44%
2033	805,136	0.31%	846,720	3.35%	717,300	0.70%	13,957	0.00%	61,667	0.23%	2,444,780	1.45%
2034	807,586	0.30%	875,008	3.34%	722,331	0.70%	13,957	0.00%	61,808	0.23%	2,480,690	1.47%
2035	810,036	0.30%	904,130	3.33%	727,405	0.70%	13,957	0.00%	61,950	0.23%	2,517,478	1.48%
2036	812,486	0.30%	934,120	3.32%	732,524	0.70%	13,957	0.00%	62,093	0.23%	2,555,179	1.50%
2037	814,936	0.30%	964,989	3.30%	737,686	0.70%	13,957	0.00%	62,235	0.23%	2,593,803	1.51%
2038	817,386	0.30%	996,773	3.29%	742,892	0.71%	13,957	0.00%	62,379	0.23%	2,633,388	1.53%
2039	819,836	0.30%	1,029,486	3.28%	748,144	0.71%	13,957	0.00%	62,522	0.23%	2,673,944	1.54%
2040	822,286	0.30%	1,063,210	3.28%	753,482	0.71%	13,957	0.00%	62,666	0.23%	2,715,602	1.56%
2041	824,736	0.30%	1,097,920	3.26%	758,867	0.71%	13,957	0.00%	62,810	0.23%	2,758,290	1.57%
2011-2021 Average Yearly Growth (10 Years History)		0.81%		0.91%		3.69%		-3.50%		2.25%		1.71%
2016-2021 Average Yearly Growth (5 Years History)		0.48%		-2.19%		2.25%		-8.76%		1.15%		0.24%
2022-2027 Average Yearly Growth (5 Years)		0.36%		3.47%		0.08%		0.00%		0.86%		1.18%
2022-2032 Average Yearly Growth (10 Years)		0.33%		3.41%		0.47%		0.00%		0.45%		1.31%
2022-2041 Average Yearly Growth (19 Years)		0.31%		3.36%		0.62%		0.00%		0.30%		1.42%

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
South Dakota
Billing Month Basis
Reflecting Demand-Side Programs

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2011	73,977		36,712		34,945		2,628		1,729		149,991	
2012	69,097	-6.60%	34,639	-5.65%	35,388	1.27%	2,620	-0.30%	1,811	4.74%	143,555	-4.29%
2013	74,265	7.48%	37,118	7.16%	36,338	2.68%	2,661	1.56%	1,866	3.04%	152,248	6.06%
2014	75,462	1.61%	38,045	2.50%	37,507	3.22%	2,651	-0.38%	1,753	-6.06%	155,418	2.08%
2015	69,743	-7.58%	35,995	-5.39%	37,084	-1.13%	2,568	-3.13%	1,730	-1.31%	147,120	-5.34%
2016	67,301	-3.50%	35,799	-0.54%	35,875	-3.26%	2,517	-1.99%	1,703	-1.56%	143,195	-2.67%
2017	67,065	-0.35%	37,186	3.87%	35,546	-0.92%	2,487	-1.18%	1,752	2.88%	144,037	0.59%
2018	72,030	7.40%	39,185	5.38%	36,289	2.09%	2,461	-1.05%	1,732	-1.14%	151,697	5.32%
2019	70,773	-1.75%	38,738	-1.14%	35,995	-0.81%	2,397	-2.59%	1,851	6.88%	149,754	-1.28%
2020	68,270	-3.54%	36,426	-5.97%	35,841	-0.43%	1,556	-35.10%	1,682	-9.14%	143,774	-3.99%
2021	66,631	-2.40%	35,305	-3.08%	34,051	-4.99%	1,185	-23.84%	1,799	6.96%	138,971	-3.34%
2022	67,334	1.06%	37,691	6.76%	36,996	8.65%	1,534	29.48%	1,682	-6.48%	145,238	4.51%
2023	67,334	0.00%	37,930	0.63%	37,592	1.61%	1,534	0.00%	1,682	0.00%	146,073	0.58%
2024	67,328	-0.01%	38,209	0.74%	38,148	1.48%	1,534	0.00%	1,682	0.00%	146,902	0.57%
2025	67,317	-0.02%	38,489	0.73%	38,744	1.56%	1,534	0.00%	1,682	0.00%	147,766	0.59%
2026	67,300	-0.03%	38,768	0.73%	39,339	1.54%	1,534	0.00%	1,682	0.00%	148,624	0.58%
2027	67,282	-0.03%	39,005	0.61%	39,892	1.40%	1,534	0.00%	1,682	0.00%	149,396	0.52%
2028	67,259	-0.03%	39,284	0.72%	40,487	1.49%	1,534	0.00%	1,682	0.00%	150,247	0.57%
2029	67,234	-0.04%	39,563	0.71%	41,082	1.47%	1,534	0.00%	1,682	0.00%	151,095	0.56%
2030	67,203	-0.05%	39,842	0.70%	41,677	1.45%	1,534	0.00%	1,682	0.00%	151,938	0.56%
2031	67,169	-0.05%	40,120	0.70%	42,272	1.43%	1,534	0.00%	1,682	0.00%	152,778	0.55%
2032	67,135	-0.05%	40,399	0.70%	42,866	1.41%	1,534	0.00%	1,682	0.00%	153,617	0.55%
2033	67,099	-0.05%	40,678	0.69%	43,461	1.39%	1,534	0.00%	1,682	0.00%	154,455	0.55%
2034	67,059	-0.06%	40,957	0.69%	44,056	1.37%	1,534	0.00%	1,682	0.00%	155,289	0.54%
2035	67,019	-0.06%	41,236	0.68%	44,650	1.35%	1,534	0.00%	1,682	0.00%	156,122	0.54%
2036	66,973	-0.07%	41,515	0.68%	45,245	1.33%	1,534	0.00%	1,682	0.00%	156,950	0.53%
2037	66,928	-0.07%	41,794	0.67%	45,840	1.31%	1,534	0.00%	1,682	0.00%	157,778	0.53%
2038	66,887	-0.06%	42,072	0.67%	46,434	1.30%	1,534	0.00%	1,682	0.00%	158,610	0.53%
2039	66,841	-0.07%	42,351	0.66%	47,029	1.28%	1,534	0.00%	1,682	0.00%	159,437	0.52%
2040	66,792	-0.07%	42,631	0.66%	47,626	1.27%	1,534	0.00%	1,682	0.00%	160,266	0.52%
2041	66,750	-0.06%	42,911	0.66%	48,223	1.25%	1,534	0.00%	1,682	0.00%	161,101	0.52%
2011-2021 Average Yearly Growth (10 Years History)		-0.77%		0.21%		-0.20%		-5.79%		-0.12%		-0.45%
2016-2021 Average Yearly Growth (5 Years History)		-0.04%		-0.41%		-0.70%		-13.81%		0.63%		-0.48%
2022-2027 Average Yearly Growth (5 Years)		-0.02%		0.70%		1.52%		0.00%		0.00%		0.57%
2022-2032 Average Yearly Growth (10 Years)		-0.03%		0.70%		1.48%		0.00%		0.00%		0.56%
2022-2041 Average Yearly Growth (19 Years)		-0.05%		0.69%		1.40%		0.00%		0.00%		0.55%

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
Integrated System
Billing Month Basis
Reflecting Demand-Side Programs

YEAR	Residential Sales (MWh)	% Change	Small C&I Sales (MWh)	% Change	Large C&I Sales (MWh)	% Change	Street Lighting Sales (MWh)	% Change	Miscellaneous Sales (MWh)	% Change	Total Sales (MWh)	% Change	Total Energy Requirements MWh	% Change
2011	946,595		606,453		977,070		29,776		55,783		2,615,677		2,776,082	
2012	957,183	1.12%	679,919	12.11%	948,828	-2.89%	29,802	0.09%	58,464	4.81%	2,674,196	2.24%	2,919,752	5.18%
2013	1,044,088	9.08%	724,960	6.62%	992,069	4.56%	29,584	-0.73%	57,014	-2.48%	2,847,715	6.49%	3,115,064	6.69%
2014	1,088,204	4.23%	784,888	8.27%	1,068,540	7.71%	29,774	0.64%	60,444	6.02%	3,031,850	6.47%	3,250,683	4.35%
2015	1,046,140	-3.87%	785,323	0.06%	1,114,703	4.32%	29,984	0.71%	60,451	0.01%	3,036,601	0.16%	3,263,271	0.39%
2016	997,971	-4.60%	767,183	-2.31%	1,128,305	1.22%	30,006	0.07%	58,780	-2.76%	2,982,245	-1.79%	3,206,737	-1.73%
2017	1,010,208	1.23%	755,955	-1.46%	1,143,403	1.34%	29,564	-1.47%	68,182	15.99%	3,007,312	0.84%	3,251,539	1.40%
2018	1,063,771	5.30%	743,362	-1.67%	1,196,287	4.63%	26,481	-10.43%	66,313	-2.74%	3,096,214	2.96%	3,313,387	1.90%
2019	1,040,900	-2.15%	746,645	0.44%	1,167,534	-2.40%	22,179	-16.25%	64,282	-3.06%	3,041,540	-1.77%	3,301,537	-0.36%
2020	1,032,674	-0.79%	714,131	-4.35%	1,109,310	-4.99%	18,590	-16.18%	63,834	-0.70%	2,938,539	-3.39%	3,169,086	-4.01%
2021	1,010,871	-2.11%	695,050	-2.67%	1,172,183	5.67%	17,880	-3.82%	65,014	1.85%	2,960,997	0.76%	3,240,600	2.26%
2022	1,028,639	1.76%	752,455	8.26%	1,164,816	-0.63%	18,568	3.85%	66,168	1.78%	3,030,648	2.35%	3,268,281	0.85%
2023	1,031,628	0.29%	775,295	3.04%	1,162,825	-0.17%	18,568	0.00%	67,285	1.69%	3,055,602	0.82%	3,295,191	0.82%
2024	1,034,611	0.29%	799,313	3.10%	1,169,335	0.56%	18,568	0.00%	68,404	1.66%	3,090,231	1.13%	3,332,536	1.13%
2025	1,037,638	0.29%	823,445	3.02%	1,175,783	0.55%	18,568	0.00%	68,515	0.16%	3,123,950	1.09%	3,368,899	1.09%
2026	1,040,071	0.23%	848,257	3.01%	1,183,050	0.62%	18,568	0.00%	68,626	0.16%	3,158,573	1.11%	3,406,236	1.11%
2027	1,042,503	0.23%	872,925	2.91%	1,189,001	0.50%	18,568	0.00%	68,739	0.16%	3,191,737	1.05%	3,442,001	1.05%
2028	1,044,930	0.23%	899,156	3.00%	1,196,389	0.62%	18,568	0.00%	68,850	0.16%	3,227,894	1.13%	3,480,993	1.13%
2029	1,047,355	0.23%	925,455	2.92%	1,203,052	0.56%	18,568	0.00%	68,963	0.16%	3,263,394	1.10%	3,519,277	1.10%
2030	1,049,774	0.23%	953,190	3.00%	1,210,566	0.62%	18,568	0.00%	69,076	0.16%	3,301,175	1.16%	3,560,020	1.16%
2031	1,052,190	0.23%	981,718	2.99%	1,218,148	0.63%	18,568	0.00%	69,189	0.16%	3,339,814	1.17%	3,601,688	1.17%
2032	1,054,606	0.23%	1,011,054	2.99%	1,225,798	0.63%	18,568	0.00%	69,302	0.16%	3,379,329	1.18%	3,644,302	1.18%
2033	1,057,020	0.23%	1,041,216	2.98%	1,233,517	0.63%	18,568	0.00%	69,417	0.17%	3,419,739	1.20%	3,687,881	1.20%
2034	1,059,430	0.23%	1,072,236	2.98%	1,241,306	0.63%	18,568	0.00%	69,530	0.16%	3,461,070	1.21%	3,732,453	1.21%
2035	1,061,840	0.23%	1,104,120	2.97%	1,249,165	0.63%	18,568	0.00%	69,645	0.17%	3,503,339	1.22%	3,778,035	1.22%
2036	1,064,244	0.23%	1,136,908	2.97%	1,257,095	0.63%	18,568	0.00%	69,761	0.17%	3,546,577	1.23%	3,824,664	1.23%
2037	1,066,649	0.23%	1,170,618	2.97%	1,265,097	0.64%	18,568	0.00%	69,875	0.16%	3,590,808	1.25%	3,872,363	1.25%
2038	1,069,058	0.23%	1,205,276	2.96%	1,273,171	0.64%	18,568	0.00%	69,992	0.17%	3,636,065	1.26%	3,921,169	1.26%
2039	1,071,462	0.22%	1,240,904	2.96%	1,281,318	0.64%	18,568	0.00%	70,107	0.16%	3,682,360	1.27%	3,971,093	1.27%
2040	1,073,863	0.22%	1,277,585	2.96%	1,289,588	0.65%	18,568	0.00%	70,224	0.17%	3,729,829	1.29%	4,022,285	1.29%
2041	1,076,271	0.22%	1,315,290	2.95%	1,297,934	0.65%	18,568	0.00%	70,340	0.17%	3,778,403	1.30%	4,074,668	1.30%
2011-2021 Average Yearly Growth (10 Years History)		0.49%		0.75%		2.09%		-4.92%		1.63%		1.12%		1.20%
2016-2021 Average Yearly Growth (5 Years History)		0.31%		-1.87%		0.22%		-11.20%		0.79%		-0.35%		-0.08%
2022-2027 Average Yearly Growth (5 Years)		0.27%		3.02%		0.46%		0.00%		0.72%		1.06%		1.06%
2022-2032 Average Yearly Growth (10 Years)		0.25%		2.99%		0.55%		0.00%		0.35%		1.10%		1.10%
2022-2041 Average Yearly Growth (19 Years)		0.23%		2.98%		0.60%		0.00%		0.23%		1.17%		1.17%


Montana-Dakota Integrated System
Historical and Forecasted Sales by Class
MWh
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
Total
LC&I
Residential
SC&I
Miscellaneous & Street Lighting
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year

Montana-Dakota Utiliities Co.
Historical and Forecasted
Residential Sales, Customers, and Use per Customer
Reflecting EE and DR Reductions

North Dakota

Year	Sales (MWh) /*	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2011	687,465		65,196		10,545	
2012	700,451	1.89%	67,888	2,692	10,318	-2.15%
2013	774,916	10.63%	70,949	3,061	10,922	5.86%
2014	812,654	4.87%	73,909	2,960	10,995	0.67%
2015	784,977	-3.41%	76,894	2,985	10,209	-7.16%
2016	746,374	-4.92%	78,553	1,659	9,502	-6.93%
2017	754,400	1.08%	78,564	11	9,602	1.06%
2018	799,661	6.00%	78,510	(54)	10,185	6.07%
2019	784,808	-1.86%	78,567	57	9,989	-1.93%
2020	779,619	-0.66%	78,812	245	9,892	-0.97%
2021	759,330	-2.60%	78,896	84	9,624	-2.71%
2022	776,520	2.26%	79,237	341	9,800	1.82%
2023	779,509	0.38%	79,542	305	9,800	0.00%
2024	782,498	0.38%	79,847	305	9,800	0.00%
2025	785,536	0.39%	80,157	310	9,800	0.00%
2026	787,986	0.31%	80,407	250	9,800	0.00%
2027	790,436	0.31%	80,657	250	9,800	0.00%
2028	792,886	0.31%	80,907	250	9,800	0.00%
2029	795,336	0.31%	81,157	250	9,800	0.00%
2030	797,786	0.31%	81,407	250	9,800	0.00%
2031	800,236	0.31%	81,657	250	9,800	0.00%
2032	802,686	0.31%	81,907	250	9,800	0.00%
2033	805,136	0.31%	82,157	250	9,800	0.00%
2034	807,586	0.30%	82,407	250	9,800	0.00%
2035	810,036	0.30%	82,657	250	9,800	0.00%
2036	812,486	0.30%	82,907	250	9,800	0.00%
2037	814,936	0.30%	83,157	250	9,800	0.00%
2038	817,386	0.30%	83,407	250	9,800	0.00%
2039	819,836	0.30%	83,657	250	9,800	0.00%
2040	822,286	0.30%	83,907	250	9,800	0.00%
2041	824,736	0.30%	84,157	250	9,800	0.00%

	Sales	Custs	Use/Cust
2011-2021 Average Yearly Growth			
(10 Years History)	0.81%	1.83%	-1.00%
2016-2021 Average Yearly Growth			
(5 Years History)	0.48%	0.09%	0.38%
2022-2027 Average Yearly Growth			
(5 Years)	0.36%	0.36%	0.00%
2022-2032 Average Yearly Growth			
(10 Years)	0.33%	0.33%	0.00%
2022-2041 Average Yearly Growth			
(19 Years)	0.31%	0.31%	0.00%

South Dakota

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2011	73,977		6,602		11,205	
2012	69,097	-6.60%	6,616	14	10,444	-6.79%
2013	74,265	7.48%	6,590	(26)	11,269	7.90%
2014	75,462	1.61%	6,580	(10)	11,468	1.77%
2015	69,743	-7.58%	6,662	82	10,469	-8.72%
2016	67,301	-3.50%	6,546	(116)	10,281	-1.79%
2017	67,065	-0.35%	6,533	(13)	10,266	-0.15%
2018	72,030	7.40%	6,496	(37)	11,088	8.02%
2019	70,773	-1.75%	6,442	(54)	10,986	-0.92%
2020	68,270	-3.54%	6,441	(1)	10,599	-3.52%
2021	66,631	-2.40%	6,423	(18)	10,374	-2.13%
2022	67,334	1.06%	6,447	24	10,444	0.68%
2023	67,334	0.00%	6,447	-	10,444	0.00%
2024	67,328	-0.01%	6,447	(1)	10,444	0.00%
2025	67,317	-0.02%	6,446	(1)	10,444	0.00%
2026	67,300	-0.03%	6,444	(2)	10,444	0.00%
2027	67,282	-0.03%	6,442	(2)	10,444	0.00%
2028	67,259	-0.03%	6,440	(2)	10,444	0.00%
2029	67,234	-0.04%	6,438	(2)	10,444	0.00%
2030	67,203	-0.05%	6,435	(3)	10,444	0.00%
2031	67,169	-0.05%	6,431	(3)	10,444	0.00%
2032	67,135	-0.05%	6,428	(3)	10,444	0.00%
2033	67,099	-0.05%	6,425	(4)	10,444	0.00%
2034	67,059	-0.06%	6,421	(4)	10,444	0.00%
2035	67,019	-0.06%	6,417	(4)	10,444	0.00%
2036	66,973	-0.07%	6,413	(4)	10,444	0.00%
2037	66,928	-0.07%	6,408	(4)	10,444	0.00%
2038	66,887	-0.06%	6,404	(4)	10,444	0.00%
2039	66,841	-0.07%	6,400	(4)	10,444	0.00%
2040	66,792	-0.07%	6,395	(5)	10,444	0.00%
2041	66,750	-0.06%	6,391	(4)	10,444	0.00%

	Sales	Custs	Use/Cust
2011-2021 Average Yearly Growth			
(10 Years History)	-0.77%	-0.32%	-0.44%
2016-2021 Average Yearly Growth			
(5 Years History)	-0.04%	-0.42%	0.38%
2022-2027 Average Yearly Growth			
(5 Years)	-0.016%	-0.016%	0.00%
2022-2032 Average Yearly Growth			
(10 Years)	-0.030%	-0.030%	0.00%
2022-2041 Average Yearly Growth			
(19 Years)	-0.05%	-0.05%	0.00%

Montana

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2011	185,153		18,883		9,805	
2012	187,635	1.34%	19,191	308	9,777	-0.29%
2013	194,907	3.88%	19,616	425	9,936	1.63%
2014	200,088	2.66%	19,918	302	10,046	1.10%
2015	191,420	-4.33%	20,135	217	9,507	-5.36%
2016	184,296	-3.72%	20,128	(7)	9,156	-3.69%
2017	188,743	2.41%	19,981	(147)	9,446	3.17%
2018	192,080	1.77%	19,911	(70)	9,647	2.13%
2019	185,319	-3.52%	19,896	(15)	9,314	-3.45%
2020	184,785	-0.29%	19,798	(98)	9,334	0.21%
2021	184,910	0.07%	19,746	(53)	9,365	0.33%
2022	185,402	0.27%	19,798	53	9,365	0.00%
2023	185,402	0.00%	19,798	-	9,365	0.00%
2024	185,402	0.00%	19,798	-	9,365	0.00%
2025	185,402	0.00%	19,798	-	9,365	0.00%
2026	185,402	0.00%	19,798	-	9,365	0.00%
2027	185,402	0.00%	19,798	-	9,365	0.00%
2028	185,402	0.00%	19,798	-	9,365	0.00%
2029	185,402	0.00%	19,798	-	9,365	0.00%
2030	185,402	0.00%	19,798	-	9,365	0.00%
2031	185,402	0.00%	19,798	-	9,365	0.00%
2032	185,402	0.00%	19,798	-	9,365	0.00%
2033	185,402	0.00%	19,798	-	9,365	0.00%
2034	185,402	0.00%	19,798	-	9,365	0.00%
2035	185,402	0.00%	19,798	-	9,365	0.00%
2036	185,402	0.00%	19,798	-	9,365	0.00%
2037	185,402	0.00%	19,798	-	9,365	0.00%
2038	185,402	0.00%	19,798	-	9,365	0.00%
2039	185,402	0.00%	19,798	-	9,365	0.00%
2040	185,402	0.00%	19,798	-	9,365	0.00%
2041	185,402	0.00%	19,798	-	9,365	0.00%

	Sales	Custs	Use/Cust
2011-2021 Average Yearly Growth			
(10 Years History)	-0.29%	0.35%	-0.63%
2016-2021 Average Yearly Growth			
(5 Years History)	-0.24%	-0.35%	0.12%
2022-2027 Average Yearly Growth			
(5 Years)	0.00%	0.00%	0.00%
2022-2032 Average Yearly Growth			
(10 Years)	0.00%	0.00%	0.00%
2022-2041 Average Yearly Growth			
(19 Years)	0.00%	0.00%	0.00%

/* **Forecasted Sales** = (Ave Custs x Avg Use Per Cust); AC Cycling program has been cancelled.

Montana-Dakota Utilities Co.
Historical and Forecasted
Residential Sales, Customers, and Use per Customer
Integrated System
with DSM Reductions

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2011	946,595		90,681		10,439	
2012	957,183	1.12%	93,695	3,014	10,216	-2.13%
2013	1,044,088	9.08%	97,155	3,460	10,747	5.19%
2014	1,088,204	4.23%	100,407	3,252	10,838	0.85%
2015	1,046,140	-3.87%	103,691	3,284	10,089	-6.91%
2016	997,971	-4.60%	105,227	1,536	9,484	-6.00%
2017	1,010,208	1.23%	105,078	(149)	9,614	1.37%
2018	1,063,771	5.30%	104,917	(161)	10,139	5.46%
2019	1,040,900	-2.15%	104,905	(12)	9,922	-2.14%
2020	1,032,674	-0.79%	105,051	146	9,830	-0.93%
2021	1,010,871	-2.11%	105,065	14	9,621	-2.12%
2022	1,029,256	1.82%	105,482	417	9,758	1.42%
2023	1,032,245	0.29%	105,787	305	9,758	0.00%
2024	1,035,228	0.29%	106,091	304	9,758	0.00%
2025	1,038,255	0.29%	106,400	309	9,758	0.00%
2026	1,040,688	0.23%	106,649	248	9,758	0.00%
2027	1,043,120	0.23%	106,897	248	9,758	0.00%
2028	1,045,547	0.23%	107,145	248	9,758	0.00%
2029	1,047,972	0.23%	107,392	248	9,758	0.00%
2030	1,050,391	0.23%	107,639	247	9,758	0.00%
2031	1,052,807	0.23%	107,886	247	9,759	0.00%
2032	1,055,223	0.23%	108,133	247	9,759	0.00%
2033	1,057,637	0.23%	108,379	246	9,759	0.00%
2034	1,060,047	0.23%	108,626	246	9,759	0.00%
2035	1,062,457	0.23%	108,872	246	9,759	0.00%
2036	1,064,861	0.23%	109,117	246	9,759	0.00%
2037	1,067,266	0.23%	109,363	246	9,759	0.00%
2038	1,069,675	0.23%	109,609	246	9,759	0.00%
2039	1,072,079	0.22%	109,855	246	9,759	0.00%
2040	1,074,480	0.22%	110,100	245	9,759	0.00%
2041	1,076,888	0.22%	110,346	246	9,759	0.00%

	Sales	**Custs**	**Use/Cust**
2011-2021 Average Yearly Growth (10 Years History)	0.49%	1.40%	-0.89%
2016-2021 Average Yearly Growth (5 Years History)	0.31%	-0.02%	0.34%
2022-2027 Average Yearly Growth (5 Years)	0.27%	0.27%	0.00%
2022-2032 Average Yearly Growth (10 Years)	0.25%	0.25%	0.00%
2022-2041 Average Yearly Growth (19 Years)	0.23%	0.23%	0.00%

4. Forecast Uncertainty

Forecasting is a process permeated with uncertainty. The demand and energy projections produced by the econometric process described in the first three sections results in a forecast based solely on the information used as inputs to the equations. For purposes of integrated resource planning, a single forecast does not allow the analysis of risk and uncertainty associated with the input assumptions. Robust resource decisions cannot be made unless uncertainty is considered. That uncertainty can be expressed through peak demand forecasts that reflect temperatures which correspond to higher confidence levels as well as by evaluating high-growth and low-growth scenarios in energy forecasts.

4.1. Effect of Temperature on Peak Demand

The final forecast results given in Section 3 were developed assuming average temperatures at the time of the system peak. However, there are some shortcomings associated with this methodology. First, with an average temperature forecast, by definition actual peak demand would have a 50% probability of being lower than the forecast values and a 50% probability of exceeding forecast values (50/50 forecast). Second, there can be an appearance that peak demand is under forecasted when the actual temperature at the time of system peak exceeds average temperatures.

A study is conducted periodically by Montana-Dakota's System Operations & Planning staff to establish the relationship between summer peak demand and temperature at the time of system peak. As part of the study, the company's historical June, July and August demands and corresponding temperatures at times when the temperatures equaled or exceeded 85°F on Mondays through Thursdays are analyzed. The 2021 study results indicated that each one degree increase in temperature at the time of summer peak would result in an increase of approximately 7.4 MW in summer peak demand.

Since Montana-Dakota does not have actual hourly load available by state or by customer class, this study is conducted on an Integrated System basis and it is not possible to produce these results by jurisdiction or by customer sector.

Further statistical analysis of temperatures at the time of system peak for the years 1991 through 2020 (prior to 1984 the company was a winter peaking utility) provided the results shown in the following table:

Temperature Probability at Peak and Effect on Peak Demand

Probability	Weighted Average Temperature	Approximate Increase in Summer Peak Demand (MW)
50%	96.1	0.0
75%	100.1	29.6
80%	101.1	37.0
85%	102.2	45.2
90%	103.7	56.3
95%	105.9	72.6
97%	107.3	83.0

*/ Using 7.4 MW/Degree F

As the table shows, there is a 90% probability that actual temperatures at the time of the system peak will not exceed 103.7°F. At this temperature, 56.3 MW of capacity, in addition to that which was forecasted, is needed to meet the system peak demand that may occur. This is called the 90/10 forecast and provides a peak demand forecast for extreme weather conditions. It represents a 90% probability that the actual peak demand would not exceed the forecast value and a 10% probability that the actual peak demand would be higher than the forecast value.

The following table summarizes the results of the 50/50 probability and 90/10 probability demand forecasts. The 2022 90/10 forecasted demand is calculated to be the 2022 50/50 forecasted demand plus 56.3 MW as shown in the table above. From that point, the growth rate for the 90/10 forecast scenario is assumed to be the same as that of the 50/50 forecast scenario.

Alternate Summer Peak Demand Forecast Comparison

Year	Base Forecast (96.1 degrees F) 50/50 Forecast (MW)	Growth Rate	Alternate Forecast (103.7 degrees F) 90/10 Forecast (MW) */
2022	580.6		636.9
2023	586.6	1.03%	643.5
2024	593.4	1.16%	651.0
2025	600.2	1.14%	658.5
2026	607.0	1.13%	666.0
2027	613.8	1.12%	673.5
2028	620.8	1.14%	681.2
2029	627.7	1.11%	688.8
2030	634.8	1.13%	696.6
2031	641.9	1.13%	704.5
2032	649.2	1.14%	712.5
2033	656.6	1.14%	720.6
2034	664.1	1.14%	728.8
2035	671.6	1.13%	737.0
2036	679.2	1.13%	745.3
2037	687.0	1.15%	753.9
2038	694.8	1.13%	762.5
2039	702.7	1.14%	771.2
2040	710.7	1.14%	780.0
2041	718.8	1.14%	788.9

*/ The growth rate for the 90/10 Forecast scenario is assumed to be the same as that of the 50/50 Forecast scenario.

4.2. High-Growth and Low-Growth Scenario Forecasts

Another approach to express uncertainty in this forecast was to simulate high-growth and low-growth scenarios which represent the corresponding economic conditions that may occur. These high-growth and low-growth scenario forecasts were developed as follows.

Historical total energy was analyzed in order to find a period of time during which unusually high growth was experienced and a period of time during which unusually low growth was experienced. Based on the historical sales data given on Appendix A-10 and graphed on Appendix A-11, the average growth rate that occurred from 1977 to 1985 (4.4%) was used as the basis for the high growth rate and the average growth rate that occurred from 1985 to 1993 (0.5%) was used as the low growth rate. Both periods consist of eight years of history.

As a result, for the high-growth scenario, an average growth rate of 4.4% per year was assumed to occur during the 20-year forecast horizon. For the low-growth scenario, an average growth rate of 0.5% per year was assumed to occur during the 20-year forecast horizon.

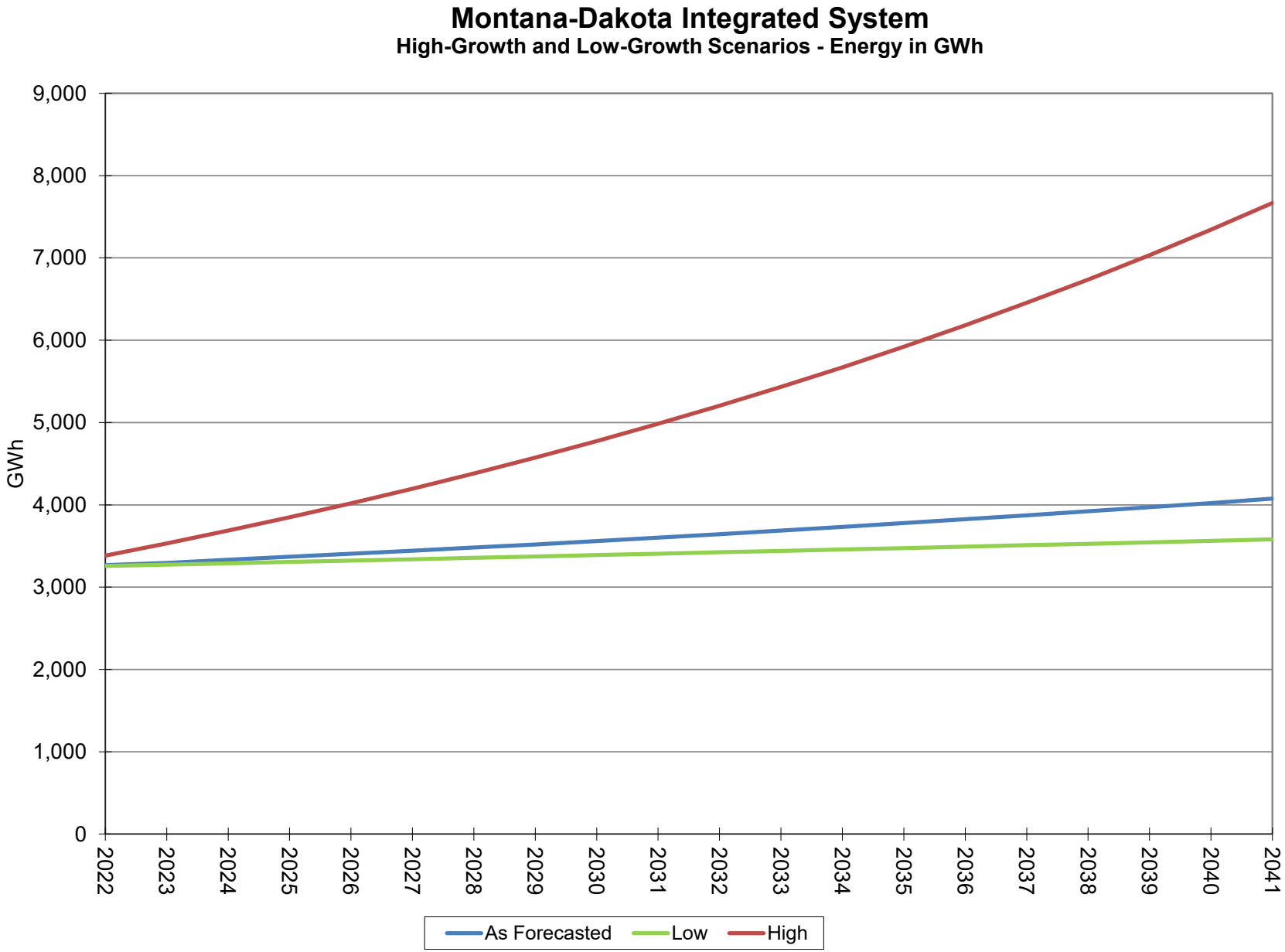
Demand for each scenario was derived by applying the load factors calculated from the base forecast to the high-growth and low-growth scenario forecasted energy.

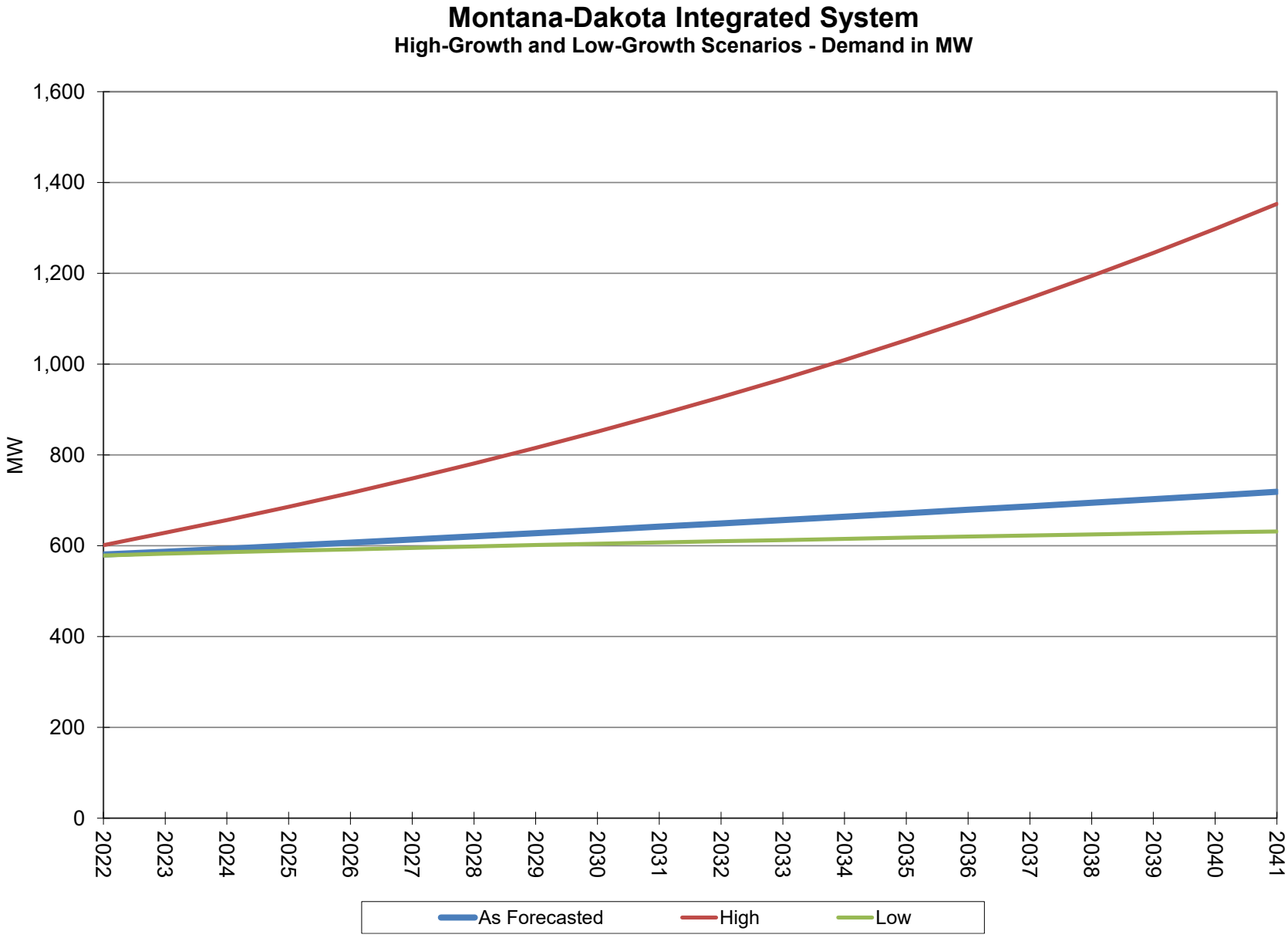
The results of the high-growth and low-growth scenarios for energy and demand are given below. The following two pages present the graphs of the numeric results.

High-Growth and Low-Growth Scenarios
Total Annual Energy (GWh) and
Summer Peak Demand (MW)

	ENERGY			DEMAND		
	Forecast	HIGH 1/	LOW 2/	Forecast	HIGH	LOW
2022	3,268.3	3,383.2	3,256.8	580.6	601.0	578.6
2023	3,295.2	3,532.1	3,273.1	586.6	628.8	582.7
2024	3,332.5	3,687.5	3,289.5	593.4	656.6	585.7
2025	3,368.9	3,849.8	3,305.9	600.2	685.9	589.0
2026	3,406.2	4,019.2	3,322.4	607.0	716.2	592.0
2027	3,442.0	4,196.0	3,339.0	613.8	748.2	595.4
2028	3,481.0	4,380.6	3,355.7	620.8	781.2	598.4
2029	3,519.3	4,573.3	3,372.5	627.7	815.6	601.5
2030	3,560.0	4,774.5	3,389.4	634.8	851.3	604.3
2031	3,601.7	4,984.6	3,406.3	641.9	888.4	607.1
2032	3,644.3	5,203.9	3,423.3	649.2	927.1	609.9
2033	3,687.9	5,432.9	3,440.4	656.6	967.3	612.6
2034	3,732.5	5,671.9	3,457.6	664.1	1009.2	615.2
2035	3,778.0	5,921.5	3,474.9	671.6	1052.7	617.7
2036	3,824.7	6,182.0	3,492.3	679.2	1097.9	620.2
2037	3,872.4	6,454.0	3,509.8	687.0	1145.0	622.7
2038	3,921.2	6,738.0	3,527.3	694.8	1193.9	625.0
2039	3,971.1	7,034.5	3,544.9	702.7	1244.8	627.3
2040	4,022.3	7,344.0	3,562.6	710.7	1297.6	629.5
2041	4,074.7	7,667.1	3,580.4	718.8	1352.5	631.6

1/ High forecast assumes 4.4% growth per year (actual 77-85 growth).
2/ Low forecast assumes 0.5% growth per year (actual 85-93 growth).


Montana-Dakota Integrated System
High-Growth and Low-Growth Scenarios - Energy in GWh
GWh
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
As Forecasted
Low
High


Montana-Dakota Integrated System
High-Growth and Low-Growth Scenarios - Demand in MW
MW
1,600
1,400
1,200
1,000
800
600
400
200
0
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
As Forecasted
High
Low

5. Allocations

Montana-Dakota's Integrated System consists of the service territories in Montana, North Dakota, and South Dakota. The sales forecasts were developed by sector for each state while the demand forecast was developed for the Integrated System in total. Montana-Dakota's Financial Forecasting Department requires forecasts of monthly peak demands by state, and monthly sales and energy requirements by sector for each state. Therefore, disaggregating the Integrated System forecast into peaks by state and month as well as disaggregating annual sales into monthly sales is necessary.

5.1. Sales and Customer Allocations by Month

The Financial Forecasting Department requires a calendar month forecast for each state. This is accomplished through a two-step process. First, monthly estimates of energy and customers by sector are determined by calculating the ratio of the monthly bill cycle value to the annual amount for the 5-year periods of time for 2016-2020 for both sales and for customers. Results were averaged for each month for each sector for each state. These ratios were then applied to the forecasts by sector and by state (annual amounts) to arrive at monthly billing-cycle sales and customers. The allocation factors for billing-cycle sales and customers for each state, month and sector are shown in Appendix A-8. Billing-month to calendar-month apportionment factors are then used to convert from billing-month to calendar-month sales. These apportionment factors are shown in Appendix A-9.

5.2. Peak Demand Allocation by State

The forecasted summer and winter peak demand for the Integrated System were allocated to the states based on the percentage of each state's forecasted annual requirements to the total Integrated System forecasted requirements for each year. This methodology permitted the seasonal demand forecasts by state to grow at the same rate as annual energy requirements for each state.

5.3. Peak Demand Allocations by Month

Allocating peak demand on a monthly basis by state consists of several steps:

1. Ratios of each monthly peak to the seasonal peak were calculated for each state for the period May 2006 through April 2021. (The summer season is May through October, and the winter season is November through April of the next year.)

2. The ratios determined by state in Step 1 from each month were averaged to determine which month of the season was to be the peak month, second highest month, etc. Final results of this step indicate that July and January are the peak months for the summer and winter seasons, respectively. (See the table below which gives the monthly ranks by state for each month and season.)

Monthly Average of the Ratios of Monthly Peak To Seasonal Peak for the Integrated System (Number in Parenthesis is Rank)

	Summer Season					
	ND		**SD**		**MT**	
MAY	(6)	0.7120	(6)	0.6272	(6)	0.6925
JUNE	(3)	0.8906	(3)	0.8602	(3)	0.8749
JULY	(1)	0.9735	(1)	0.9538	(1)	0.9787
AUGUST	(2)	0.9717	(2)	0.9199	(2)	0.9492
SEPTEMBER	(4)	0.8383	(4)	0.7915	(4)	0.8317
OCTOBER	(5)	0.7275	(5)	0.7474	(5)	0.7122

	Winter Season					
	ND		**SD**		**MT**	
NOV	(5)	0.8549	(4)	0.8698	(4)	0.8826
DEC	(2)	0.9378	(2)	0.9343	(2)	0.9545
JAN	(1)	0.9879	(1)	0.9512	(1)	0.9321
FEB	(3)	0.9290	(3)	0.9286	(3)	0.9370
MARCH	(4)	0.8637	(5)	0.8622	(5)	0.8573
APRIL	(6)	0.7597	(6)	0.7502	(6)	0.7618

3. For each season, the monthly ratios determined in Step 1 for the May 2016 through April 2021 time period were sorted into rank sequence for each year of historical data and averaged across the years for each ranking. Applying the ranked average ratios from this step to the proper month according to the rank determined in Step 2 results in the monthly assignments given in the following table.

ND 5-Year Average Monthly Ratios of Seasonal Peaks

January	1.0000	July	1.0000
February	0.9233	August	0.9617
March	0.8458	September	0.8535
April	0.7438	October	0.7691
May	0.6939	November	0.8123
June	0.9083	December	0.9462

SD 5-Year Average Monthly Ratios of Seasonal Peaks

January	1.0000	July	1.0000
February	0.8928	August	0.9190
March	0.8310	September	0.7741
April	0.7169	October	0.7031
May	0.5976	November	0.8647
June	0.8470	December	0.9406

MT 5-Year Average Monthly Ratios of Seasonal Peaks

January	1.0000	*/	July	1.0000
February	0.9070		August	0.9399
March	0.8027		September	0.7958
April	0.7655		October	0.7615
May	0.6923		November	0.8579
June	0.8246		December	0.9493

*/ The December and January ratios for the state of Montana as determined in Step 2 above were very close. Since January is typically the peak month, the ratios used here were flipped between December and January, allowing the peak month to continue to be January.

5.4. Annual Energy and Seasonal Peak Demand by State

Historical and forecasted sales by sector and in total are shown on the graphs on Appendices C-1 through C-7.

The forecasts of summer and winter peak demands and annual energy through the year 2041 for the states of Montana, North Dakota, and South Dakota are also given in Appendix C. The peak demand and annual energy for Montana, North Dakota, South Dakota, and the Integrated System are shown on Appendix C-8, C-9, C-10, and C-11. Appendices C-12, C-13, and C-14 graphically portray the tables in Appendices C-8 through C-11.

5.5. Sales Forecasts by Sector

The monthly forecasts for the ten-year period 2022-2031, which result from the allocation method described above, are shown in Appendices D, E, F, and G for Montana, North Dakota, South Dakota, and the Integrated System, respectively.

Wyoming System

Overview

Econometric equations were used to develop a long-range (20-year) electric load forecast for Montana-Dakota's Wyoming System; this analysis was begun in late 2021.

Montana-Dakota's Wyoming electric system, commonly referred to as the Sheridan System, is not interconnected with the company's other three jurisdictions and is located in the Western Interconnection. The Sheridan System serves approximately 16,300 customers in the communities of Acme, Big Horn, Dayton, Ranchester, Sheridan, and Story, all located in Sheridan County. The Sheridan System was generally a winter peaking system until migrating to a summer peaking system in 2001. The Sheridan System has experienced winter peaks that exceeded the corresponding summer peak in 2008 and 2009, but at this time that appears to be just a short-term variation.

The Sheridan System is supplied by wholesale power that Montana-Dakota purchases from Black Hills Power, Inc. (Black Hills) through a power purchase agreement that runs through December 31, 2023. The agreement with Black Hills provides capacity and energy for the Sheridan System. Montana-Dakota jointly owns 25 MW of a generating resource with Black Hills and the City of Gillette, Wygen III, which came on-line in April 2010 and is also used to serve the Sheridan System.

The forecast results provided in this load forecast report reflect the demand-side management (DSM) programs that are forecasted to be implemented by Montana-Dakota in Wyoming in 2021 and beyond. At this time, the Sheridan Load Management Rate is the only DSM program in place on Montana-Dakota's Sheridan System, and no other programs are expected or planned.

The Wyoming System load forecast methodology and results are given in detail on the following sections.

The monthly forecasts for the ten-year period 2022-2031 are shown in Appendix K.

1. Forecast Methodology - Sales

The Wyoming System sales forecast is disaggregated into five sales sectors:

- Residential sector.
- Small Commercial & Industrial (SC&I) sector. This sector consists of those commercial and industrial customers whose monthly peak demand averages less than 50 kilowatts over a year's time.
- Large Commercial & Industrial (LC&I) sector. This sector consists of those commercial and industrial customers whose monthly peak demand averages more than 50 kilowatts over a year's time.
- Street Lighting. This sector consists of energy for public street and highway lighting.
- Miscellaneous. This sector includes interdepartmental sales and company use.

Econometric equations were developed to forecast sales for the three primary customer categories – residential, SC&I, and LC&I – while the sales forecast for the street lighting and miscellaneous sectors were held constant at actual 2020 levels.

The development of the sales forecasts for each of the five end-use sectors is explained below.

1.1 Residential

The residential sales forecast is derived by developing a forecast of residential use per customer and a forecast of number of residential customers. In this way, it is possible for residential sales to depend on variables such as the residential price of electricity, alternate fuel prices for residential customers (natural gas), personal income per household, heating degree days, cooling degree days, number of households, and year. Higher electricity prices and lower income may result in less electricity use, while higher alternate fuel prices as well as colder than normal winters (more heating degree days) and hotter than normal summers (more cooling degree days) may result in more electricity consumption. Historical and forecasted values for these variables are available and were tested for statistical significance in developing the residential econometric equation. The historical and forecasted values for these variables are given in Appendix I.

The final use per residential customer model is as follows:

$$\ln(res\_upc_t) = a + b^{HDD} \times HDD_t + b^{CDD} \times CDD_t + b^{yr} \times year_t + e_t$$

where:

ln	= natural logarithm;
res_upc_t	= residential use per customer;
HDD_t	= heating degree days;
CDD_t	= cooling degree days; and
$year_t$	= year (1996-2020) which serves as a time trend variable.

The *a* and the *b*'s are the estimated parameters, and e_t is the error term. All variables are actual calendar year values.

This best fit model projections were too conservative as compared to the growth that has been experienced and are expected to continue, in the MDU territory. Therefore, the residential use per customer is set to the average of the most recent 10 years and then remains flat for the remainder of the forecast.

The model for the number of customers (bills) is as follows:

$$\ln(res\_bills_t) = a + b^{hhld} \times \ln(hholds_t) + e_t$$

In this equation, *a* and *b* are estimated parameters; e_t is the error term, the dependent variable is the natural log of the number of bills and the only explanatory variable is the natural log of the number of households.

Household numbers are available from W&P for the historical time period from the U.S. Department of Commerce. Household projections are made by W&P.

Historical and forecasted customer (bill) and household values are given in Appendix I-6.

1.2 Small Commercial & Industrial

Small commercial & industrial (SC&I) sales could potentially depend on variables such as the SC&I price of electricity, alternate fuel prices for SC&I customers (natural gas), employment, heating degree days, cooling degree days, and year. Higher electricity prices may result in less electricity use, while higher alternate fuel prices and higher employment as well as colder than normal winters (more heating degree days) and hotter than normal summers (more cooling degree days) may result in more electricity consumption. Historical and forecasted values for these variables are available and were tested for statistical significance in developing the SC&I econometric equation. The historical and forecasted values for these variables are given in Appendix I.

In contrast to the residential sales forecast, a single model is used to forecast small commercial & industrial (SCI) sales. The final model is as follows:

$$\ln(sci\_kwh_t) = a + b^{CDD} \times CDD_t + b^{Emp} \times \ln(emp\_no\_farm\_mining_t) + e_t$$

where:

ln	= natural logarithm;
sci_kwh_t	= small commercial & industrial sales;
CDD_t	= cooling degree days; and
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining.

In this equation, *a* and the *b*'s are estimated parameters; e_t is the error term.

Employment numbers are available from W&P for the historical time period from the U.S. Department of Commerce, Bureau of Economic Analysis. Employment projections for Sheridan County are made by W&P.

Historical employment as well as employment as forecasted by W&P are given on Appendix I-7.

1.3 Large Commercial & Industrial

LC&I sales could depend on variables such as the LC&I price of electricity, alternate fuel prices for LC&I customers (natural gas), heating degree days, cooling degree days, employment, and year. Higher electricity prices can result in less electricity use, while higher alternate fuel prices and higher employment as well as colder than normal winters (more heating degree days) and hotter than normal summers (more cooling degree days) could result in more electricity consumption. Historical and forecasted values for these variables are available and were tested for statistical significance in developing the LC&I econometric equation. The historical and forecasted values for these variables are given in Appendix I.

As with SCI sales, general large commercial & industrial (LCI) sales are forecast using a single model. The final model is as follows:

$$\ln(lci\_kwh_t) = a + b^{Emp} \times \ln(emp\_no\_farm\_mining_t) + e_t$$

where:

ln	= natural logarithm;
lci_kwh_t	= large commercial & industrial sales; and
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining.

In this equation, *a* and *b* are estimated parameters; e_t is the error term.

The Personal Consumption Expenditure Deflator, whose values are given on Appendix I-5, was used to place the LC&I price of electricity into real dollar terms for both the historical and forecasted time periods.

1.4 Street Lighting

An LED replacement project took place in 2019, from February through April, that brought about an average monthly load reduction of approximately 58% of the 2018 monthly averages. The electric sales forecast for the street lighting sector is set with the 2020 actual level, which is the result of a full year of LED replacements, and then were held constant for the remainder of the forecast.

1.5 Miscellaneous

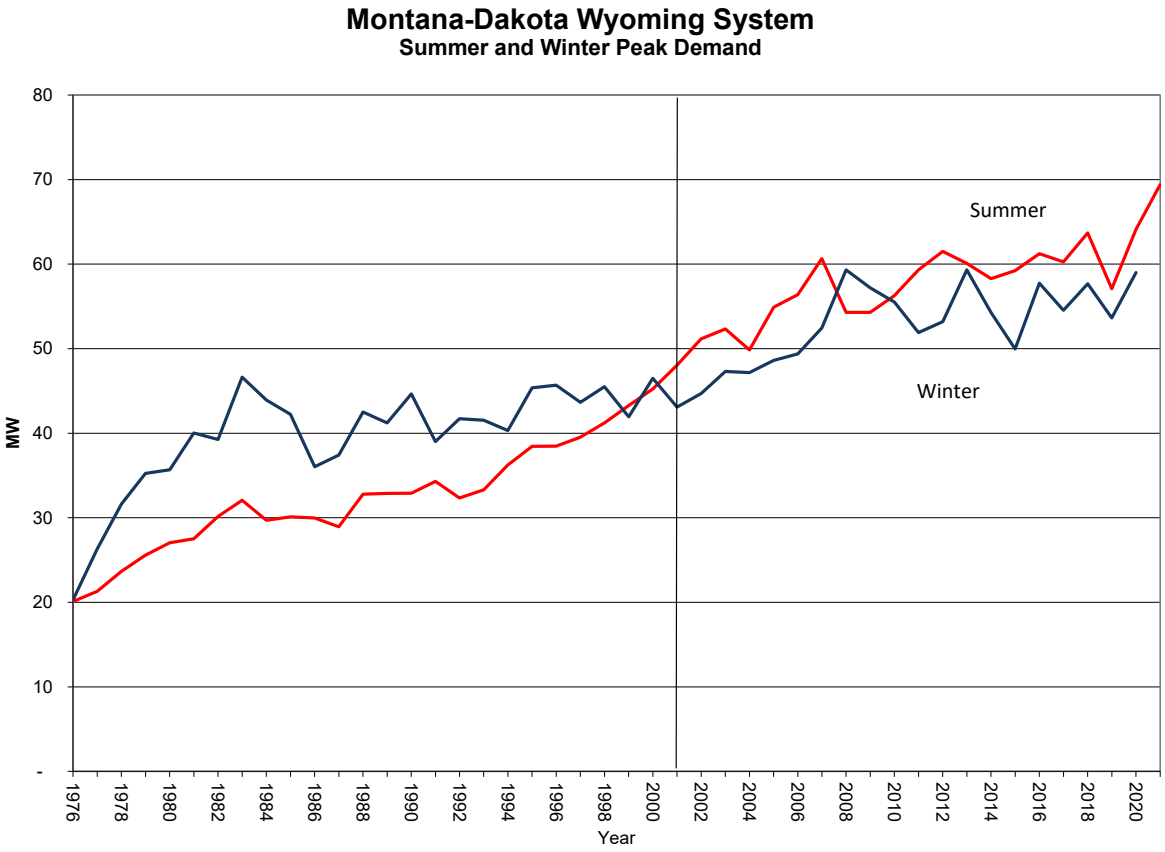
The miscellaneous sales sector is made up of sales for the following two end-uses:

1. Interdepartmental Sales – gas utility use of electricity
2. Company Use - Montana-Dakota offices

The forecast for Interdepartmental Sales was held constant at actual 2020 levels.

2. Forecast Methodology – Peak Demand

Wyoming System historical peak demand is shown on the chart below.



Montana-Dakota's Wyoming System was winter peaking prior to 2001. From approximately 1983 to 1998, the spread between the winter and summer peaks began to narrow and in 2001 Montana-Dakota's Wyoming System became summer peaking. From Montana-Dakota's Residential Energy Use Surveys and other available information, it is known that air conditioning has become more prevalent over time and air conditioning load drove much of the increase in summer peak demand. Although in 2008 and 2009 the Montana-Dakota Wyoming System again experienced its annual peak in the winter season, it is projected that the Wyoming System will continue to be a summer peaking system.

The Wyoming System peak demand forecast is developed on a total Sheridan System basis; it is not disaggregated by sector. The summer and winter peak demand forecasts were developed through the use of econometric models.

For the summer peak, econometric equations were run with summer peak demand as the dependent variable and time, Sheridan temperature at the time of the summer peak, and annual energy requirements as independent variables. All three were found to be statistically significant variables.

The summer peak demand model is as follows:

$$peak\_load_t = a + b^{PTemp} \times peak\_temp_t + b^{Sales} \times system\_kwh_t + b^{yr} \times year_t + e_t$$

where:

$peak\_load_t$	= summer peak demand;
$peak\_temp_t$	= Sheridan temperature at time of summer peak;
$system\_kwh_t$	= annual energy requirements; and
$year_t$	= year (1991-2020), which serves as a time trend variable.

In this equation, *a* and the *b*'s are estimated parameters; e_t is the error term.

For the summer peak forecast, a temperature of 94.2 degrees F was used in the equation which is the 10-year average (2012-2021) of the Sheridan temperatures at the time of the summer peak.

For the winter peak, econometric equations were run with winter peak demand as the dependent variable and time, Sheridan temperature at the time of the peak, and annual energy requirements as independent variables. Time was not found to be a statistically significant variable. An additional variable testing the statistical significance of Christmas lighting load was added to the model. This variable was a switch to indicate whether or not Christmas lighting was in use at the time of the winter peak (Christmas lighting is "on" if the peak occurs within two weeks prior to Christmas and one week after, and the Christmas lighting switch is "off" if the winter peak occurs outside of that window.) It was found that modeling whether or not Christmas lighting is on at the time of the winter peak was not statistically significant.

The winter peak demand model is as follows:

$$peak\_load_t = a + b^{PTemp} \times peak\_temp_t + b^{Sales} \times system\_kwh_t + b^{LtgSwch} \times ltg\_expected\_value + b^{yr} \times year_t + e_t$$

where:

peak_load$_t$ = winter peak demand;

peak_temp$_t$ = weighted average temp at time of winter peak; and

system_kwh$_t$ = annual energy requirements.

In this equation, ***a*** and the ***b***'s are estimated parameters; e_t is the error term.

For the winter peak forecast, a temperature of -3.9 degrees F was used in the equation which is the 10-year average (2011-2020) of the Sheridan temperatures at the time of the winter peak.

3. Forecast Results – Sales and Demand

The forecast methodology for both sales and demand as described in Sections 1 and 2 results in the initial sales forecasts by sales class and the initial demand forecast. Reductions to the sales forecasts by class and to the demand forecasts are made to reflect Demand-Side Management programs that are being implemented. Once these reductions are reflected in the sales forecasts, the total of the sales forecasts by class are adjusted by the loss factor to arrive at the final forecast of energy requirements.

3.1. Demand-Side Management (DSM) Reductions

Montana-Dakota continues to offer the Special Residential Controlled Electric Service Rate 11 and Special General Controlled Electric Service Rate 22 (also known as load management rates) to customers on its Sheridan Electric System. The reduction in demand is reflected in the winter demand numbers.

All other DSM programs have been suspended by the Wyoming Public Service Commission. Since the timing and magnitude of any future DSM is uncertain, this forecast reflects no additional reductions for future DSM programs.

3.2. Losses

The sales forecasts reflect the energy delivered to Montana-Dakota's customers' meters. The total amount of electricity purchased to meet Montana-Dakota's customers' energy needs is greater than what is delivered to the meters and is called the 'Total Energy Requirements.' The difference between the sales and energy requirements is due to losses that occur.

The annual energy loss percentage, defined as a fraction of the total annual energy requirements, has varied from year to year. Therefore, these loss percentages are averaged over a ten-year time period. The average value for the past ten years is 4.201%. Using this value for all future years, the total energy requirements are calculated for each year during the study period.

3.3. Final Energy Requirements Forecast

The forecasted sales and system peak demand are first adjusted to reflect the effects of the DSM programs that are being implemented as explained in Section 3.1 and then adjusted for losses as outlined in Section 3.2 to calculate the total energy requirements and peak demand forecasts. This is the amount of energy and capacity that needs to be supplied to meet Montana-Dakota's Wyoming electric customers' energy needs.

The final forecast results are presented on the following several pages. A table summarizing the Wyoming System energy requirements and seasonal peak demand is given first, followed by a graph with historical and forecasted seasonal peak demand and energy requirements. A table summarizing historical and forecasted sales by sales sector is given next, followed by a graph of that table's data. The last page of this section is a table detailing the historical and forecasted residential sales, customers, and use per customer.

Refer to Appendices J-1 through J-6 for graphs of the historical and forecasted sales by sector and in total.

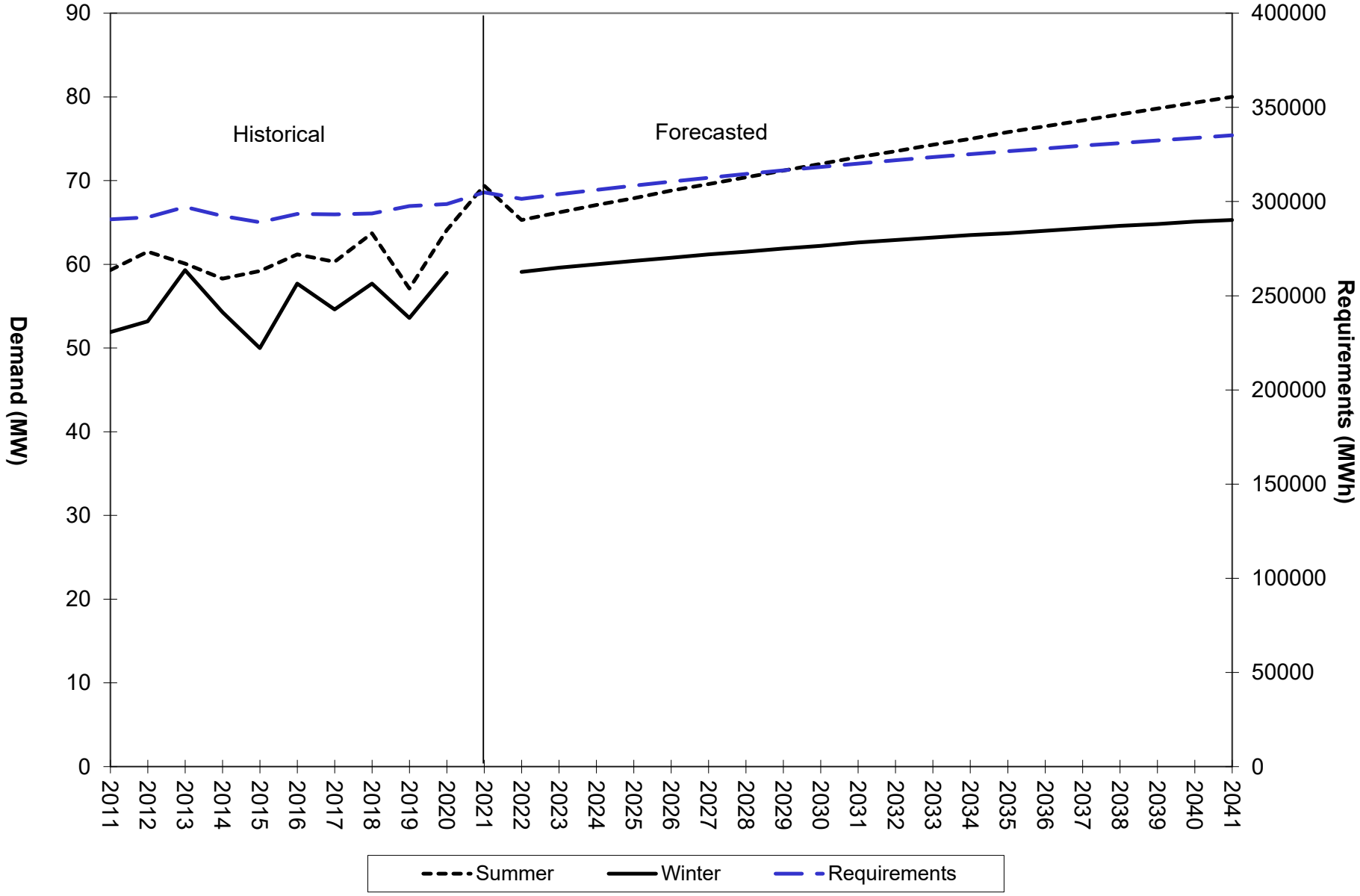
Montana-Dakota Utilities Co.
Historical and Forecasted Energy and Demand
Wyoming System
Calendar Month Basis

	Total Energy Requirements		Summer Peak		Winter Peak - MW */			
Year	MWh	% Change	MW	% Change	MW	Control Load	Peak with Control	% Change
2011	290,557		59.3				51.9	
2012	291,603	0.36%	61.5	3.71%			53.2	2.50%
2013	297,102	1.89%	60.1	-2.28%			59.3	11.47%
2014	292,411	-1.58%	58.3	-3.00%			54.3	-8.43%
2015	289,029	-1.16%	59.2	1.54%			50.0	-7.92%
2016	293,378	1.50%	61.2	3.38%			57.7	15.40%
2017	293,191	-0.06%	60.3	-1.47%			54.6	-5.37%
2018	293,652	0.16%	63.7	5.64%			57.7	5.68%
2019	297,641	1.36%	57.1	-10.36%			53.6	-7.11%
2020	298,695	0.35%	64.1	12.26%			59.0	10.07%
2021	304,930	2.09%	69.4	8.27%	not yet available			
2022	301,479	-1.13%	65.3	-5.91%	61.8	2.7	59.1	
2023	303,883	0.80%	66.2	1.38%	62.3	2.7	59.6	0.85%
2024	306,195	0.76%	67.1	1.36%	62.7	2.7	60.0	0.67%
2025	308,420	0.73%	67.9	1.19%	63.1	2.7	60.4	0.67%
2026	310,569	0.70%	68.8	1.33%	63.5	2.7	60.8	0.66%
2027	312,651	0.67%	69.6	1.16%	63.9	2.7	61.2	0.66%
2028	314,667	0.64%	70.4	1.15%	64.2	2.7	61.5	0.49%
2029	316,583	0.61%	71.2	1.14%	64.6	2.7	61.9	0.65%
2030	318,419	0.58%	72.0	1.12%	64.9	2.7	62.2	0.48%
2031	320,197	0.56%	72.8	1.11%	65.3	2.7	62.6	0.64%
2032	321,912	0.54%	73.5	0.96%	65.6	2.7	62.9	0.48%
2033	323,561	0.51%	74.3	1.09%	65.9	2.7	63.2	0.48%
2034	325,139	0.49%	75.0	0.94%	66.2	2.7	63.5	0.47%
2035	326,675	0.47%	75.8	1.07%	66.4	2.7	63.7	0.31%
2036	328,184	0.46%	76.5	0.92%	66.7	2.7	64.0	0.47%
2037	329,647	0.45%	77.2	0.92%	67.0	2.7	64.3	0.47%
2038	331,060	0.43%	77.9	0.91%	67.3	2.7	64.6	0.47%
2039	332,434	0.42%	78.6	0.90%	67.5	2.7	64.8	0.31%
2040	333,802	0.41%	79.3	0.89%	67.8	2.7	65.1	0.46%
2041	335,179	0.41%	80.0	0.88%	68.0	2.7	65.3	0.31%

*/ Winter Peak is for Nov-Dec of current year and Jan-Apr of following year.

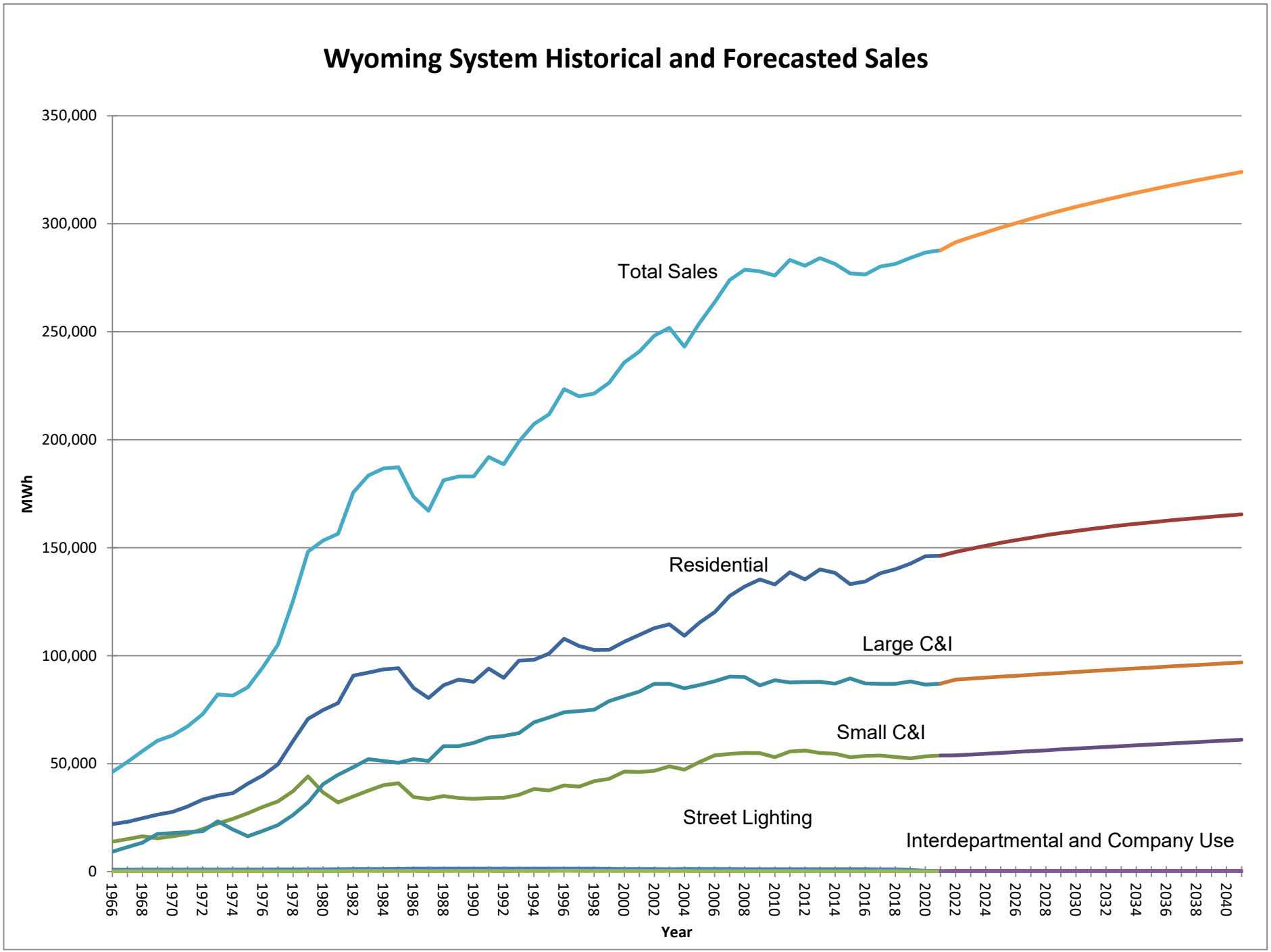
Montana-Dakota Wyoming System

Summer and Winter Season Peak Demand and Annual Energy Requirements



Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
Wyoming System
Billing-Month Basis
With DSM Reductions

Year	Residential Sales (MWh)	Residential % Change	Small C&I Sales (MWh)	Small C&I % Change	Large C&I Sales (MWh)	Large C&I % Change	Street Lighting Sales (MWh)	Street Lighting % Change	Interdepartmental & Company Use Sales (MWh)	Interdepartmental & Company Use % Change	Total Sales Sales (MWh)	Total Sales % Change	Total Energy Requirements MWh	Total Energy Requirements % Change
2011	138,600		55,664		87,596		1,169		224		283,253		290,557	
2012	135,278	-2.40%	56,079	0.75%	87,813	0.25%	1,145	-2.05%	218	-2.68%	280,533	-0.96%	291,603	0.36%
2013	139,919	3.43%	54,932	-2.05%	87,881	0.08%	1,136	-0.79%	193	-11.47%	284,061	1.26%	297,102	1.89%
2014	138,406	-1.08%	54,600	-0.60%	87,035	-0.96%	1,160	2.11%	179	-7.25%	281,380	-0.94%	292,411	-1.58%
2015	133,195	-3.77%	53,072	-2.80%	89,479	2.81%	1,145	-1.29%	179	0.00%	277,070	-1.53%	289,029	-1.16%
2016	134,391	0.90%	53,541	0.88%	87,194	-2.55%	1,136	-0.79%	174	-2.79%	276,436	-0.23%	293,378	1.50%
2017	138,176	2.82%	53,734	0.36%	86,992	-0.23%	1,093	-3.79%	207	18.97%	280,202	1.36%	293,191	-0.06%
2018	140,036	1.35%	53,129	-1.13%	86,976	-0.02%	1,043	-4.57%	213	2.90%	281,397	0.43%	293,652	0.16%
2019	142,588	1.82%	52,499	-1.19%	88,129	1.33%	782	-25.07%	177	-16.90%	284,174	0.99%	297,641	1.36%
2020	146,082	2.45%	53,405	1.73%	86,613	-1.72%	439	-43.83%	164	-7.34%	286,703	0.89%	298,695	0.35%
2021	146,238	0.11%	53,806	0.75%	87,044	0.50%	434	-1.14%	175	6.71%	287,697	0.35%	304,930	2.09%
2022	148,051	1.24%	53,820	0.03%	88,943	2.18%	439	1.15%	164	-6.29%	291,417	1.29%	303,656	-0.42%
2023	149,536	1.00%	54,218	0.74%	89,388	0.50%	439	0.00%	164	0.00%	293,745	0.80%	306,083	0.80%
2024	150,926	0.93%	54,619	0.74%	89,835	0.50%	439	0.00%	164	0.00%	295,983	0.76%	308,415	0.76%
2025	152,232	0.87%	55,021	0.74%	90,281	0.50%	439	0.00%	164	0.00%	298,137	0.73%	310,659	0.73%
2026	153,466	0.81%	55,422	0.73%	90,726	0.49%	439	0.00%	164	0.00%	300,217	0.70%	312,827	0.70%
2027	154,640	0.76%	55,821	0.72%	91,167	0.49%	439	0.00%	164	0.00%	302,231	0.67%	314,925	0.67%
2028	155,767	0.73%	56,213	0.70%	91,600	0.47%	439	0.00%	164	0.00%	304,183	0.65%	316,958	0.65%
2029	156,796	0.66%	56,605	0.70%	92,032	0.47%	439	0.00%	164	0.00%	306,036	0.61%	318,889	0.61%
2030	157,764	0.62%	56,990	0.68%	92,454	0.46%	439	0.00%	164	0.00%	307,811	0.58%	320,739	0.58%
2031	158,672	0.58%	57,377	0.68%	92,879	0.46%	439	0.00%	164	0.00%	309,531	0.56%	322,531	0.56%
2032	159,531	0.54%	57,758	0.66%	93,296	0.45%	439	0.00%	164	0.00%	311,188	0.54%	324,258	0.54%
2033	160,330	0.50%	58,139	0.66%	93,711	0.44%	439	0.00%	164	0.00%	312,783	0.51%	325,920	0.51%
2034	161,079	0.47%	58,510	0.64%	94,115	0.43%	439	0.00%	164	0.00%	314,307	0.49%	327,508	0.49%
2035	161,780	0.44%	58,885	0.64%	94,523	0.43%	439	0.00%	164	0.00%	315,791	0.47%	329,055	0.47%
2036	162,457	0.42%	59,260	0.64%	94,929	0.43%	439	0.00%	164	0.00%	317,249	0.46%	330,574	0.46%
2037	163,110	0.40%	59,625	0.62%	95,325	0.42%	439	0.00%	164	0.00%	318,663	0.45%	332,046	0.45%
2038	163,713	0.37%	59,991	0.61%	95,720	0.41%	439	0.00%	164	0.00%	320,027	0.43%	333,468	0.43%
2039	164,292	0.35%	60,351	0.60%	96,108	0.41%	439	0.00%	164	0.00%	321,354	0.41%	334,851	0.41%
2040	164,859	0.35%	60,713	0.60%	96,499	0.41%	439	0.00%	164	0.00%	322,674	0.41%	336,226	0.41%
2041	165,451	0.36%	61,069	0.59%	96,881	0.40%	439	0.00%	164	0.00%	324,004	0.41%	337,612	0.41%
2011-2021 Average Yearly Growth (10 Years History)		0.63%		-0.49%		-0.10%		-8.83%		-1.93%		0.16%		0.33%
2016-2021 Average Yearly Growth (5 Years History)		1.75%		-0.02%		-0.02%		-20.06%		-2.41%		0.80%		0.75%
2022-2027 Average Yearly Growth (5 Years)		0.87%		0.73%		0.50%		0.00%		0.00%		0.73%		0.73%
2022-2032 Average Yearly Growth (10 Years)		0.75%		0.71%		0.48%		0.00%		0.00%		0.66%		0.66%
2022-2041 Average Yearly Growth (19 Years)		0.57%		0.67%		0.45%		0.00%		0.00%		0.55%		0.55%


Wyoming System Historical and Forecasted Sales
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
MWh
Total Sales
Residential
Large C&I
Small C&I
Street Lighting
Interdepartmental and Company Use
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
Year

Montana-Dakota Utilities Co.
Historical and Forecasted
Residential Sales, Customers, and Use per Customer
Wyoming System
With DSM Reductions

Year	Sales (MWh)	% Change	Avg Custs	Cust No. Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2011	138,600		12,584		11,014	
2012	135,278	-2.40%	12,732	148	10,625	-3.53%
2013	139,919	3.43%	12,834	102	10,902	2.61%
2014	138,406	-1.08%	12,938	104	10,698	-1.88%
2015	133,195	-3.77%	13,234	296	10,065	-5.92%
2016	134,391	0.90%	13,149	(85)	10,221	1.55%
2017	138,176	2.82%	13,277	128	10,407	1.83%
2018	140,036	1.35%	13,410	133	10,443	0.34%
2019	142,588	1.82%	13,543	133	10,529	0.82%
2020	146,082	2.45%	13,704	161	10,660	1.25%
2021	146,238	0.11%	13,886	182	10,531	-1.21%
2022	148,051	1.24%	14,025	139	10,556	0.23%
2023	149,536	1.00%	14,166	141	10,556	0.00%
2024	150,926	0.93%	14,298	132	10,556	0.00%
2025	152,232	0.87%	14,421	124	10,556	0.00%
2026	153,466	0.81%	14,538	117	10,556	0.00%
2027	154,640	0.76%	14,650	111	10,556	0.00%
2028	155,767	0.73%	14,756	107	10,556	0.00%
2029	156,796	0.66%	14,854	97	10,556	0.00%
2030	157,764	0.62%	14,945	92	10,556	0.00%
2031	158,672	0.58%	15,031	86	10,556	0.00%
2032	159,531	0.54%	15,113	81	10,556	0.00%
2033	160,330	0.50%	15,188	76	10,556	0.00%
2034	161,079	0.47%	15,260	71	10,556	0.00%
2035	161,780	0.44%	15,326	66	10,556	0.00%
2036	162,457	0.42%	15,390	64	10,556	0.00%
2037	163,110	0.40%	15,452	62	10,556	0.00%
2038	163,713	0.37%	15,509	57	10,556	0.00%
2039	164,292	0.35%	15,564	55	10,556	0.00%
2040	164,859	0.35%	15,618	54	10,556	0.00%
2041	165,451	0.36%	15,674	56	10,556	0.00%

	Sales	**Custs**	**Use/Cust**
2011-2021 Average Yearly Growth (10 Years History)	0.63%	0.93%	-0.30%
2016-2021 Average Yearly Growth (5 Years History)	1.75%	1.08%	0.66%
2022-2027 Average Yearly Growth (5 Years)	0.87%	0.87%	0.00%
2022-2032 Average Yearly Growth (10 Years)	0.75%	0.75%	0.00%
2022-2041 Average Yearly Growth (19 Years)	0.57%	0.57%	0.00%

4. Allocations

The forecasts developed by sector as described up to this point are for Montana-Dakota's Wyoming System in total. Montana-Dakota's Financial Forecasting Department requires forecasts of sales by sector, peak demands, and energy requirements by month. Therefore, disaggregating the Wyoming System forecast into monthly numbers is necessary.

4.1. Sales and Customer Allocations by Month

Montana-Dakota's Financial Reporting Department requires a calendar month forecast of both sales and customers for Wyoming. This is accomplished through a two-step process. First, monthly estimates of energy and customers by sector are determined by calculating the monthly bill-cycle value to the annual amount for the sector and the monthly customers to annual customers for the historical time period. Results are then averaged for each month for each sector for the historical time period. These ratios were then applied to the annual forecasted amounts to arrive at monthly billing-cycle sales and monthly customers. The allocation factors for customers and billing-cycle sales for each month and sector are shown in Appendix H-4. Billing-month to calendar-month apportionment factors are then used to convert from billing-month to calendar-month sales. These apportionment factors are also shown in Appendix H-4.

For monthly customer allocations, ratios for 2016-2020, a 5-year period of history, were used. For monthly sales allocations by sector, ratios for 2006-2020, a 15-year period of history, were developed and used.

4.2. Peak Demand Allocations by Month

Allocating peak demand on a monthly basis consists of several steps:

1. Ratios of each monthly peak to the seasonal peak were calculated for the Wyoming System for the period October 2011 through September 2021. (The summer season is May through September, and the winter season is October through April of the next year.)
2. The ratios determined in Step 1 from each month for ten years were averaged to determine which month of the season was to be the peak month, second highest month, etc. Final results of this step indicate that July and December are the peak months for the summer and winter seasons, respectively, August and January have the second highest peaks for their respective seasons, etc. (See the table below which gives the monthly ranks for each month by season.)

Monthly Average of the Ratios of Monthly Peak To Seasonal Peak for the Wyoming System (Number in Parenthesis is Rank)

Summer Season			Winter Season		
May	(5)	0.64845	October	(6)	0.76389
June	(3)	0.86693	November	(4)	0.85526
July	(1)	0.98970	December	(1)	0.95199
August	(2)	0.96883	January	(2)	0.95755
September	(4)	0.82884	February	(3)	0.94881
			March	(5)	0.85246
			April	(7)	0.74043

3. For each season, the monthly ratios determined in Step 1 for October 2018 through September 2021 were sorted into rank sequence for each year of historical data and averaged across the years for each ranking. Applying the ranked average ratios from this step to the proper month according to the rank determined in Step 2 results in the monthly assignments given in the following table.

3-Year Average Monthly Ratios of Seasonal Peaks For the Wyoming System

January	0.91249	July	1.00000
February	0.88369	August	0.97096
March	0.76694	September	0.78220
April	0.73332	October	0.86800
May	0.63344	November	0.80593
June	0.91437	December	1.00000

*/ The January and December ratios as determined in Step 2 above were very close. Since December is typically considered to be the peak month for the Sheridan System, the ratios used here were flipped between January and December, allowing the peak month to continue to be December.

4.3. Sales Forecasts by Sector

The monthly forecasts of sales and customers by sector and energy for the ten-year period 2022-2031, which result from the allocation methods described above, are given in Appendix K.

APPENDIX A

Integrated System
Historical Data

Montana-Dakota Utilities Co.
Annual Sales by Class for the State of Montana
(Kilowatt Hours)

Year	Residential	Small C&I	Large C&I	Street Lighting	Other Public Sales	Interdepart-mental	Company Use	Unbilled	Total
1966	68,502,477	49,977,929	72,419,095	3,866,284	3,808,210	1,015,211	377,210	-	199,966,416
1967	68,579,218	50,233,896	98,914,908	4,015,663	3,715,582	1,091,354	810,948	-	227,361,569
1968	71,874,276	52,477,560	118,039,208	4,249,304	3,535,121	1,375,297	723,627	-	252,274,393
1969	78,325,684	53,242,727	138,245,825	5,604,625	3,863,692	1,249,804	709,401	-	281,241,758
1970	82,496,690	55,175,717	153,459,061	6,083,320	3,897,568	1,160,863	737,641	-	303,010,860
1971	85,705,748	55,865,479	163,248,877	6,492,393	4,104,508	958,540	960,127	-	317,335,672
1972	90,077,273	58,161,951	172,396,207	6,600,222	3,795,853	992,915	890,585	-	332,915,006
1973	92,338,476	61,367,352	190,984,413	6,706,073	4,211,624	1,158,025	902,676	-	357,668,639
1974	96,505,351	66,904,551	186,287,388	6,840,674	4,153,930	1,315,961	945,082	-	362,952,937
1975	105,048,515	69,452,309	178,400,297	7,087,080	3,913,278	1,506,121	984,351	-	366,391,951
1976	115,110,425	77,612,604	175,313,131	7,268,240	4,495,249	1,583,748	1,004,267	-	382,387,664
1977	120,454,365	81,073,772	172,531,607	7,359,231	4,657,927	1,548,399	1,036,205	-	388,661,506
1978	129,852,166	87,526,266	175,599,086	7,353,808	4,677,788	4,820,487	1,049,471	-	410,879,072
1979	136,672,460	96,589,760	178,879,168	7,359,189	5,467,739	2,283,782	1,029,716	-	428,281,814
1980	136,149,204	101,715,349	198,015,998	7,459,268	6,123,304	1,797,126	972,817	-	452,233,066
1981	144,334,391	111,228,786	206,717,766	7,487,108	6,381,820	1,715,542	752,755	-	478,618,168
1982	153,313,720	125,817,634	213,636,154	7,407,897	5,634,466	2,943,589	1,651,780	-	510,405,240
1983	150,623,962	108,187,279	249,492,431	7,481,435	7,159,425	1,709,185	917,496	-	525,571,213
1984	149,973,668	101,423,250	272,228,601	7,379,668	6,998,461	3,442,266	900,229	-	542,346,143
1985	142,726,940	106,608,809	281,467,351	7,188,874	6,516,453	1,001,594	639,636	-	546,149,657
1986	133,656,316	101,534,376	277,264,926	7,266,290	5,968,032	189,694	590,579	-	526,470,213
1987	126,119,227	95,806,617	248,018,234	7,290,415	6,493,543	195,663	580,473	-	484,504,172
1988	139,327,515	87,777,108	259,622,149	7,217,742	7,711,112	211,260	616,658	-	502,483,544
1989	133,923,369	85,321,774	255,852,368	7,076,958	7,254,814	226,885	599,867	-	490,256,035
1990	130,093,020	84,487,870	253,081,235	7,009,344	7,148,412	226,321	714,125	-	482,760,327
1991	135,844,961	85,054,308	253,947,072	7,232,332	6,944,172	225,952	606,717	-	489,855,514
1992	126,265,220	82,097,610	246,018,931	7,228,554	6,937,275	215,649	560,531	-	469,323,770
1993	131,148,008	85,150,142	239,566,466	7,228,736	6,709,227	223,166	621,957	-	470,647,702
1994	137,293,020	91,734,345	237,573,170	7,257,426	7,110,947	232,838	679,830	-	481,881,576
1995	139,222,942	92,004,117	231,710,303	7,224,945	6,846,494	228,038	621,915	-	477,858,754
1996	147,421,480	96,007,848	231,515,420	7,237,827	7,135,267	233,336	574,831	-	490,126,009
1997	144,515,075	94,430,882	238,928,697	7,237,555	7,244,423	201,302	556,239	-	493,114,173
1998	144,374,643	96,561,060	237,770,443	7,271,601	7,162,112	213,369	549,751	-	493,902,979
1999	139,939,058	93,535,156	251,450,993	7,241,875	7,037,487	201,768	551,485	-	499,957,822
2000	143,298,426	94,947,102	276,845,617	7,212,210	6,819,914	218,795	456,819	-	529,798,883
2001	144,170,040	94,133,492	282,466,554	7,242,218	6,677,075	218,859	453,240	-	535,361,478
2002	147,916,359	96,252,274	306,159,986	7,240,913	6,893,847	195,977	448,893	-	565,108,249
2003	153,518,427	100,463,048	340,070,071	7,208,314	6,991,783	190,115	501,557	-	608,943,315
2004	141,249,319	98,150,615	348,097,119	7,249,849	6,709,211	178,934	469,139	-	602,104,186
2005	150,705,819	102,045,511	364,489,268	7,232,015	6,481,903	194,114	454,825	-	631,603,455
2006	157,205,695	104,213,569	368,666,049	7,202,765	6,996,525	189,666	435,247	-	644,909,516
2007	162,186,142	109,101,052	385,230,122	7,187,164	6,827,828	197,773	430,092	-	671,160,173
2008	162,181,766	108,595,072	408,686,454	7,243,765	7,034,312	190,513	411,809	-	694,343,691
2009	167,420,839	110,379,920	407,647,345	7,244,288	7,149,420	187,117	364,946	-	700,393,875
2010	171,661,490	109,187,916	415,946,482	7,203,307	6,973,614	185,423	351,780	-	711,510,012
2011	185,153,498	119,643,444	427,886,806	7,088,889	7,232,041	192,681	364,683	-	747,562,042
2012	187,634,686	132,714,357	420,458,666	7,106,072	7,603,435	171,842	358,713	-	756,047,771
2013	194,906,971	128,002,892	438,917,563	7,028,478	7,201,469	173,489	366,794	-	776,597,656
2014	200,088,171	137,799,079	451,686,572	7,107,653	7,341,210	175,228	384,145	-	804,582,058
2015	191,419,674	135,201,525	473,740,249	7,103,015	7,483,730	172,627	334,528	-	815,455,348
2016	184,295,936	131,689,711	474,495,852	7,102,363	7,019,988	170,203	326,917	-	805,100,970
2017	188,742,767	133,595,374	469,137,508	7,035,259	6,889,892	177,157	341,467	-	805,919,424
2018	192,079,714	138,485,324	469,653,438	4,451,247	5,752,819	176,856	372,851	-	810,972,249
2019	185,319,037	133,950,418	455,960,225	3,048,711	5,603,887	167,964	398,753	-	784,448,995
2020	184,784,621	125,022,927	421,234,462	3,077,171	5,904,576	147,189	372,449	-	740,543,395
2021	184,910,322	129,676,168	421,852,914	2,941,573	6,613,210	126,709	513,299		746,634,195

Montana-Dakota Utilities Co.
Annual Sales by Class for the State of North Dakota
(Kilowatt Hours)

Year	Residential	Small C&I	Large C&I	Street Lighting	Other Public Sales	Interdepart-mental	Company Use	Unbilled	Total
1966	177,839,445	101,454,865	62,248,779	12,065,801	9,778,523	242,324	627,634	35,481	364,292,852
1967	178,648,631	101,511,079	66,238,823	12,404,851	10,627,735	235,590	1,496,352	68,626	371,231,687
1968	189,586,695	108,098,127	68,327,053	13,528,733	11,306,057	1,075,808	1,514,551	68,231	393,505,255
1969	203,352,077	117,146,235	69,429,138	14,548,153	11,781,023	3,257,680	1,710,576	66,543	421,291,425
1970	215,129,232	128,966,438	74,006,755	15,405,493	12,432,105	2,976,220	1,632,669	66,670	450,615,582
1971	224,660,134	137,368,067	78,485,841	15,852,055	12,356,099	1,532,592	3,570,747	68,888	473,894,423
1972	241,177,868	141,541,263	85,849,701	16,145,159	12,610,906	230,775	5,480,921	72,184	503,108,777
1973	245,827,613	146,917,105	92,262,004	16,519,767	14,113,173	198,917	5,488,128	71,349	521,398,056
1974	259,763,946	151,905,722	95,263,639	16,812,962	14,147,896	207,547	5,388,873	64,700	543,555,285
1975	284,712,928	174,078,088	107,153,806	17,229,492	14,613,377	194,573	5,283,319	54,272	603,319,855
1976	307,231,757	188,990,076	119,225,930	17,788,799	17,287,746	233,931	5,201,276	58,861	656,018,376
1977	322,066,615	202,204,724	123,518,797	18,705,610	20,388,865	775,960	5,329,555	61,312	693,051,438
1978	360,829,206	226,814,052	131,861,024	19,233,630	22,666,150	448,114	5,583,243	55,953	767,491,372
1979	385,274,877	251,074,945	134,220,720	19,899,710	23,913,957	263,925	5,383,105	56,305	820,087,544
1980	390,283,221	265,468,707	140,987,413	20,492,222	26,160,460	382,762	5,040,756	44,390	848,859,931
1981	408,735,140	273,869,995	175,505,109	21,076,949	24,329,774	244,375	4,212,597	46,134	908,020,073
1982	452,363,924	245,889,852	236,334,289	21,499,821	26,288,435	261,436	4,964,613	47,986	987,650,356
1983	456,184,125	258,134,530	230,553,333	21,370,120	28,270,730	382,443	8,659,379	41,916	1,003,596,576
1984	455,285,616	267,515,911	240,737,178	20,966,383	28,884,506	2,020,361	6,602,362	42,325	1,022,054,642
1985	450,793,794	284,254,986	233,446,499	20,793,870	28,421,516	194,570	6,810,757	39,484	1,024,755,476
1986	434,367,094	282,091,350	232,968,286	20,399,709	29,251,485	283,486	8,387,924	37,451	1,007,786,785
1987	414,769,777	226,151,695	289,829,031	20,488,538	27,652,568	306,718	6,531,047	46,880	985,776,254
1988	449,769,976	199,876,624	348,910,521	20,488,320	27,128,548	233,035	6,339,307	34,969	1,052,781,300
1989	443,827,623	195,738,987	362,960,433	20,407,635	26,027,847	236,202	6,825,024	38,865	1,056,062,616
1990	430,825,093	192,983,257	373,076,254	20,510,585	25,648,820	243,363	6,283,396	37,303	1,049,608,071
1991	450,333,411	196,030,842	383,766,958	20,458,655	30,828,407	266,645	6,137,808	33,378	1,087,856,104
1992	423,260,909	188,693,144	398,197,743	20,663,341	31,720,268	282,076	6,211,805	48,627	1,069,077,913
1993	439,344,573	191,672,169	416,752,959	20,565,116	31,146,204	322,281	5,956,790	46,519	1,105,806,611
1994	456,342,312	203,783,580	445,849,305	20,574,807	32,828,420	316,899	6,987,912	41,960	1,166,725,195
1995	473,310,757	207,631,769	447,406,363	20,664,316	32,139,766	311,888	7,116,061	43,365	1,188,624,285
1996	489,581,963	212,394,753	463,633,627	20,598,257	33,617,666	293,678	7,112,634	42,287	1,227,274,865
1997	485,185,916	215,341,328	464,356,987	20,448,097	35,525,187	276,970	7,039,295	37,836	1,228,211,616
1998	476,555,259	216,137,378	470,352,073	20,780,506	33,387,706	268,955	6,460,961	35,675	1,223,978,513
1999	476,150,870	215,933,149	487,339,322	20,930,538	32,535,686	269,387	6,214,785	24,378	1,239,398,115
2000	480,611,397	220,082,001	496,752,971	20,765,723	32,298,343	276,507	5,758,461	-	1,256,545,403
2001	495,264,092	219,718,551	524,934,913	20,801,786	32,839,971	283,411	5,380,094	-	1,299,222,818
2002	510,649,026	223,725,158	534,095,959	20,845,828	33,601,388	245,882	4,924,187	-	1,328,087,428
2003	518,362,506	230,831,463	538,714,606	20,964,805	33,818,825	243,012	5,146,364	-	1,348,081,581
2004	482,828,358	224,924,291	532,079,391	20,632,572	32,251,096	238,077	5,030,082	-	1,297,983,867
2005	525,132,818	250,022,338	563,792,863	20,484,092	33,806,432	248,541	5,291,349	-	1,398,778,433
2006	550,070,624	274,727,542	564,963,429	20,772,430	35,894,619	238,213	7,203,891	-	1,453,870,748
2007	568,709,867	299,602,230	570,170,485	20,947,764	36,072,776	235,341	7,511,339	-	1,503,249,802
2008	585,608,722	320,093,226	583,501,829	21,200,739	35,709,163	242,421	7,356,084	-	1,553,712,184
2009	609,178,728	340,495,770	551,113,741	20,582,112	36,202,033	237,223	7,494,346	-	1,565,303,953
2010	632,068,296	382,985,447	530,340,771	20,372,584	35,746,426	237,329	7,232,018	-	1,608,982,871
2011	687,464,765	450,098,381	514,238,222	20,059,394	38,643,539	230,042	7,390,957	-	1,718,125,300
2012	700,451,260	512,566,297	492,981,290	20,075,686	40,771,733	202,097	7,544,693	-	1,774,593,056
2013	774,915,846	559,838,729	516,813,483	19,894,701	41,656,843	207,997	5,541,282	-	1,918,868,881
2014	812,653,819	609,043,689	579,346,413	20,014,582	44,712,842	189,611	5,887,244	-	2,071,848,200
2015	784,976,717	614,126,114	603,878,747	20,313,025	45,323,656	172,838	5,233,849	-	2,074,024,946
2016	746,374,241	599,694,059	617,933,575	20,386,694	44,431,734	170,182	4,958,056	-	2,033,948,541
2017	754,399,763	585,174,349	638,719,056	20,041,593	53,958,297	170,423	4,892,346	-	2,057,355,827
2018	799,660,935	565,691,780	690,344,780	19,569,074	53,201,967	179,514	4,896,729	-	2,133,544,779
2019	784,808,269	573,956,119	675,578,678	16,733,425	51,275,800	165,045	4,819,419	-	2,107,336,755
2020	779,618,599	552,682,437	652,235,577	13,956,705	50,838,854	153,386	4,736,174	-	2,054,221,732
2021	759,330,204	530,068,190	716,278,492	13,753,205	51,171,048	145,864	4,644,860		2,075,391,863

Montana-Dakota Utilities Co.
Annual Sales by Class for the State of South Dakota
(Kilowatt Hours)

Year	Residential	Small C&I	Large C&I	Street Lighting	Other Public Sales	Interdepart-mental	Company Use	Unbilled	Total
1966	42,230,739	22,427,449	6,732,280	2,095,903	1,697,150	1,424	126,325	-	75,311,270
1967	41,997,237	25,800,957	4,063,750	1,979,052	1,847,881	1,153	260,654	-	75,950,684
1968	43,952,926	23,284,225	3,940,603	2,575,843	1,707,100	1,608	268,857	-	75,731,162
1969	46,482,606	24,758,227	929,501	2,598,403	1,841,636	2,207	287,654	-	76,900,234
1970	47,361,709	22,775,007	3,464,385	2,547,642	1,759,567	2,154	269,189	-	78,179,653
1971	49,310,679	22,255,017	4,727,415	2,716,302	1,834,084	2,362	315,769	215	81,161,843
1972	52,980,235	22,785,758	5,347,104	2,813,232	1,918,580	2,270	365,122	-	86,212,301
1973	53,570,804	23,259,175	5,400,790	2,859,812	1,987,540	2,559	432,365	-	87,513,045
1974	56,666,860	23,203,748	5,840,707	2,994,179	2,138,696	2,487	428,561	-	91,275,238
1975	62,824,496	24,817,191	6,748,459	3,128,822	2,030,891	2,433	480,797	-	100,033,089
1976	66,343,302	25,800,602	7,756,873	3,103,016	2,053,227	2,370	467,531	-	105,526,921
1977	65,963,975	26,111,838	8,474,190	3,124,296	1,840,714	3,151	478,536	-	105,996,700
1978	68,589,710	27,328,956	9,693,110	3,113,948	1,774,321	2,966	607,731	-	111,110,742
1979	67,938,559	26,971,950	10,123,460	3,121,871	1,904,825	2,983	620,674	-	110,684,322
1980	64,325,468	26,196,596	10,851,108	3,140,131	2,170,017	3,737	507,507	-	107,194,564
1981	61,878,613	25,902,182	11,243,318	3,083,603	1,830,577	2,970	356,399	-	104,297,662
1982	65,558,005	27,156,570	11,426,316	3,030,031	1,871,552	2,943	607,247	-	109,652,664
1983	65,118,829	26,884,079	12,353,692	3,006,759	1,716,506	2,486	557,667	-	109,640,018
1984	65,920,772	27,933,476	12,698,954	2,964,197	1,816,219	1,782	545,965	-	111,881,365
1985	64,222,969	27,289,287	13,297,147	2,968,984	1,826,822	7,425	829,238	-	110,441,872
1986	62,444,941	27,005,631	14,820,308	2,987,404	1,637,375	22,258	571,879	-	109,489,796
1987	59,644,668	26,773,933	16,227,633	2,986,179	1,857,719	28,687	363,754	-	107,882,573
1988	63,622,038	28,168,260	18,064,220	2,953,900	1,925,245	14,449	419,470	-	115,167,582
1989	61,747,940	28,578,702	19,249,467	2,937,751	2,019,854	13,359	456,236	-	115,003,309
1990	59,041,129	27,674,002	20,540,349	2,938,991	1,879,111	9,908	369,286	-	112,452,776
1991	60,709,134	28,371,913	20,800,179	2,944,664	2,119,069	10,945	398,192	-	115,354,096
1992	56,416,333	27,113,531	21,125,368	2,920,263	2,354,085	10,701	343,584	-	110,283,865
1993	59,615,263	27,986,509	22,314,105	2,921,246	2,116,180	11,786	397,837	-	115,362,926
1994	61,124,471	30,267,538	23,784,346	2,922,998	2,427,771	11,901	422,267	-	120,961,292
1995	62,959,707	31,134,415	24,670,253	2,854,516	3,097,276	11,484	404,093	-	125,131,744
1996	63,638,266	32,141,951	25,352,355	2,872,136	3,137,175	12,172	352,311	-	127,506,366
1997	61,623,748	31,753,237	25,522,619	2,805,901	3,058,443	11,319	342,786	-	125,118,053
1998	59,360,287	32,313,292	25,113,488	2,796,107	3,003,078	9,777	286,457	-	122,882,486
1999	59,567,949	32,498,800	25,977,705	2,807,423	2,954,190	9,857	297,480	-	124,113,404
2000	59,525,312	32,320,913	25,956,274	2,740,106	2,810,931	9,227	308,855	-	123,671,618
2001	61,117,630	33,018,447	25,846,819	2,748,375	2,742,790	9,414	325,833	-	125,809,308
2002	61,780,443	33,800,702	26,645,097	2,691,584	2,737,670	9,884	329,617	-	127,994,997
2003	61,149,061	33,964,499	27,075,451	2,683,876	2,791,070	10,319	319,687	-	127,993,963
2004	56,535,958	32,909,312	27,090,632	2,672,475	2,885,412	9,788	290,260	-	122,393,837
2005	61,267,370	34,678,560	28,886,389	2,660,320	2,535,633	10,026	305,636	-	130,343,934
2006	61,675,574	34,206,361	28,556,470	2,626,482	2,204,422	9,086	299,875	-	129,578,270
2007	63,017,590	35,210,997	29,271,378	2,637,764	2,364,117	9,526	304,850	-	132,816,222
2008	67,104,019	36,965,622	30,890,745	2,635,828	2,432,011	9,826	318,928	-	140,356,979
2009	69,689,062	39,395,377	32,856,198	2,606,502	1,701,927	9,019	335,872	-	146,593,957
2010	70,867,723	37,312,865	34,338,981	2,638,638	1,210,011	8,876	316,402	-	146,693,496
2011	73,976,689	36,711,846	34,944,961	2,627,500	1,383,960	7,798	337,074	-	149,989,828
2012	69,097,067	34,638,566	35,388,342	2,620,423	1,518,467	2,742	289,333	-	143,554,940
2013	74,264,716	37,118,359	36,338,433	2,660,824	1,508,134	4,023	353,347	-	152,247,836
2014	75,462,217	38,045,222	37,507,489	2,650,807	1,431,970	4,128	316,511	-	155,418,344
2015	69,742,814	35,994,853	37,083,842	2,567,823	1,492,996	2,990	234,056	-	147,119,374
2016	67,300,830	35,799,151	35,874,593	2,517,019	1,485,537	2,291	215,472	-	143,194,893
2017	67,065,372	37,185,771	35,546,200	2,487,177	1,482,823	1,162	268,202	-	144,036,707
2018	72,030,090	39,185,098	36,289,248	2,461,232	1,434,645	1,919	295,533	-	151,697,765
2019	70,772,512	38,738,341	35,995,139	2,397,250	1,507,854	1,871	341,410	-	149,754,377
2020	68,270,425	36,425,549	35,840,638	1,555,865	1,413,561	1,699	267,237	-	143,774,974
2021	66,630,726	35,305,416	34,051,344	1,184,901	1,540,872	1,732	256,208		138,971,199

Montana-Dakota Utilities Co.
Annual Sales by Class for the Integrated System
(Kilowatt Hours)

Year	Residential	Small C&I	Large C&I	Street Lighting	Other Public Sales	Interdepart-mental	Company Use	Unbilled	Total
1966	288,572,661	173,860,243	141,400,154	18,027,988	15,283,883	1,258,959	1,131,169	35,481	639,570,538
1967	289,225,086	177,545,932	169,217,481	18,399,566	16,191,198	1,328,097	2,567,954	68,626	674,543,940
1968	305,413,897	183,859,912	190,306,864	20,353,880	16,548,278	2,452,713	2,507,035	68,231	721,510,810
1969	328,160,367	195,147,189	208,604,464	22,751,181	17,486,351	4,509,691	2,707,631	66,543	779,433,417
1970	344,987,631	206,917,162	230,930,201	24,036,455	18,089,240	4,139,237	2,639,499	66,670	831,806,095
1971	359,676,561	215,488,563	246,462,133	25,060,750	18,294,691	2,493,494	4,846,643	69,103	872,391,938
1972	384,235,376	222,488,972	263,593,012	25,558,613	18,325,339	1,225,960	6,736,628	72,184	922,236,084
1973	391,736,893	231,543,632	288,647,207	26,085,652	20,312,337	1,359,501	6,823,169	71,349	966,579,740
1974	412,936,157	242,014,021	287,391,734	26,647,815	20,440,522	1,525,995	6,762,516	64,700	997,783,460
1975	452,585,939	268,347,588	292,302,562	27,445,394	20,557,546	1,703,127	6,748,467	54,272	1,069,744,895
1976	488,685,484	292,403,282	302,295,934	28,160,055	23,836,222	1,820,049	6,673,074	58,861	1,143,932,961
1977	508,484,955	309,390,334	304,524,594	29,189,137	26,887,506	2,327,510	6,844,296	61,312	1,187,709,644
1978	559,271,082	341,669,274	317,153,220	29,701,386	29,118,259	5,271,567	7,240,445	55,953	1,289,481,186
1979	589,885,896	374,636,655	323,223,348	30,380,770	31,286,521	2,550,690	7,033,495	56,305	1,359,053,680
1980	590,757,893	393,380,652	349,854,519	31,091,621	34,453,781	2,183,625	6,521,080	44,390	1,408,287,561
1981	614,948,144	411,000,963	393,466,193	31,647,660	32,542,171	1,962,887	5,321,751	46,134	1,490,935,903
1982	671,235,649	398,864,056	461,396,759	31,937,749	33,794,453	3,207,968	7,223,640	47,986	1,607,708,260
1983	671,926,916	393,205,888	492,399,456	31,858,314	37,146,661	2,094,114	10,134,542	41,916	1,638,807,807
1984	671,180,056	396,872,637	525,664,733	31,310,248	37,699,186	5,464,409	8,048,556	42,325	1,676,282,150
1985	657,743,703	418,153,082	528,210,997	30,951,728	36,764,791	1,203,589	8,279,631	39,484	1,681,347,005
1986	630,468,351	410,631,357	525,053,520	30,653,403	36,856,892	495,438	9,550,382	37,451	1,643,746,794
1987	600,533,672	348,732,245	554,074,898	30,765,132	36,003,830	531,068	7,475,274	46,880	1,578,162,999
1988	652,719,529	315,821,992	626,596,890	30,659,962	36,764,905	458,744	7,375,435	34,969	1,670,432,426
1989	639,498,932	309,639,463	638,062,268	30,422,344	35,302,515	476,446	7,881,127	38,865	1,661,321,960
1990	619,959,242	305,145,129	646,697,838	30,458,920	34,676,343	479,592	7,366,807	37,303	1,644,821,174
1991	646,887,506	309,457,063	658,514,209	30,635,651	39,891,648	503,542	7,142,717	33,378	1,693,065,714
1992	605,942,462	297,904,285	665,342,042	30,812,158	41,011,628	508,426	7,115,920	48,627	1,648,685,548
1993	630,107,844	304,808,820	678,633,530	30,715,098	39,971,611	557,233	6,976,584	46,519	1,691,817,239
1994	654,759,803	325,785,463	707,206,821	30,755,231	42,367,138	561,638	8,090,009	41,960	1,769,568,063
1995	675,493,406	330,770,301	703,786,919	30,743,777	42,083,536	551,410	8,142,069	43,365	1,791,614,783
1996	700,641,709	340,544,552	720,501,402	30,708,220	43,890,108	539,186	8,039,776	42,287	1,844,907,240
1997	691,324,739	341,525,447	728,808,303	30,491,553	45,828,053	489,591	7,938,320	37,836	1,846,443,842
1998	680,290,189	345,011,730	733,236,004	30,848,214	43,552,896	492,101	7,297,169	35,675	1,840,763,978
1999	675,657,877	341,967,105	764,768,020	30,979,836	42,527,363	481,012	7,063,750	24,378	1,863,469,341
2000	683,435,135	347,350,016	799,554,862	30,718,039	41,929,188	504,529	6,524,135	-	1,910,015,904
2001	700,551,762	346,870,490	833,248,286	30,792,379	42,259,836	511,684	6,159,167	-	1,960,393,604
2002	720,345,828	353,778,134	866,901,042	30,778,325	43,232,905	451,743	5,702,697	-	2,021,190,674
2003	733,029,994	365,259,010	905,860,128	30,856,995	43,601,678	443,446	5,967,608	-	2,085,018,859
2004	680,613,635	355,984,218	907,267,142	30,554,896	41,845,719	426,799	5,789,481	-	2,022,481,890
2005	737,106,007	386,746,409	957,168,520	30,376,427	42,823,968	452,681	6,051,810	-	2,160,725,822
2006	768,951,893	413,147,472	962,185,948	30,601,677	45,095,566	436,965	7,939,013	-	2,228,358,534
2007	793,913,599	443,914,279	984,671,985	30,772,692	45,264,721	442,640	8,246,281	-	2,307,226,197
2008	814,894,507	465,653,920	1,023,079,028	31,080,332	45,175,486	442,760	8,086,821	-	2,388,412,854
2009	846,288,629	490,271,067	991,617,284	30,432,902	45,053,380	433,359	8,195,164	-	2,412,291,785
2010	874,597,509	529,486,228	980,626,234	30,214,529	43,930,051	431,628	7,900,200	-	2,467,186,379
2011	946,594,952	606,453,671	977,069,989	29,775,783	47,259,540	430,521	8,092,714	-	2,615,677,170
2012	957,183,013	679,919,220	948,828,298	29,802,181	49,893,635	376,681	8,192,739	-	2,674,195,767
2013	1,044,087,533	724,959,980	992,069,479	29,584,003	50,366,446	385,509	6,261,423	-	2,847,714,373
2014	1,088,204,207	784,887,990	1,068,540,474	29,773,042	53,486,022	368,967	6,587,900	-	3,031,848,602
2015	1,046,139,205	785,322,492	1,114,702,838	29,983,863	54,300,382	348,455	5,802,433	-	3,036,599,668
2016	997,971,007	767,182,921	1,128,304,020	30,006,076	52,937,259	342,676	5,500,445	-	2,982,244,404
2017	1,010,207,902	755,955,494	1,143,402,764	29,564,029	62,331,012	348,742	5,502,015	-	3,007,311,958
2018	1,063,770,739	743,362,202	1,196,287,466	26,481,553	60,389,431	358,289	5,565,113	-	3,096,214,793
2019	1,040,899,818	746,644,878	1,167,534,042	22,179,386	58,387,541	334,880	5,559,582	-	3,041,540,127
2020	1,032,673,645	714,130,913	1,109,310,677	18,589,741	58,156,991	302,274	5,375,860	-	2,938,540,101
2021	1,010,871,252	695,049,774	1,172,182,750	17,879,679	59,325,130	274,305	5,414,367	-	2,960,997,257

Montana-Dakota Utilities Co.
Integrated System Seasonal Peaks and Peak Month Load Factors 1/
1960 through 2020

1/ MDU only net peak on combined system as calculated by MDU (excludes REC adjusted peak).

2/ January and February is of the following year.

	SUMMER			WINTER			Annual
Year	MW	Month	Load Factor	MW	2/ Month	Load Factor	load Factor
1960	76.7	AUG	70.7	109.3	DEC	58.8	50.9
1961	82.8	AUG	73.7	113.7	JAN	62.0	52.5
1962	83.8	AUG	76 4	123.2	JAN	65.4	53.7
1963	95.9	JUL	68.9	127.6	DEC	63.3	52.5
1964	101.8	AUG	68.2	138.2	DEC	64.2	51.8
1965	108.4	AUG	68.7	138.0	JAN	68.5	56.5
1966	114.0	JUL	70.5	149.6	JAN	65.4	58.2
1967	129.0	JUL	71.3	161.8	JAN	68.1	60.0
1968	133.3	JUL	69.9	173.5	DEC	65.1	55.0
1969	153.4	AUG	70.0	178.2	JAN	70.3	62.0
1970	160.5	JUL	70.2	186.2	DEC	67.6	59.5
1971	170.9	AUG	72.2	195.7	JAN	70.5	58.2
1972	174.5	AUG	72.6	209.1	DEC	69.4	58.5
1973	199.6	AUG	69.9	200.1	DEC	67.3	63.2
1974	210.0	JUL	71.9	222.0	JAN	66.6	62.7
1975	230.8	JUL	68.3	238.2	JAN	67.8	59.5
1976	242.6	AUG	64.8	241.3	JAN	78.1	59.7
1977	253.7	JUL	61.2	257.8	DEC	71.3	57.9
1978	257.2	SEP	59.9	268.1	JAN	79.0	62.9
1979	257.6	JUL	65.0	287.5	JAN	73.7	63.1
1980	291.2	JUL	64.4	292.0	DEC	73.4	61.7
1981	315.4	JUL	61.6	333.4	JAN	75.2	59.0
1982	322.7	AUG	60.8	293.7	DEC	74.9	59.6
1983	337.5	AUG	68.5	354.1	DEC	72.7	57.5
1984	354.6	AUG	64.3	330.6	JAN	74 3	58.3
1985	350.4	JUL	62.7	324.2	DEC	74.2	59.8
1986	338.0	JUN	57.9	293.2	DEC	73.4	59.2
1987	358.6	JUL	58.7	306.2	FEB	76.2	54.6
1988	386.7	JUN	61.6	320.9	FEB	74.1	54.2
1989	383.6	AUG	57.1	341.6	DEC	69.8	54.4
1990	381.6	JUL	55.4	330.2	DEC	70.8	53.5
1991	387.1	JUL	58.0	311.8	DEC	74.3	54.2
1992	339.1	AUG	60.9	337.5	DEC	73.1	61.4
1993	350.3	AUG	62.3	332.7	JAN	77.5	61.0
1994	369.8	AUG	61.8	322.6	DEC	74.5	59.7
1995	412.7	AUG	59.8	348.7	FEB	68.6	54.0
1996	393.3	AUG	62.6	343.1	JAN	78.4	58.3
1997	404.6	JUL	61.6	332.8	JAN	74.4	56.6
1998	402.5	AUG	63.6	354.2	DEC	70.1	56.9
1999	420.6	JUL	61.3	342.4	DEC	70.7	54.2
2000	432.3	AUG	61.3	353.9	DEC	77.4	54.9
2001	452.9	AUG	62.3	328.9	DEC	78.2	53.0
2002	458.8	JUL	64.9	343.5	JAN	78.4	53.7
2003	470.5	AUG	64.3	367.7	JAN	77.2	54.0
2004	458.4	JUL	60.4	383.4	JAN	76.7	54.9
2005	459.1	JUL	65.9	387.2	DEC	76.8	57.9
2006	485.5	JUL	68.3	397.2	NOV	69.3	56.4
2007	525.6	JUL	66.3	407.3	JAN	80.5	54.5
2008	476.6	AUG	66.9	455.0	DEC	78.1	62.2
2009	473.8	AUG	61.2	459.6	DEC	78.4	62.5
2010	502.5	AUG	64.8	457.8	JAN	79.8	61.7
2011	535.8	JUL	63.2	510.8	JAN	71.6	59.2
2012	573.6	JUL	66.8	516.2	JAN	78.3	58.0
2013	546.9	AUG	65.2	582.1	JAN	74.2	63.5
2014	533.0	AUG	66.6	557.2	JAN	77.1	63.8
2015	611.5	AUG	63.2	514.9	JAN	83.4	60.9
2016	596.8	JUL	63.6	564.9	DEC	79.3	61.2
2017	579.1	JUL	70.6	565.1	JAN	78.3	64.1
2018	572.4	JUL	67.6	563.8	FEB	83.6	66.1
2019	536.9	AUG	67.8	571.1	JAN	76.3	66.8
2020	585.6	AUG	65.1	572.7	FEB	78.2	61.6
2021	603.7	JUL	69.3				

Montana-Dakota Utilities Co.
Demand by State at Time of System Seasonal Peak
(Megawatts)

	SUMMER				WINTER				
Year	ND	SD	MT	Int Sys	ND	SD	MT	Int Sys	
1975	139.4	22.1	69.3	230.8	145.1	22.8	70.3	238.2	*
1976	147.4	24.2	71.0	242.6	147.3	24.1	69.9	241.3	*
1977	155.9	23.5	74.6	254.0	155.1	24.3	78.4	257.8	
1978	165.5	20.4	70.3	256.2	165.5	23.9	78.7	268.1	*
1979	166.4	16.4	74.8	257.6	177.2	24.1	86.2	287.5	*
1980	181.5	21.5	88.2	291.2	180.8	21.8	89.4	292.0	
1981	202.3	21.0	92.1	315.4	201.5	24.9	106.9	333.3	*
1982	208.0	20.8	93.9	322.7	185.0	21.1	87.6	293.7	
1983	221.2	20.9	95.4	337.5	225.7	27.5	100.9	354.1	
1984	234.8	23.9	96.0	354.7	209.4	23.0	98.2	330.6	*
1985	233.3	24.4	92.7	350.4	206.9	22.4	94.9	324.2	
1986	224.2	22.5	91.4	338.1	196.4	21.2	75.7	293.3	
1987	242.1	28.5	88.1	358.7	204.6	22.8	78.8	306.2	*
1988	265.6	28.4	92.7	386.7	212.1	23.7	85.0	320.8	*
1989	265.1	27.6	90.9	383.6	225.6	26.9	89.1	341.6	
1990	261.2	26.2	94.2	381.6	218.2	24.1	87.9	330.2	
1991	271.9	30.0	85.2	387.1	217.5	19.9	74.4	311.8	
1992	234.4	20.9	83.7	339.0	233.4	23.9	80.1	337.4	
1993	251.1	23.3	75.9	350.3	225.6	25.5	81.6	332.7	*
1994	253.7	27.9	88.2	369.8	220.9	24.5	77.2	322.6	
1995	290.6	27.1	95.0	412.7	236.1	22.5	90.1	348.7	*
1996	272.0	27.1	94.1	393.2	233.6	21.3	88.2	343.1	*
1997	288.0	22.4	94.3	404.7	225.0	20.0	87.8	332.8	*
1998	285.1	25.7	91.7	402.5	248.2	21.6	84.4	354.2	
1999	295.0	28.7	96.9	420.6	237.3	21.6	83.6	342.5	
2000	302.9	30.1	99.3	432.3	234.7	22.8	96.4	353.9	
2001	317.8	29.8	105.4	453.0	235.0	14.3	79.6	328.9	
2002	326.0	26.4	106.4	458.8	242.9	14.4	86.2	343.5	*
2003	328.4	28.4	113.7	470.5	251.4	19.4	96.9	367.7	*
2004	320.2	28.4	109.8	458.4	258.8	21.9	102.7	383.4	*
2005	311.6	27.7	119.8	459.1	265.0	21.8	100.4	387.2	
2006	346.3	29.0	110.1	485.4	272.0	23.8	101.4	397.2	
2007	365.8	31.6	128.3	525.7	293.0	25.3	89.0	407.3	*
2008	330.1	27.6	118.9	476.6	309.1	30.3	115.6	455.0	
2009	337.0	27.7	109.0	473.7	313.3	28.8	117.5	459.6	
2010	357.7	28.4	116.4	502.5	330.1	25.7	102.0	457.8	*
2011	385.3	32.6	117.9	535.8	366.4	29.9	114.5	510.8	*
2012	406.8	24.9	141.9	573.6	380.0	29.4	106.8	516.2	*
2013	396.4	27.6	122.9	546.9	437.7	29.9	114.5	582.1	*
2014	376.3	24.8	131.9	533.0	409.0	29.6	118.6	557.2	*
2015	438.2	30.2	143.1	611.5	382.0	25.5	107.4	514.9	*
2016	416.2	37.6	143.0	596.8	403.8	28.5	132.6	564.9	
2017	412.3	31.8	135.0	579.1	409.9	29.4	125.7	565.1	*
2018	410.5	29.2	132.6	572.4	397.1	28.8	137.9	563.8	*
2019	383.7	25.7	127.5	536.9	408.7	31.6	130.8	571.1	*
2020	414.1	30.4	141.1	585.6	408.9	30.2	133.6	572.7	*
2021	424.6	31.7	147.4	603.7					

* Winter peak is in the following year.

Montana-Dakota Utilities Co.
Billing Cycle Allocation Factors by State

North Dakota

Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.119159	0.101562	0.099517	0.079043	0.065404	0.068338	0.079400	0.089680	0.072355	0.063468	0.069104	0.092970
Small C&I	0.104894	0.091040	0.097699	0.080499	0.072266	0.074226	0.077516	0.084446	0.076777	0.075897	0.073849	0.090891
Large C&I	0.093172	0.081073	0.089996	0.078441	0.074385	0.080074	0.083663	0.091229	0.083419	0.082213	0.074845	0.087489
Street Lighting	0.104197	0.087717	0.090542	0.083541	0.075676	0.075857	0.071033	0.074639	0.075676	0.082750	0.081164	0.097209
Other Public Sales	0.086077	0.073071	0.082838	0.074894	0.073771	0.090606	0.094281	0.109726	0.088858	0.078823	0.068088	0.078967
Interdepartmental	0.111607	0.096328	0.101202	0.088969	0.082024	0.075744	0.067621	0.069719	0.066993	0.072987	0.075629	0.091176
Company Use	0.092901	0.080909	0.092060	0.079988	0.076869	0.082735	0.086324	0.091743	0.081447	0.079937	0.071424	0.083664
Tesoro Refinery	0.087572	0.075542	0.087582	0.083479	0.072617	0.082642	0.084322	0.091139	0.088407	0.088937	0.075939	0.081823
Westmoreland Coal	0.103380	0.099961	0.103702	0.086262	0.069019	0.065264	0.066641	0.074028	0.072660	0.078181	0.082139	0.098761
Customers												
Residential	0.999567	1.000427	1.000175	0.998768	0.999267	0.999526	0.999259	1.000345	1.000256	1.000615	1.000829	1.000966
Small C&I	0.995650	0.996037	0.996862	0.998477	1.001792	1.003559	1.003593	1.003929	1.002734	0.999992	0.999066	0.998309
Large C&I	0.974261	0.975269	0.980472	0.987690	0.995748	1.001119	1.007330	1.014548	1.016226	1.015891	1.017569	1.013876
Street Lighting	0.991770	0.991002	0.99177	0.992539	0.993308	0.996766	0.997534	1.002145	1.002914	1.008678	1.014442	1.017132
Other Public Sales	0.998601	0.998272	0.999259	1.003538	1.005184	1.005513	1.003538	1.003538	1.002880	0.997943	0.993993	0.987740
Peak Demand	1.0000	0.9233	0.8458	0.7438	0.6939	0.9083	1.0000	0.9617	0.8535	0.7691	0.8123	0.9462

South Dakota

Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.117701	0.101800	0.101571	0.080940	0.066981	0.067276	0.078134	0.090017	0.071420	0.063127	0.068595	0.092437
Small C&I	0.113905	0.100039	0.104580	0.082531	0.069956	0.068908	0.072963	0.084916	0.072376	0.066420	0.069859	0.093547
Large C&I	0.094677	0.078698	0.084696	0.075271	0.075370	0.078464	0.079559	0.088901	0.084359	0.082870	0.080942	0.096192
Street Lighting	0.101770	0.086801	0.091802	0.085574	0.077067	0.080507	0.074578	0.080296	0.076815	0.081718	0.076448	0.086624
Other Public Sales	0.094290	0.089300	0.095657	0.087303	0.083547	0.082401	0.076835	0.087955	0.074704	0.074359	0.068758	0.084890
Interdepartmental	0.177477	0.150861	0.108477	0.076381	0.049541	0.046858	0.057258	0.061619	0.050883	0.054127	0.069559	0.096958
Company Use	0.157378	0.173355	0.164261	0.110457	0.063964	0.034333	0.030870	0.037562	0.030469	0.031771	0.056311	0.109272
Customers												
Residential	0.999913	0.999635	0.999420	1.000036	1.001207	1.000929	1.000714	1.001638	1.001330	0.999266	0.998680	0.997232
Small C&I	0.988445	0.988659	0.988445	0.995287	1.004160	1.009399	1.009613	1.008330	1.008223	1.003198	0.998708	0.997532
Large C&I	0.994038	0.995921	0.994038	0.995921	0.999686	0.999686	1.001569	1.005334	1.003452	1.003452	1.003452	1.003452
Street Lighting	0.978684	0.978684	0.978684	0.978684	0.989805	0.989805	0.989805	0.989805	0.989805	1.045412	1.045412	1.045412
Other Public Sales	0.993163	0.993163	0.993163	0.997481	1.010435	1.010435	1.010435	1.010435	1.010435	1.001799	0.984527	0.984527
Peak Demand	1.0000	0.8928	0.8310	0.7169	0.5976	0.8470	1.0000	0.9190	0.7741	0.7031	0.8647	0.9406

Montana

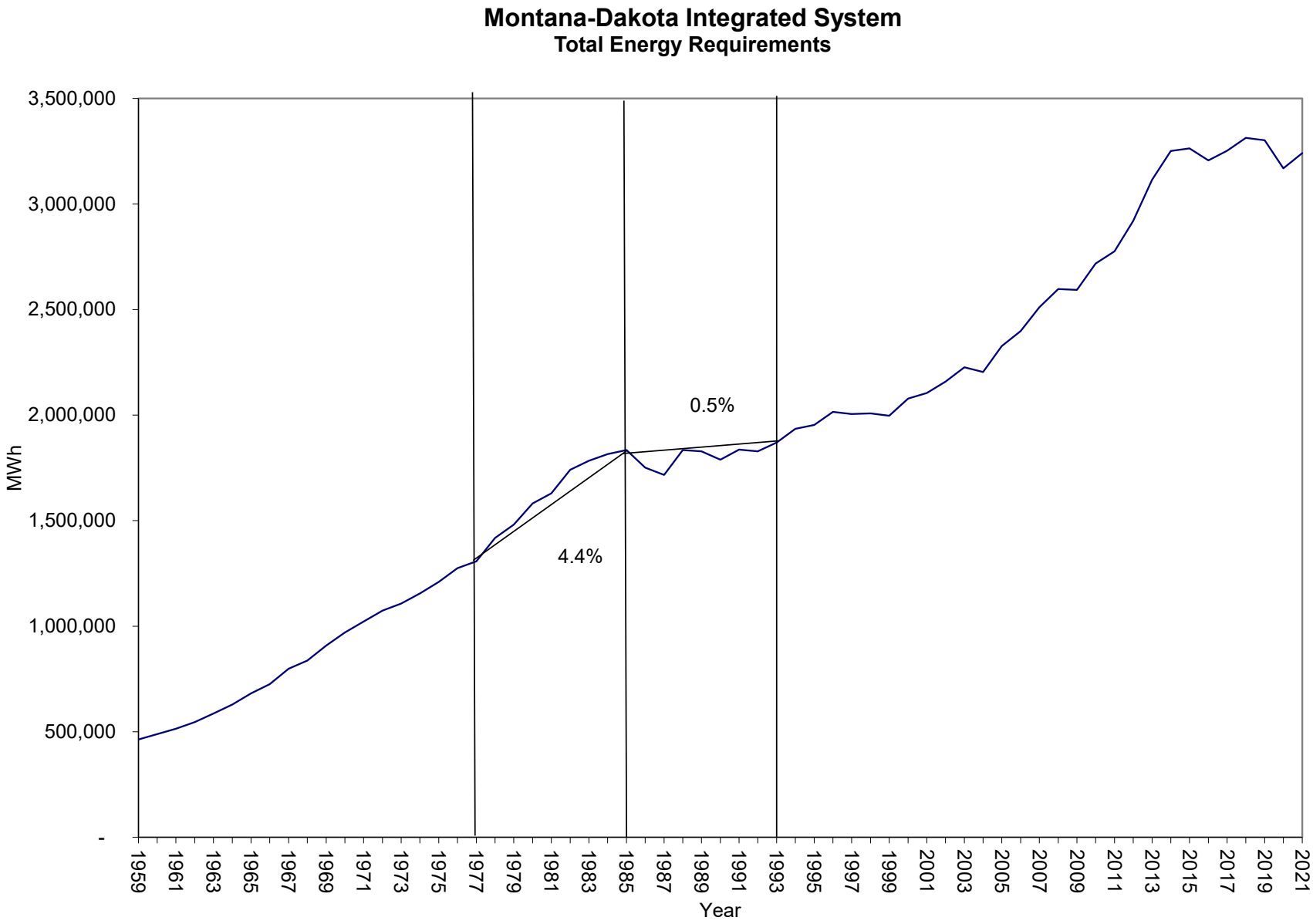
Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.112728	0.096579	0.097910	0.076608	0.064686	0.068215	0.081067	0.101395	0.080244	0.064532	0.067304	0.088732
Small C&I	0.099454	0.087483	0.094382	0.076700	0.067174	0.072677	0.083149	0.101079	0.086378	0.075388	0.070316	0.085821
Large C&I	0.097649	0.085020	0.092990	0.081114	0.075981	0.079048	0.077618	0.082961	0.078604	0.082580	0.078753	0.087681
Street Lighting	0.104537	0.085812	0.094438	0.085428	0.081637	0.080884	0.073947	0.079615	0.075625	0.077219	0.072620	0.088238
Other Public Sales	0.083367	0.072548	0.082076	0.071278	0.068368	0.087918	0.105861	0.122464	0.102540	0.075922	0.057380	0.070279
Interdepartmental	0.112025	0.098654	0.099705	0.083167	0.071780	0.071095	0.068830	0.077401	0.072490	0.075733	0.076350	0.092770
Company Use	0.123142	0.097059	0.099893	0.093120	0.071106	0.065321	0.070287	0.083697	0.073772	0.066450	0.068797	0.087354
Oil Fields	0.093136	0.079415	0.085824	0.083720	0.079595	0.083248	0.081824	0.082213	0.081052	0.084834	0.079077	0.086061
Westmoreland Coal	0.126971	0.111267	0.110428	0.089012	0.065773	0.059375	0.060194	0.057778	0.054738	0.071660	0.084006	0.108800
Customers												
Residential	1.003268	1.003017	1.002666	1.001844	1.000971	0.999457	0.998654	0.998394	0.997541	0.997662	0.998063	0.998464
Small C&I	0.989296	0.988127	0.986995	0.996424	1.005701	1.009095	1.010227	1.010151	1.008831	1.002458	0.997819	0.994877
Large C&I	0.998438	0.996939	0.996939	0.999188	1.005185	1.008183	1.008932	1.015679	1.009682	0.991692	0.985696	0.983447
Street Lighting	1.009818	1.009818	1.009818	1.004208	0.998597	1.004208	1.004208	0.987377	0.987377	0.981767	0.998597	1.004208
Other Public Sales	0.999498	0.995484	0.995484	0.997491	0.999498	0.999498	1.003512	1.003512	1.005519	0.997491	1.001505	1.001505
Peak Demand	1.0000	0.9070	0.8027	0.7655	0.6923	0.8246	1.0000	0.9399	0.7958	0.7615	0.8579	0.9493

Montana-Dakota Utilities Co.
Billing-Month to Calendar-Month Allocation Factors

Residential	January	February	March	April	May	June	July	August	September	October	November	December
North Dakota	60.5%	63.7%	61.6%	64.2%	64.6%	62.1%	58.3%	60.8%	62.6%	60.1%	63.5%	64.2%
South Dakota	65.4%	69.9%	68.6%	69.8%	65.1%	67.0%	62.3%	67.9%	65.8%	64.1%	65.6%	66.9%
Montana	65.3%	70.0%	66.8%	68.9%	69.8%	61.5%	64.2%	67.7%	67.9%	66.3%	68.6%	68.9%
Small Commercial & Industrial												
North Dakota	59.0%	61.8%	58.3%	61.3%	61.1%	60.0%	56.7%	57.7%	59.3%	57.6%	62.3%	62.6%
South Dakota	68.5%	73.3%	71.9%	72.7%	63.2%	68.8%	65.2%	69.4%	67.0%	66.9%	69.0%	70.3%
Montana	58.8%	62.6%	58.9%	60.9%	62.5%	58.2%	57.9%	60.6%	59.9%	59.1%	60.9%	61.4%
Large Commercial & Industrial												
North Dakota	61.9%	64.9%	60.9%	64.1%	63.6%	64.2%	61.9%	62.7%	63.9%	62.8%	66.3%	65.6%
South Dakota	72.9%	76.8%	75.4%	76.9%	65.1%	75.5%	73.9%	76.8%	72.5%	74.0%	75.8%	75.4%
Montana	39.5%	40.4%	36.1%	37.9%	37.7%	44.4%	37.0%	38.9%	37.2%	37.4%	39.1%	40.9%
Street Lighting												
North Dakota	57.7%	60.2%	56.5%	59.0%	59.3%	58.9%	54.8%	55.7%	56.1%	55.8%	60.6%	60.3%
South Dakota	68.3%	70.5%	67.7%	69.0%	61.4%	69.6%	66.3%	68.0%	66.3%	66.6%	69.8%	70.6%
Montana	62.9%	67.9%	64.3%	65.5%	67.7%	61.9%	62.8%	64.2%	63.7%	64.6%	68.8%	64.5%
Other Public Sales												
North Dakota	58.3%	61.3%	57.2%	58.7%	58.3%	58.8%	56.2%	57.1%	57.4%	55.6%	60.6%	61.4%
South Dakota	81.2%	87.0%	84.3%	85.1%	58.1%	84.4%	78.7%	82.9%	78.2%	79.8%	83.5%	80.0%
Montana	64.1%	68.9%	63.8%	66.1%	65.2%	59.2%	61.9%	64.1%	63.1%	63.3%	65.2%	66.6%
Interdepartmental												
North Dakota	54.9%	56.0%	55.0%	57.4%	60.5%	60.5%	50.5%	51.5%	54.8%	52.1%	58.4%	58.5%
South Dakota	29.4%	25.7%	32.0%	32.5%	56.5%	42.9%	27.8%	24.1%	29.5%	28.7%	30.7%	37.9%
Montana	66.8%	71.8%	69.4%	71.0%	73.5%	66.5%	67.7%	75.2%	70.5%	70.7%	73.2%	72.1%
Company Use												
North Dakota	55.0%	56.6%	51.3%	55.0%	54.3%	53.6%	50.9%	52.1%	52.5%	51.4%	57.0%	57.3%
South Dakota	94.1%	96.5%	94.8%	96.4%	58.2%	95.3%	91.5%	92.1%	76.2%	72.9%	66.5%	71.5%
Montana	68.3%	73.4%	68.9%	72.4%	73.5%	61.5%	68.1%	66.4%	70.0%	69.9%	73.9%	72.3%

Montana-Dakota Utilties Co.
Historical Energy Requirements Integrated System
(Megawatt Hours)

Year	Total Requirements	%Inc/Dec
1959	463,307	
1960	488,316	5.40%
1961	514,086	5.28%
1962	545,306	6.07%
1963	586,589	7.57%
1964	628,616	7.16%
1965	682,214	8.53%
1966	725,389	6.33%
1967	798,855	10.13%
1968	837,504	4.84%
1969	908,231	8.44%
1970	970,490	6.85%
1971	1,021,876	5.29%
1972	1,073,560	5.06%
1973	1,107,691	3.18%
1974	1,155,351	4.30%
1975	1,210,168	4.74%
1976	1,274,391	5.31%
1977	1,307,542	2.60%
1978	1,418,366	8.48%
1979	1,481,019	4.42%
1980	1,581,612	6.79%
1981	1,629,323	3.02%
1982	1,740,859	6.85%
1983	1,783,753	2.46%
1984	1,815,453	1.78%
1985	1,834,294	1.04%
1986	1,751,503	-4.51%
1987	1,716,377	-2.01%
1988	1,834,232	6.87%
1989	1,828,665	-0.30%
1990	1,788,854	-2.18%
1991	1,836,243	2.65%
1992	1,827,866	-0.46%
1993	1,870,268	2.32%
1994	1,934,561	3.44%
1995	1,952,872	0.95%
1996	2,014,830	3.17%
1997	2,005,195	-0.48%
1998	2,007,534	0.12%
1999	1,996,647	-0.54%
2000	2,077,579	4.05%
2001	2,104,119	1.28%
2002	2,158,431	2.58%
2003	2,226,531	3.16%
2004	2,204,012	-1.01%
2005	2,327,117	5.59%
2006	2,397,793	3.04%
2007	2,510,540	4.70%
2008	2,596,990	3.44%
2009	2,593,368	-0.14%
2010	2,718,192	4.81%
2011	2,776,082	2.13%
2012	2,919,752	5.18%
2013	3,115,064	6.69%
2014	3,250,683	4.35%
2015	3,263,271	0.39%
2016	3,206,737	-1.73%
2017	3,251,539	1.40%
2018	3,313,387	1.90%
2019	3,301,537	-0.36%
2020	3,169,086	-4.01%
2021	3,240,600	2.26%


Montana-Dakota Integrated System
Total Energy Requirements
MWh
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
4.4%
0.5%
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
Year

APPENDIX B

Integrated System
Historical and Forecasted Exogenous Variables

Montana-Dakota Utilities Co.
Integrated System
Historical Electricity Prices 1/
cents/kWh

	Residential Prices			Small C&I Prices			Large C&I Prices		
Year	MT	ND	SD	MT	ND	SD	MT	ND	SD
1996	7.400	6.744	8.768	6.157	7.559	8.295	4.802	5.376	6.041
1997	7.408	6.845	8.875	6.191	7.666	8.384	4.977	5.510	6.177
1998	7.413	6.878	8.962	6.193	7.697	8.375	5.012	5.549	6.146
1999	7.433	6.833	8.923	6.200	7.622	8.339	4.888	5.447	6.134
2000	7.445	6.731	8.783	6.177	7.512	8.243	4.850	5.339	5.989
2001	7.356	6.839	8.862	6.142	7.651	8.338	4.840	5.431	6.182
2002	7.335	6.753	8.807	6.109	7.552	8.294	4.821	5.509	6.162
2003	7.331	6.812	8.884	6.087	7.606	8.379	4.517	5.510	6.273
2004	7.375	7.172	9.098	6.133	7.861	8.565	4.524	5.720	6.440
2005	7.352	7.010	8.918	6.142	7.681	8.437	4.512	5.635	6.356
2006	7.337	7.342	9.165	6.106	8.027	8.689	4.500	6.009	6.596
2007	7.338	7.823	9.616	6.116	8.544	9.142	4.477	6.573	7.134
2008	8.370	7.844	9.606	7.288	8.683	9.125	5.183	6.673	7.167
2009	7.844	7.236	9.176	6.993	8.121	8.646	5.257	6.228	6.865
2010	7.973	7.664	9.243	7.171	8.596	8.779	4.946	6.709	7.217
2011	8.301	8.020	9.082	7.478	8.935	8.667	5.432	7.040	7.156
2012	8.453	8.406	9.349	7.592	9.216	8.962	5.624	7.388	7.334
2013	8.585	8.230	9.304	7.715	9.037	8.850	5.634	7.467	7.365
2014	8.705	8.614	9.360	7.809	9.397	8.877	5.851	7.719	7.470
2015	8.705	9.095	9.404	7.790	10.203	8.916	5.991	7.913	7.418
2016	8.718	9.907	10.934	7.934	11.044	10.400	5.743	8.481	8.570
2017	9.314	10.730	10.907	8.690	12.156	10.856	6.508	9.130	8.525
2018	9.423	10.729	10.862	8.948	12.390	10.905	6.687	9.005	8.576
2019	10.716	10.568	11.245	10.258	12.275	11.310	7.436	8.924	9.140
2020	10.826	10.295	11.028	10.250	12.117	10.984	7.654	8.575	8.625

SOURCE:
1996-2020: Historical prices calculated from Montana-Dakota Utilities Co., *Electric Operating Revenues Reports*

1/ Price of electricity reflects the "all-inclusive" price for each kWh sold (basic service charge, demand charge, energy charge, and fuel and purchased power.)

Montana-Dakota Utilities Co.
Integrated System
Historical Natural Gas Prices
$/Dk

Year	Residential Price	Firm Price
1996	4.13	3.71
1997	4.54	4.09
1998	4.85	4.30
1999	5.08	4.54
2000	5.92	5.39
2001	7.42	6.87
2002	4.57	4.03
2003	6.83	6.29
2004	8.56	7.97
2005	10.49	9.84
2006	9.87	9.15
2007	7.78	7.09
2008	9.42	8.77
2009	7.82	7.19
2010	7.05	6.37
2011	7.03	6.37
2012	6.52	5.65
2013	6.56	5.85
2014	7.80	6.91
2015	7.56	6.55
2016	6.40	5.10
2017	6.89	5.68
2018	6.52	5.44
2019	6.44	5.41
2020	6.35	5.22

SOURCE:
1996-2020: CSBE Rate Reporting Class Report
Gas Year-to-Date Report for Year-end

Bismarck, ND and Aberdeen, SD
Heating Degree Days (HDD)
and
Cooling Degree Days (CDD)
(Annual)

	HDD		CDD	
	MT & ND	SD	MT & ND	SD
1996	10,027	9,875	480	475
1997	8,450	8,854	609	540
1998	7,765	7,502	633	645
1999	7,710	7,401	457	507
2000	8,412	8,436	549	554
2001	8,039	8,348	668	727
2002	8,532	8,369	745	788
2003	8,493	8,319	737	601
2004	8,183	8,035	379	341
2005	7,792	7,871	555	659
2006	7,525	7,437	793	704
2007	8,345	8,465	666	698
2008	8,946	9,022	524	499
2009	9,108	8,847	331	327
2010	8,643	8,255	507	661
2011	8,750	8,668	425	729
2012	7,612	7,342	599	764
2013	9,133	9,445	555	580
2014	8,887	9,087	457	342
2015	7,655	7,364	622	677
2016	7,235	7,015	548	722
2017	7,894	7,845	615	552
2018	8,825	8,728	701	849
2019	9,327	9,261	530	601
2020	7,774	7,789	793	871
NORMAL	8,558	8,534	520	525

Montana-Dakota Utilities Co.
Service Territory Counties
Personal Income (2009 $s)

Year	Montana	North Dakota	South Dakota
1996	1,575,759	5,813,396	811,231
1997	1,574,035	5,567,217	780,438
1998	1,652,582	6,076,571	864,332
1999	1,665,978	6,106,999	890,307
2000	1,657,847	6,520,305	952,689
2001	1,729,211	6,753,275	960,715
2002	1,675,860	6,587,305	807,031
2003	1,809,966	7,148,888	972,057
2004	1,835,955	7,173,615	976,105
2005	1,874,439	7,527,772	987,376
2006	1,859,777	7,724,909	782,681
2007	2,043,725	8,374,474	1,004,955
2008	2,161,266	9,269,709	1,133,264
2009	2,152,949	9,516,427	1,039,758
2010	2,360,494	10,697,214	1,088,212
2011	2,488,414	12,386,439	1,324,465
2012	2,816,835	14,805,303	1,345,133
2013	2,885,380	15,155,640	1,443,245
2014	2,957,185	16,648,848	1,353,459
2015	2,859,721	15,619,741	1,207,768
2016	2,615,160	13,958,597	1,075,950
2017	2,643,957	13,967,956	1,081,974
2018	2,659,901	14,518,411	1,133,870
2019	2,671,981	14,912,107	1,100,891
2020	2,818,867	15,012,457	1,141,074

SOURCES:
1996-2019: U.S. Dept. of Commerce
2020: Woods & Poole Economics, Inc.

Integrated System
Personal Consumption Expediture Deflator

Year	Personal Consumption Expenditure Deflator (2012 = 100)	Inflation Rate
1996	73.35	
1997	74.62	1.7%
1998	75.22	0.8%
1999	76.34	1.5%
2000	78.24	2.5%
2001	79.74	1.9%
2002	80.79	1.3%
2003	82.36	1.9%
2004	84.41	2.5%
2005	86.81	2.8%
2006	89.17	2.7%
2007	91.44	2.5%
2008	94.18	3.0%
2009	94.09	-0.1%
2010	95.71	1.7%
2011	98.13	2.5%
2012	100.00	1.9%
2013	101.35	1.3%
2014	102.83	1.5%
2015	103.04	0.2%
2016	104.12	1.0%
2017	105.98	1.8%
2018	108.24	2.1%
2019	109.85	1.5%
2020	111.15	1.2%
2021	113.66	2.3%
2022	116.31	2.3%
2023	119.22	2.5%
2024	122.38	2.7%
2025	125.81	2.8%
2026	129.50	2.9%
2027	133.45	3.0%
2028	137.63	3.1%
2029	142.05	3.2%
2030	146.70	3.3%
2031	151.54	3.3%
2032	156.58	3.3%
2033	161.82	3.3%
2034	167.26	3.4%
2035	172.90	3.4%
2036	178.74	3.4%
2037	184.81	3.4%
2038	191.09	3.4%
2039	197.59	3.4%
2040	204.32	3.4%
2041	211.30	3.4%

SOURCES:
1996-2020 U.S. Department of Commerce
2021-2041 Woods & Poole Economics, Inc.

Montana-Dakota Utilities Co.
Integrated System
Residential Sector
Households and Customers for Service Territory Counties

	Montana		North Dakota		South Dakota	
Year	Number of Households	Average Customers	Number of Households	Average Customers	Number of Households	Average Customers
1996	24,188	18,689	79,774	58,529	11,775	6,936
1997	24,100	18,803	80,321	58,787	11,538	6,919
1998	24,019	18,839	80,967	59,081	11,384	6,913
1999	23,884	18,799	81,058	58,988	11,505	6,883
2000	23,829	18,716	81,566	59,332	11,459	6,866
2001	24,092	18,645	83,396	59,405	11,545	6,816
2002	23,799	18,635	83,797	59,608	11,407	6,768
2003	23,959	18,602	85,009	59,953	11,391	6,724
2004	23,931	18,539	85,375	60,279	11,204	6,681
2005	23,976	18,502	86,433	60,641	11,133	6,648
2006	23,945	18,505	87,358	61,026	10,989	6,620
2007	24,224	18,531	89,030	61,451	10,962	6,593
2008	24,285	18,582	89,973	62,068	10,897	6,612
2009	24,574	18,636	91,208	62,631	10,767	6,619
2010	24,545	18,716	91,736	63,619	10,761	6,609
2011	25,173	18,883	95,145	65,196	10,936	6,602
2012	25,223	19,191	96,058	67,888	10,913	6,616
2013	25,317	19,616	97,131	70,949	10,906	6,590
2014	25,355	19,918	98,400	73,909	10,913	6,580
2015	25,506	20,135	100,152	76,894	10,951	6,662
2016	25,629	20,128	101,552	78,553	10,971	6,546
2017	25,579	19,981	102,407	78,564	10,922	6,533
2018	25,795	19,911	103,784	78,510	10,952	6,496
2019	25,868	19,896	104,917	78,567	10,952	6,442
2020	26,029	19,798	106,475	78,812	10,985	6,441
2021	26,158	19,798	107,959	78,962	11,006	6,447
2022	26,257	19,798	109,342	79,237	11,012	6,447
2023	26,337	19,798	110,661	79,542	11,012	6,447
2024	26,402	19,798	111,926	79,847	11,005	6,447
2025	26,454	19,798	113,155	80,157	10,993	6,446
2026	26,497	19,798	114,343	80,407	10,974	6,444
2027	26,529	19,798	115,506	80,657	10,954	6,442
2028	26,552	19,798	116,642	80,907	10,929	6,440
2029	26,564	19,798	117,735	81,157	10,901	6,438
2030	26,568	19,798	118,799	81,407	10,867	6,435
2031	26,564	19,798	119,835	81,657	10,830	6,431
2032	26,552	19,798	120,845	81,907	10,793	6,428
2033	26,533	19,798	121,830	82,157	10,753	6,425
2034	26,509	19,798	122,794	82,407	10,710	6,421
2035	26,481	19,798	123,739	82,657	10,667	6,417
2036	26,451	19,798	124,677	82,907	10,617	6,413
2037	26,417	19,798	125,603	83,157	10,569	6,408
2038	26,379	19,798	126,523	83,407	10,525	6,404
2039	26,338	19,798	127,426	83,657	10,476	6,400
2040	26,295	19,798	128,334	83,907	10,424	6,395
2041	26,259	19,798	129,266	84,157	10,380	6,391

*/ Actual customer numbers for 1999 are unavailable due to the installation of a new CIS.
This number is an estimate.

SOURCES:
Households
2000, 2010: U.S. Department of Commerce
All other years: Estimated and projected by Woods & Poole Economics, Inc.
Customers
1996-2020: Actuals from Montana-Dakota Utilities Co. Customer Information System Active Customers Report
2021-2041: Montana-Dakota forecast

Integrated System
Employment Data
Total Employment less Farming and Mining Employment

	Montana				North Dakota				South Dakota	
Year	Number of Employees	Growth Rate	Adjusted Employment	Growth Rate	Number of Employees	Growth Rate	Adjusted Employment	Growth Rate	Number of Employees	Growth Rate
1996	30,123				111,558				12,240	
1997	30,473	1.16%			113,352	1.61%			12,137	-0.84%
1998	30,885	1.35%			115,791	2.15%			12,248	0.91%
1999	30,700	-0.60%			116,934	0.99%			12,219	-0.24%
2000	30,722	0.07%			119,252	1.98%			12,396	1.45%
2001	30,206	-1.68%			119,218	-0.03%			12,162	-1.89%
2002	30,138	-0.23%			120,576	1.14%			12,162	0.00%
2003	30,312	0.58%			121,969	1.16%			11,846	-2.60%
2004	30,467	0.51%			124,635	2.19%			11,966	1.01%
2005	30,609	0.47%			127,447	2.26%			12,000	0.28%
2006	30,848	0.78%			131,658	3.30%			12,138	1.15%
2007	31,580	2.37%			134,593	2.23%			12,192	0.44%
2008	32,009	1.36%			137,596	2.23%			12,251	0.48%
2009	32,268	0.81%			139,817	1.61%			12,358	0.87%
2010	32,662	1.22%			144,254	3.17%			12,363	0.04%
2011	33,932	3.89%			155,901	8.07%			12,390	0.22%
2012	34,848	2.70%			172,075	10.37%			12,432	0.34%
2013	35,743	2.57%			182,884	6.28%			12,736	2.45%
2014	35,839	0.27%			193,379	5.74%			12,853	0.92%
2015	35,019	-2.29%			190,711	-1.38%			12,770	-0.65%
2016	33,598	-4.06%			179,241	-6.01%			12,736	-0.27%
2017	33,208	-1.16%			176,458	-1.55%			12,590	-1.15%
2018	32,488	-2.17%			177,672	0.69%			12,486	-0.83%
2019	32,715	0.70%			182,779	2.87%			12,434	-0.42%
2020	32,176	-1.65%			174,503	-4.53%			12,429	-0.04%
2021	33,157	3.05%	32,252	0.24%	188,556	8.05%	176,551	1.17%	12,589	1.29%
2022	33,387	0.69%	32,329	0.24%	191,548	1.59%	178,888	1.32%	12,660	0.56%
2023	33,599	0.63%	32,405	0.24%	194,468	1.52%	181,305	1.35%	12,728	0.54%
2024	33,818	0.65%	32,482	0.24%	197,446	1.53%	183,735	1.34%	12,795	0.53%
2025	34,026	0.62%	32,558	0.23%	200,415	1.50%	186,190	1.34%	12,862	0.52%
2026	34,237	0.62%	32,634	0.23%	203,421	1.50%	188,518	1.25%	12,939	0.60%
2027	34,442	0.60%	32,711	0.24%	206,439	1.48%	190,857	1.24%	13,004	0.50%
2028	34,643	0.58%	32,787	0.23%	209,458	1.46%	193,206	1.23%	13,070	0.51%
2029	34,841	0.57%	32,864	0.23%	212,498	1.45%	195,567	1.22%	13,140	0.54%
2030	35,034	0.55%	32,940	0.23%	215,543	1.43%	197,938	1.21%	13,199	0.45%
2031	35,227	0.55%	33,016	0.23%	218,603	1.42%	200,321	1.20%	13,259	0.45%
2032	35,409	0.52%	33,093	0.23%	221,694	1.41%	202,714	1.19%	13,321	0.47%
2033	35,588	0.51%	33,169	0.23%	224,776	1.39%	205,118	1.19%	13,383	0.47%
2034	35,767	0.50%	33,246	0.23%	227,867	1.38%	207,533	1.18%	13,439	0.42%
2035	35,938	0.48%	33,322	0.23%	230,976	1.36%	209,958	1.17%	13,496	0.42%
2036	36,117	0.50%	33,398	0.23%	234,089	1.35%	212,395	1.16%	13,553	0.42%
2037	36,282	0.46%	33,475	0.23%	237,214	1.33%	214,842	1.15%	13,615	0.46%
2038	36,448	0.46%	33,551	0.23%	240,359	1.33%	217,301	1.14%	13,671	0.41%
2039	36,614	0.46%	33,628	0.23%	243,523	1.32%	219,770	1.14%	13,727	0.41%
2040	36,771	0.43%	33,704	0.23%	246,699	1.30%	222,250	1.13%	13,779	0.38%
2041	36,927	0.42%	33,780	0.23%	249,876	1.29%	224,741	1.12%	13,832	0.38%

SOURCES:

Number of Employees:

1996-2019: U.S. Department of Commerce

2020-2041: Estimated and projected by Woods & Poole Economics, Inc.

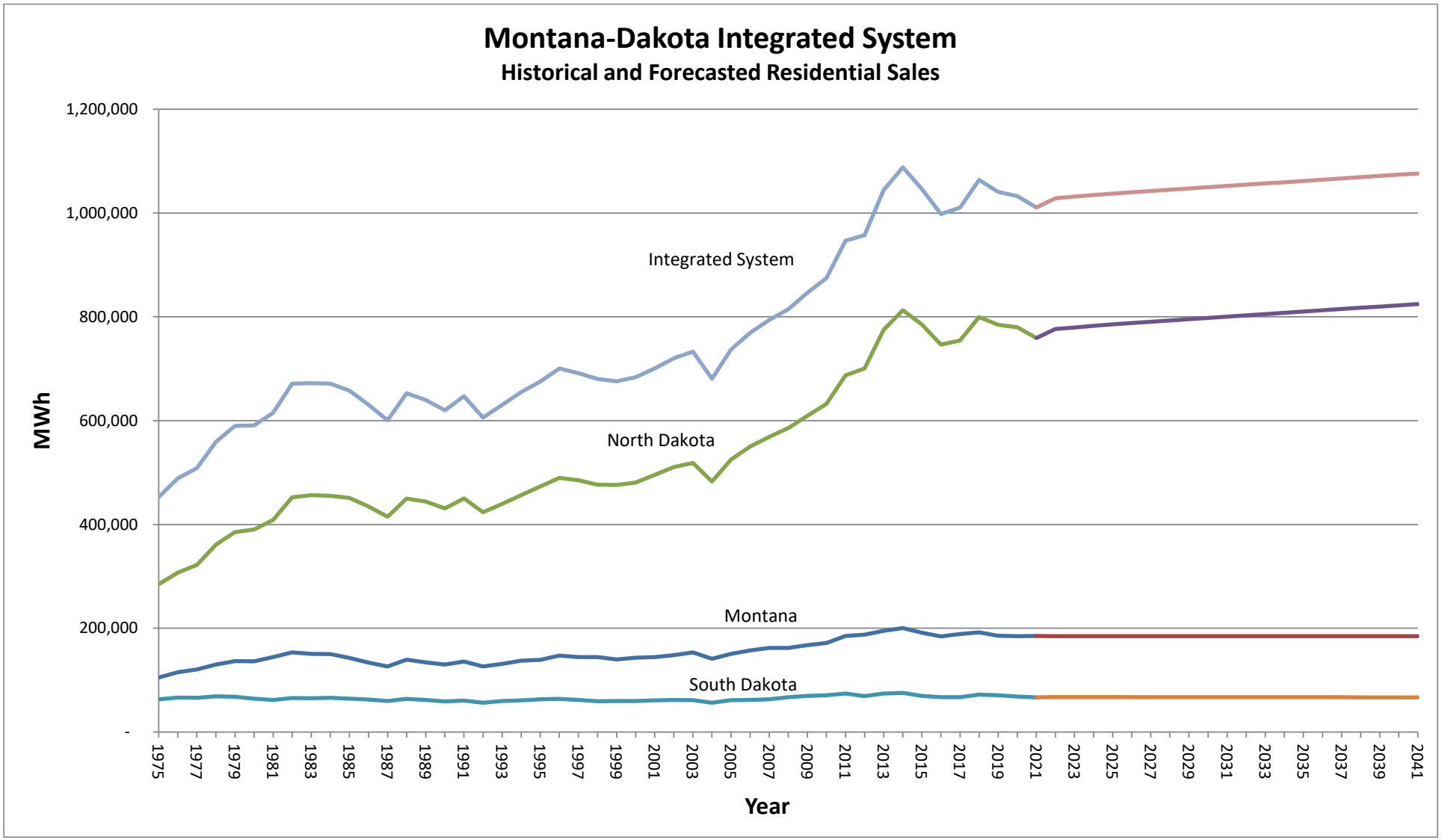
Adjusted Employment:

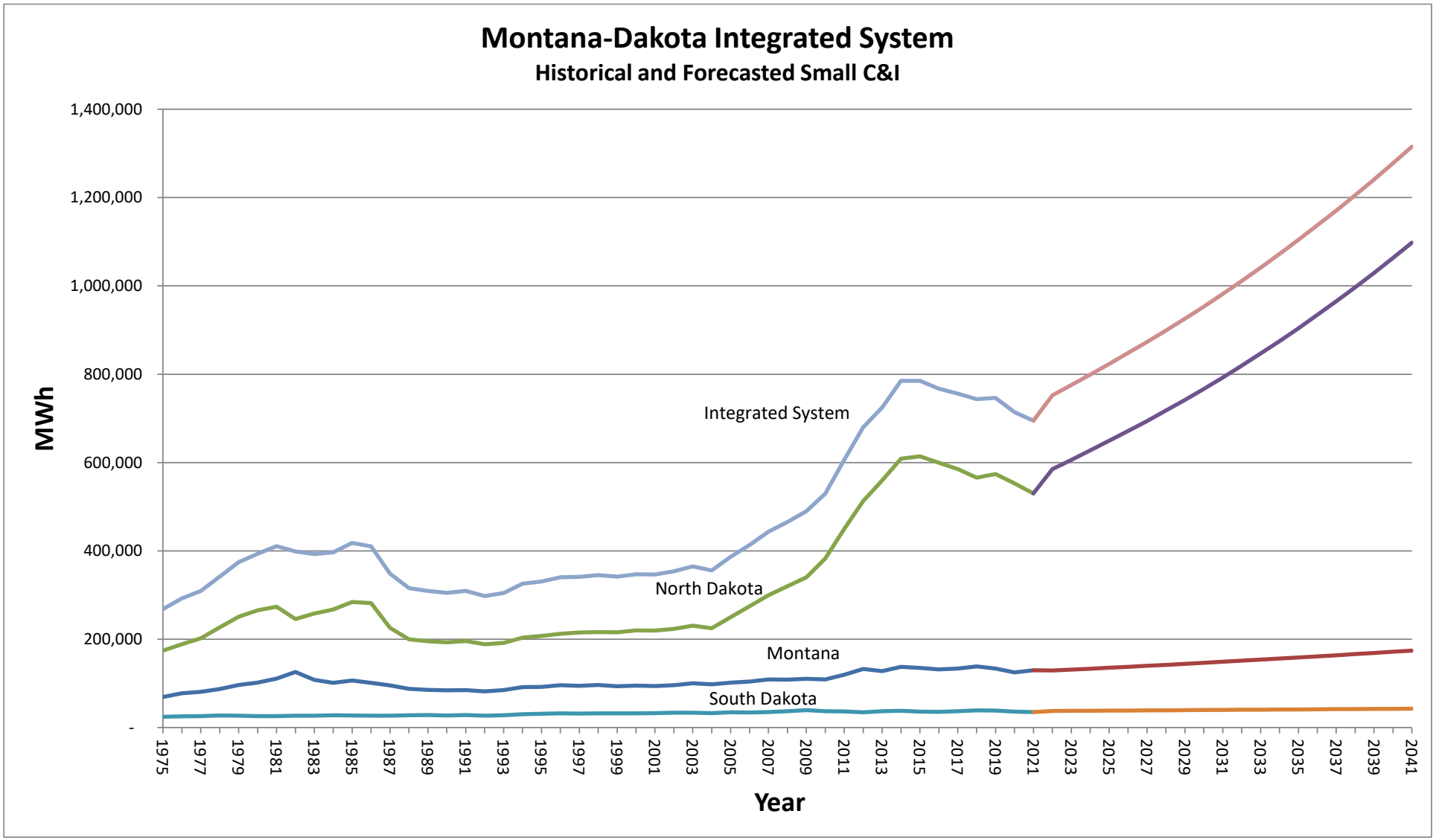
2021-2041: For Montana and North Dakota, employment was tied to the growth in residential customers by running a regression on the historical (1996-2020) ratio of actual residential customer numbers to employees. Those regression results were then applied on a forecasted basis to the adjusted forecast of residential customer numbers to arrive at an adjusted forecast of number of employees. No adjustment was made to South Dakota employment.

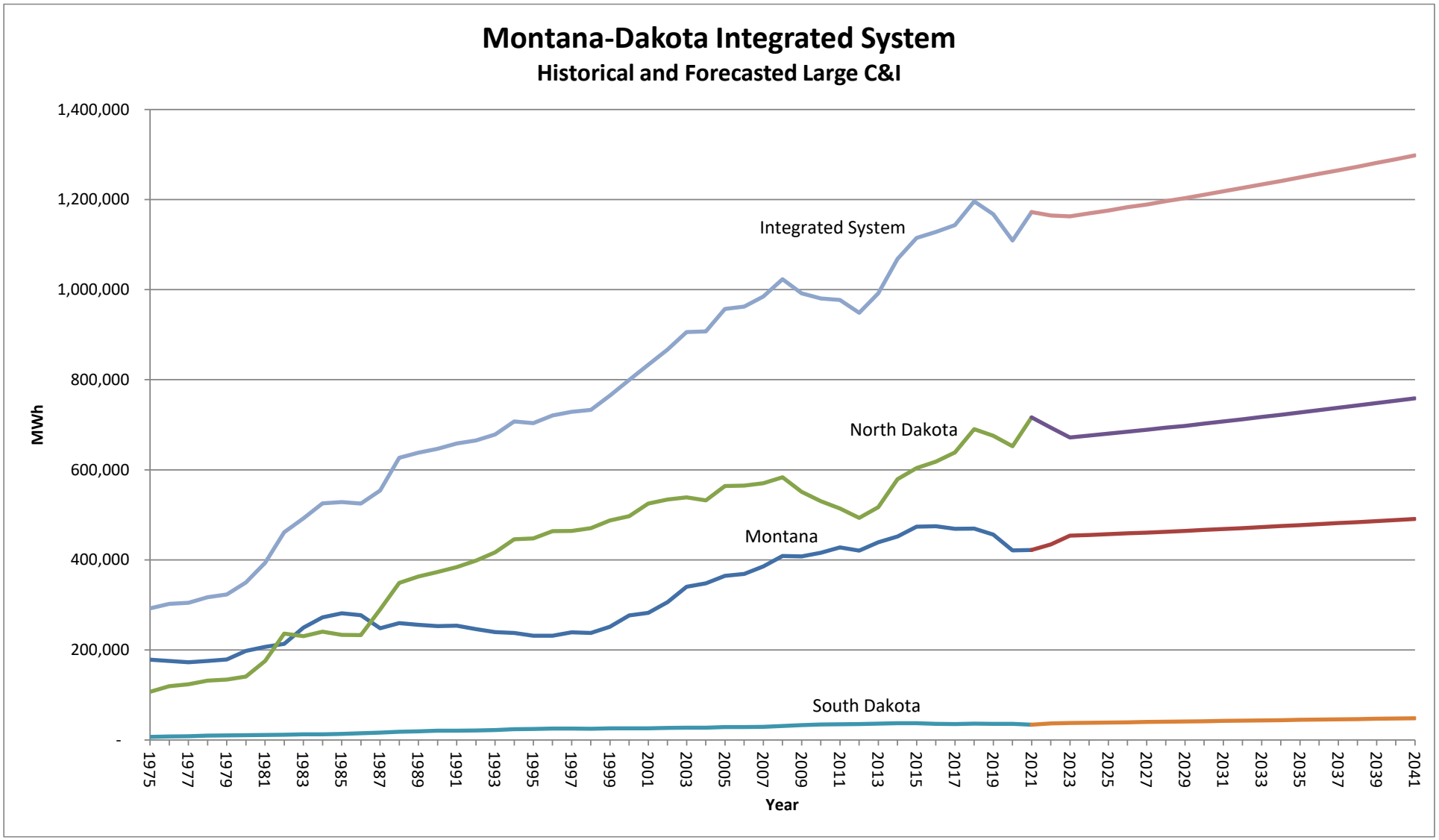
NOTE: The number of employees used for the forecast is total employment less farming and mining employment (most farms are not served by Montana-Dakota and the mining sector (oil fields and coal mining) is forecasted separately).

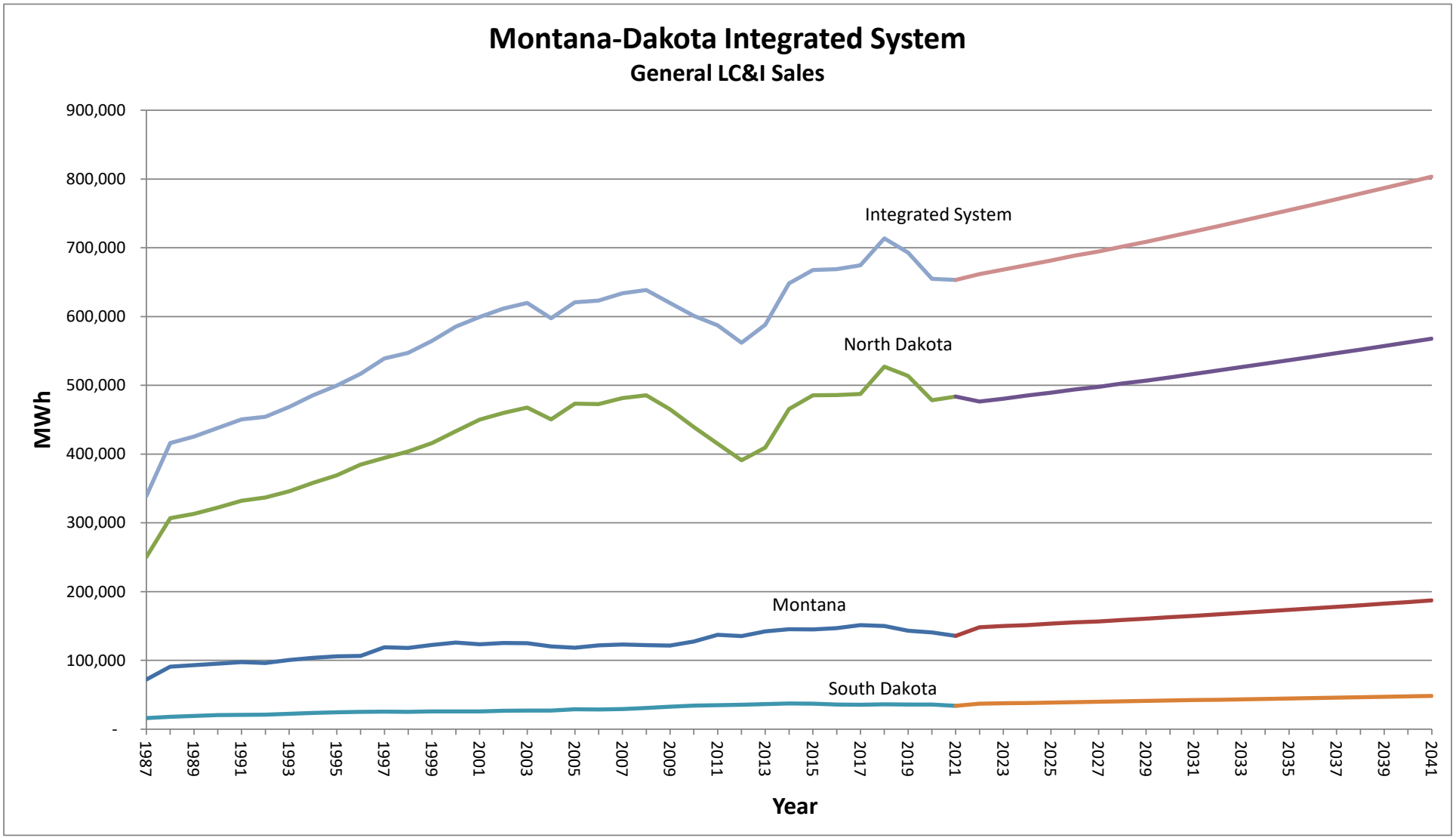
APPENDIX C

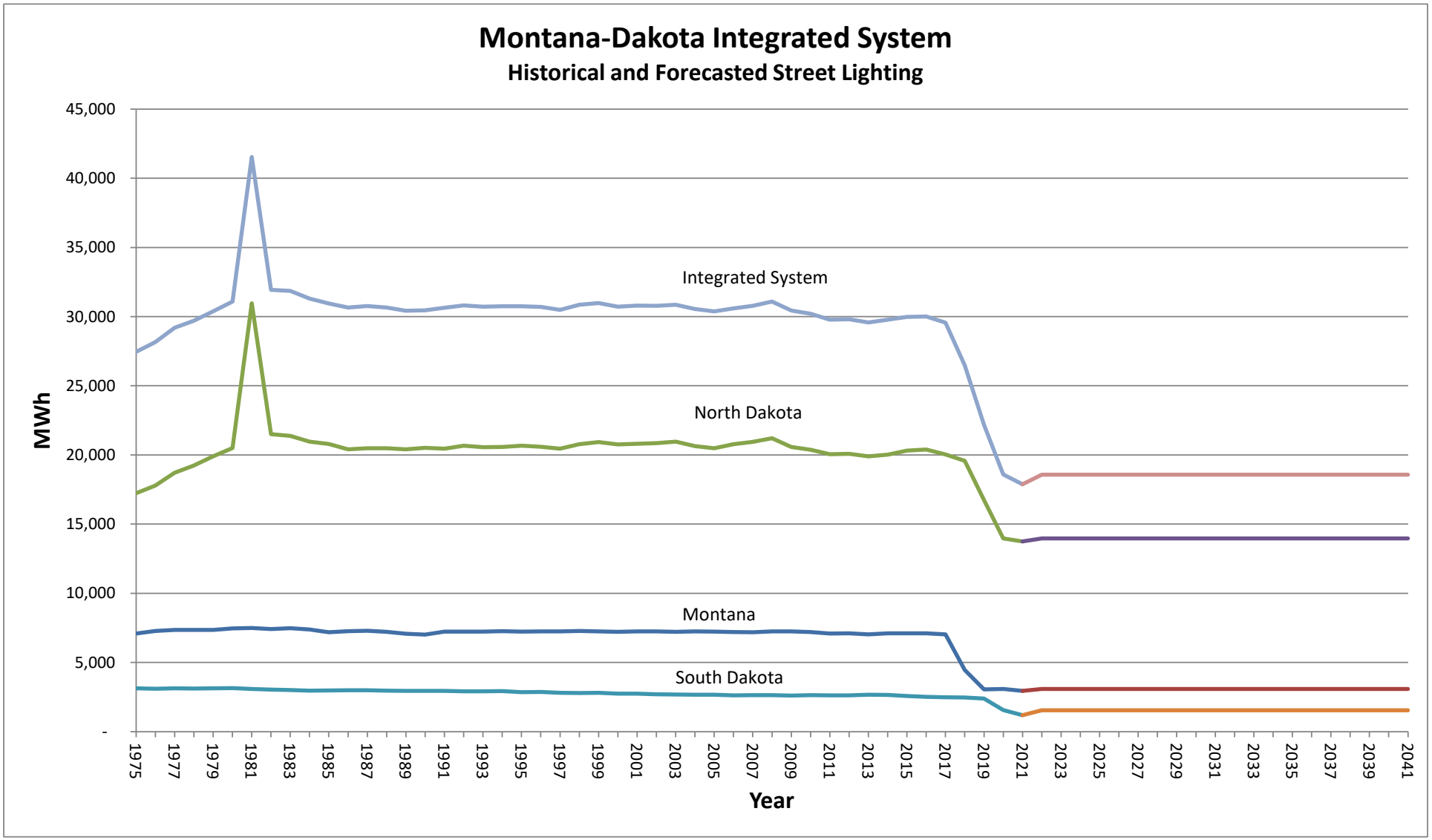
Integrated System Forecast Results

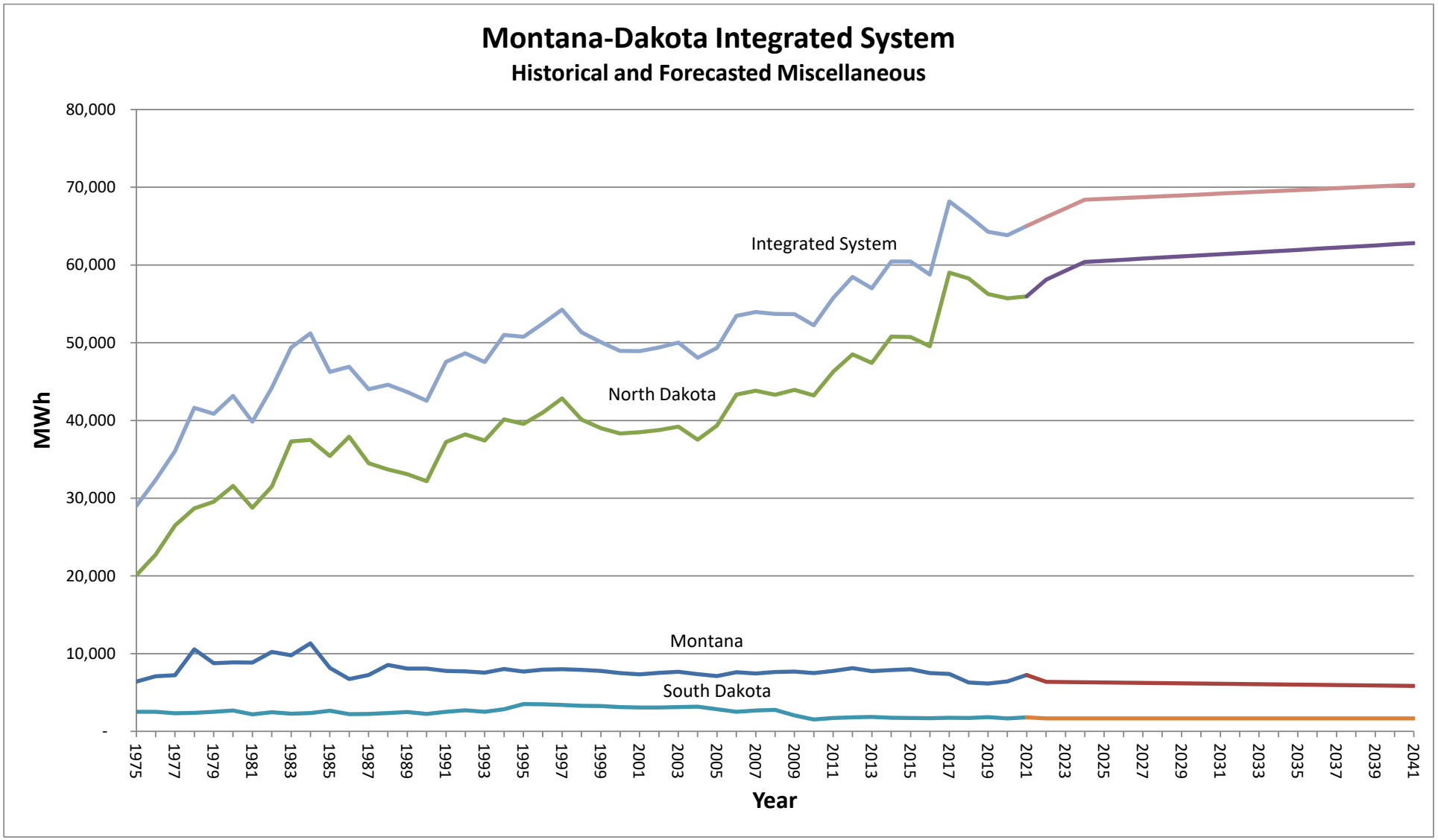

Montana-Dakota Integrated System
Historical and Forecasted Residential Sales
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year

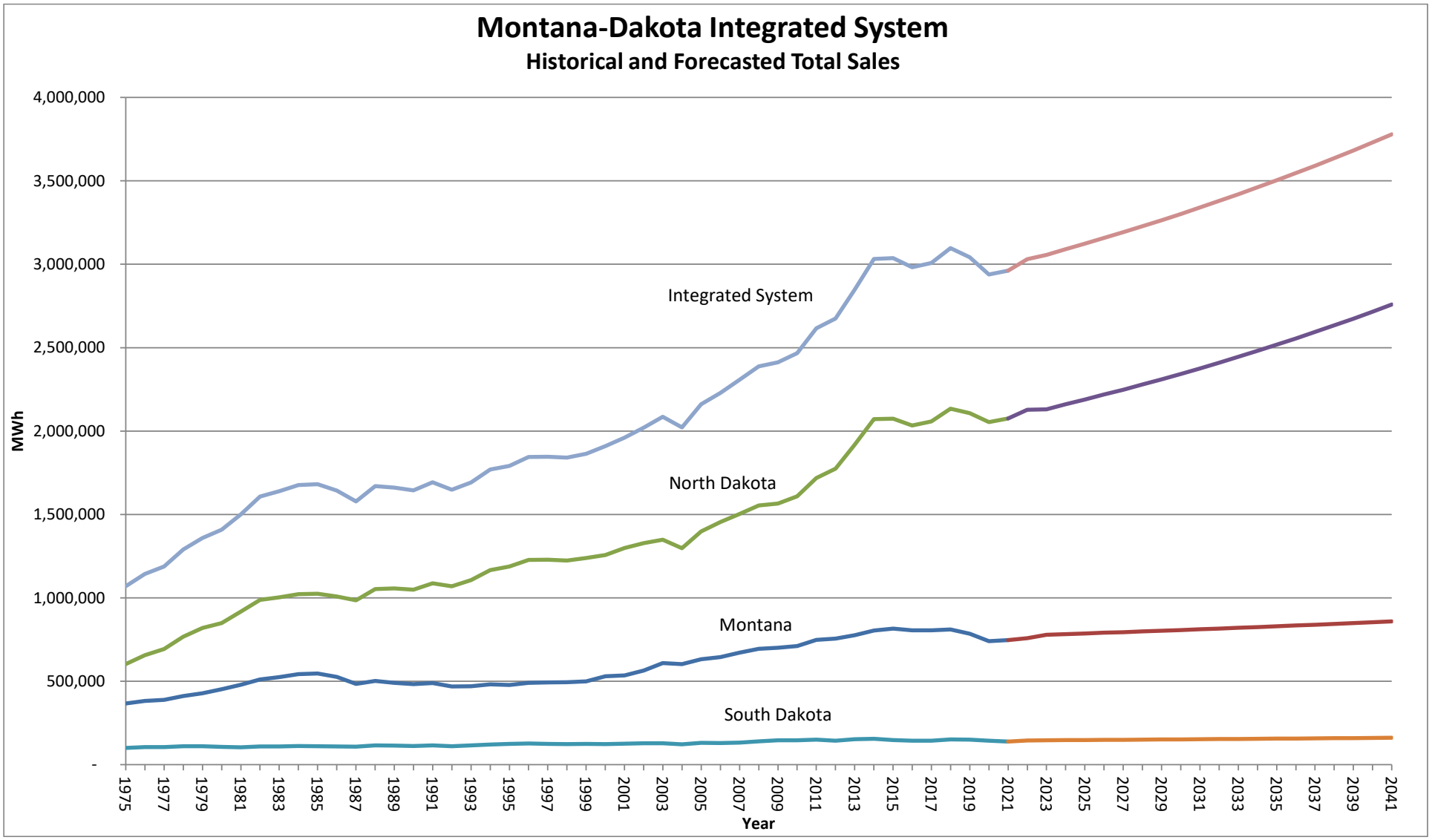

Montana-Dakota Integrated System
Historical and Forecasted Small C&I
MWh
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
Integrated System
North Dakota
Montana
South Dakota
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year


Montana-Dakota Integrated System
Historical and Forecasted Large C&I
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year


Montana-Dakota Integrated System
General LC&I Sales
MWh
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Integrated System
North Dakota
Montana
South Dakota
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year


Montana-Dakota Integrated System
Historical and Forecasted Street Lighting
MWh
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Integrated System
North Dakota
Montana
South Dakota
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year


Montana-Dakota Integrated System
Historical and Forecasted Miscellaneous
MWh
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Integrated System
North Dakota
Montana
South Dakota
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year


Montana-Dakota Integrated System
Historical and Forecasted Total Sales
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Year

Montana-Dakota Utilities Co.
Forecasted Energy (MWh) and
Seasonal Demands (MW) Prior to Demand Response
Integrated System

Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2022	580.6		579.0		3,269.5		64.28%
2023	586.5	1.02%	583.8	0.83%	3,297.5	0.86%	64.18%
2024	593.4	1.18%	590.4	1.13%	3,334.7	1.13%	63.98%
2025	600.2	1.15%	596.7	1.07%	3,371.1	1.09%	64.12%
2026	606.9	1.12%	603.3	1.11%	3,408.4	1.11%	64.11%
2027	613.7	1.12%	609.5	1.03%	3,444.4	1.06%	64.07%
2028	620.8	1.16%	616.6	1.16%	3,483.3	1.13%	63.88%
2029	627.7	1.11%	623.2	1.07%	3,521.8	1.10%	64.05%
2030	634.7	1.12%	630.4	1.16%	3,562.5	1.16%	64.07%
2031	641.9	1.13%	637.6	1.14%	3,604.3	1.17%	64.10%
2032	649.2	1.14%	645.1	1.18%	3,646.9	1.18%	63.95%
2033	656.6	1.14%	652.8	1.19%	3,690.6	1.20%	64.16%
2034	664.2	1.16%	660.6	1.19%	3,735.2	1.21%	64.20%
2035	671.6	1.11%	668.7	1.23%	3,780.8	1.22%	64.26%
2036	679.2	1.13%	676.8	1.21%	3,827.5	1.23%	64.15%
2037	687.1	1.16%	685.3	1.26%	3,875.3	1.25%	64.38%
2038	694.8	1.12%	693.9	1.25%	3,924.2	1.26%	64.47%
2039	702.7	1.14%	702.6	1.25%	3,974.2	1.27%	64.56%
2040	710.7	1.14%	711.6	1.28%	4,025.5	1.29%	64.48%
2041	718.7	1.13%	720.8	1.29%	4,077.8	1.30%	64.77%

Montana-Dakota Utilities Co.
Forecasted Energy (MWh) and
Seasonal Demands (MW) Prior to Demand Response
Montana

Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2022	145.3		144.9		818.2		64.28%
2023	149.5	2.89%	148.8	2.69%	840.5	2.72%	64.18%
2024	150.2	0.47%	149.5	0.47%	844.2	0.45%	63.99%
2025	151.1	0.60%	150.2	0.47%	848.6	0.52%	64.11%
2026	151.9	0.53%	151.0	0.53%	853.0	0.52%	64.10%
2027	152.6	0.46%	151.6	0.40%	856.8	0.44%	64.09%
2028	153.5	0.59%	152.5	0.59%	861.3	0.53%	63.88%
2029	154.3	0.52%	153.2	0.46%	866.0	0.54%	64.07%
2030	155.1	0.52%	154.1	0.59%	870.6	0.54%	64.08%
2031	155.9	0.52%	154.9	0.52%	875.4	0.55%	64.10%
2032	156.7	0.51%	155.7	0.52%	880.2	0.55%	63.95%
2033	157.5	0.51%	156.6	0.58%	885.1	0.55%	64.15%
2034	158.3	0.51%	157.4	0.51%	890.0	0.56%	64.18%
2035	159.0	0.44%	158.3	0.57%	895.0	0.56%	64.26%
2036	159.8	0.50%	159.2	0.57%	900.1	0.57%	64.13%
2037	160.5	0.44%	160.1	0.57%	905.3	0.57%	64.39%
2038	161.2	0.44%	161.0	0.56%	910.5	0.58%	64.48%
2039	161.9	0.43%	161.9	0.56%	915.8	0.58%	64.57%
2040	162.6	0.43%	162.8	0.56%	921.2	0.59%	64.50%
2041	163.3	0.43%	163.8	0.61%	926.6	0.59%	64.78%

Montana-Dakota Utilities Co.
Forecasted Energy (MWh) and
Seasonal Demands (MW) Prior to Demand Response
North Dakota

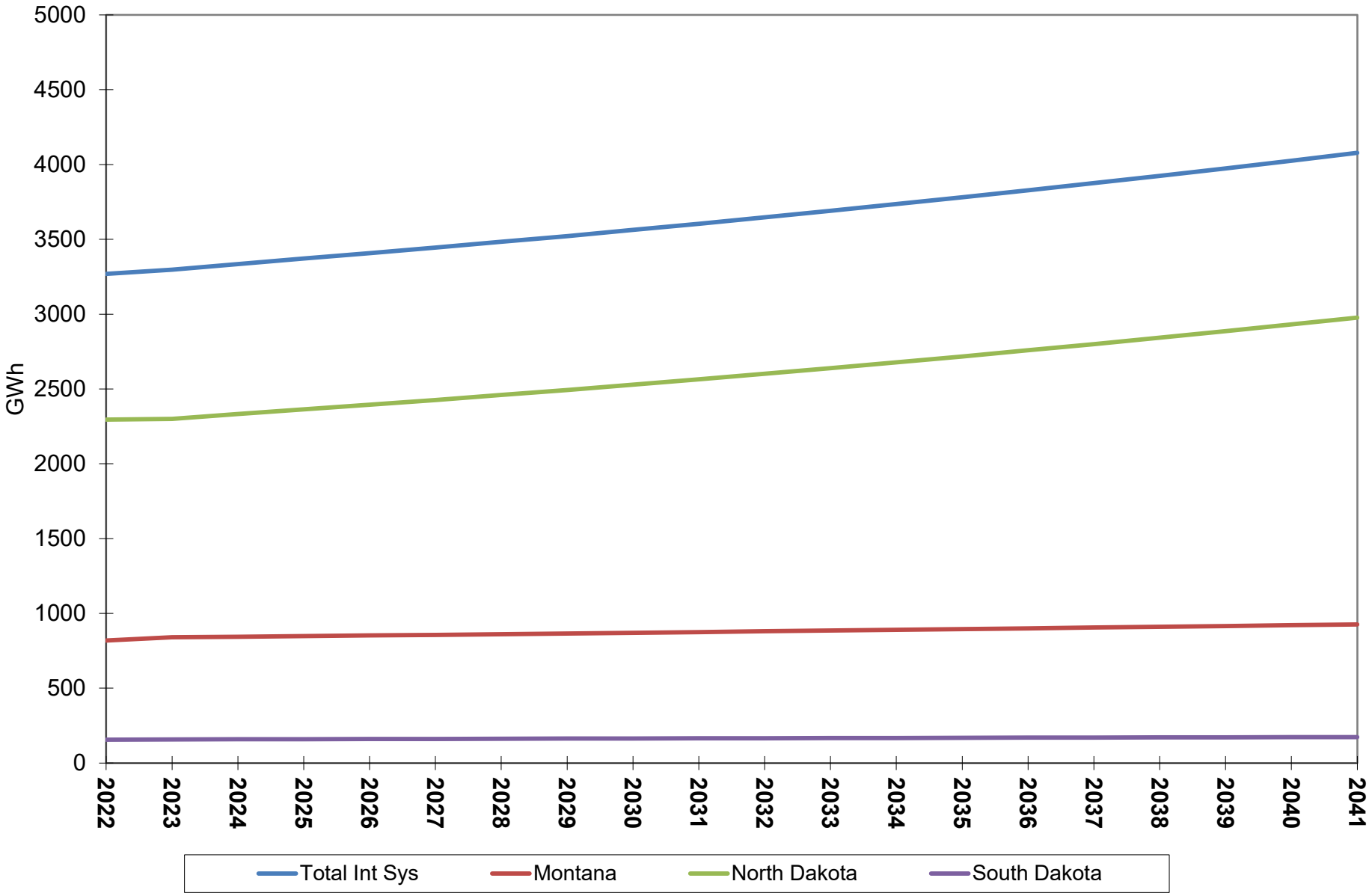
Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2022	407.5		406.4		2,294.6		64.28%
2023	409.0	0.37%	407.1	0.17%	2,299.4	0.21%	64.18%
2024	415.0	1.47%	412.9	1.42%	2,332.0	1.42%	63.97%
2025	420.7	1.37%	418.3	1.31%	2,363.1	1.33%	64.12%
2026	426.5	1.38%	423.9	1.34%	2,395.1	1.35%	64.11%
2027	432.4	1.38%	429.4	1.30%	2,426.4	1.31%	64.06%
2028	438.4	1.39%	435.4	1.40%	2,459.9	1.38%	63.88%
2029	444.3	1.35%	441.1	1.31%	2,492.8	1.34%	64.05%
2030	450.4	1.37%	447.3	1.41%	2,528.0	1.41%	64.07%
2031	456.7	1.40%	453.6	1.41%	2,564.1	1.43%	64.09%
2032	463.0	1.38%	460.1	1.43%	2,601.0	1.44%	63.95%
2033	469.5	1.40%	466.8	1.46%	2,638.9	1.46%	64.16%
2034	476.1	1.41%	473.6	1.46%	2,677.7	1.47%	64.20%
2035	482.7	1.39%	480.6	1.48%	2,717.4	1.48%	64.26%
2036	489.4	1.39%	487.7	1.48%	2,758.1	1.50%	64.16%
2037	496.4	1.43%	495.1	1.52%	2,799.8	1.51%	64.39%
2038	503.3	1.39%	502.6	1.51%	2,842.6	1.53%	64.47%
2039	510.4	1.41%	510.3	1.53%	2,886.4	1.54%	64.56%
2040	517.5	1.39%	518.2	1.55%	2,931.4	1.56%	64.49%
2041	524.8	1.41%	526.3	1.56%	2,977.4	1.57%	64.76%

Montana-Dakota Utilities Co.
Forecasted Energy (MWh) and
Seasonal Demands (MW) Prior to Demand Response
South Dakota

Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2022	27.8		27.7		156.7		64.35%
2023	28.0	0.72%	27.9	0.72%	157.6	0.57%	64.25%
2024	28.2	0.71%	28.0	0.36%	158.5	0.57%	63.99%
2025	28.4	0.71%	28.2	0.71%	159.4	0.57%	64.07%
2026	28.5	0.35%	28.4	0.71%	160.3	0.56%	64.21%
2027	28.7	0.70%	28.5	0.35%	161.2	0.56%	64.12%
2028	28.9	0.70%	28.7	0.70%	162.1	0.56%	63.85%
2029	29.1	0.69%	28.9	0.70%	163.0	0.56%	63.94%
2030	29.2	0.34%	29.0	0.35%	163.9	0.55%	64.08%
2031	29.3	0.34%	29.1	0.34%	164.8	0.55%	64.21%
2032	29.5	0.68%	29.3	0.69%	165.7	0.55%	63.95%
2033	29.6	0.34%	29.4	0.34%	166.6	0.54%	64.25%
2034	29.8	0.68%	29.6	0.68%	167.5	0.54%	64.16%
2035	29.9	0.34%	29.8	0.68%	168.4	0.54%	64.29%
2036	30.0	0.33%	29.9	0.34%	169.3	0.53%	64.25%
2037	30.2	0.67%	30.1	0.67%	170.2	0.53%	64.34%
2038	30.3	0.33%	30.3	0.66%	171.1	0.53%	64.46%
2039	30.4	0.33%	30.4	0.33%	172.0	0.53%	64.59%
2040	30.6	0.66%	30.6	0.66%	172.9	0.52%	64.33%
2041	30.6	0.00%	30.7	0.33%	173.8	0.52%	64.84%

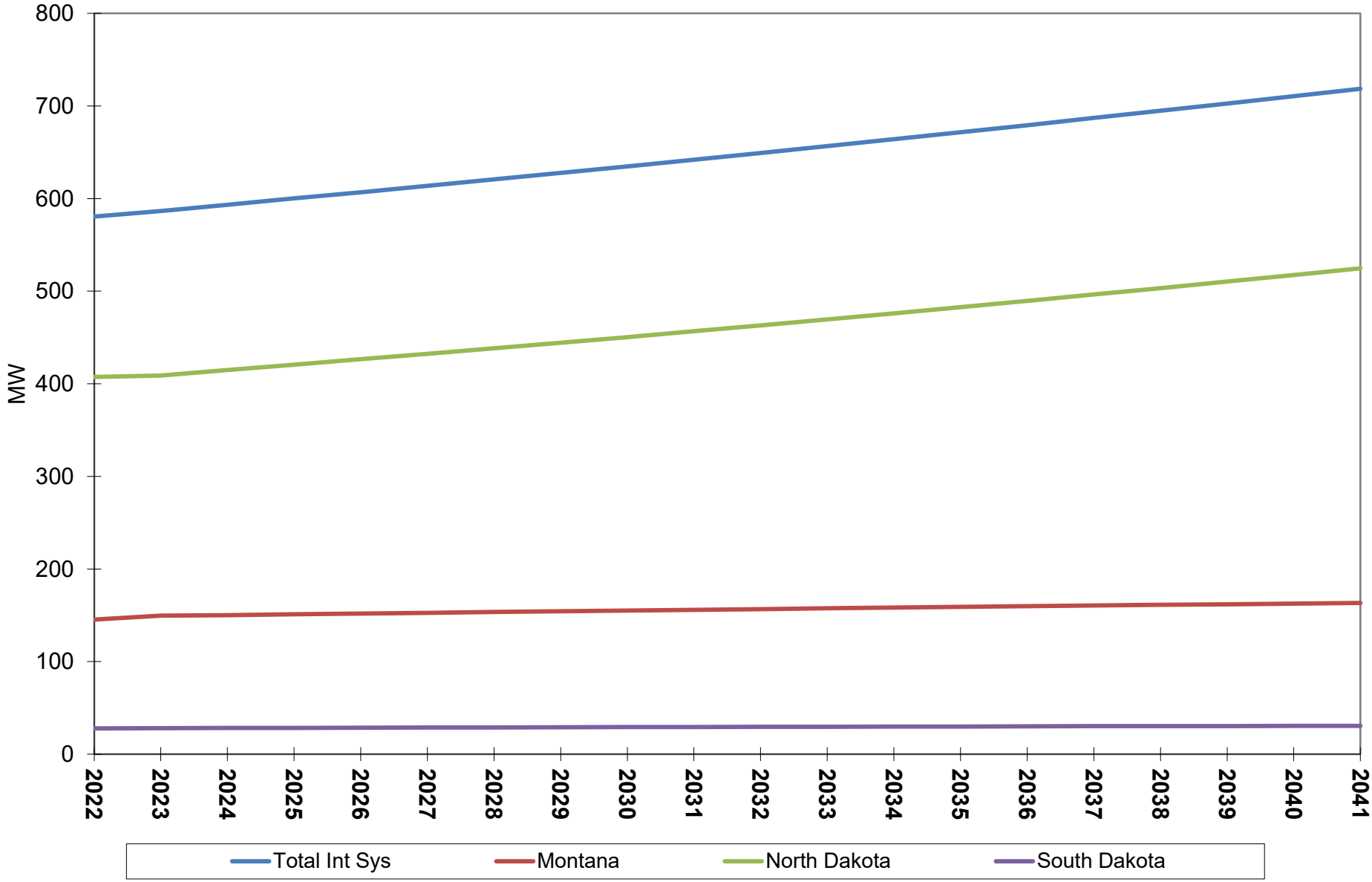
Montana-Dakota Integrated System

Forecast of Annual Energy by State



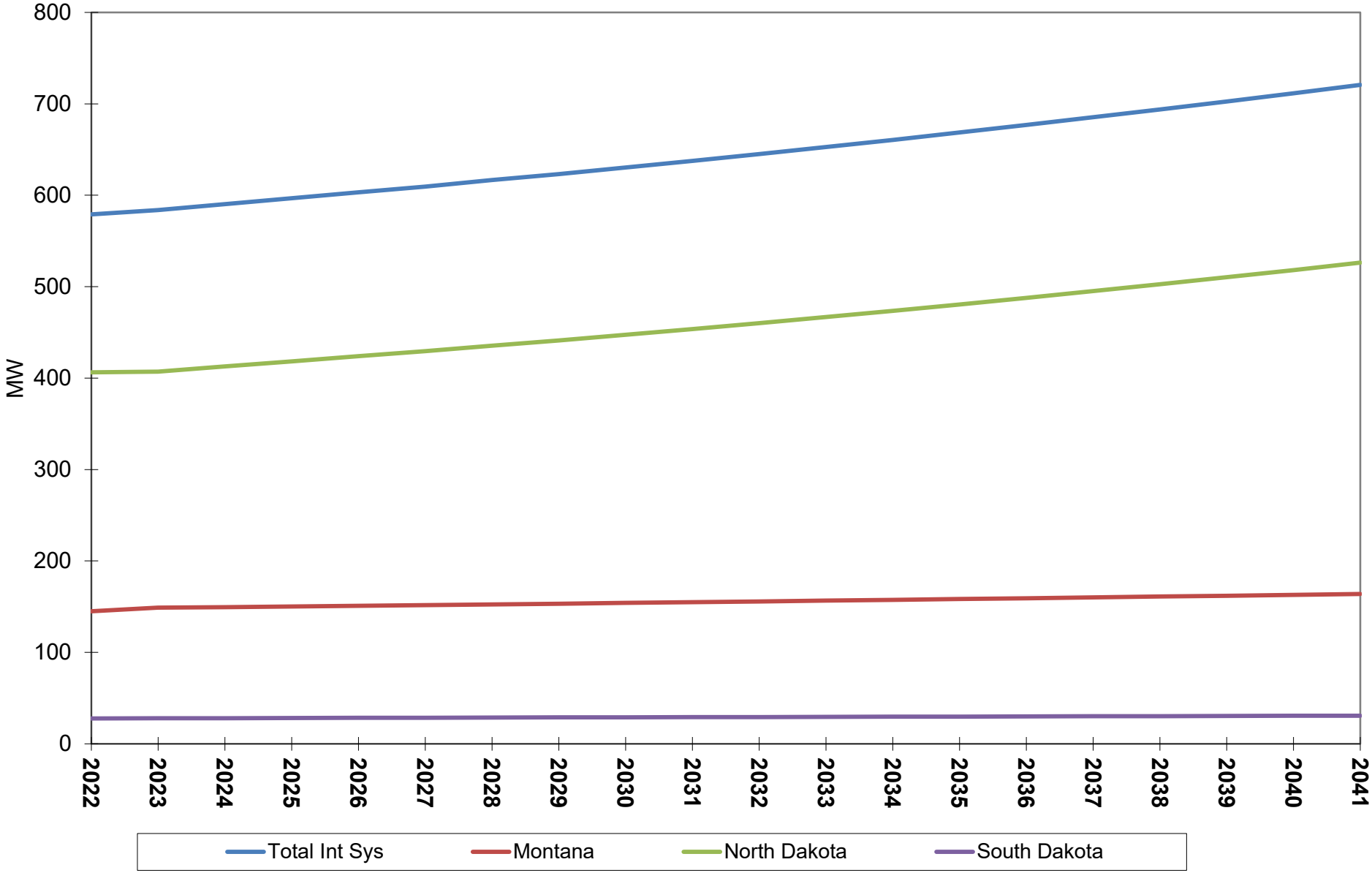
Montana-Dakota Integrated System

Forecast of Summer Peak Demand (Prior to Demand Response) by State



Montana-Dakota Integrated System

Forecast of Winter Peak Demand by State



APPENDIX D

Monthly Forecasts – Montana
(2022-2031)

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,377.5	2,196.0	2,128.3	1,774.9	1,649.0	1,911.9	2,341.2	2,227.5	1,928.5	1,805.3	1,974.3	2,284.2	24,591.9
# of Small Comm & Ind Customers	5,210	5,203	5,198	5,247	5,296	5,314	5,320	5,319	5,313	5,279	5,255	5,239	5,266
Total Small Comm & Ind Sales - MWh	12,387	11,426	11,063	9,313	8,733	10,160	12,455	11,848	10,246	9,530	10,375	11,967	129,503
Large Comm & Ind Sales	39,520	35,335	38,398	34,940	36,663	32,375	35,745	34,805	35,348	36,144	36,303	39,393	434,969
Total Sales (Residential, SC&I and LC&I)	71,627	64,200	65,221	56,999	56,758	57,005	66,247	62,773	58,260	58,225	61,880	70,061	749,256
Other Public Sales	467	438	449	402	443	593	695	636	502	382	391	448	5,846
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	72,409	64,925	65,959	57,674	57,446	57,846	67,196	63,655	59,011	58,856	62,529	70,823	758,329
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	72,450	64,960	65,996	57,703	57,468	57,873	67,225	63,684	59,037	58,883	62,559	70,863	758,701
Total Requirements (Energy + Losses)	78,131	70,054	71,171	62,227	61,974	62,411	72,496	68,677	63,666	63,500	67,464	76,419	818,190
# of Large Comm & Ind Customers	260	259	259	260	261	262	262	264	263	258	256	256	260
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	142.8	129.5	114.6	109.3	100.6	119.8	145.3	136.6	115.6	110.6	124.3	137.6	145.3

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,407.9	2,223.7	2,155.3	1,797.0	1,669.4	1,935.8	2,370.5	2,254.8	1,952.7	1,828.0	1,999.4	2,314.4	24,902.1
# of Small Comm & Ind Customers	5,222	5,216	5,210	5,260	5,309	5,327	5,333	5,333	5,326	5,292	5,267	5,252	5,279
Total Small Comm & Ind Sales - MWh	12,574	11,599	11,229	9,452	8,863	10,312	12,642	12,025	10,400	9,674	10,531	12,155	131,456
Large Comm & Ind Sales	41,245	36,866	40,084	36,525	38,333	33,854	37,361	36,363	36,947	37,772	37,920	40,433	453,703
Total Sales (Residential, SC&I and LC&I)	73,539	65,904	67,073	58,723	58,558	58,636	68,050	64,508	60,013	59,997	63,653	71,289	769,943
Other Public Sales	465	436	447	400	442	590	692	633	500	380	389	446	5,820
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	74,319	66,627	67,809	59,396	59,245	59,474	68,996	65,387	60,762	60,626	64,300	72,049	778,990
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	74,360	66,662	67,846	59,425	59,267	59,501	69,025	65,416	60,788	60,653	64,330	72,089	779,362
Total Requirements (Energy + Losses)	80,191	71,889	73,166	64,085	63,914	64,166	74,437	70,545	65,554	65,409	69,374	77,741	840,471
# of Large Comm & Ind Customers	260	259	259	260	261	262	262	264	263	258	256	256	260
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	144.9	131.4	116.3	110.9	103.5	123.3	149.5	140.5	119.0	113.8	127.7	141.3	149.5

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,441.2	2,254.2	2,185.2	1,821.9	1,692.7	1,962.7	2,403.6	2,286.2	1,980.0	1,853.3	2,027.1	2,346.3	25,247.4
# of Small Comm & Ind Customers	5,234	5,228	5,222	5,272	5,321	5,339	5,345	5,345	5,338	5,304	5,279	5,264	5,291
Total Small Comm & Ind Sales - MWh	12,777	11,785	11,411	9,605	9,007	10,479	12,847	12,220	10,569	9,830	10,701	12,351	133,582
Large Comm & Ind Sales	41,371	36,980	40,206	36,632	38,444	33,951	37,470	36,471	37,055	37,883	38,033	40,578	455,074
Total Sales (Residential, SC&I and LC&I)	73,868	66,204	67,377	58,983	58,813	58,900	68,364	64,811	60,290	60,264	63,936	71,630	773,440
Other Public Sales	463	434	445	398	439	587	689	630	498	379	387	444	5,793
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	74,646	66,925	68,111	59,654	59,497	59,735	69,307	65,687	61,037	60,892	64,581	72,388	782,460
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	74,687	66,960	68,148	59,683	59,519	59,762	69,336	65,716	61,063	60,919	64,611	72,428	782,832
Total Requirements (Energy + Losses)	80,543	72,210	73,491	64,363	64,186	64,448	74,773	70,869	65,851	65,696	69,677	78,107	844,214
# of Large Comm & Ind Customers	261	260	260	261	262	263	263	265	264	259	257	257	261
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	148.8	135.0	119.4	113.9	104.0	123.9	150.2	141.2	119.5	114.4	128.2	141.9	150.2

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,474.4	2,284.9	2,214.9	1,846.7	1,715.6	1,989.5	2,436.2	2,317.5	2,006.9	1,878.5	2,054.8	2,378.2	25,591.1
# of Small Comm & Ind Customers	5,247	5,241	5,235	5,285	5,334	5,352	5,358	5,358	5,351	5,317	5,292	5,277	5,304
Total Small Comm & Ind Sales - MWh	12,983	11,975	11,595	9,760	9,151	10,648	13,053	12,417	10,739	9,988	10,874	12,550	135,733
Large Comm & Ind Sales	41,552	37,143	40,381	36,785	38,604	34,093	37,627	36,627	37,211	38,043	38,196	40,754	457,016
Total Sales (Residential, SC&I and LC&I)	74,255	66,557	67,736	59,291	59,117	59,211	68,727	65,164	60,616	60,582	64,272	72,005	777,533
Other Public Sales	461	432	443	396	437	585	685	626	495	377	385	442	5,764
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	75,031	67,276	68,468	59,960	59,799	60,044	69,666	66,036	61,360	61,208	64,915	72,761	786,524
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	75,072	67,311	68,505	59,989	59,821	60,071	69,695	66,065	61,386	61,235	64,945	72,801	786,896
Total Requirements (Energy + Losses)	80,958	72,589	73,876	64,693	64,512	64,781	75,160	71,245	66,199	66,036	70,037	78,509	848,595
# of Large Comm & Ind Customers	261	260	260	261	262	263	263	265	264	259	257	257	261
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	149.5	135.6	120.0	114.4	104.6	124.6	151.1	142.0	120.3	115.1	128.9	142.6	151.1

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,508.3	2,316.4	2,245.3	1,872.2	1,739.4	2,017.0	2,469.8	2,349.5	2,034.5	1,904.3	2,083.1	2,409.3	25,942.1
# of Small Comm & Ind Customers	5,259	5,253	5,247	5,297	5,346	5,364	5,370	5,370	5,363	5,329	5,304	5,289	5,316
Total Small Comm & Ind Sales - MWh	13,191	12,168	11,781	9,917	9,299	10,819	13,263	12,617	10,911	10,148	11,049	12,743	137,906
Large Comm & Ind Sales	41,735	37,308	40,557	36,940	38,766	34,235	37,787	36,783	37,369	38,205	38,360	40,911	458,956
Total Sales (Residential, SC&I and LC&I)	74,646	66,915	68,098	59,603	59,427	59,524	69,097	65,520	60,946	60,904	64,611	72,355	781,646
Other Public Sales	459	430	441	394	435	582	682	624	493	375	383	440	5,738
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	75,420	67,632	68,828	60,270	60,107	60,354	70,033	66,390	61,688	61,528	65,252	73,109	790,611
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	75,461	67,667	68,865	60,299	60,129	60,381	70,062	66,419	61,714	61,555	65,282	73,149	790,983
Total Requirements (Energy + Losses)	81,378	72,973	74,265	65,027	64,844	65,115	75,556	71,627	66,553	66,382	70,401	78,885	853,006
# of Large Comm & Ind Customers	262	261	261	262	263	264	264	266	265	260	258	258	262
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	150.2	136.2	120.6	115.0	105.2	125.3	151.9	142.8	120.9	115.7	129.5	143.4	151.9

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,539.8	2,345.2	2,273.4	1,895.7	1,761.1	2,042.2	2,500.8	2,379.0	2,060.1	1,928.3	2,109.1	2,441.0	26,268.6
# of Small Comm & Ind Customers	5,272	5,266	5,260	5,310	5,359	5,377	5,383	5,383	5,376	5,342	5,317	5,302	5,329
Total Small Comm & Ind Sales - MWh	13,390	12,350	11,958	10,066	9,438	10,981	13,462	12,806	11,075	10,301	11,214	12,942	139,983
Large Comm & Ind Sales	41,868	37,428	40,685	37,052	38,883	34,338	37,902	36,896	37,482	38,322	38,479	41,062	460,397
Total Sales (Residential, SC&I and LC&I)	74,978	67,217	68,403	59,864	59,683	59,789	69,411	65,822	61,223	61,174	64,895	72,705	785,164
Other Public Sales	456	428	439	393	433	579	679	621	491	373	382	438	5,712
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	75,749	67,932	69,131	60,530	60,361	60,616	70,344	66,689	61,963	61,796	65,535	73,457	794,103
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	75,790	67,967	69,168	60,559	60,383	60,643	70,373	66,718	61,989	61,823	65,565	73,497	794,475
Total Requirements (Energy + Losses)	81,733	73,296	74,591	65,307	65,118	65,398	75,891	71,949	66,850	66,671	70,706	79,260	856,770
# of Large Comm & Ind Customers	263	262	262	263	264	265	265	267	266	261	259	259	263
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	151.0	137.0	121.2	115.6	105.6	125.8	152.6	143.4	121.4	116.2	130.1	143.9	152.6

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,574.6	2,377.4	2,304.4	1,921.6	1,785.5	2,070.1	2,534.8	2,411.7	2,088.5	1,954.8	2,138.1	2,474.6	26,629.1
# of Small Comm & Ind Customers	5,284	5,278	5,272	5,322	5,371	5,390	5,396	5,395	5,388	5,354	5,329	5,314	5,341
Total Small Comm & Ind Sales - MWh	13,604	12,548	12,149	10,227	9,590	11,158	13,678	13,011	11,253	10,466	11,394	13,150	142,228
Large Comm & Ind Sales	42,056	37,597	40,866	37,211	39,049	34,484	38,065	37,057	37,643	38,487	38,647	41,244	462,406
Total Sales (Residential, SC&I and LC&I)	75,380	67,584	68,775	60,184	60,001	60,112	69,790	66,188	61,562	61,504	65,243	73,095	789,418
Other Public Sales	454	426	437	391	431	577	675	618	489	371	380	436	5,685
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	76,149	68,297	69,501	60,848	60,677	60,937	70,719	67,052	62,300	62,124	65,881	73,845	798,330
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	76,190	68,332	69,538	60,877	60,699	60,964	70,748	67,081	62,326	62,151	65,911	73,885	798,702
Total Requirements (Energy + Losses)	82,164	73,690	74,990	65,650	65,458	65,744	76,295	72,341	67,213	67,024	71,079	79,678	861,326
# of Large Comm & Ind Customers	263	262	262	263	264	265	265	267	266	261	259	259	263
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	151.6	137.5	121.7	116.0	106.3	126.6	153.5	144.3	122.2	116.9	130.8	144.7	153.5

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2029

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,609.9	2,410.5	2,336.6	1,948.1	1,809.8	2,098.5	2,569.7	2,445.0	2,117.2	1,981.7	2,167.6	2,508.4	26,995.5
# of Small Comm & Ind Customers	5,296	5,289	5,283	5,334	5,384	5,402	5,408	5,407	5,400	5,366	5,341	5,326	5,353
Total Small Comm & Ind Sales - MWh	13,822	12,749	12,344	10,391	9,744	11,336	13,897	13,220	11,433	10,634	11,577	13,360	144,507
Large Comm & Ind Sales	42,246	37,768	41,050	37,372	39,216	34,632	38,231	37,220	37,807	38,655	38,818	41,429	464,444
Total Sales (Residential, SC&I and LC&I)	75,788	67,956	69,154	60,509	60,322	60,438	70,175	66,560	61,906	61,840	65,597	73,490	793,735
Other Public Sales	452	424	434	389	429	574	672	615	486	370	378	434	5,657
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	76,555	68,667	69,877	61,171	60,996	61,260	71,101	67,421	62,641	62,459	66,233	74,238	802,619
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	76,596	68,702	69,914	61,200	61,018	61,287	71,130	67,450	62,667	62,486	66,263	74,278	802,991
Total Requirements (Energy + Losses)	82,602	74,089	75,396	65,999	65,802	66,093	76,707	72,739	67,581	67,386	71,459	80,102	865,955
# of Large Comm & Ind Customers	264	263	263	264	265	266	266	268	267	262	260	260	264
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	152.5	138.3	122.4	116.7	106.8	127.2	154.3	145.0	122.8	117.5	131.5	145.5	154.3

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2030

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,645.1	2,443.0	2,368.0	1,974.4	1,834.2	2,126.9	2,604.5	2,478.0	2,145.9	2,008.6	2,196.9	2,542.4	27,360.4
# of Small Comm & Ind Customers	5,309	5,302	5,296	5,347	5,397	5,415	5,421	5,420	5,413	5,379	5,354	5,339	5,366
Total Small Comm & Ind Sales - MWh	14,043	12,953	12,541	10,557	9,899	11,517	14,119	13,431	11,616	10,804	11,762	13,574	146,816
Large Comm & Ind Sales	42,438	37,942	41,236	37,534	39,386	34,781	38,397	37,384	37,972	38,825	38,990	41,616	466,501
Total Sales (Residential, SC&I and LC&I)	76,201	68,334	69,537	60,837	60,647	60,768	70,563	66,935	62,254	62,180	65,954	73,891	798,101
Other Public Sales	449	422	432	387	427	571	669	611	483	367	376	432	5,626
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	76,965	69,043	70,258	61,497	61,319	61,587	71,486	67,792	62,986	62,796	66,588	74,637	806,954
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	77,006	69,078	70,295	61,526	61,341	61,614	71,515	67,821	63,012	62,823	66,618	74,677	807,326
Total Requirements (Energy + Losses)	83,044	74,494	75,807	66,350	66,151	66,445	77,122	73,139	67,953	67,749	71,842	80,532	870,628
# of Large Comm & Ind Customers	264	263	263	264	265	266	266	268	267	262	260	260	264
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	153.2	139.0	123.0	117.3	107.4	127.9	155.1	145.8	123.4	118.1	132.2	146.3	155.1

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

MONTANA YEAR 2031

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	992.8	878.2	793.9	642.6	573.3	731.3	912.8	815.5	641.3	635.4	769.3	946.0	9,333.4
# of Residential Customers	19,863	19,858	19,851	19,835	19,817	19,787	19,771	19,766	19,749	19,752	19,760	19,768	19,798
Total Residential Sales - MWh	19,720	17,439	15,760	12,746	11,362	14,470	18,047	16,120	12,666	12,551	15,202	18,701	184,784
Use per Small Comm & Ind Customer - kWh	2,681.8	2,476.5	2,400.5	2,001.5	1,859.5	2,156.3	2,640.3	2,511.5	2,175.5	2,036.2	2,227.0	2,577.8	27,736.6
# of Small Comm & Ind Customers	5,320	5,314	5,308	5,359	5,409	5,427	5,433	5,433	5,425	5,391	5,366	5,350	5,378
Total Small Comm & Ind Sales - MWh	14,267	13,160	12,742	10,726	10,058	11,702	14,345	13,645	11,802	10,977	11,950	13,791	149,165
Large Comm & Ind Sales	42,633	38,117	41,423	37,699	39,558	34,933	38,566	37,551	38,139	38,997	39,165	41,806	468,587
Total Sales (Residential, SC&I and LC&I)	76,620	68,716	69,925	61,171	60,978	61,105	70,958	67,316	62,607	62,525	66,317	74,298	802,536
Other Public Sales	447	420	430	385	425	568	666	609	481	366	374	430	5,601
Street & Highway Lighting Sales	299	272	276	261	235	238	242	236	238	238	245	299	3,079
Interdepartmental Sales	16	15	13	12	10	10	12	10	11	11	13	15	148
Total Billed Sales - MWh	77,382	69,423	70,644	61,829	61,648	61,921	71,878	68,171	63,337	63,140	66,949	75,042	811,364
Company Use	41	35	37	29	22	27	29	29	26	27	30	40	372
Total Energy	77,423	69,458	70,681	61,858	61,670	61,948	71,907	68,200	63,363	63,167	66,979	75,082	811,736
Total Requirements (Energy + Losses)	83,494	74,904	76,223	66,708	66,506	66,805	77,545	73,548	68,331	68,120	72,231	80,969	875,384
# of Large Comm & Ind Customers	265	264	264	265	266	267	267	269	268	263	261	261	265
# of Other Public Customers	102	102	102	102	102	102	102	102	103	102	102	102	102
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	154.1	139.7	123.7	117.9	107.9	128.6	155.9	146.5	124.1	118.7	132.9	147.0	155.9

APPENDIX E

Monthly Forecasts - North Dakota
(2022-2031)

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.8	961.7	871.6	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,034.4	9,802.7
# of Residential Customers	79,202	79,271	79,251	79,139	79,179	79,199	79,178	79,264	79,257	79,285	79,302	79,313	79,237
Total Residential Sales - MWh	86,786	76,231	69,079	54,782	50,933	56,057	68,050	62,470	50,633	53,739	65,934	82,041	776,735
Use per Small Comm & Ind Customer - kWh	5,025.9	4,642.5	4,555.1	3,801.9	3,655.3	3,699.0	4,133.1	4,079.3	3,768.3	3,941.2	4,275.5	4,951.6	50,516.8
# of Small Comm & Ind Customers	11,562	11,567	11,577	11,595	11,634	11,654	11,655	11,659	11,645	11,613	11,602	11,593	11,613
Total Small Comm & Ind Sales - MWh	58,110	53,700	52,734	44,083	42,526	43,108	48,171	47,561	43,882	45,769	49,604	57,404	586,652
Large Comm & Ind Sales	60,723	57,486	59,664	52,573	54,509	55,717	61,410	60,609	57,206	56,127	57,115	59,145	692,284
Total Sales (Residential, SC&I and LC&I)	205,619	187,417	181,477	151,438	147,968	154,882	177,631	170,640	151,721	155,635	172,653	198,590	2,055,671
Other Public Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Street & Highway Lighting Sales	4,287	4,020	4,219	3,929	4,465	4,798	5,523	5,211	4,340	4,052	4,002	4,343	53,189
Interdepartmental Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Total Billed Sales - MWh	211,258	192,638	186,934	156,471	153,487	160,658	184,182	176,905	157,169	160,884	177,920	204,311	2,122,817
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	211,680	193,035	187,363	156,846	153,870	161,055	184,617	177,323	157,554	161,267	178,299	204,729	2,127,638
Total Requirements (Energy + Losses)	228,296	208,188	202,071	169,160	165,949	173,694	199,106	191,240	169,920	173,926	192,295	220,799	2,294,644
# of Large Comm & Ind Customers	1,163	1,164	1,171	1,179	1,189	1,195	1,203	1,211	1,213	1,213	1,215	1,211	1,194
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	403.6	372.6	341.3	300.2	282.8	370.1	407.5	391.9	347.8	313.4	330.1	384.5	407.5

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.8	961.6	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,034.4	9,802.7
# of Residential Customers	79,507	79,576	79,556	79,444	79,483	79,504	79,483	79,569	79,562	79,591	79,608	79,619	79,542
Total Residential Sales - MWh	87,120	76,524	69,345	54,993	51,129	56,273	68,312	62,710	50,828	53,946	66,188	82,356	779,724
Use per Small Comm & Ind Customer - kWh	5,133.5	4,742.3	4,653.1	3,883.5	3,733.9	3,778.3	4,222.0	4,167.2	3,849.4	4,025.9	4,367.3	5,059.1	51,603.4
# of Small Comm & Ind Customers	11,719	11,723	11,733	11,752	11,791	11,812	11,812	11,816	11,802	11,770	11,759	11,750	11,770
Total Small Comm & Ind Sales - MWh	60,160	55,594	54,595	45,639	44,026	44,629	49,870	49,240	45,431	47,385	51,355	59,444	607,368
Large Comm & Ind Sales	58,755	55,628	57,766	50,915	52,805	53,978	59,484	58,713	55,421	54,357	55,278	58,741	671,841
Total Sales (Residential, SC&I and LC&I)	206,035	187,746	181,706	151,547	147,960	154,880	177,666	170,663	151,680	155,688	172,821	200,541	2,058,933
Other Public Sales	4,379	4,107	4,310	4,013	4,561	4,902	5,642	5,323	4,433	4,139	4,088	4,436	54,333
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	211,783	193,070	187,270	156,679	153,588	160,770	184,348	177,052	157,232	161,037	178,188	206,371	2,127,388
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	212,205	193,467	187,699	157,054	153,971	161,167	184,783	177,470	157,617	161,420	178,567	206,789	2,132,209
Total Requirements (Energy + Losses)	228,844	208,637	202,416	169,369	166,044	173,804	199,272	191,385	169,976	174,077	192,568	223,003	2,299,395
# of Large Comm & Ind Customers	1,179	1,180	1,186	1,195	1,205	1,211	1,219	1,228	1,230	1,229	1,231	1,227	1,210
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	406.4	375.2	343.7	302.3	283.8	371.5	409.0	393.3	349.1	314.5	330.7	385.2	409.0

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.8	961.6	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,034.4	9,802.7
# of Residential Customers	79,812	79,881	79,861	79,748	79,788	79,809	79,788	79,874	79,867	79,896	79,913	79,924	79,847
Total Residential Sales - MWh	87,454	76,817	69,611	55,204	51,324	56,488	68,574	62,951	51,023	54,153	66,442	82,675	782,716
Use per Small Comm & Ind Customer - kWh	5,246.4	4,846.1	4,755.0	3,968.6	3,816.0	3,861.4	4,314.5	4,258.5	3,933.7	4,114.2	4,463.0	5,166.4	52,731.6
# of Small Comm & Ind Customers	11,876	11,881	11,891	11,910	11,949	11,970	11,971	11,975	11,961	11,928	11,917	11,908	11,928
Total Small Comm & Ind Sales - MWh	62,306	57,577	56,542	47,266	45,597	46,221	51,649	50,996	47,051	49,074	53,186	61,522	628,987
Large Comm & Ind Sales	59,160	56,012	58,160	51,262	53,167	54,348	59,894	59,115	55,797	54,726	55,658	59,106	676,405
Total Sales (Residential, SC&I and LC&I)	208,920	190,406	184,313	153,732	150,088	157,057	180,117	173,062	153,871	157,953	175,286	203,303	2,088,108
Other Public Sales	4,472	4,193	4,402	4,098	4,658	5,006	5,761	5,436	4,527	4,227	4,174	4,477	55,431
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	214,761	195,816	189,969	158,949	155,813	163,051	186,918	179,564	159,517	163,390	180,739	209,174	2,157,661
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	215,183	196,213	190,398	159,324	156,196	163,448	187,353	179,982	159,902	163,773	181,118	209,592	2,162,482
Total Requirements (Energy + Losses)	232,055	211,598	205,327	171,817	168,443	176,264	202,043	194,094	172,440	176,614	195,319	226,026	2,332,040
# of Large Comm & Ind Customers	1,194	1,196	1,202	1,211	1,221	1,227	1,235	1,244	1,246	1,245	1,248	1,243	1,226
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	407.1	375.9	344.3	302.8	288.0	376.9	415.0	399.1	354.2	319.2	335.4	390.7	415.0

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.8	961.7	871.6	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,033.9	9,802.2
# of Residential Customers	80,122	80,191	80,171	80,058	80,098	80,119	80,097	80,184	80,177	80,206	80,223	80,234	80,157
Total Residential Sales - MWh	87,794	77,116	69,881	55,418	51,524	56,708	68,841	63,195	51,220	54,363	66,700	82,952	785,712
Use per Small Comm & Ind Customer - kWh	5,356.6	4,948.0	4,855.0	4,051.8	3,895.8	3,942.3	4,405.2	4,348.0	4,016.4	4,200.5	4,556.6	5,274.2	53,837.8
# of Small Comm & Ind Customers	12,034	12,039	12,049	12,069	12,109	12,130	12,130	12,134	12,120	12,087	12,076	12,067	12,087
Total Small Comm & Ind Sales - MWh	64,461	59,569	58,498	48,901	47,174	47,820	53,435	52,759	48,679	50,772	55,025	63,644	650,737
Large Comm & Ind Sales	59,506	56,338	58,494	51,557	53,474	54,663	60,243	59,456	56,117	55,040	55,982	59,495	680,365
Total Sales (Residential, SC&I and LC&I)	211,761	193,023	186,873	155,876	152,172	159,191	182,519	175,410	156,016	160,175	177,707	206,091	2,116,814
Other Public Sales	4,483	4,204	4,413	4,108	4,669	5,018	5,775	5,449	4,538	4,237	4,184	4,488	55,566
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	217,613	198,444	192,540	161,103	157,908	165,197	189,334	181,925	161,673	165,622	183,170	211,973	2,186,502
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	218,035	198,841	192,969	161,478	158,291	165,594	189,769	182,343	162,058	166,005	183,549	212,391	2,191,323
Total Requirements (Energy + Losses)	235,131	214,432	208,100	174,139	170,703	178,578	204,649	196,641	174,765	179,021	197,941	229,045	2,363,145
# of Large Comm & Ind Customers	1,210	1,211	1,218	1,227	1,237	1,243	1,251	1,260	1,262	1,262	1,264	1,259	1,242
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	412.9	381.2	349.2	307.1	291.9	382.1	420.7	404.6	359.1	323.5	339.8	395.8	420.7

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.7	961.6	871.7	692.2	643.3	707.8	859.5	788.1	638.9	677.8	831.4	1,033.9	9,802.2
# of Residential Customers	80,372	80,441	80,421	80,308	80,348	80,369	80,347	80,434	80,427	80,456	80,473	80,484	80,407
Total Residential Sales - MWh	88,067	77,356	70,099	55,591	51,684	56,885	69,056	63,393	51,381	54,532	66,908	83,210	788,162
Use per Small Comm & Ind Customer - kWh	5,472.3	5,054.9	4,960.0	4,139.8	3,980.2	4,027.5	4,500.5	4,442.0	4,103.5	4,291.5	4,655.3	5,385.0	54,999.5
# of Small Comm & Ind Customers	12,185	12,190	12,200	12,219	12,260	12,282	12,282	12,286	12,271	12,238	12,227	12,217	12,238
Total Small Comm & Ind Sales - MWh	66,680	61,619	60,512	50,584	48,797	49,466	55,275	54,575	50,354	52,519	56,920	65,788	673,089
Large Comm & Ind Sales	59,921	56,730	58,897	51,913	53,844	55,042	60,662	59,868	56,502	55,418	56,371	59,866	685,034
Total Sales (Residential, SC&I and LC&I)	214,668	195,705	189,508	158,088	154,325	161,393	184,993	177,836	158,237	162,469	180,199	208,864	2,146,285
Other Public Sales	4,494	4,214	4,424	4,119	4,681	5,030	5,790	5,463	4,549	4,247	4,194	4,500	55,705
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	220,531	201,136	195,186	163,326	160,073	167,411	191,823	184,365	163,905	167,926	185,672	214,758	2,216,112
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	220,953	201,533	195,615	163,701	160,456	167,808	192,258	184,783	164,290	168,309	186,051	215,176	2,220,933
Total Requirements (Energy + Losses)	238,278	217,335	210,953	176,537	173,037	180,966	207,333	199,272	177,172	181,506	200,639	232,048	2,395,076
# of Large Comm & Ind Customers	1,226	1,227	1,233	1,243	1,253	1,259	1,267	1,276	1,278	1,278	1,280	1,275	1,258
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	418.3	386.2	353.8	311.1	296.0	387.4	426.5	410.2	364.0	328.0	344.3	401.1	426.5

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.7	961.7	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,033.9	9,802.2
# of Residential Customers	80,622	80,691	80,671	80,557	80,598	80,619	80,597	80,685	80,677	80,706	80,724	80,735	80,657
Total Residential Sales - MWh	88,341	77,597	70,317	55,764	51,846	57,062	69,270	63,590	51,540	54,702	67,116	83,469	790,614
Use per Small Comm & Ind Customer - kWh	5,585.3	5,159.3	5,062.4	4,225.1	4,062.4	4,110.7	4,593.0	4,533.6	4,187.9	4,380.0	4,751.6	5,498.8	56,136.9
# of Small Comm & Ind Customers	12,336	12,341	12,351	12,371	12,412	12,434	12,435	12,439	12,424	12,390	12,378	12,369	12,390
Total Small Comm & Ind Sales - MWh	68,900	63,671	62,526	52,269	50,422	51,112	57,114	56,393	52,031	54,268	58,815	68,015	695,536
Large Comm & Ind Sales	60,271	57,061	59,237	52,213	54,156	55,362	61,017	60,215	56,827	55,736	56,699	60,262	689,056
Total Sales (Residential, SC&I and LC&I)	217,512	198,329	192,080	160,246	156,424	163,536	187,401	180,198	160,398	164,706	182,630	211,746	2,175,206
Other Public Sales	4,505	4,225	4,435	4,129	4,692	5,043	5,805	5,477	4,561	4,258	4,205	4,511	55,846
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	223,386	203,771	197,769	165,494	162,183	169,567	194,246	186,741	166,078	170,174	188,114	217,651	2,245,174
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	223,808	204,168	198,198	165,869	162,566	169,964	194,681	187,159	166,463	170,557	188,493	218,069	2,249,995
Total Requirements (Energy + Losses)	241,357	220,177	213,739	178,875	175,313	183,291	209,946	201,834	179,515	183,930	203,273	235,168	2,426,418
# of Large Comm & Ind Customers	1,240	1,242	1,248	1,257	1,268	1,274	1,282	1,292	1,294	1,293	1,295	1,291	1,273
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	423.9	391.4	358.5	315.3	300.1	392.8	432.4	415.8	369.1	332.5	348.8	406.3	432.4

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.7	961.7	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,033.8	9,802.2
# of Residential Customers	80,872	80,941	80,921	80,807	80,847	80,868	80,847	80,935	80,927	80,957	80,974	80,985	80,907
Total Residential Sales - MWh	88,615	77,837	70,535	55,937	52,006	57,239	69,485	63,787	51,700	54,872	67,324	83,726	793,063
Use per Small Comm & Ind Customer - kWh	5,705.8	5,270.6	5,171.3	4,316.0	4,150.0	4,199.2	4,692.2	4,631.4	4,278.3	4,474.4	4,853.9	5,613.4	57,343.1
# of Small Comm & Ind Customers	12,488	12,493	12,504	12,524	12,565	12,588	12,588	12,592	12,577	12,543	12,531	12,522	12,543
Total Small Comm & Ind Sales - MWh	71,254	65,846	64,662	54,054	52,145	52,859	59,066	58,319	53,808	56,122	60,824	70,291	719,250
Large Comm & Ind Sales	60,693	57,459	59,646	52,574	54,531	55,747	61,443	60,633	57,218	56,121	57,095	60,639	693,799
Total Sales (Residential, SC&I and LC&I)	220,562	201,142	194,843	162,565	158,682	165,845	189,994	182,739	162,726	167,115	185,243	214,656	2,206,112
Other Public Sales	4,516	4,235	4,445	4,139	4,705	5,056	5,819	5,490	4,572	4,268	4,215	4,522	55,982
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	226,447	206,594	200,542	167,823	164,454	171,889	196,853	189,295	168,417	172,593	190,737	220,572	2,276,216
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	226,869	206,991	200,971	168,198	164,837	172,286	197,288	189,713	168,802	172,976	191,116	220,990	2,281,037
Total Requirements (Energy + Losses)	244,658	223,221	216,729	181,386	177,762	185,795	212,757	204,588	182,038	186,539	206,101	238,318	2,459,892
# of Large Comm & Ind Customers	1,256	1,257	1,264	1,273	1,284	1,290	1,298	1,308	1,310	1,309	1,312	1,307	1,289
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	429.4	396.5	363.2	319.4	304.2	398.2	438.4	421.6	374.2	337.2	353.7	412.0	438.4

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2029

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.7	961.6	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,033.8	9,802.2
# of Residential Customers	81,122	81,191	81,171	81,057	81,097	81,118	81,097	81,185	81,178	81,207	81,224	81,235	81,157
Total Residential Sales - MWh	88,889	78,077	70,753	56,110	52,167	57,416	69,700	63,984	51,860	55,041	67,532	83,984	795,513
Use per Small Comm & Ind Customer - kWh	5,823.1	5,379.1	5,278.2	4,405.0	4,235.3	4,285.9	4,788.8	4,726.8	4,366.3	4,566.6	4,953.9	5,732.1	58,527.5
# of Small Comm & Ind Customers	12,641	12,646	12,656	12,677	12,719	12,741	12,742	12,746	12,731	12,696	12,684	12,675	12,696
Total Small Comm & Ind Sales - MWh	73,610	68,024	66,801	55,842	53,869	54,607	61,019	60,248	55,588	57,978	62,835	72,654	743,075
Large Comm & Ind Sales	61,048	57,795	59,991	52,879	54,848	56,072	61,802	60,986	57,548	56,444	57,428	61,041	697,882
Total Sales (Residential, SC&I and LC&I)	223,547	203,896	197,545	164,831	160,884	168,095	192,521	185,218	164,996	169,463	187,795	217,679	2,236,470
Other Public Sales	4,528	4,246	4,457	4,149	4,716	5,069	5,834	5,504	4,584	4,279	4,226	4,534	56,126
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	229,444	209,359	203,256	170,099	166,667	174,152	199,395	191,788	170,699	174,952	193,300	223,607	2,306,718
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	229,866	209,756	203,685	170,474	167,050	174,549	199,830	192,206	171,084	175,335	193,679	224,025	2,311,539
Total Requirements (Energy + Losses)	247,890	226,203	219,656	183,841	180,148	188,235	215,499	207,277	184,499	189,083	208,865	241,591	2,492,787
# of Large Comm & Ind Customers	1,271	1,273	1,280	1,289	1,299	1,306	1,315	1,324	1,326	1,326	1,328	1,323	1,305
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	435.4	402.0	368.2	323.8	308.3	403.6	444.3	427.3	379.2	341.7	358.3	417.4	444.3

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2030

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.7	961.6	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,033.8	9,802.2
# of Residential Customers	81,372	81,442	81,421	81,306	81,347	81,368	81,346	81,435	81,428	81,457	81,474	81,485	81,407
Total Residential Sales - MWh	89,163	78,318	70,971	56,282	52,327	57,592	69,914	64,181	52,020	55,211	67,740	84,243	797,962
Use per Small Comm & Ind Customer - kWh	5,948.6	5,495.0	5,391.6	4,500.1	4,326.6	4,378.0	4,892.1	4,828.8	4,460.5	4,665.0	5,060.5	5,855.3	59,788.0
# of Small Comm & Ind Customers	12,794	12,799	12,810	12,830	12,873	12,896	12,896	12,900	12,885	12,850	12,838	12,828	12,850
Total Small Comm & Ind Sales - MWh	76,106	70,331	69,066	57,736	55,696	56,459	63,089	62,291	57,473	59,945	64,967	75,112	768,271
Large Comm & Ind Sales	61,477	58,200	60,406	53,246	55,229	56,463	62,235	61,410	57,945	56,833	57,829	61,469	702,742
Total Sales (Residential, SC&I and LC&I)	226,746	206,849	200,443	167,264	163,252	170,514	195,238	187,882	167,438	171,989	190,536	220,824	2,268,975
Other Public Sales	4,540	4,256	4,468	4,159	4,728	5,081	5,848	5,518	4,595	4,290	4,237	4,545	56,265
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	232,655	212,322	206,165	172,542	169,047	176,583	202,126	194,466	173,152	177,489	196,052	226,763	2,339,362
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	233,077	212,719	206,594	172,917	169,430	176,980	202,561	194,884	173,537	177,872	196,431	227,181	2,344,183
Total Requirements (Energy + Losses)	251,353	229,398	222,793	186,475	182,715	190,857	218,444	210,165	187,144	191,819	211,833	244,994	2,527,990
# of Large Comm & Ind Customers	1,287	1,288	1,295	1,305	1,315	1,322	1,331	1,340	1,342	1,342	1,344	1,339	1,321
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	441.1	407.3	373.1	328.1	312.5	409.1	450.4	433.1	384.4	346.4	363.4	423.2	450.4

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

NORTH DAKOTA YEAR 2031

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.8	961.6	871.7	692.2	643.3	707.8	859.5	788.1	638.8	677.8	831.4	1,033.8	9,802.2
# of Residential Customers	81,621	81,692	81,671	81,556	81,597	81,618	81,596	81,685	81,678	81,707	81,724	81,736	81,657
Total Residential Sales - MWh	89,437	78,559	71,189	56,456	52,489	57,770	70,129	64,378	52,179	55,380	67,948	84,501	800,415
Use per Small Comm & Ind Customer - kWh	6,076.9	5,613.7	5,508.0	4,597.0	4,419.9	4,472.6	4,997.4	4,932.7	4,556.4	4,765.5	5,169.5	5,980.8	61,075.8
# of Small Comm & Ind Customers	12,947	12,952	12,963	12,984	13,027	13,050	13,051	13,055	13,040	13,004	12,992	12,982	13,004
Total Small Comm & Ind Sales - MWh	78,678	72,708	71,400	59,687	57,578	58,367	65,221	64,396	59,415	61,970	67,162	77,643	794,225
Large Comm & Ind Sales	61,909	58,608	60,825	53,616	55,614	56,857	62,672	61,838	58,347	57,227	58,235	61,902	707,650
Total Sales (Residential, SC&I and LC&I)	230,024	209,875	203,414	169,759	165,681	172,994	198,022	190,612	169,941	174,577	193,345	224,046	2,302,290
Other Public Sales	4,551	4,267	4,479	4,170	4,740	5,093	5,862	5,532	4,607	4,301	4,248	4,557	56,407
Street & Highway Lighting Sales	1,352	1,201	1,238	1,104	1,054	978	1,028	1,054	1,108	1,197	1,265	1,378	13,957
Interdepartmental Sales	17	16	16	15	13	10	12	12	11	13	14	16	165
Total Billed Sales - MWh	235,944	215,359	209,147	175,048	171,488	179,075	204,924	197,210	175,667	180,088	198,872	229,997	2,372,819
Company Use	422	397	429	375	383	397	435	418	385	383	379	418	4,821
Total Energy	236,366	215,756	209,576	175,423	171,871	179,472	205,359	197,628	176,052	180,471	199,251	230,415	2,377,640
Total Requirements (Energy + Losses)	254,899	232,673	226,009	189,178	185,347	193,544	221,461	213,124	189,856	194,622	214,874	248,482	2,564,069
# of Large Comm & Ind Customers	1,303	1,304	1,311	1,321	1,331	1,338	1,347	1,356	1,359	1,358	1,360	1,356	1,337
# of Other Public Customers	582	582	583	585	586	586	585	585	585	582	579	576	583
# of Street & Highway Lighting Customers	556	556	556	557	557	559	560	562	563	566	569	571	561
Peak Demand Net of Energy Efficiency Progs	447.3	413.0	378.3	332.7	316.9	414.8	456.7	439.2	389.8	351.2	368.5	429.2	456.7

APPENDIX F

Monthly Forecasts – South Dakota
(2022-2031)

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.6	1,048.1	923.8	710.7	714.0	739.7	945.3	791.3	676.9	707.2	893.5	1,126.6	10,444.3
# of Residential Customers	6,447	6,445	6,443	6,447	6,455	6,453	6,452	6,458	6,456	6,442	6,439	6,429	6,447
Total Residential Sales - MWh	7,534	6,755	5,952	4,582	4,609	4,773	6,099	5,110	4,370	4,556	5,753	7,243	67,336
Use per Small Comm & Ind Customer - kWh	2,178.9	2,033.4	1,783.5	1,322.8	1,436.7	1,349.4	1,647.5	1,456.7	1,336.3	1,379.8	1,726.0	2,101.8	19,732.1
# of Small Comm & Ind Customers	1,889	1,889	1,889	1,902	1,919	1,929	1,929	1,927	1,927	1,917	1,909	1,906	1,911
Total Small Comm & Ind Sales - MWh	4,116	3,841	3,369	2,516	2,757	2,603	3,178	2,807	2,575	2,645	3,295	4,006	37,708
Large Comm & Ind Sales	3,185	3,038	2,912	2,458	3,165	2,886	3,294	3,026	3,127	3,067	3,408	3,470	37,036
Total Sales (Residential, SC&I and LC&I)	14,835	13,634	12,233	9,556	10,531	10,262	12,571	10,943	10,072	10,268	12,456	14,719	142,080
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	
Total Billed Sales - MWh	15,113	13,899	12,495	9,756	10,810	10,479	12,819	11,165	10,302	10,493	12,697	14,997	145,025
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,160	13,942	12,526	9,767	10,826	10,487	12,829	11,172	10,310	10,505	12,723	15,045	145,292
Total Requirements (Energy + Losses)	16,349	15,035	13,508	10,533	11,675	11,309	13,835	12,048	11,118	11,329	13,721	16,225	156,685
# of Large Comm & Ind Customers	108	109	108	109	109	109	109	110	109	109	109	109	109
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	27.6	24.6	22.9	19.8	16.6	23.5	27.8	25.5	21.5	19.5	24.0	26.1	27.8

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.6	1,048.1	923.8	710.7	714.0	739.7	945.3	791.3	676.9	707.2	893.5	1,126.6	10,444.3
# of Residential Customers	6,447	6,445	6,443	6,447	6,455	6,453	6,452	6,458	6,456	6,442	6,439	6,429	6,447
Total Residential Sales - MWh	7,534	6,755	5,952	4,582	4,609	4,773	6,099	5,110	4,370	4,556	5,753	7,243	67,336
Use per Small Comm & Ind Customer - kWh	2,181.1	2,035.3	1,785.2	1,323.7	1,438.6	1,351.2	1,649.3	1,458.4	1,337.6	1,381.4	1,728.0	2,105.9	19,755.3
# of Small Comm & Ind Customers	1,899	1,899	1,899	1,912	1,929	1,939	1,939	1,937	1,937	1,927	1,919	1,916	1,921
Total Small Comm & Ind Sales - MWh	4,142	3,865	3,390	2,531	2,775	2,620	3,198	2,825	2,591	2,662	3,316	4,035	37,950
Large Comm & Ind Sales	3,236	3,087	2,960	2,498	3,216	2,933	3,347	3,074	3,177	3,116	3,463	3,523	37,630
Total Sales (Residential, SC&I and LC&I)	14,912	13,707	12,302	9,611	10,600	10,326	12,644	11,009	10,138	10,334	12,532	14,801	142,916
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,190	13,972	12,564	9,811	10,879	10,543	12,892	11,231	10,368	10,559	12,773	15,079	145,861
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,237	14,015	12,595	9,822	10,895	10,551	12,902	11,238	10,376	10,571	12,799	15,127	146,128
Total Requirements (Energy + Losses)	16,432	15,114	13,583	10,592	11,749	11,378	13,914	12,119	11,190	11,400	13,803	16,313	157,587
# of Large Comm & Ind Customers	109	110	109	110	110	110	110	111	110	110	110	110	110
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	27.7	24.7	23.0	19.9	16.7	23.7	28.0	25.7	21.7	19.7	24.1	26.2	28.0

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.6	1,048.3	923.8	710.7	714.1	739.7	945.4	791.4	676.8	707.1	893.4	1,126.5	10,444.4
# of Residential Customers	6,446	6,444	6,443	6,447	6,454	6,453	6,451	6,457	6,455	6,442	6,438	6,429	6,447
Total Residential Sales - MWh	7,533	6,755	5,952	4,582	4,609	4,773	6,099	5,110	4,369	4,555	5,752	7,242	67,331
Use per Small Comm & Ind Customer - kWh	2,185.4	2,039.8	1,788.9	1,326.7	1,441.5	1,354.0	1,652.3	1,461.7	1,340.5	1,384.6	1,731.5	2,110.6	19,797.2
# of Small Comm & Ind Customers	1,909	1,909	1,909	1,922	1,939	1,949	1,950	1,947	1,947	1,937	1,929	1,926	1,931
Total Small Comm & Ind Sales - MWh	4,172	3,894	3,415	2,550	2,795	2,639	3,222	2,846	2,610	2,682	3,340	4,065	38,230
Large Comm & Ind Sales	3,284	3,133	3,003	2,535	3,263	2,976	3,396	3,120	3,224	3,163	3,514	3,577	38,188
Total Sales (Residential, SC&I and LC&I)	14,989	13,782	12,370	9,667	10,667	10,388	12,717	11,076	10,203	10,400	12,606	14,884	143,749
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,267	14,047	12,632	9,867	10,946	10,605	12,965	11,298	10,433	10,625	12,847	15,162	146,694
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,314	14,090	12,663	9,878	10,962	10,613	12,975	11,305	10,441	10,637	12,873	15,210	146,961
Total Requirements (Energy + Losses)	16,515	15,195	13,656	10,653	11,822	11,445	13,992	12,191	11,260	11,471	13,882	16,403	158,485
# of Large Comm & Ind Customers	109	110	109	110	110	110	110	111	110	110	110	110	110
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	27.9	24.9	23.2	20.0	16.9	23.9	28.2	25.9	21.8	19.8	24.2	26.3	28.2

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.7	1,048.1	923.6	710.7	714.1	739.6	945.4	791.4	676.9	707.2	893.6	1,126.3	10,444.2
# of Residential Customers	6,445	6,443	6,442	6,446	6,453	6,452	6,450	6,456	6,454	6,441	6,437	6,428	6,446
Total Residential Sales - MWh	7,532	6,753	5,950	4,581	4,608	4,772	6,098	5,109	4,369	4,555	5,752	7,240	67,319
Use per Small Comm & Ind Customer - kWh	2,189.1	2,042.7	1,792.2	1,329.0	1,444.1	1,356.1	1,654.8	1,464.2	1,342.7	1,386.6	1,734.9	2,113.6	19,829.6
# of Small Comm & Ind Customers	1,920	1,920	1,920	1,933	1,950	1,960	1,961	1,958	1,958	1,948	1,939	1,937	1,942
Total Small Comm & Ind Sales - MWh	4,203	3,922	3,441	2,569	2,816	2,658	3,245	2,867	2,629	2,701	3,364	4,094	38,509
Large Comm & Ind Sales	3,336	3,181	3,050	2,575	3,314	3,022	3,449	3,168	3,275	3,212	3,569	3,632	38,783
Total Sales (Residential, SC&I and LC&I)	15,071	13,856	12,441	9,725	10,738	10,452	12,792	11,144	10,273	10,468	12,685	14,966	144,611
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,349	14,121	12,703	9,925	11,017	10,669	13,040	11,366	10,503	10,693	12,926	15,244	147,556
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,396	14,164	12,734	9,936	11,033	10,677	13,050	11,373	10,511	10,705	12,952	15,292	147,823
Total Requirements (Energy + Losses)	16,603	15,275	13,732	10,715	11,898	11,514	14,073	12,265	11,335	11,544	13,968	16,491	159,413
# of Large Comm & Ind Customers	110	111	110	111	111	111	111	112	111	111	111	111	111
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	28.0	25.0	23.3	20.1	17.0	24.1	28.4	26.1	22.0	20.0	24.4	27	28

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.7	1,048.1	923.8	710.7	714.0	739.5	945.3	791.4	676.8	707.1	893.6	1,126.4	10,444.1
# of Residential Customers	6,443	6,442	6,440	6,444	6,452	6,450	6,449	6,454	6,452	6,439	6,435	6,426	6,444
Total Residential Sales - MWh	7,530	6,752	5,949	4,580	4,607	4,770	6,096	5,108	4,367	4,553	5,750	7,238	67,300
Use per Small Comm & Ind Customer - kWh	2,193.8	2,045.6	1,795.9	1,331.3	1,446.2	1,358.7	1,657.7	1,466.2	1,345.4	1,389.0	1,737.9	2,115.5	19,862.4
# of Small Comm & Ind Customers	1,930	1,931	1,930	1,944	1,961	1,971	1,972	1,969	1,969	1,959	1,950	1,948	1,953
Total Small Comm & Ind Sales - MWh	4,234	3,950	3,466	2,588	2,836	2,678	3,269	2,887	2,649	2,721	3,389	4,121	38,788
Large Comm & Ind Sales	3,387	3,231	3,097	2,614	3,365	3,069	3,503	3,218	3,325	3,261	3,624	3,684	39,378
Total Sales (Residential, SC&I and LC&I)	15,151	13,933	12,512	9,782	10,808	10,517	12,868	11,213	10,341	10,535	12,763	15,043	145,466
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,429	14,198	12,774	9,982	11,087	10,734	13,116	11,435	10,571	10,760	13,004	15,321	148,411
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,476	14,241	12,805	9,993	11,103	10,742	13,126	11,442	10,579	10,772	13,030	15,369	148,678
Total Requirements (Energy + Losses)	16,689	15,358	13,809	10,777	11,974	11,584	14,155	12,339	11,408	11,617	14,052	16,574	160,336
# of Large Comm & Ind Customers	110	111	110	111	111	111	111	112	111	111	111	111	111
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	28.2	25.2	23.4	20.2	17.0	24.1	28.5	26.2	22.1	20.0	24.6	26.7	28.5

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.4	1,048.1	923.7	710.8	714.0	739.6	945.4	791.3	676.8	707.2	893.4	1,126.4	10,443.7
# of Residential Customers	6,442	6,440	6,438	6,442	6,450	6,448	6,447	6,453	6,451	6,437	6,434	6,424	6,442
Total Residential Sales - MWh	7,527	6,750	5,947	4,579	4,605	4,769	6,095	5,106	4,366	4,552	5,748	7,236	67,280
Use per Small Comm & Ind Customer - kWh	2,195.9	2,047.9	1,796.9	1,332.7	1,448.0	1,359.9	1,659.4	1,467.9	1,346.6	1,390.6	1,739.8	2,119.0	19,884.0
# of Small Comm & Ind Customers	1,940	1,941	1,940	1,954	1,971	1,981	1,982	1,979	1,979	1,969	1,960	1,958	1,963
Total Small Comm & Ind Sales - MWh	4,260	3,975	3,486	2,604	2,854	2,694	3,289	2,905	2,665	2,738	3,410	4,149	39,029
Large Comm & Ind Sales	3,434	3,276	3,141	2,651	3,413	3,112	3,552	3,262	3,372	3,307	3,675	3,738	39,933
Total Sales (Residential, SC&I and LC&I)	15,221	14,001	12,574	9,834	10,872	10,575	12,936	11,273	10,403	10,597	12,833	15,123	146,242
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,499	14,266	12,836	10,034	11,151	10,792	13,184	11,495	10,633	10,822	13,074	15,401	149,187
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,546	14,309	12,867	10,045	11,167	10,800	13,194	11,502	10,641	10,834	13,100	15,449	149,454
Total Requirements (Energy + Losses)	16,765	15,431	13,876	10,833	12,043	11,647	14,229	12,404	11,475	11,683	14,127	16,660	161,173
# of Large Comm & Ind Customers	111	112	111	112	112	112	112	113	112	112	112	112	112
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	28.4	25.4	23.6	20.4	17.2	24.3	28.7	26.4	22.2	20.2	24.6	26.8	28.7

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.7	1,048.2	923.7	710.7	714.0	739.5	945.2	791.2	676.8	707.2	893.3	1,126.4	10,443.7
# of Residential Customers	6,439	6,438	6,436	6,440	6,448	6,446	6,445	6,451	6,449	6,435	6,432	6,422	6,440
Total Residential Sales - MWh	7,525	6,748	5,945	4,577	4,604	4,767	6,092	5,104	4,365	4,551	5,746	7,234	67,258
Use per Small Comm & Ind Customer - kWh	2,200.0	2,051.8	1,800.5	1,335.0	1,450.8	1,361.9	1,663.2	1,471.1	1,349.4	1,393.1	1,743.1	2,123.0	19,922.3
# of Small Comm & Ind Customers	1,950	1,951	1,950	1,964	1,981	1,992	1,992	1,989	1,989	1,979	1,970	1,968	1,973
Total Small Comm & Ind Sales - MWh	4,290	4,003	3,511	2,622	2,874	2,713	3,313	2,926	2,684	2,757	3,434	4,178	39,305
Large Comm & Ind Sales	3,486	3,325	3,187	2,691	3,464	3,159	3,605	3,311	3,422	3,356	3,730	3,794	40,530
Total Sales (Residential, SC&I and LC&I)	15,301	14,076	12,643	9,890	10,942	10,639	13,010	11,341	10,471	10,664	12,910	15,206	147,093
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,579	14,341	12,905	10,090	11,221	10,856	13,258	11,563	10,701	10,889	13,151	15,484	150,038
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,626	14,384	12,936	10,101	11,237	10,864	13,268	11,570	10,709	10,901	13,177	15,532	150,305
Total Requirements (Energy + Losses)	16,851	15,512	13,950	10,893	12,118	11,716	14,308	12,477	11,549	11,756	14,210	16,750	162,090
# of Large Comm & Ind Customers	111	112	111	112	112	112	112	113	112	112	112	112	112
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	28.5	25.4	23.7	20.4	17.3	24.5	28.9	26.6	22.4	20.3	24.8	27.0	28.9

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2029

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.6	1,048.2	923.7	710.6	714.0	739.4	945.4	791.3	676.9	707.1	893.5	1,126.2	10,443.4
# of Residential Customers	6,437	6,435	6,434	6,438	6,445	6,444	6,442	6,448	6,446	6,433	6,429	6,420	6,438
Total Residential Sales - MWh	7,522	6,745	5,943	4,575	4,602	4,765	6,090	5,102	4,363	4,549	5,744	7,230	67,230
Use per Small Comm & Ind Customer - kWh	2,203.5	2,055.6	1,803.2	1,337.2	1,452.8	1,364.5	1,666.0	1,472.3	1,351.5	1,395.5	1,746.1	2,126.3	19,953.5
# of Small Comm & Ind Customers	1,961	1,961	1,961	1,975	1,992	2,003	2,003	2,001	2,000	1,990	1,981	1,979	1,984
Total Small Comm & Ind Sales - MWh	4,321	4,031	3,536	2,641	2,894	2,733	3,337	2,946	2,703	2,777	3,459	4,208	39,586
Large Comm & Ind Sales	3,537	3,373	3,234	2,730	3,514	3,205	3,658	3,360	3,472	3,405	3,784	3,849	41,121
Total Sales (Residential, SC&I and LC&I)	15,380	14,149	12,713	9,946	11,010	10,703	13,085	11,408	10,538	10,731	12,987	15,287	147,937
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,658	14,414	12,975	10,146	11,289	10,920	13,333	11,630	10,768	10,956	13,228	15,565	150,882
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,705	14,457	13,006	10,157	11,305	10,928	13,343	11,637	10,776	10,968	13,254	15,613	151,149
Total Requirements (Energy + Losses)	16,936	15,591	14,026	10,953	12,191	11,785	14,389	12,549	11,621	11,828	14,293	16,837	162,999
# of Large Comm & Ind Customers	112	113	112	113	113	113	113	114	113	113	113	113	113
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	28.7	25.6	23.8	20.6	17.4	24.6	29.1	26.7	22.5	20.5	25.0	27.2	29.1

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2030

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.6	1,048.2	923.7	710.6	714.1	739.5	945.3	791.3	676.9	707.2	893.6	1,126.2	10,443.7
# of Residential Customers	6,434	6,432	6,431	6,435	6,442	6,441	6,439	6,445	6,443	6,430	6,426	6,417	6,435
Total Residential Sales - MWh	7,519	6,742	5,940	4,573	4,600	4,763	6,087	5,100	4,361	4,547	5,742	7,227	67,201
Use per Small Comm & Ind Customer - kWh	2,209.8	2,062.0	1,808.5	1,340.9	1,457.0	1,368.5	1,670.3	1,476.9	1,355.6	1,399.4	1,751.1	2,132.4	20,011.4
# of Small Comm & Ind Customers	1,969	1,969	1,969	1,983	2,000	2,011	2,011	2,009	2,008	1,998	1,989	1,987	1,992
Total Small Comm & Ind Sales - MWh	4,351	4,060	3,561	2,659	2,914	2,752	3,359	2,967	2,722	2,796	3,483	4,237	39,861
Large Comm & Ind Sales	3,588	3,423	3,281	2,769	3,565	3,252	3,711	3,409	3,523	3,455	3,839	3,904	41,719
Total Sales (Residential, SC&I and LC&I)	15,458	14,225	12,782	10,001	11,079	10,767	13,157	11,476	10,606	10,798	13,064	15,368	148,781
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,736	14,490	13,044	10,201	11,358	10,984	13,405	11,698	10,836	11,023	13,305	15,646	151,726
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,783	14,533	13,075	10,212	11,374	10,992	13,415	11,705	10,844	11,035	13,331	15,694	151,993
Total Requirements (Energy + Losses)	17,021	15,673	14,100	11,013	12,266	11,854	14,467	12,623	11,694	11,900	14,376	16,925	163,912
# of Large Comm & Ind Customers	113	114	113	114	114	114	114	115	114	114	114	114	114
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	28.9	25.8	24.0	20.7	17.5	24.7	29.2	26.8	22.6	20.5	25.1	27.3	29.2

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2031

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,168.6	1,048.1	923.6	710.7	714.1	739.6	945.3	791.2	676.7	707.0	893.5	1,126.1	10,443.1
# of Residential Customers	6,431	6,429	6,428	6,432	6,439	6,437	6,436	6,442	6,440	6,427	6,423	6,414	6,432
Total Residential Sales - MWh	7,515	6,738	5,937	4,571	4,598	4,761	6,084	5,097	4,358	4,544	5,739	7,223	67,165
Use per Small Comm & Ind Customer - kWh	2,214.2	2,066.2	1,812.0	1,343.7	1,460.2	1,371.1	1,673.9	1,479.9	1,358.3	1,402.4	1,754.4	2,136.7	20,052.3
# of Small Comm & Ind Customers	1,979	1,979	1,979	1,993	2,010	2,021	2,021	2,019	2,018	2,008	1,999	1,997	2,002
Total Small Comm & Ind Sales - MWh	4,382	4,089	3,586	2,678	2,935	2,771	3,383	2,988	2,741	2,816	3,507	4,267	40,143
Large Comm & Ind Sales	3,640	3,471	3,328	2,809	3,616	3,298	3,764	3,457	3,573	3,505	3,894	3,959	42,314
Total Sales (Residential, SC&I and LC&I)	15,537	14,298	12,851	10,058	11,149	10,830	13,231	11,542	10,672	10,865	13,140	15,449	149,622
Other Public Sales	135	130	126	87	147	104	126	104	107	102	112	132	1,412
Street & Highway Lighting Sales	143	135	136	113	132	113	122	118	123	123	129	146	1,533
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,815	14,563	13,113	10,258	11,428	11,047	13,479	11,764	10,902	11,090	13,381	15,727	152,567
Company Use	47	43	31	11	16	8	10	7	8	12	26	48	267
Total Energy	15,862	14,606	13,144	10,269	11,444	11,055	13,489	11,771	10,910	11,102	13,407	15,775	152,834
Total Requirements (Energy + Losses)	17,106	15,751	14,175	11,074	12,341	11,922	14,547	12,694	11,765	11,973	14,458	17,012	164,818
# of Large Comm & Ind Customers	113	114	113	114	114	114	114	115	114	114	114	114	114
# of Other Public Customers	46	46	46	46	46	46	46	46	46	46	45	45	46
# of Street & Highway Lighting Customers	12	20	20	20	20	20	20	20	20	21	21	21	20
Peak Demand Net of Energy Efficiency Progs	29.0	25.9	24.1	20.8	17.5	24.8	29.3	26.9	22.7	20.6	25.2	27.4	29.3

APPENDIX G

Monthly Forecasts – Integrated System (2022-2031)

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,080.8	951.2	860.2	684.0	634.5	714.2	874.7	793.5	641.6	671.7	823.6	1,023.5	9,753.9
# of Residential Customers	105,512	105,574	105,545	105,421	105,451	105,439	105,401	105,488	105,462	105,479	105,501	105,510	105,482
Total Residential Sales - MWh	114,040	100,425	90,791	72,110	66,904	75,300	92,196	83,700	67,669	70,846	86,889	107,985	1,028,855
Use per Small Comm & Ind Customer - kWh	3,998.3	3,696.2	3,598.7	2,982.9	2,865.7	2,956.6	3,375.2	3,291.0	3,002.5	3,080.7	3,371.7	3,915.9	40,120.3
# of Small Comm & Ind Customers	18,661	18,659	18,664	18,744	18,849	18,897	18,904	18,905	18,885	18,809	18,766	18,738	18,790
Total Small Comm & Ind Sales - MWh	74,613	68,967	67,166	55,912	54,016	55,871	63,804	62,216	56,703	57,944	63,274	73,377	753,863
Large Comm & Ind Sales	103,428	95,859	100,974	89,971	94,337	90,978	100,449	98,440	95,681	95,338	96,826	102,008	1,164,289
Total Sales (Residential, SC&I and LC&I)	292,081	265,251	258,931	217,993	215,257	222,149	256,449	244,356	220,053	224,128	246,989	283,370	2,947,007
Other Public Sales	602	568	575	489	590	697	821	740	609	484	503	580	7,258
Street & Highway Lighting Sales	4,729	4,427	4,631	4,303	4,832	5,149	5,887	5,565	4,701	4,413	4,376	4,788	57,801
Interdepartmental Sales	1,368	1,216	1,251	1,116	1,064	988	1,040	1,064	1,119	1,208	1,278	1,393	14,105
Total Billed Sales - MWh	298,780	271,462	265,388	223,901	221,743	228,983	264,197	251,725	226,482	230,233	253,146	290,131	3,026,171
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	299,290	271,937	265,885	224,316	222,164	229,415	264,671	252,179	226,901	230,655	253,581	290,637	3,031,631
Total Requirements (Energy + Losses)	322,776	293,277	286,750	241,920	239,598	247,414	285,437	271,965	244,704	248,755	273,480	313,443	3,269,519
# of Large Comm & Ind Customers	1,531	1,532	1,538	1,548	1,559	1,566	1,574	1,585	1,585	1,580	1,580	1,576	1,563
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	574.0	526.7	478.8	429.3	400.0	513.4	580.6	554.0	484.9	443.5	478.4	548.2	580.6

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,080.9	951.3	860.2	684.0	634.5	714.1	874.7	793.4	641.6	671.7	823.6	1,023.5	9,754.0
# of Residential Customers	105,817	105,879	105,850	105,726	105,755	105,744	105,706	105,793	105,767	105,785	105,807	105,816	105,787
Total Residential Sales - MWh	114,374	100,718	91,057	72,321	67,100	75,516	92,458	83,940	67,864	71,053	87,143	108,300	1,031,844
Use per Small Comm & Ind Customer - kWh	4,080.5	3,772.1	3,673.4	3,044.9	2,925.2	3,017.1	3,443.2	3,358.0	3,064.4	3,145.0	3,441.6	3,998.0	40,947.9
# of Small Comm & Ind Customers	18,840	18,838	18,842	18,924	19,029	19,078	19,084	19,086	19,065	18,989	18,945	18,918	18,970
Total Small Comm & Ind Sales - MWh	76,876	71,058	69,214	57,622	55,664	57,561	65,710	64,090	58,422	59,721	65,202	75,634	776,774
Large Comm & Ind Sales	103,236	95,581	100,810	89,938	94,354	90,765	100,192	98,150	95,545	95,245	96,661	102,697	1,163,174
Total Sales (Residential, SC&I and LC&I)	294,486	267,357	261,081	219,881	217,118	223,842	258,360	246,180	221,831	226,019	249,006	286,631	2,971,792
Other Public Sales	4,979	4,673	4,883	4,500	5,150	5,596	6,460	6,060	5,040	4,621	4,589	5,014	61,565
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	301,292	273,669	267,643	225,886	223,712	230,787	266,236	253,670	228,362	232,222	255,261	293,499	3,052,239
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	301,802	274,144	268,140	226,301	224,133	231,219	266,710	254,124	228,781	232,644	255,696	294,005	3,057,699
Total Requirements (Energy + Losses)	325,467	295,640	289,165	244,046	241,707	249,348	287,623	274,049	246,720	250,886	275,745	317,057	3,297,453
# of Large Comm & Ind Customers	1,548	1,549	1,554	1,565	1,576	1,583	1,591	1,603	1,603	1,597	1,597	1,593	1,580
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	579.0	531.3	483.0	433.1	404.0	518.5	586.5	559.5	489.8	448.0	482.5	552.7	586.5

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,080.9	951.3	860.3	684.1	634.5	714.1	874.6	793.4	641.6	671.7	823.6	1,023.5	9,754.1
# of Residential Customers	106,121	106,183	106,155	106,030	106,059	106,049	106,010	106,097	106,071	106,090	106,111	106,121	106,091
Total Residential Sales - MWh	114,707	101,011	91,323	72,532	67,295	75,731	92,720	84,181	68,058	71,259	87,396	108,618	1,034,831
Use per Small Comm & Ind Customer - kWh	4,167.1	3,851.9	3,751.9	3,110.4	2,988.1	3,081.3	3,514.9	3,428.8	3,129.5	3,212.8	3,515.1	4,081.0	41,817.0
# of Small Comm & Ind Customers	19,019	19,018	19,022	19,104	19,209	19,258	19,266	19,267	19,246	19,169	19,125	19,098	19,150
Total Small Comm & Ind Sales - MWh	79,255	73,256	71,368	59,421	57,399	59,339	67,718	66,062	60,230	61,586	67,227	77,938	800,799
Large Comm & Ind Sales	103,815	96,125	101,369	90,429	94,874	91,275	100,760	98,706	96,076	95,772	97,205	103,261	1,169,667
Total Sales (Residential, SC&I and LC&I)	297,777	270,392	264,060	222,382	219,568	226,345	261,198	248,949	224,364	228,617	251,828	289,817	3,005,297
Other Public Sales	5,070	4,757	4,973	4,583	5,244	5,697	6,576	6,170	5,132	4,708	4,673	5,053	62,636
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	304,674	276,788	270,712	228,470	226,256	233,391	269,190	256,549	230,987	234,907	258,167	296,724	3,086,815
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	305,184	277,263	271,209	228,885	226,677	233,823	269,664	257,003	231,406	235,329	258,602	297,230	3,092,275
Total Requirements (Energy + Losses)	329,113	299,003	292,474	246,833	244,451	252,157	290,808	277,154	249,551	253,781	278,878	320,536	3,334,739
# of Large Comm & Ind Customers	1,564	1,566	1,571	1,582	1,593	1,600	1,608	1,620	1,620	1,614	1,615	1,610	1,597
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	583.8	535.8	486.9	436.7	408.9	524.7	593.4	566.2	495.5	453.4	487.8	558.9	593.4

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.0	951.3	860.3	684.1	634.5	714.1	874.6	793.4	641.6	671.7	823.7	1,023.1	9,753.9
# of Residential Customers	106,430	106,492	106,464	106,339	106,368	106,358	106,318	106,406	106,380	106,399	106,420	106,430	106,400
Total Residential Sales - MWh	115,046	101,308	91,591	72,745	67,494	75,950	92,986	84,424	68,255	71,469	87,654	108,893	1,037,815
Use per Small Comm & Ind Customer - kWh	4,252.2	3,930.5	3,829.1	3,174.7	3,049.6	3,144.0	3,585.4	3,498.4	3,193.5	3,279.3	3,587.5	4,164.1	42,672.2
# of Small Comm & Ind Customers	19,201	19,200	19,204	19,287	19,393	19,442	19,449	19,450	19,429	19,352	19,307	19,281	19,333
Total Small Comm & Ind Sales - MWh	81,647	75,466	73,534	61,230	59,141	61,126	69,733	68,043	62,047	63,461	69,263	80,288	824,979
Large Comm & Ind Sales	104,394	96,662	101,925	90,917	95,392	91,778	101,319	99,251	96,603	96,295	97,747	103,881	1,176,164
Total Sales (Residential, SC&I and LC&I)	301,087	273,436	267,050	224,892	222,027	228,854	264,038	251,718	226,905	231,225	254,664	293,062	3,038,958
Other Public Sales	5,079	4,766	4,982	4,591	5,253	5,707	6,586	6,179	5,140	4,716	4,681	5,062	62,742
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	307,993	279,841	273,711	230,988	228,724	235,910	272,040	259,327	233,536	237,523	261,011	299,978	3,120,582
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	308,503	280,316	274,208	231,403	229,145	236,342	272,514	259,781	233,955	237,945	261,446	300,484	3,126,042
Total Requirements (Energy + Losses)	332,692	302,296	295,708	249,547	247,113	254,873	293,882	280,151	252,299	256,601	281,946	324,045	3,371,153
# of Large Comm & Ind Customers	1,581	1,582	1,588	1,599	1,610	1,617	1,625	1,637	1,637	1,632	1,632	1,627	1,614
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	590.4	541.8	492.5	441.6	413.5	530.8	600.2	572.7	501.4	458.6	493.1	564.9	600.2

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.0	951.3	860.3	684.1	634.5	714.1	874.6	793.4	641.6	671.7	823.7	1,023.2	9,754.0
# of Residential Customers	106,678	106,741	106,712	106,587	106,617	106,606	106,567	106,654	106,628	106,647	106,668	106,678	106,649
Total Residential Sales - MWh	115,317	101,547	91,808	72,917	67,653	76,125	93,199	84,621	68,414	71,636	87,860	109,149	1,040,246
Use per Small Comm & Ind Customer - kWh	4,341.1	4,012.4	3,909.7	3,242.0	3,114.0	3,209.6	3,659.1	3,570.9	3,260.4	3,348.8	3,663.0	4,248.6	43,563.3
# of Small Comm & Ind Customers	19,374	19,374	19,377	19,460	19,567	19,617	19,624	19,625	19,603	19,526	19,481	19,454	19,507
Total Small Comm & Ind Sales - MWh	84,105	77,737	75,759	63,089	60,932	62,963	71,807	70,079	63,914	65,388	71,358	82,652	849,783
Large Comm & Ind Sales	105,043	97,269	102,551	91,467	95,975	92,346	101,952	99,869	97,196	96,884	98,355	104,461	1,183,368
Total Sales (Residential, SC&I and LC&I)	304,465	276,553	270,118	227,473	224,560	231,434	266,958	254,569	229,524	233,908	257,573	296,262	3,073,397
Other Public Sales	5,088	4,774	4,991	4,600	5,263	5,716	6,598	6,191	5,149	4,724	4,689	5,072	62,855
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	311,380	282,966	276,788	233,578	231,267	238,499	274,972	262,190	236,164	240,214	263,928	303,188	3,155,134
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	311,890	283,441	277,285	233,993	231,688	238,931	275,446	262,644	236,583	240,636	264,363	303,694	3,160,594
Total Requirements (Energy + Losses)	336,345	305,666	299,027	252,341	249,855	257,665	297,044	283,238	255,133	259,505	285,092	327,507	3,408,418
# of Large Comm & Ind Customers	1,598	1,599	1,604	1,616	1,627	1,634	1,642	1,654	1,654	1,649	1,649	1,644	1,631
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	596.7	547.6	497.8	446.3	418.2	536.8	606.9	579.2	507.0	463.7	498.4	571.2	606.9

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.0	951.4	860.4	684.1	634.6	714.1	874.5	793.4	641.6	671.7	823.7	1,023.2	9,754.0
# of Residential Customers	106,927	106,989	106,960	106,834	106,865	106,854	106,815	106,904	106,877	106,895	106,918	106,927	106,897
Total Residential Sales - MWh	115,588	101,786	92,024	73,089	67,813	76,301	93,412	84,816	68,572	71,805	88,066	109,406	1,042,678
Use per Small Comm & Ind Customer - kWh	4,427.6	4,092.3	3,988.0	3,307.3	3,176.7	3,273.4	3,730.6	3,641.4	3,325.3	3,416.4	3,736.4	4,335.7	44,434.5
# of Small Comm & Ind Customers	19,548	19,548	19,551	19,635	19,742	19,792	19,800	19,801	19,779	19,701	19,655	19,629	19,682
Total Small Comm & Ind Sales - MWh	86,550	79,996	77,970	64,939	62,714	64,787	73,865	72,104	65,771	67,307	73,439	85,106	874,548
Large Comm & Ind Sales	105,573	97,765	103,063	91,916	96,452	92,812	102,471	100,373	97,681	97,365	98,853	105,062	1,189,386
Total Sales (Residential, SC&I and LC&I)	307,711	279,547	273,057	229,944	226,979	233,900	269,748	257,293	232,024	236,477	260,358	299,574	3,106,612
Other Public Sales	5,096	4,783	5,000	4,609	5,272	5,726	6,610	6,202	5,159	4,733	4,699	5,081	62,970
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	314,634	285,969	279,736	236,058	233,695	240,975	277,774	264,925	238,674	242,792	266,723	306,509	3,188,464
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	315,144	286,444	280,233	236,473	234,116	241,407	278,248	265,379	239,093	243,214	267,158	307,015	3,193,924
Total Requirements (Energy + Losses)	339,855	308,904	302,206	255,015	252,474	260,336	300,066	286,187	257,840	262,284	288,106	331,088	3,444,361
# of Large Comm & Ind Customers	1,614	1,616	1,621	1,632	1,644	1,651	1,659	1,672	1,672	1,666	1,666	1,662	1,648
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	603.3	553.8	503.3	451.3	422.9	542.9	613.7	585.6	512.7	468.9	503.5	577.0	613.7

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.0	951.4	860.4	684.1	634.6	714.1	874.5	793.4	641.6	671.8	823.7	1,023.2	9,754.1
# of Residential Customers	107,174	107,237	107,208	107,082	107,112	107,101	107,063	107,152	107,125	107,144	107,166	107,175	107,145
Total Residential Sales - MWh	115,860	102,024	92,240	73,260	67,972	76,476	93,624	85,011	68,731	71,974	88,272	109,661	1,045,105
Use per Small Comm & Ind Customer - kWh	4,520.2	4,177.9	4,071.9	3,377.2	3,243.9	3,341.5	3,807.4	3,717.3	3,395.1	3,488.9	3,815.0	4,424.3	45,363.7
# of Small Comm & Ind Customers	19,722	19,722	19,726	19,810	19,917	19,970	19,976	19,976	19,954	19,876	19,830	19,804	19,857
Total Small Comm & Ind Sales - MWh	89,148	82,397	80,322	66,903	64,609	66,730	76,057	74,256	67,745	69,345	75,652	87,619	900,783
Large Comm & Ind Sales	106,235	98,381	103,699	92,476	97,044	93,390	103,113	101,001	98,283	97,964	99,472	105,677	1,196,735
Total Sales (Residential, SC&I and LC&I)	311,243	282,802	276,261	232,639	229,625	236,596	272,794	260,268	234,759	239,283	263,396	302,957	3,142,623
Other Public Sales	5,105	4,791	5,008	4,617	5,283	5,737	6,620	6,212	5,168	4,741	4,707	5,090	63,079
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	318,175	289,232	282,948	238,761	236,352	243,682	280,830	267,910	241,418	245,606	269,769	309,901	3,224,584
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	318,685	289,707	283,445	239,176	236,773	244,114	281,304	268,364	241,837	246,028	270,204	310,407	3,230,044
Total Requirements (Energy + Losses)	343,673	312,423	305,669	257,929	255,338	263,255	303,360	289,406	260,800	265,319	291,390	334,746	3,483,308
# of Large Comm & Ind Customers	1,630	1,631	1,637	1,648	1,660	1,667	1,675	1,688	1,688	1,682	1,683	1,678	1,664
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	609.5	559.4	508.6	455.8	427.8	549.3	620.8	592.5	518.8	474.4	509.3	583.7	620.8

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2029

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.1	951.4	860.4	684.2	634.6	714.0	874.4	793.4	641.6	671.8	823.7	1,023.2	9,754.2
# of Residential Customers	107,422	107,484	107,456	107,330	107,359	107,349	107,310	107,399	107,373	107,392	107,413	107,423	107,393
Total Residential Sales - MWh	116,131	102,261	92,456	73,431	68,131	76,651	93,837	85,206	68,889	72,141	88,478	109,915	1,047,527
Use per Small Comm & Ind Customer - kWh	4,611.2	4,262.4	4,154.8	3,446.1	3,309.6	3,408.9	3,882.9	3,791.5	3,463.5	3,560.2	3,892.4	4,515.6	46,281.8
# of Small Comm & Ind Customers	19,898	19,896	19,900	19,986	20,095	20,146	20,153	20,154	20,131	20,052	20,006	19,980	20,033
Total Small Comm & Ind Sales - MWh	91,753	84,804	82,681	68,874	66,507	68,676	78,253	76,414	69,724	71,389	77,871	90,222	927,168
Large Comm & Ind Sales	106,831	98,936	104,275	92,981	97,578	93,909	103,691	101,566	98,827	98,504	100,030	106,319	1,203,447
Total Sales (Residential, SC&I and LC&I)	314,715	286,001	279,412	235,286	232,216	239,236	275,781	263,186	237,440	242,034	266,379	306,456	3,178,142
Other Public Sales	5,115	4,800	5,017	4,625	5,292	5,747	6,632	6,223	5,177	4,751	4,716	5,100	63,195
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	321,657	292,440	286,108	241,416	238,952	246,332	283,829	270,839	244,108	248,367	272,761	313,410	3,260,219
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	322,167	292,915	286,605	241,831	239,373	246,764	284,303	271,293	244,527	248,789	273,196	313,916	3,265,679
Total Requirements (Energy + Losses)	347,428	315,883	309,078	260,793	258,141	266,113	306,595	292,565	263,701	268,297	294,617	338,530	3,521,741
# of Large Comm & Ind Customers	1,647	1,649	1,655	1,666	1,677	1,685	1,694	1,706	1,706	1,701	1,701	1,696	1,682
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	616.6	565.9	514.4	461.1	432.5	555.4	627.7	599.0	524.5	479.7	514.8	590.1	627.7

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2030

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.1	951.4	860.4	684.2	634.6	714.0	874.4	793.4	641.6	671.8	823.7	1,023.2	9,754.3
# of Residential Customers	107,669	107,732	107,703	107,576	107,606	107,596	107,556	107,646	107,620	107,639	107,660	107,670	107,639
Total Residential Sales - MWh	116,402	102,499	92,671	73,601	68,289	76,825	94,048	85,401	69,047	72,309	88,684	110,171	1,049,947
Use per Small Comm & Ind Customer - kWh	4,708.1	4,352.0	4,242.5	3,519.4	3,379.8	3,480.4	3,963.4	3,870.8	3,536.4	3,636.0	3,974.6	4,610.6	47,256.3
# of Small Comm & Ind Customers	20,072	20,070	20,075	20,160	20,270	20,322	20,328	20,329	20,306	20,227	20,181	20,154	20,208
Total Small Comm & Ind Sales - MWh	94,500	87,344	85,168	70,952	68,509	70,728	80,567	78,689	71,811	73,545	80,212	92,923	954,948
Large Comm & Ind Sales	107,503	99,565	104,923	93,549	98,180	94,496	104,343	102,203	99,440	99,113	100,658	106,989	1,210,962
Total Sales (Residential, SC&I and LC&I)	318,405	289,408	282,762	238,102	234,978	242,049	278,958	266,293	240,298	244,967	269,554	310,083	3,215,857
Other Public Sales	5,124	4,808	5,026	4,633	5,302	5,756	6,643	6,233	5,185	4,759	4,725	5,109	63,303
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	325,356	295,855	289,467	244,240	241,724	249,154	287,017	273,956	246,974	251,308	275,945	317,046	3,298,042
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	325,866	296,330	289,964	244,655	242,145	249,586	287,491	274,410	247,393	251,730	276,380	317,552	3,303,502
Total Requirements (Energy + Losses)	351,418	319,565	312,700	263,838	261,132	269,156	310,033	295,927	266,791	271,468	298,051	342,451	3,562,530
# of Large Comm & Ind Customers	1,664	1,665	1,671	1,683	1,694	1,702	1,711	1,723	1,723	1,718	1,718	1,713	1,699
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	623.2	572.1	520.1	466.1	437.4	561.7	634.7	605.7	530.4	485.0	520.7	596.8	634.7

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

INTEGRATED SYSTEM YEAR 2031

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,081.1	951.4	860.5	684.2	634.7	714.0	874.4	793.3	641.6	671.8	823.8	1,023.2	9,754.4
# of Residential Customers	107,915	107,979	107,950	107,823	107,853	107,842	107,803	107,893	107,867	107,886	107,907	107,918	107,886
Total Residential Sales - MWh	116,672	102,736	92,886	73,773	68,449	77,001	94,260	85,595	69,203	72,475	88,889	110,425	1,052,364
Use per Small Comm & Ind Customer - kWh	4,807.2	4,443.4	4,332.2	3,594.2	3,451.6	3,553.5	4,045.3	3,951.3	3,610.7	3,713.3	4,058.5	4,707.6	48,250.8
# of Small Comm & Ind Customers	20,246	20,245	20,250	20,336	20,446	20,498	20,505	20,507	20,483	20,403	20,357	20,329	20,384
Total Small Comm & Ind Sales - MWh	97,327	89,957	87,728	73,091	70,571	72,840	82,949	81,029	73,958	75,763	82,619	95,701	983,533
Large Comm & Ind Sales	108,182	100,196	105,576	94,124	98,788	95,088	105,002	102,846	100,059	99,729	101,294	107,667	1,218,551
Total Sales (Residential, SC&I and LC&I)	322,181	292,889	286,190	240,988	237,808	244,929	282,211	269,470	243,220	247,967	272,802	313,793	3,254,448
Other Public Sales	5,133	4,817	5,035	4,642	5,312	5,765	6,654	6,245	5,195	4,769	4,734	5,119	63,420
Street & Highway Lighting Sales	1,794	1,608	1,650	1,478	1,421	1,329	1,392	1,408	1,469	1,558	1,639	1,823	18,569
Interdepartmental Sales	33	31	29	27	23	20	24	22	22	24	27	31	313
Total Billed Sales - MWh	329,141	299,345	292,904	247,135	244,564	252,043	290,281	277,145	249,906	254,318	279,202	320,766	3,336,750
Company Use	510	475	497	415	421	432	474	454	419	422	435	506	5,460
Total Energy	329,651	299,820	293,401	247,550	244,985	252,475	290,755	277,599	250,325	254,740	279,637	321,272	3,342,210
Total Requirements (Energy + Losses)	355,499	323,328	316,407	266,960	264,194	272,271	313,553	299,366	269,952	274,715	301,563	346,463	3,604,271
# of Large Comm & Ind Customers	1,681	1,682	1,688	1,700	1,711	1,719	1,728	1,740	1,741	1,735	1,735	1,731	1,716
# of Other Public Customers	730	730	731	733	734	734	733	733	734	730	726	723	731
# of Street & Highway Lighting Customers	604	612	612	613	613	615	616	618	619	623	626	628	617
Peak Demand Net of Energy Efficiency Progs	630.4	578.6	526.1	471.4	442.3	568.2	641.9	612.6	536.6	490.5	526.6	603.6	641.9

APPENDIX H

Wyoming System
Historical Data

Wyoming System Annual Sales by Class
(Kilowatt Hours)

Year	Residential	Small C&I	Large C&I	Street Lighting	Other Public Sales	Interde-partmental	Company Use	Total
1966	22,019,032	13,848,726	9,261,460	926,431	216,240	61,165	79,902	46,412,956
1967	23,110,966	15,102,252	11,395,920	945,672	234,800	59,165	157,328	51,006,103
1968	24,736,766	16,364,898	13,468,229	994,681	15,200	60,553	158,242	55,798,569
1969	26,422,498	15,477,222	17,507,890	991,901	-	51,544	165,826	60,616,881
1970	27,691,842	16,345,022	17,846,966	1,010,285	-	51,246	169,949	63,115,310
1971	30,256,286	17,524,940	18,355,567	975,775	-	51,846	169,181	67,333,595
1972	33,334,819	19,725,398	18,675,220	991,901	-	53,766	175,441	72,956,545
1973	35,176,643	22,281,022	23,375,873	986,830	-	54,278	175,603	82,050,249
1974	36,287,997	24,481,302	19,523,415	965,791	-	52,805	154,392	81,465,702
1975	40,742,391	27,025,023	16,406,232	1,002,958	-	48,899	152,567	85,378,070
1976	44,543,942	30,009,653	18,891,810	1,019,449	-	43,902	170,215	94,678,971
1977	49,656,991	32,573,035	21,595,741	1,045,584	-	45,059	156,340	105,072,750
1978	60,460,106	37,268,388	26,253,826	1,055,742	-	42,222	162,199	125,242,483
1979	70,700,335	44,163,407	32,073,872	1,061,448	-	46,939	193,959	148,239,960
1980	74,868,604	36,676,014	40,464,530	1,101,131	-	45,643	184,051	153,339,973
1981	78,090,870	32,084,582	44,832,260	1,161,597	-	50,709	188,967	156,408,985
1982	90,814,821	34,836,087	48,404,309	1,233,267	-	57,932	305,789	175,652,205
1983	92,192,152	37,558,900	52,076,602	1,264,761	-	77,821	309,298	183,479,534
1984	93,702,593	40,030,115	51,287,024	1,300,311	-	68,068	304,581	186,692,692
1985	94,179,603	40,944,419	50,451,930	1,342,770	-	57,911	279,194	187,255,827
1986	85,155,461	34,554,788	52,082,471	1,419,359	-	64,334	266,710	173,543,123
1987	80,402,962	33,658,069	51,281,336	1,434,679	-	65,844	230,743	167,073,633
1988	86,329,326	35,000,825	58,128,534	1,447,657	-	53,642	247,967	181,207,951
1989	88,941,168	34,104,945	58,145,252	1,450,643	-	54,945	252,457	182,949,410
1990	87,912,112	33,723,160	59,589,435	1,456,299	-	52,369	260,127	182,993,502
1991	94,024,714	34,065,869	62,135,795	1,468,440	-	50,001	259,806	192,004,625
1992	89,774,184	34,197,588	62,898,725	1,490,661	-	51,239	243,455	188,655,852
1993	97,699,586	35,597,932	64,122,851	1,474,638	-	53,888	266,383	199,215,278
1994	98,062,262	38,247,954	69,208,841	1,451,234	-	58,850	289,022	207,318,163
1995	100,961,390	37,619,673	71,389,651	1,428,917	-	65,858	306,736	211,772,225
1996	107,823,594	39,910,294	73,838,245	1,431,009	-	58,502	333,452	223,395,096
1997	104,520,484	39,392,692	74,345,722	1,433,479	-	56,949	324,978	220,074,304
1998	102,665,836	41,904,733	75,018,594	1,427,195	-	52,680	305,098	221,374,136
1999	102,727,998	42,983,318	78,999,842	1,353,776	-	53,893	297,783	226,416,610
2000	106,493,117	46,355,985	81,218,172	1,310,307	-	54,367	301,847	235,733,795
2001	109,590,656	46,190,548	83,351,817	1,283,949	-	49,384	324,724	240,791,078
2002	112,798,119	46,756,543	86,974,250	1,256,213	-	48,945	314,315	248,148,385
2003	114,519,688	48,793,599	86,944,753	1,224,695	-	45,216	310,357	251,838,308
2004	109,259,952	47,310,464	84,919,480	1,236,210	-	41,830	286,251	243,054,187
2005	115,398,500	50,816,039	86,435,328	1,238,139	-	39,277	219,731	254,147,014
2006	120,147,513	53,856,084	88,137,945	1,240,052	-	37,189	215,814	263,634,597
2007	127,661,625	54,556,122	90,300,187	1,234,054	-	38,639	209,602	274,000,229
2008	132,094,288	54,991,425	90,169,915	1,225,057	-	32,636	211,916	278,725,237
2009	135,291,592	54,911,317	86,272,328	1,221,386	-	30,213	222,979	277,949,815
2010	132,942,472	52,998,802	88,670,040	1,208,158	-	28,436	206,302	276,054,210
2011	138,600,277	55,663,700	87,595,829	1,168,810	-	28,352	195,768	283,252,736
2012	135,277,701	56,079,134	87,813,055	1,145,559	-	27,163	190,666	280,533,278
2013	139,918,515	54,932,130	87,881,008	1,136,464	-	25,912	167,062	284,061,091
2014	138,405,562	54,600,468	87,035,099	1,159,533	-	26,955	152,512	281,380,129
2015	133,195,042	53,071,969	89,479,086	1,145,251	-	26,614	152,457	277,070,419
2016	134,391,103	53,541,457	87,193,776	1,135,901	-	24,106	150,252	276,436,595
2017	138,175,899	53,734,184	86,992,018	1,092,661	-	24,656	182,544	280,201,962
2018	140,036,394	53,129,269	86,975,782	1,043,478	-	24,200	188,324	281,397,447
2019	142,588,274	52,498,830	88,128,660	781,515	-	25,671	151,335	284,174,285
2020	146,082,098	53,405,274	86,613,008	438,758	-	27,495	136,341	286,702,974
2021	146,237,572	53,806,143	87,044,101	434,456	-	30,351	144,748	287,697,371

Wyoming System Seasonal Peaks and Annual Load Factor
1966 Through Summer 2021

	SUMMER		WINTER		Annual Load
Year	MW	Month	MW	Month */	Factor
1966	9.2	July	10.9	Dec	54.7%
1967	10.0	Aug	12.1	Dec	53.6%
1968	10.9	July	13.0	Dec	53.9%
1969	11.8	Aug	13.6	Dec	56.1%
1970	12.6	Aug	14.8	Dec	53.4%
1971	13.5	Aug	16.4	Jan	51.9%
1972	14.3	Aug	18.4	Jan	50.3%
1973	16.5	July	16.1	Jan	62.2%
1974	17.0	July	17.0	Dec	60.1%
1975	18.4	July	19.5	Jan	55.2%
1976	20.1	July	20.3	Jan	56.8%
1977	21.3	July	26.3	Dec	50.0%
1978	23.7	Sept	31.6	Jan	50.3%
1979	25.6	Aug	35.2	Jan	51.6%
1980	27.1	July	35.7	Feb	53.2%
1981	27.5	July	40.0	Jan	48.1%
1982	30.2	Aug	39.3	Dec	55.2%
1983	32.1	Aug	46.6	Dec	47.8%
1984	29.7	June	43.9	Feb	52.3%
1985	30.1	July	42.2	Nov	53.9%
1986	30.0	Aug	36.0	Jan	57.4%
1987	28.9	Aug	37.4	Jan	54.4%
1988	32.8	July	42.5	Feb	51.3%
1989	32.9	Aug	41.2	Dec	56.4%
1990	32.9	July	44.6	Dec	50.1%
1991	34.3	Aug	39.0	Jan	58.9%
1992	32.3	Aug	41.7	Dec	55.5%
1993	33.3	July	41.5	Feb	57.9%
1994	36.3	Aug	40.3	Feb	62.7%
1995	38.5	Aug	45.4	Feb	56.3%
1996	38.5	July	45.7	Jan	59.4%
1997	39.5	July	43.6	Jan	60.9%
1998	41.2	July	45.5	Dec	58.9%
1999	43.3	July	42.0	Dec	62.0%
2000	45.2	July	46.5	Dec	61.1%
2001	48.0	Aug	43.1	Jan	60.0%
2002	51.2	July	44.7	Jan	57.0%
2003	52.3	Aug	47.3	Jan	57.1%
2004	49.9	July	47.2	Jan	57.8%
2005	54.9	July	48.6	Dec	54.4%
2006	56.4	July	49.4	Feb	54.9%
2007	60.6	July	52.5	Jan	52.8%
2008	54.3	July	59.3	Dec	55.3%
2009	54.3	July	57.2	Dec	56.9%
2010	56.3	July	55.5	Jan	57.6%
2011	59.3	July	51.9	Dec	55.9%
2012	61.5	July	53.2	Jan	54.0%
2013	60.1	Aug	59.3	Dec	56.4%
2014	58.3	July	54.3	Dec	57.3%
2015	59.2	Aug	50.0	Dec	55.7%
2016	61.2	July	57.7	Jan	54.6%
2017	60.3	Aug	54.6	Jan	55.5%
2018	63.7	July	57.7	Feb	52.6%
2019	57.1	July	53.6	Jan	59.5%
2020	64.1	July	59.0	Feb	53.0%
2021	69.4	August			

*/ January and February are of the following year.

Wyoming System Historical Energy Requirements

Year	Total Energy Requirements MWh	%Inc/Dec
1966	52,249	
1967	56,834	8.78%
1968	61,422	8.07%
1969	66,872	8.87%
1970	69,220	3.51%
1971	74,603	7.78%
1972	81,133	8.75%
1973	89,971	10.89%
1974	89,457	-0.57%
1975	94,233	5.34%
1976	101,069	7.25%
1977	115,112	13.89%
1978	139,187	20.91%
1979	159,091	14.30%
1980	166,330	4.55%
1981	168,407	1.25%
1982	190,015	12.83%
1983	195,138	2.70%
1984	201,292	3.15%
1985	199,320	-0.98%
1986	181,073	-9.15%
1987	178,195	-1.59%
1988	191,139	7.26%
1989	203,537	6.49%
1990	195,674	-3.86%
1991	201,162	2.80%
1992	202,644	0.74%
1993	210,314	3.78%
1994	221,212	5.18%
1995	224,009	1.26%
1996	237,681	6.10%
1997	232,495	-2.18%
1998	234,932	1.05%
1999	235,091	0.07%
2000	249,731	6.23%
2001	252,187	0.98%
2002	255,458	1.30%
2003	261,394	2.32%
2004	253,564	-3.00%
2005	261,463	3.12%
2006	271,201	3.72%
2007	280,370	3.38%
2008	287,946	2.70%
2009	285,294	-0.92%
2010	283,884	-0.49%
2011	290,557	2.35%
2012	291,603	0.36%
2013	297,102	1.89%
2014	292,411	-1.58%
2015	289,029	-1.16%
2016	293,378	1.50%
2017	293,191	-0.06%
2018	293,652	0.16%
2019	297,641	1.36%
2020	298,695	0.35%
2021	304,930	2.09%

Wyoming System
Billing-Cycle Allocation Factors

Sales (15-Year Avg 2006-2020)

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Residential	0.117514	0.097296	0.097531	0.079519	0.068156	0.066604	0.076007	0.087124	0.071739	0.066898	0.070904	0.100707
Small C&I	0.095066	0.082834	0.086956	0.074982	0.069402	0.077372	0.090728	0.105975	0.088276	0.076334	0.066795	0.085280
Large C&I	0.089501	0.079986	0.086132	0.077922	0.075203	0.080505	0.086339	0.092473	0.086283	0.085221	0.074456	0.085979
Street Lighting	0.089417	0.081224	0.084617	0.084374	0.083526	0.084627	0.084813	0.083462	0.080455	0.081884	0.077716	0.083886
Interdepartmental	0.084586	0.072341	0.077812	0.076084	0.079605	0.086501	0.095321	0.101187	0.089544	0.084729	0.073226	0.079064
Company Use	0.107411	0.105044	0.106083	0.090410	0.073200	0.066512	0.071558	0.083916	0.073821	0.070021	0.064955	0.087069

Customers (5-Year Avg 2016-2020)

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Residential	0.995142	0.995917	0.996394	0.997065	0.999032	1.000106	1.000419	1.001611	1.002058	1.002848	1.004235	1.005174
Small C&I	0.972634	0.972968	0.973387	0.981921	1.010535	1.029528	1.037225	1.038647	1.019990	0.991208	0.986188	0.985770
Large C&I	0.999153	0.996248	0.997701	0.999153	1.000605	1.002057	0.999153	1.002057	0.997701	0.999153	1.002057	1.004962
Street Lighting	1.027237	1.027237	1.027237	1.027237	1.027237	0.980545	0.980545	0.980545	0.980545	0.980545	0.980545	0.980545
Interdepartmental	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
Company Use	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000	1.000000
Peak Demand	0.912495	0.883695	0.766944	0.733325	0.633443	0.914368	1.000000	0.970957	0.782195	0.867998	0.805934	1.000000

Wyoming System
Billing-Month to Calendar Month Apportionment Factors

(5-Year Avg 2016-2020)

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Residential	60.3%	63.5%	61.1%	63.3%	64.6%	63.4%	57.7%	61.3%	62.4%	60.4%	63.8%	63.7%
Small C&I	61.2%	65.2%	61.2%	63.4%	64.8%	62.3%	57.5%	60.5%	61.3%	62.0%	65.1%	64.8%
Large C&I	64.9%	69.0%	64.7%	66.1%	68.2%	68.1%	63.2%	66.7%	64.7%	66.2%	68.9%	68.7%
Street Lighting	67.7%	73.2%	68.7%	73.5%	73.7%	71.6%	68.9%	68.9%	69.0%	69.1%	77.3%	72.0%
Interdepartmental	85.0%	87.8%	84.7%	85.6%	84.5%	83.1%	81.6%	82.8%	84.2%	77.5%	83.5%	86.1%
Company Use	93.7%	97.9%	94.5%	96.6%	97.9%	98.0%	94.7%	98.1%	95.6%	97.0%	96.4%	96.7%

APPENDIX I

Wyoming System
Historical and Forecasted Exogenous Variables

Wyoming System Electricity Prices
Historical Prices
cents/kWh

Year	Residential Price	Small C&I Price	Large C&I Price
1991	6.789	5.811	4.447
1992	6.698	5.662	4.252
1993	6.427	5.555	4.190
1994	6.396	5.576	4.166
1995	6.342	5.514	4.175
1996	6.351	5.569	4.288
1997	7.164	6.394	5.013
1998	7.287	6.345	4.982
1999	7.407	6.422	5.056
2000	7.487	6.451	5.075
2001	7.554	6.543	5.212
2002	7.624	6.624	5.235
2003	7.730	6.754	5.374
2004	7.897	6.932	5.505
2005	7.917	7.008	5.573
2006	8.014	7.028	5.689
2007	7.700	6.780	5.423
2008	7.487	6.620	5.280
2009	8.530	7.301	5.666
2010	8.904	7.476	5.574
2011	9.275	7.948	5.937
2012	9.878	8.500	6.605
2013	10.175	8.879	6.830
2014	10.218	8.932	6.848
2015	10.197	8.858	6.686
2016	10.247	8.904	6.811
2017	11.005	9.678	7.526
2018	11.260	9.798	7.672
2019	10.653	9.267	7.250
2020	10.392	9.074	7.148

SOURCE:
1991-2020: Historical prices calculated from Montana-Dakota Utilities Co., *Electric Operating Revenues Reports*

Wyoming System Natural Gas Prices
Historical Prices
$/Dk

Year	Residential Price	Firm General
1991	4.606	4.174
1992	4.864	4.469
1993	4.595	4.259
1994	5.075	4.532
1995	4.681	4.148
1996	3.989	3.509
1997	4.388	3.911
1998	4.970	4.414
1999	5.203	4.637
2000	5.987	5.474
2001	7.486	6.820
2002	4.661	4.084
2003	6.884	6.333
2004	8.775	8.202
2005	10.795	10.188
2006	10.192	9.438
2007	7.527	6.837
2008	9.149	8.675
2009	8.020	7.386
2010	7.195	6.530
2011	7.017	6.415
2012	6.428	5.624
2013	6.397	5.689
2014	7.424	6.743
2015	7.270	6.019
2016	6.032	4.396
2017	6.346	4.931
2018	6.013	4.693
2019	6.007	4.768
2020	6.246	4.684

SOURCE:
1991-2020: Historical prices calculated from Montana-Dakota Utilities Co., *Gas Operating Revenues Reports*

Sheridan, Wyoming
Heating Degree Days (HDD) and Cooling Degree Days (CDD)

	HDD	CDD
1969	8,002	394
1970	8,020	412
1971	8,044	491
1972	7,892	276
1973	7,625	376
1974	7,180	412
1975	8,193	269
1976	7,308	369
1977	7,611	300
1978	8,755	294
1979	8,301	305
1980	7,516	351
1981	6,577	453
1982	8,035	509
1983	7,209	768
1984	7,938	510
1985	8,835	373
1986	6,974	379
1987	6,593	330
1988	6,887	838
1989	7,865	486
1990	7,319	480
1991	7,271	542
1992	6,798	268
1993	8,070	121
1994	7,085	529
1995	7,511	415
1996	8,464	486
1997	7,913	244
1998	7,490	507
1999	6,858	392
2000	7,777	487
2001	7,499	668
2002	7,815	501
2003	7,408	627
2004	6,944	278
2005	7,138	474
2006	6,624	631
2007	7,223	669
2008	7,998	351
2009	7,642	282
2010	7,523	355
2011	7,679	511
2012	6,767	664
2013	7,816	592
2014	7,739	346
2015	6,755	479
2016	6,696	549
2017	7,359	481
2018	7,750	399
2019	8,222	403
2020	7,095	612
NORMAL	7,643	419

Personal Income
(in thousands of 2009 dollars)
Sheridan County

Year	Pers Inc per W&P	% Change
1991	762,582	
1992	779,626	2.24%
1993	799,761	2.58%
1994	835,424	4.46%
1995	878,237	5.12%
1996	914,436	4.12%
1997	977,553	6.90%
1998	1,042,621	6.66%
1999	1,080,016	3.59%
2000	1,151,229	6.59%
2001	1,214,340	5.48%
2002	1,225,296	0.90%
2003	1,286,036	4.96%
2004	1,371,957	6.68%
2005	1,500,717	9.39%
2006	1,783,985	18.88%
2007	1,881,769	5.48%
2008	1,880,297	-0.08%
2009	1,714,151	-8.84%
2010	1,536,015	-10.39%
2011	1,426,474	-7.13%
2012	1,617,014	13.36%
2013	1,425,505	-11.84%
2014	1,552,140	8.88%
2015	1,497,263	-3.54%
2016	1,514,051	1.12%
2017	1,551,266	2.46%
2018	1,636,662	5.50%
2019	1,655,798	1.17%
2020	1,783,559	7.72%

SOURCES:
1991-2019: U.S. Department of Commerce
2020: Woods & Poole Economics, Inc.

Wyoming System
Personal Consumption Expediture Deflator

Year	PCE Deflator (2012 = 100)	Inflation Rate
1991	65.47	
1992	67.22	2.7%
1993	68.89	2.5%
1994	70.33	2.1%
1995	71.81	2.1%
1996	73.35	2.1%
1997	74.62	1.7%
1998	75.22	0.8%
1999	76.34	1.5%
2000	78.24	2.5%
2001	79.74	1.9%
2002	80.79	1.3%
2003	82.36	1.9%
2004	84.41	2.5%
2005	86.81	2.8%
2006	89.17	2.7%
2007	91.44	2.5%
2008	94.18	3.0%
2009	94.09	-0.1%
2010	95.71	1.7%
2011	98.13	2.5%
2012	100.00	1.9%
2013	101.35	1.3%
2014	102.83	1.5%
2015	103.04	0.2%
2016	104.12	1.0%
2017	105.98	1.8%
2018	108.24	2.1%
2019	109.85	1.5%
2020	111.15	1.2%
2021	113.66	2.3%
2022	116.31	2.3%
2023	119.22	2.5%
2024	122.38	2.7%
2025	125.81	2.8%
2026	129.50	2.9%
2027	133.45	3.0%
2028	137.63	3.1%
2029	142.05	3.2%
2030	146.70	3.3%
2031	151.54	3.3%
2032	156.58	3.3%
2033	161.82	3.3%
2034	167.26	3.4%
2035	172.90	3.4%
2036	178.74	3.4%
2037	184.81	3.4%
2038	191.09	3.4%
2039	197.59	3.4%
2040	204.32	3.4%
2041	211.30	3.4%

SOURCES:
1991-2020: U.S. Department of Commerce
2021-2041: Woods & Poole Economics, Inc.

Wyoming System Residential Sector

Year	Households	Growth Rate	Average Customers	Growth Rate
1991	9,500		9,865	
1992	9,775	2.89%	9,987	1.24%
1993	10,021	2.52%	10,097	1.10%
1994	10,235	2.14%	10,254	1.55%
1995	10,478	2.37%	10,451	1.92%
1996	10,757	2.66%	10,556	1.00%
1997	10,872	1.07%	10,740	1.74%
1998	11,007	1.24%	10,866	1.17%
1999	11,071	0.58%	10,956 */	0.83%
2000	11,213	1.28%	11,041	0.78%
2001	11,466	2.26%	11,135	0.85%
2002	11,523	0.50%	11,280	1.30%
2003	11,647	1.08%	11,495	1.91%
2004	11,605	-0.36%	11,602	0.93%
2005	11,670	0.56%	11,715	0.97%
2006	11,792	1.05%	11,849	1.14%
2007	12,033	2.04%	12,073	1.89%
2008	12,258	1.87%	12,333	2.15%
2009	12,414	1.27%	12,446	0.92%
2010	12,374	-0.32%	12,521	0.60%
2011	12,567	1.56%	12,584	0.50%
2012	12,659	0.73%	12,732	1.18%
2013	12,776	0.92%	12,834	0.80%
2014	12,842	0.52%	12,938	0.81%
2015	12,973	1.02%	13,234	2.29%
2016	13,100	0.98%	13,149	-0.64%
2017	13,143	0.33%	13,277	0.97%
2018	13,284	1.07%	13,410	1.00%
2019	13,390	0.80%	13,543	0.99%
2020	13,539	1.11%	13,704	1.19%
2021	13,686	1.09%	13,873	1.23%
2022	13,818	0.96%	14,025	1.10%
2023	13,940	0.88%	14,166	1.00%
2024	14,054	0.82%	14,298	0.93%
2025	14,161	0.76%	14,421	0.87%
2026	14,262	0.71%	14,538	0.81%
2027	14,358	0.67%	14,650	0.76%
2028	14,450	0.64%	14,756	0.73%
2029	14,534	0.58%	14,854	0.66%
2030	14,613	0.54%	14,945	0.62%
2031	14,687	0.51%	15,031	0.58%
2032	14,757	0.48%	15,113	0.54%
2033	14,822	0.44%	15,188	0.50%
2034	14,883	0.41%	15,260	0.47%
2035	14,940	0.38%	15,326	0.44%
2036	14,995	0.37%	15,390	0.42%
2037	15,048	0.35%	15,452	0.40%
2038	15,097	0.33%	15,509	0.37%
2039	15,144	0.31%	15,564	0.35%
2040	15,190	0.30%	15,618	0.35%
2041	15,238	0.32%	15,674	0.36%

*/ Actual customer numbers for 1999 are unavailable due to the installation of a new CIS. This number is an estimate.

SOURCES:

Households

2000, 2019: U.S. Department of Commerce

All other years: Estimated and Projected by Woods & Poole Economics, Inc.

Customers

1991-2020: Actuals from Montana-Dakota Utilities Co. Customer Information System

2021-2041: Montana-Dakota forecast

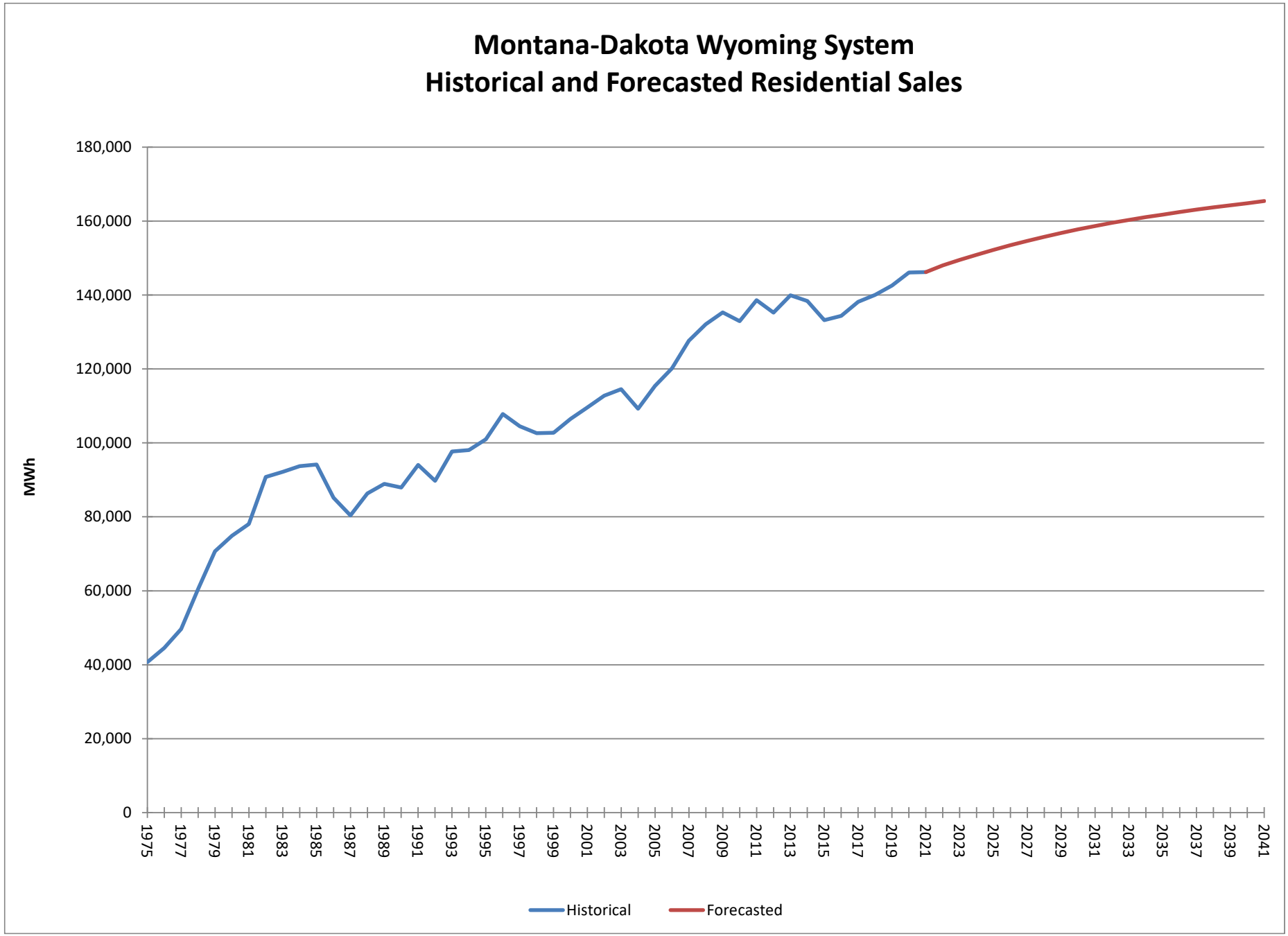
Wyoming System Employment
(Total Employment Less Farming and Mining)

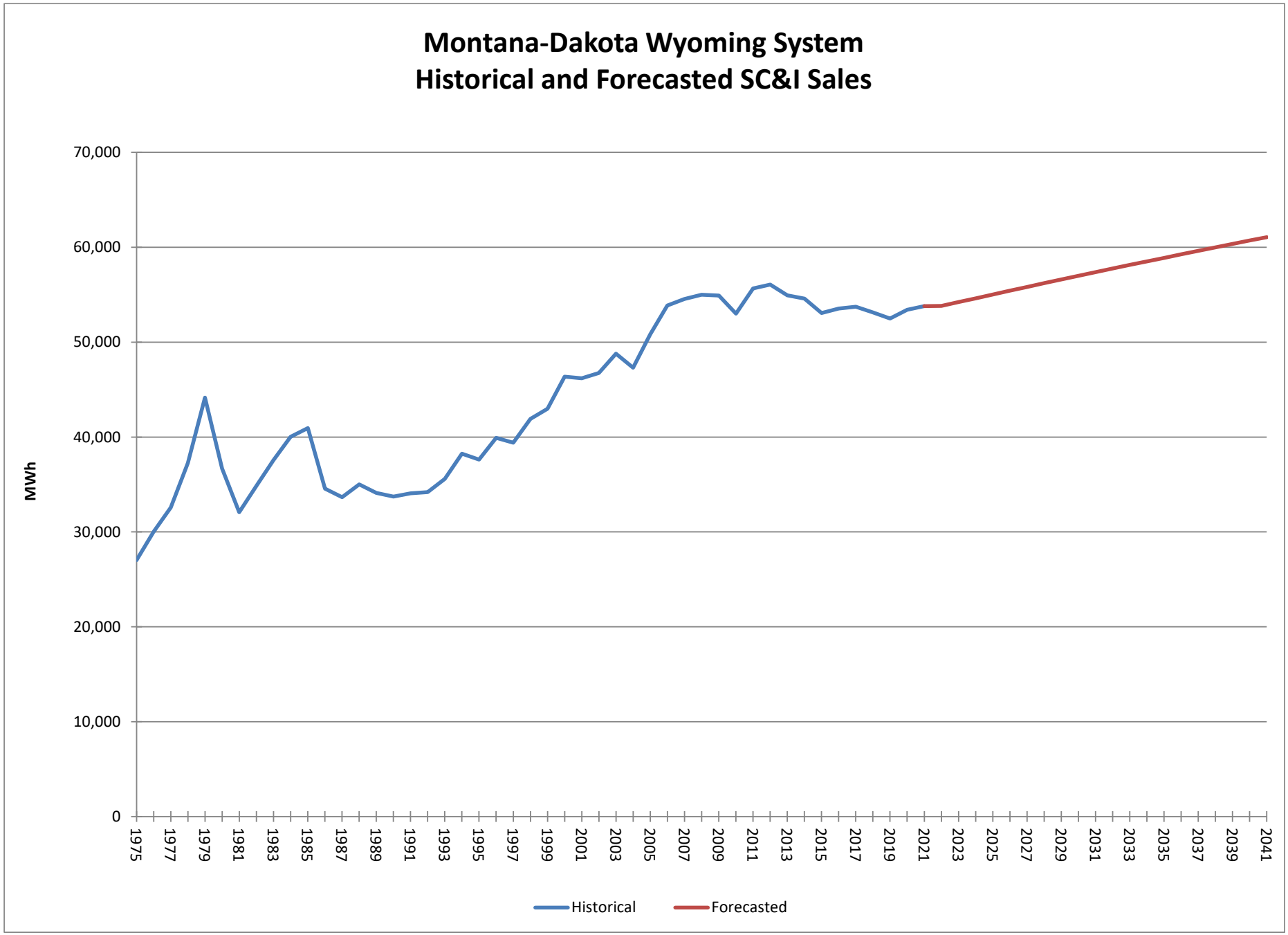
Year	Number of Employees	Growth Rate
1991	12,430	
1992	12,964	4.30%
1993	13,557	4.57%
1994	13,852	2.18%
1995	14,158	2.21%
1996	14,402	1.72%
1997	14,465	0.44%
1998	14,622	1.09%
1999	14,776	1.05%
2000	15,335	3.78%
2001	15,768	2.82%
2002	16,286	3.29%
2003	16,353	0.41%
2004	16,606	1.55%
2005	16,962	2.14%
2006	17,656	4.09%
2007	18,490	4.72%
2008	18,835	1.87%
2009	18,417	-2.22%
2010	18,156	-1.42%
2011	18,124	-0.18%
2012	18,156	0.18%
2013	18,479	1.78%
2014	18,896	2.26%
2015	19,158	1.39%
2016	19,353	1.02%
2017	19,709	1.84%
2018	20,876	5.92%
2019	21,227	1.68%
2020	21,751	2.47%
2021	21,792	0.19%
2022	22,092	1.38%
2023	22,373	1.27%
2024	22,657	1.27%
2025	22,943	1.26%
2026	23,230	1.25%
2027	23,517	1.24%
2028	23,801	1.21%
2029	24,086	1.20%
2030	24,367	1.17%
2031	24,651	1.17%
2032	24,932	1.14%
2033	25,214	1.13%
2034	25,490	1.09%
2035	25,771	1.10%
2036	26,052	1.09%
2037	26,328	1.06%
2038	26,605	1.05%
2039	26,879	1.03%
2040	27,156	1.03%
2041	27,429	1.01%

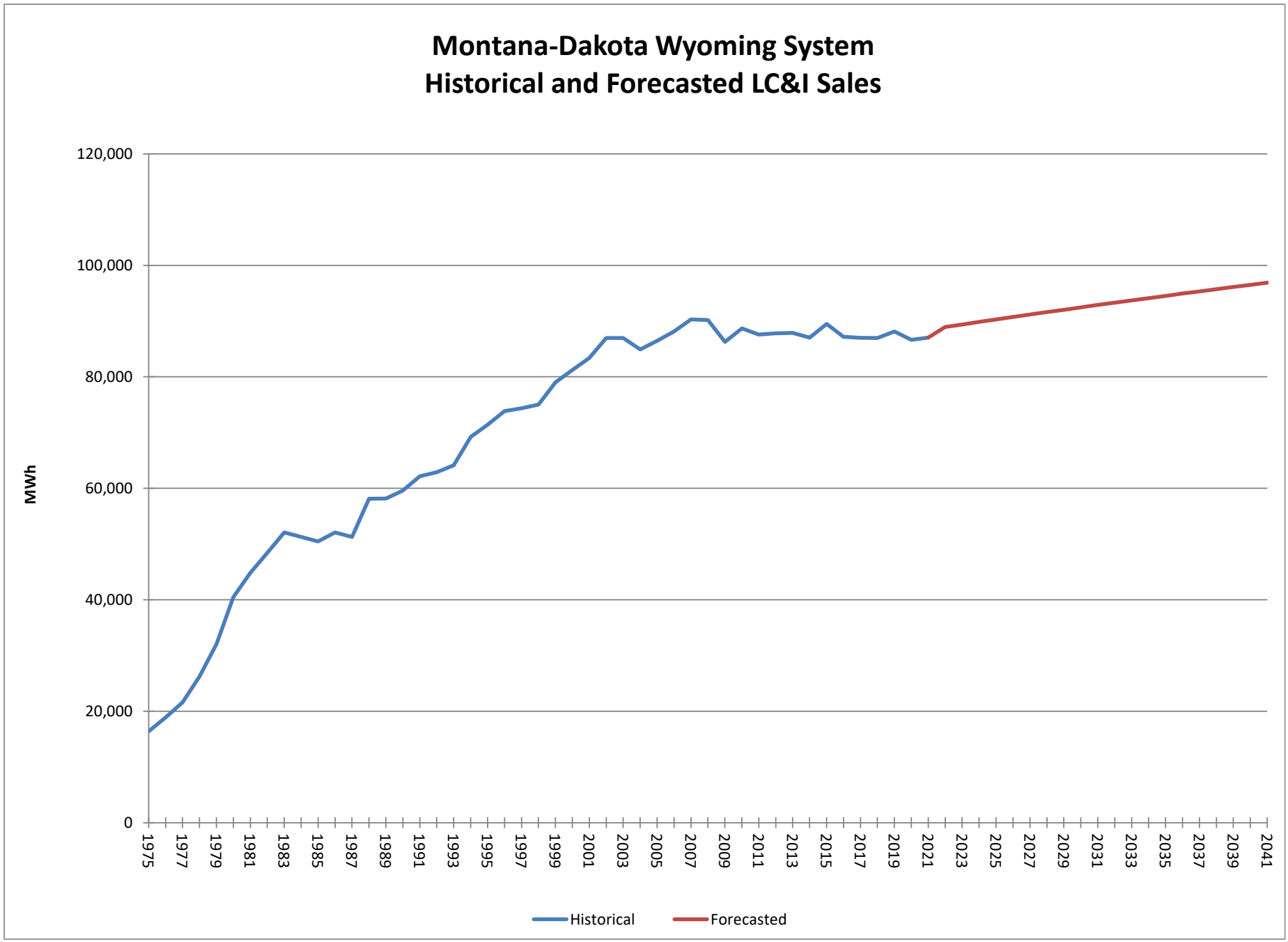
SOURCES:
1991-2019: U.S. Department of Commerce
2020-2041: Woods & Poole Economics, Inc.

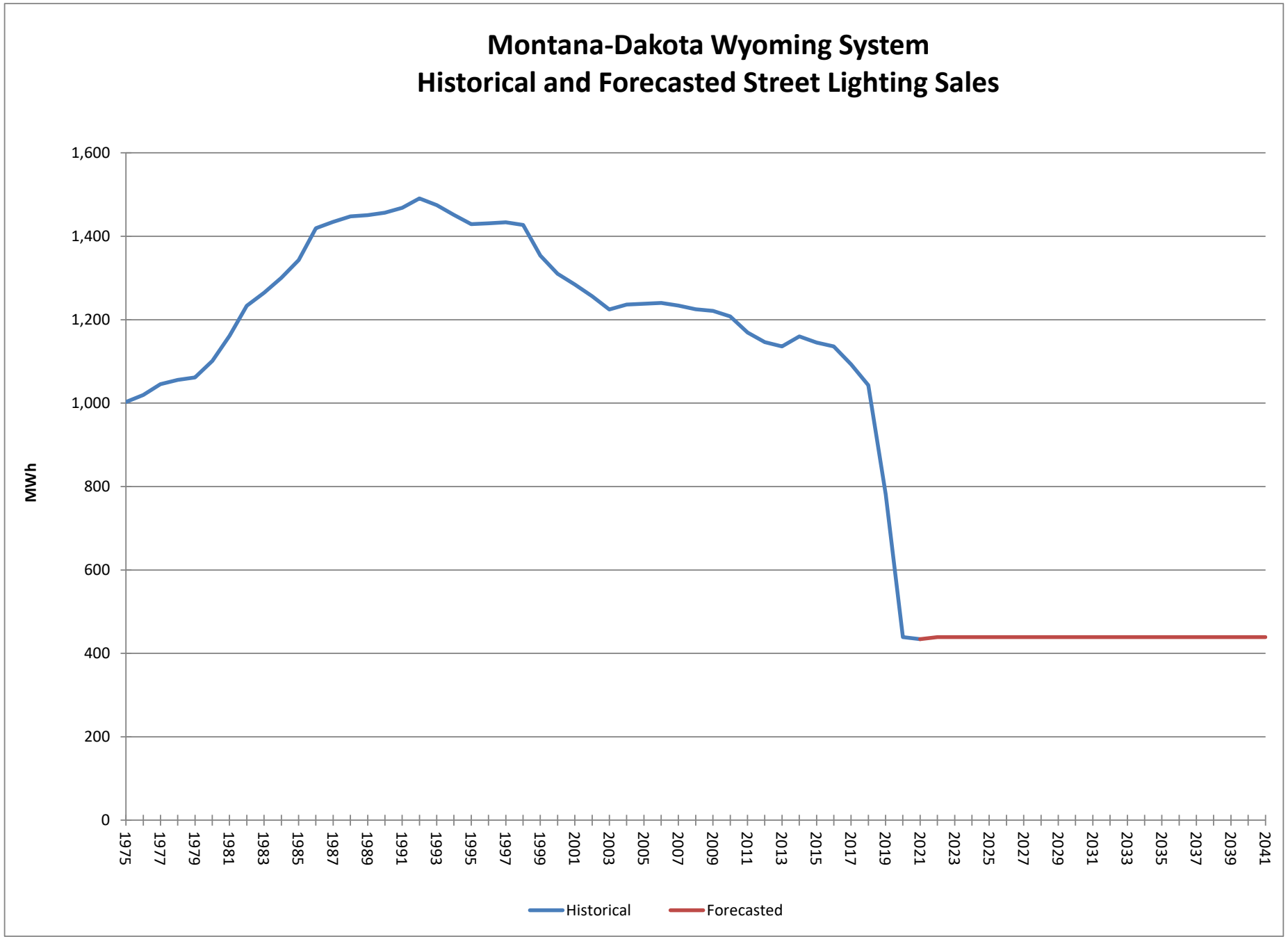
APPENDIX J

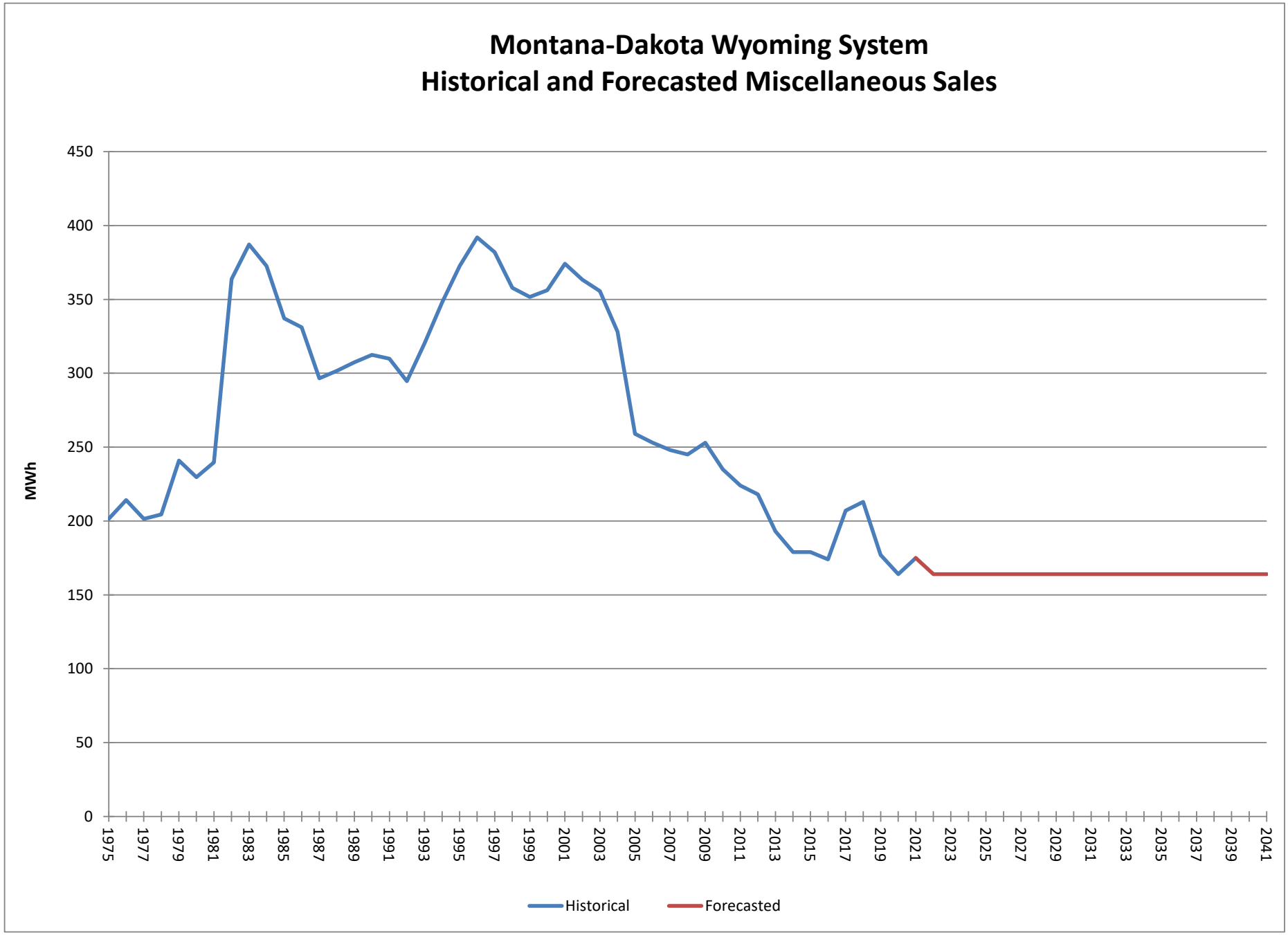
Wyoming System
Forecast Results

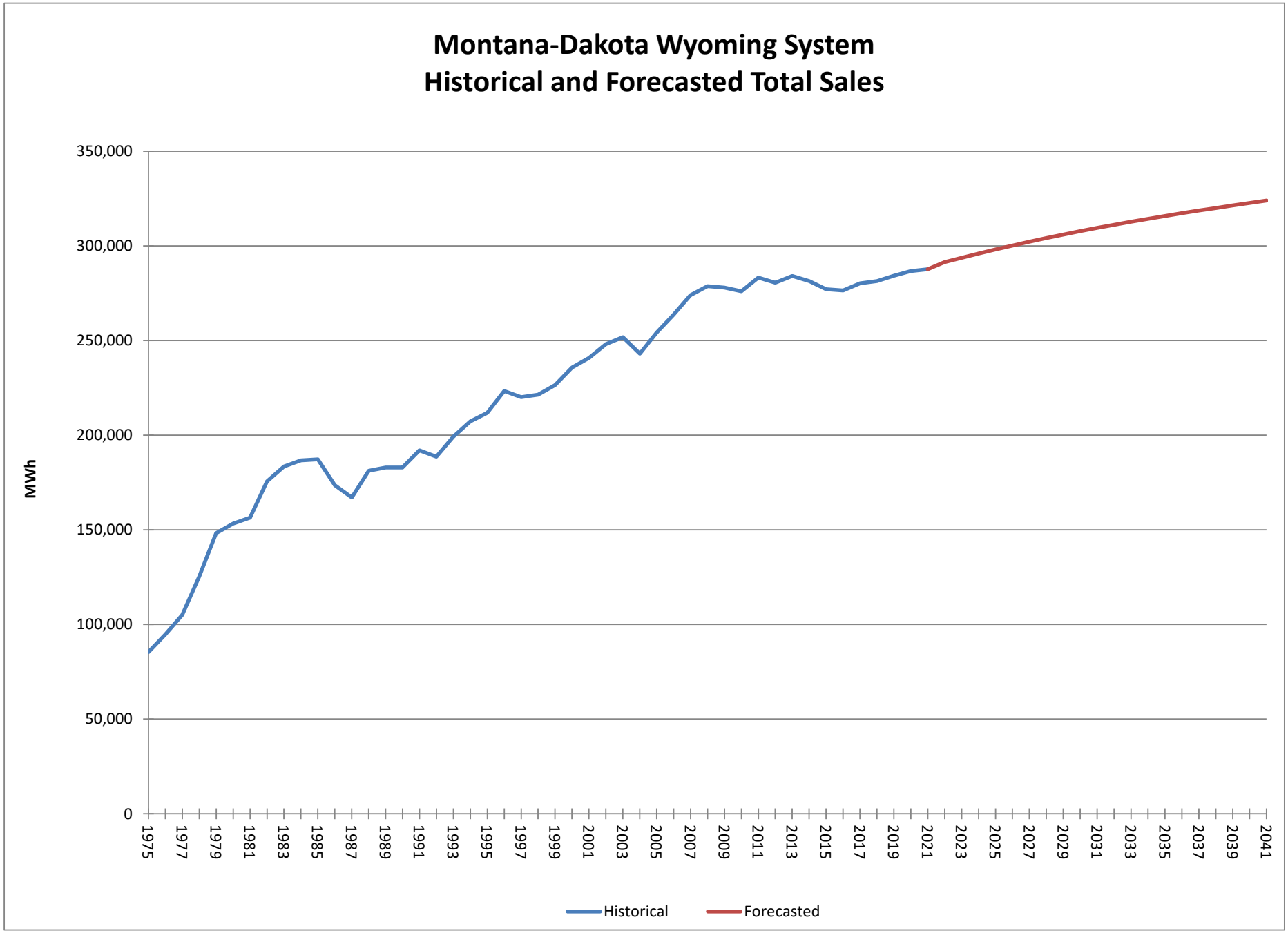

Montana-Dakota Wyoming System
Historical and Forecasted Residential Sales
MWh
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Historical
Forecasted


Montana-Dakota Wyoming System
Historical and Forecasted SC&I Sales
MWh
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Historical
Forecasted


Montana-Dakota Wyoming System
Historical and Forecasted LC&I Sales
MWh
120,000
100,000
80,000
60,000
40,000
20,000
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Historical
Forecasted


Montana-Dakota Wyoming System
Historical and Forecasted Street Lighting Sales
MWh
1,600
1,400
1,200
1,000
800
600
400
200
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Historical
Forecasted


Montana-Dakota Wyoming System
Historical and Forecasted Miscellaneous Sales
MWh
450
400
350
300
250
200
150
100
50
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Historical
Forecasted


Montana-Dakota Wyoming System
Historical and Forecasted Total Sales
MWh
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
2027
2029
2031
2033
2035
2037
2039
2041
Historical
Forecasted

APPENDIX K

Monthly Forecasts - Wyoming
(2022-2031)

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.2	691.2	710.0	890.0	815.4	699.8	744.3	930.8	1,119.5	10,414.3
# of Residential Customers	13,957	13,968	13,975	13,984	14,012	14,027	14,031	14,048	14,054	14,065	14,085	14,098	14,025
Total Residential Sales - MWh	15,827	13,882	12,885	10,686	9,685	9,959	12,488	11,455	9,835	10,469	13,110	15,783	146,064
Use per Small Comm & Ind Customer - kWh	2,012.3	1,816.5	1,798.9	1,588.0	1,548.1	1,701.5	2,131.9	1,989.6	1,720.7	1,574.9	1,716.3	1,936.7	21,546.9
# of Small Comm & Ind Customers	2,431	2,431	2,432	2,454	2,525	2,573	2,592	2,596	2,549	2,477	2,464	2,463	2,499
Total Small Comm & Ind Sales - MWh	4,892	4,416	4,375	3,897	3,909	4,378	5,526	5,165	4,386	3,901	4,229	4,770	53,844
Large Comm & Ind Sales	7,703	7,162	7,286	6,912	7,003	7,137	8,312	7,704	7,727	7,125	7,313	7,586	88,970
Total Sales (Residential, SC&I and LC&I)	28,422	25,460	24,546	21,495	20,597	21,474	26,326	24,324	21,948	21,495	24,652	28,139	288,878
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	28,463	25,497	24,587	21,534	20,635	21,513	26,366	24,362	21,986	21,534	24,688	28,178	289,343
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	28,478	25,511	24,599	21,544	20,644	21,523	26,377	24,372	21,996	21,543	24,700	28,192	289,479
Total Requirements (Energy + Losses)	29,674	26,582	25,632	22,449	21,511	22,427	27,485	25,396	22,920	22,448	25,737	29,376	301,637
# of Large Comm & Ind Customers	145	144	145	145	145	145	145	145	145	145	145	146	145
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	53.5	51.8	44.9	43.0	41.4	59.7	65.3	63.4	51.1	51.3	47.6	59.1	65.3

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.2	691.2	710.0	890.0	815.4	699.8	744.3	930.8	1,119.0	10,413.8
# of Residential Customers	14,097	14,108	14,115	14,124	14,152	14,168	14,172	14,189	14,195	14,206	14,226	14,239	14,166
Total Residential Sales - MWh	15,986	14,021	13,014	10,793	9,782	10,059	12,613	11,570	9,933	10,574	13,242	15,934	147,521
Use per Small Comm & Ind Customer - kWh	2,001.6	1,805.9	1,788.6	1,579.9	1,539.5	1,692.2	2,120.8	1,979.1	1,711.1	1,566.4	1,706.7	1,925.9	21,428.9
# of Small Comm & Ind Customers	2,462	2,463	2,464	2,485	2,558	2,606	2,625	2,629	2,582	2,509	2,496	2,495	2,531
Total Small Comm & Ind Sales - MWh	4,928	4,448	4,407	3,926	3,938	4,410	5,567	5,203	4,418	3,930	4,260	4,805	54,240
Large Comm & Ind Sales	7,742	7,198	7,322	6,946	7,038	7,173	8,354	7,743	7,766	7,160	7,349	7,623	89,414
Total Sales (Residential, SC&I and LC&I)	28,656	25,667	24,743	21,665	20,758	21,642	26,534	24,516	22,117	21,664	24,851	28,362	291,175
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	28,697	25,704	24,784	21,704	20,796	21,681	26,574	24,554	22,155	21,703	24,887	28,401	291,640
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	28,712	25,718	24,796	21,714	20,805	21,691	26,585	24,564	22,165	21,712	24,899	28,415	291,776
Total Requirements (Energy + Losses)	29,918	26,798	25,837	22,626	21,679	22,602	27,702	25,596	23,096	22,624	25,945	29,608	304,031
# of Large Comm & Ind Customers	147	146	147	147	147	147	147	147	147	147	147	148	147
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	53.9	52.2	45.3	43.3	41.9	60.5	66.2	64.3	51.8	51.7	48.0	59.6	66.2

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.1	691.2	710.0	890.0	815.4	699.8	744.4	930.8	1,118.5	10,413.4
# of Residential Customers	14,228	14,239	14,246	14,256	14,284	14,299	14,304	14,321	14,327	14,338	14,358	14,372	14,298
Total Residential Sales - MWh	16,135	14,151	13,135	10,893	9,873	10,153	12,731	11,678	10,026	10,673	13,365	16,075	148,888
Use per Small Comm & Ind Customer - kWh	1,991.2	1,796.7	1,779.2	1,571.3	1,531.7	1,683.2	2,109.9	1,969.2	1,702.8	1,558.7	1,697.8	1,915.7	21,318.5
# of Small Comm & Ind Customers	2,493	2,494	2,495	2,517	2,590	2,639	2,658	2,662	2,614	2,540	2,528	2,527	2,563
Total Small Comm & Ind Sales - MWh	4,964	4,481	4,439	3,955	3,967	4,442	5,608	5,242	4,451	3,959	4,292	4,841	54,641
Large Comm & Ind Sales	7,780	7,234	7,359	6,981	7,073	7,209	8,395	7,781	7,804	7,196	7,387	7,662	89,861
Total Sales (Residential, SC&I and LC&I)	28,879	25,866	24,933	21,829	20,913	21,804	26,734	24,701	22,281	21,828	25,044	28,578	293,390
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	28,920	25,903	24,974	21,868	20,951	21,843	26,774	24,739	22,319	21,867	25,080	28,617	293,855
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	28,935	25,917	24,986	21,878	20,960	21,853	26,785	24,749	22,329	21,876	25,092	28,631	293,991
Total Requirements (Energy + Losses)	30,150	27,006	26,035	22,797	21,840	22,771	27,910	25,788	23,267	22,795	26,146	29,834	306,339
# of Large Comm & Ind Customers	149	148	149	149	149	149	149	149	149	149	149	150	149
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	54.4	52.7	45.7	43.7	42.5	61.4	67.1	65.2	52.5	52.1	48.4	60.0	67.1

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.1	993.8	922.1	764.2	691.3	710.0	890.1	815.4	699.8	744.4	930.8	1,118.1	10,413.2
# of Residential Customers	14,351	14,363	14,369	14,379	14,407	14,423	14,427	14,445	14,451	14,462	14,482	14,496	14,421
Total Residential Sales - MWh	16,275	14,274	13,249	10,988	9,959	10,240	12,841	11,779	10,113	10,765	13,480	16,208	150,171
Use per Small Comm & Ind Customer - kWh	1,981.4	1,787.7	1,770.4	1,564.0	1,524.0	1,674.8	2,098.4	1,959.6	1,694.0	1,550.5	1,689.3	1,906.2	21,211.6
# of Small Comm & Ind Customers	2,524	2,525	2,526	2,548	2,622	2,672	2,692	2,695	2,647	2,572	2,559	2,558	2,595
Total Small Comm & Ind Sales - MWh	5,001	4,514	4,472	3,985	3,996	4,475	5,649	5,281	4,484	3,988	4,323	4,876	55,044
Large Comm & Ind Sales	7,819	7,270	7,395	7,015	7,108	7,245	8,437	7,820	7,843	7,232	7,423	7,699	90,306
Total Sales (Residential, SC&I and LC&I)	29,095	26,058	25,116	21,988	21,063	21,960	26,927	24,880	22,440	21,985	25,226	28,783	295,521
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	29,136	26,095	25,157	22,027	21,101	21,999	26,967	24,918	22,478	22,024	25,262	28,822	295,986
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	29,151	26,109	25,169	22,037	21,110	22,009	26,978	24,928	22,488	22,033	25,274	28,836	296,122
Total Requirements (Energy + Losses)	30,375	27,206	26,226	22,963	21,997	22,933	28,111	25,975	23,432	22,958	26,336	30,047	308,559
# of Large Comm & Ind Customers	151	150	151	151	151	151	151	151	151	151	151	152	151
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	54.7	53.0	46.0	44.0	43.0	62.1	67.9	65.9	53.1	52.4	48.7	60.4	67.9

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.1	691.2	710.0	890.1	815.4	699.8	744.4	930.8	1,117.7	10,412.6
# of Residential Customers	14,468	14,479	14,486	14,496	14,524	14,540	14,544	14,562	14,568	14,580	14,600	14,614	14,538
Total Residential Sales - MWh	16,406	14,389	13,356	11,077	10,039	10,324	12,945	11,874	10,195	10,853	13,590	16,334	151,382
Use per Small Comm & Ind Customer - kWh	1,971.0	1,778.3	1,761.1	1,555.4	1,515.4	1,665.9	2,087.3	1,948.4	1,684.4	1,542.4	1,679.8	1,895.4	21,096.1
# of Small Comm & Ind Customers	2,556	2,557	2,558	2,580	2,656	2,706	2,726	2,730	2,681	2,605	2,592	2,591	2,628
Total Small Comm & Ind Sales - MWh	5,038	4,547	4,505	4,013	4,025	4,508	5,690	5,319	4,516	4,018	4,354	4,911	55,444
Large Comm & Ind Sales	7,857	7,305	7,432	7,050	7,144	7,280	8,479	7,859	7,882	7,268	7,460	7,738	90,754
Total Sales (Residential, SC&I and LC&I)	29,301	26,241	25,293	22,140	21,208	22,112	27,114	25,052	22,593	22,139	25,404	28,983	297,580
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	29,342	26,278	25,334	22,179	21,246	22,151	27,154	25,090	22,631	22,178	25,440	29,022	298,045
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	29,357	26,292	25,346	22,189	21,255	22,161	27,165	25,100	22,641	22,187	25,452	29,036	298,181
Total Requirements (Energy + Losses)	30,590	27,396	26,411	23,121	22,148	23,092	28,306	26,154	23,592	23,119	26,521	30,256	310,706
# of Large Comm & Ind Customers	153	152	153	153	153	153	153	153	153	153	153	154	153
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	55.1	53.4	46.3	44.3	43.6	62.9	68.8	66.8	53.8	52.8	49.0	60.8	68.8

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.2	691.2	710.1	890.0	815.4	699.8	744.4	930.8	1,117.5	10,412.4
# of Residential Customers	14,578	14,590	14,597	14,607	14,635	14,651	14,656	14,673	14,680	14,691	14,712	14,725	14,650
Total Residential Sales - MWh	16,532	14,499	13,458	11,162	10,116	10,403	13,044	11,965	10,273	10,936	13,694	16,455	152,537
Use per Small Comm & Ind Customer - kWh	1,961.3	1,769.7	1,752.4	1,547.5	1,508.2	1,657.9	2,077.6	1,939.2	1,676.7	1,534.7	1,672.1	1,886.3	20,994.7
# of Small Comm & Ind Customers	2,587	2,588	2,589	2,612	2,688	2,739	2,759	2,763	2,713	2,637	2,623	2,622	2,660
Total Small Comm & Ind Sales - MWh	5,074	4,580	4,537	4,042	4,054	4,541	5,732	5,358	4,549	4,047	4,386	4,946	55,846
Large Comm & Ind Sales	7,896	7,341	7,468	7,084	7,178	7,316	8,519	7,896	7,920	7,303	7,496	7,774	91,191
Total Sales (Residential, SC&I and LC&I)	29,502	26,420	25,463	22,288	21,348	22,260	27,295	25,219	22,742	22,286	25,576	29,175	299,574
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	29,543	26,457	25,504	22,327	21,386	22,299	27,335	25,257	22,780	22,325	25,612	29,214	300,039
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	29,558	26,471	25,516	22,337	21,395	22,309	27,346	25,267	22,790	22,334	25,624	29,228	300,175
Total Requirements (Energy + Losses)	30,799	27,583	26,588	23,275	22,294	23,246	28,495	26,328	23,747	23,272	26,700	30,456	312,783
# of Large Comm & Ind Customers	155	154	155	155	155	155	155	155	155	155	155	156	155
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	55.5	53.7	46.6	44.6	44.1	63.6	69.6	67.6	54.4	53.1	49.3	61.2	69.6

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,133.9	993.8	922.1	764.2	691.2	710.0	890.1	815.4	699.7	744.4	930.8	1,117.0	10,411.7
# of Residential Customers	14,685	14,696	14,703	14,713	14,742	14,758	14,762	14,780	14,787	14,798	14,819	14,833	14,756
Total Residential Sales - MWh	16,652	14,605	13,557	11,243	10,190	10,478	13,139	12,052	10,347	11,015	13,793	16,568	153,639
Use per Small Comm & Ind Customer - kWh	1,951.5	1,761.0	1,743.9	1,540.3	1,501.1	1,649.9	2,067.0	1,929.5	1,668.2	1,527.4	1,663.7	1,876.8	20,891.3
# of Small Comm & Ind Customers	2,618	2,619	2,620	2,643	2,720	2,771	2,792	2,796	2,746	2,668	2,655	2,654	2,692
Total Small Comm & Ind Sales - MWh	5,109	4,612	4,569	4,071	4,083	4,572	5,771	5,395	4,581	4,075	4,417	4,981	56,236
Large Comm & Ind Sales	7,933	7,376	7,503	7,118	7,212	7,351	8,561	7,935	7,958	7,337	7,532	7,811	91,627
Total Sales (Residential, SC&I and LC&I)	29,694	26,593	25,629	22,432	21,485	22,401	27,471	25,382	22,886	22,427	25,742	29,360	301,502
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	29,735	26,630	25,670	22,471	21,523	22,440	27,511	25,420	22,924	22,466	25,778	29,399	301,967
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	29,750	26,644	25,682	22,481	21,532	22,450	27,522	25,430	22,934	22,475	25,790	29,413	302,103
Total Requirements (Energy + Losses)	31,000	27,763	26,761	23,425	22,436	23,393	28,678	26,498	23,897	23,419	26,873	30,648	314,791
# of Large Comm & Ind Customers	156	155	156	156	156	156	156	156	156	156	156	157	156
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	55.8	54.1	46.9	44.9	44.6	64.4	70.4	68.4	55.1	53.4	49.6	61.5	70.4

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2029

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,133.9	993.8	922.0	764.1	691.2	710.1	890.0	815.4	699.8	744.4	930.8	1,116.7	10,411.6
# of Residential Customers	14,782	14,793	14,800	14,810	14,839	14,855	14,860	14,878	14,884	14,896	14,917	14,931	14,854
Total Residential Sales - MWh	16,762	14,702	13,646	11,317	10,257	10,548	13,226	12,132	10,416	11,088	13,885	16,673	154,652
Use per Small Comm & Ind Customer - kWh	1,941.5	1,751.8	1,734.5	1,531.8	1,493.1	1,641.4	2,056.6	1,919.8	1,659.9	1,519.1	1,655.0	1,867.1	20,782.5
# of Small Comm & Ind Customers	2,650	2,651	2,652	2,676	2,754	2,805	2,826	2,830	2,779	2,701	2,687	2,686	2,725
Total Small Comm & Ind Sales - MWh	5,145	4,644	4,600	4,099	4,112	4,604	5,812	5,433	4,613	4,103	4,447	5,015	56,627
Large Comm & Ind Sales	7,970	7,411	7,538	7,151	7,246	7,385	8,600	7,972	7,995	7,372	7,567	7,847	92,054
Total Sales (Residential, SC&I and LC&I)	29,877	26,757	25,784	22,567	21,615	22,537	27,638	25,537	23,024	22,563	25,899	29,535	303,333
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	29,918	26,794	25,825	22,606	21,653	22,576	27,678	25,575	23,062	22,602	25,935	29,574	303,798
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	29,933	26,808	25,837	22,616	21,662	22,586	27,689	25,585	23,072	22,611	25,947	29,588	303,934
Total Requirements (Energy + Losses)	31,190	27,934	26,922	23,566	22,572	23,535	28,852	26,660	24,041	23,561	27,037	30,831	316,701
# of Large Comm & Ind Customers	158	157	158	158	158	158	158	158	158	158	158	159	158
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	56.1	54.3	47.2	45.1	45.1	65.1	71.2	69.1	55.7	53.7	49.9	61.9	71.2

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2030

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.1	691.2	710.0	890.0	815.4	699.8	744.3	930.8	1,116.4	10,411.0
# of Residential Customers	14,873	14,884	14,892	14,902	14,931	14,947	14,952	14,970	14,976	14,988	15,009	15,023	14,946
Total Residential Sales - MWh	16,866	14,792	13,730	11,387	10,320	10,613	13,307	12,207	10,480	11,156	13,970	16,771	155,599
Use per Small Comm & Ind Customer - kWh	1,931.4	1,743.5	1,725.8	1,524.6	1,485.6	1,633.5	2,046.2	1,909.9	1,651.5	1,511.5	1,646.9	1,857.6	20,679.1
# of Small Comm & Ind Customers	2,682	2,682	2,684	2,707	2,786	2,838	2,860	2,864	2,812	2,733	2,719	2,718	2,757
Total Small Comm & Ind Sales - MWh	5,180	4,676	4,632	4,127	4,139	4,636	5,852	5,470	4,644	4,131	4,478	5,049	57,014
Large Comm & Ind Sales	8,007	7,445	7,573	7,184	7,280	7,419	8,640	8,008	8,032	7,406	7,602	7,883	92,479
Total Sales (Residential, SC&I and LC&I)	30,053	26,913	25,935	22,698	21,739	22,668	27,799	25,685	23,156	22,693	26,050	29,703	305,092
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	30,094	26,950	25,976	22,737	21,777	22,707	27,839	25,723	23,194	22,732	26,086	29,742	305,557
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	30,109	26,964	25,988	22,747	21,786	22,717	27,850	25,733	23,204	22,741	26,098	29,756	305,693
Total Requirements (Energy + Losses)	31,374	28,096	27,079	23,702	22,701	23,671	29,020	26,814	24,179	23,696	27,194	31,006	318,532
# of Large Comm & Ind Customers	160	159	160	160	160	160	160	160	160	160	160	161	160
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	56.5	54.7	47.5	45.4	45.6	65.8	72.0	69.9	56.3	54.0	50.1	62.2	72.0

MONTHLY FORECASTS
SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

WYOMING YEAR 2031

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,134.0	993.8	922.0	764.2	691.2	710.0	890.0	815.4	699.8	744.4	930.8	1,116.2	10,411.1
# of Residential Customers	14,958	14,970	14,977	14,987	15,017	15,033	15,038	15,056	15,062	15,074	15,095	15,109	15,031
Total Residential Sales - MWh	16,963	14,877	13,809	11,453	10,380	10,674	13,384	12,277	10,540	11,221	14,051	16,864	156,493
Use per Small Comm & Ind Customer - kWh	1,922.2	1,734.3	1,717.5	1,517.0	1,478.7	1,625.6	2,036.6	1,900.9	1,643.6	1,504.7	1,639.3	1,849.0	20,580.5
# of Small Comm & Ind Customers	2,713	2,714	2,715	2,739	2,818	2,871	2,893	2,897	2,845	2,764	2,750	2,749	2,789
Total Small Comm & Ind Sales - MWh	5,215	4,707	4,663	4,155	4,167	4,667	5,892	5,507	4,676	4,159	4,508	5,083	57,399
Large Comm & Ind Sales	8,044	7,479	7,608	7,217	7,313	7,453	8,680	8,045	8,069	7,440	7,637	7,919	92,904
Total Sales (Residential, SC&I and LC&I)	30,222	27,063	26,080	22,825	21,860	22,794	27,956	25,829	23,285	22,820	26,196	29,866	306,796
Street & Highway Lighting Sales	39	35	39	37	36	36	37	36	36	37	34	37	439
Interdepartmental Sales	2	2	2	2	2	3	3	2	2	2	2	2	26
Total Billed Sales - MWh	30,263	27,100	26,121	22,864	21,898	22,833	27,996	25,867	23,323	22,859	26,232	29,905	307,261
Company Use	15	14	12	10	9	10	11	10	10	9	12	14	136
Total Energy	30,278	27,114	26,133	22,874	21,907	22,843	28,007	25,877	23,333	22,868	26,244	29,919	307,397
Total Requirements (Energy + Losses)	31,550	28,253	27,231	23,835	22,827	23,802	29,183	26,964	24,313	23,828	27,346	31,176	320,308
# of Large Comm & Ind Customers	162	161	162	162	162	162	162	162	162	162	162	163	162
# of Street & Highway Lighting Customers	5	5	5	5	5	5	5	5	5	5	5	5	5
Peak Demand Net of Load Management	56.8	55.0	47.7	45.6	46.1	66.6	72.8	70.7	56.9	54.3	50.5	62.6	72.8

North Dakota

	Res Cust # Growth	Average Residential Custs
2020	245	78,812
	res Cust Growth fcst	**avg Res Cust fcst**
2021	150	78,962
2022	275	79,237
2023	305	79,542
2024	305	79,847
2025	310	80,157
2026	250	80,407
2027	250	80,657
2028	250	80,907
2029	250	81,157
2030	250	81,407
2031	250	81,657
2032	250	81,907
2033	250	82,157
2034	250	82,407
2035	250	82,657
2036	250	82,907
2037	250	83,157
2038	250	83,407
2039	250	83,657
2040	250	83,907
2041	250	84,157

North Dakota

Year	Sales (MWh) /*	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2011	687,465		65,196		10,545	
2012	700,451	1.89%	67,888	2,692	10,318	-2.15%
2013	774,916	10.63%	70,949	3,061	10,922	5.86%
2014	812,654	4.87%	73,909	2,960	10,995	0.67%
2015	784,977	-3.41%	76,894	2,985	10,209	-7.16%
2016	746,374	-4.92%	78,553	1,659	9,502	-6.93%
2017	754,400	1.08%	78,564	11	9,602	1.06%
2018	799,661	6.00%	78,510	(54)	10,185	6.07%
2019	784,808	-1.86%	78,567	57	9,989	-1.93%
2020	779,619	-0.66%	78,812	245	9,892	-0.97%
2021	759,330	-2.60%	78,896	84	9,624	-2.71%
2022	776,520	2.26%	79,237	341	9,800	1.82%
2023	779,509	0.38%	79,542	305	9,800	0.00%
2024	782,498	0.38%	79,847	305	9,800	0.00%
2025	785,536	0.39%	80,157	310	9,800	0.00%
2026	787,986	0.31%	80,407	250	9,800	0.00%
2027	790,436	0.31%	80,657	250	9,800	0.00%
2028	792,886	0.31%	80,907	250	9,800	0.00%
2029	795,336	0.31%	81,157	250	9,800	0.00%
2030	797,786	0.31%	81,407	250	9,800	0.00%
2031	800,236	0.31%	81,657	250	9,800	0.00%
2032	802,686	0.31%	81,907	250	9,800	0.00%
2033	805,136	0.31%	82,157	250	9,800	0.00%
2034	807,586	0.30%	82,407	250	9,800	0.00%
2035	810,036	0.30%	82,657	250	9,800	0.00%
2036	812,486	0.30%	82,907	250	9,800	0.00%
2037	814,936	0.30%	83,157	250	9,800	0.00%
2038	817,386	0.30%	83,407	250	9,800	0.00%
2039	819,836	0.30%	83,657	250	9,800	0.00%
2040	822,286	0.30%	83,907	250	9,800	0.00%
2041	824,736	0.30%	84,157	250	9,800	0.00%

	Sales	**Custs**	**Use/Cust**
2011-2021 Average Yearly Growth (10 Years History)	0.81%	1.83%	-1.00%
2016-2021 Average Yearly Growth (5 Years History)	0.48%	0.09%	0.38%
2022-2027 Average Yearly Growth (5 Years)	0.36%	0.36%	0.00%
2022-2032 Average Yearly Growth (10 Years)	0.33%	0.33%	0.00%
2022-2041 Average Yearly Growth (19 Years)	0.31%	0.31%	0.00%

/* **Forecasted Sales** = (Ave Custs x Avg Use Per Cust)

Case No. PU-22-194
Exhibit No. ____(DJN-3)
Page 1 of 1

Means on small commercial estimation sample

The MEANS Procedure

Variable	N	N Miss	Mean	Std Dev	Minimum	Maximum
year	25	0	2008.00	7.3598007	1996.00	2020.00
lsci_kwh	25	0	19.6659017	0.4325612	19.1739571	20.2393833
cdd	25	0	579.1200000	122.5184748	331.0000000	793.0000000
hdd	25	0	8362.48	671.1975690	7235.00	10027.00
lemp_no_farm_mining	25	0	11.8774294	0.1918274	11.6222999	12.1724073
ln_sci_p_elec	25	0	2.2740071	0.0838253	2.1553292	2.4397049
ln_p_gas_firm	25	0	1.8766154	0.2533294	1.5467510	2.4278810

Log(small commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure

Dependent Variable	lsci_kwh

Log(small commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure

Ordinary Least Squares Estimates			
SSE	0.07303354	DFE	22
MSE	0.00332	Root MSE	0.05762
SBC	-65.289255	AIC	-68.945883
MAE	0.04457855	AICC	-67.803026
MAPE	0.22730182	HQC	-67.93169
Log Likelihood	37.4729415	Total R-Square	0.9837
Durbin-Watson	0.6011	Observations	25

Durbin-Watson Statistics			
Order	DW	Pr < DW	Pr > DW
1	0.6011	<.0001	1.0000

NOTE: Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation.

Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	-17.0333	7.9705	-2.14	0.0440
lemp_no_farm_mining	1	2.0008	0.1932	10.35	<.0001
year	1	0.006442	0.005037	1.28	0.2142

Estimates of Autocorrelations

Lag	Covariance	Correlation	-1.0 -0.5 0.0 0.5 1.0
0	0.0029	1.0000	
1	0.0019	0.6363	

Preliminary MSE	0.00174

Estimates of Autoregressive Parameters			
		Standard	

Lag	Coefficient	Error	t Value
1	-0.636321	0.168339	-3.78

Algorithm converged.

Log(small commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure

Maximum Likelihood Estimates			
SSE	0.02916791	DFE	21
MSE	0.00139	Root MSE	0.03727
SBC	-83.55359	AIC	-88.429094
MAE	0.028241	AICC	-86.429094
MAPE	0.14414541	HQC	-87.076836
Log Likelihood	48.2145468	Transformed Regression R-Square	0.8666
Durbin-Watson	1.2649	Total R-Square	0.9935
		Observations	25

Durbin-Watson Statistics			
Order	DW	Pr < DW	Pr > DW
1	1.2649	0.0147	0.9853

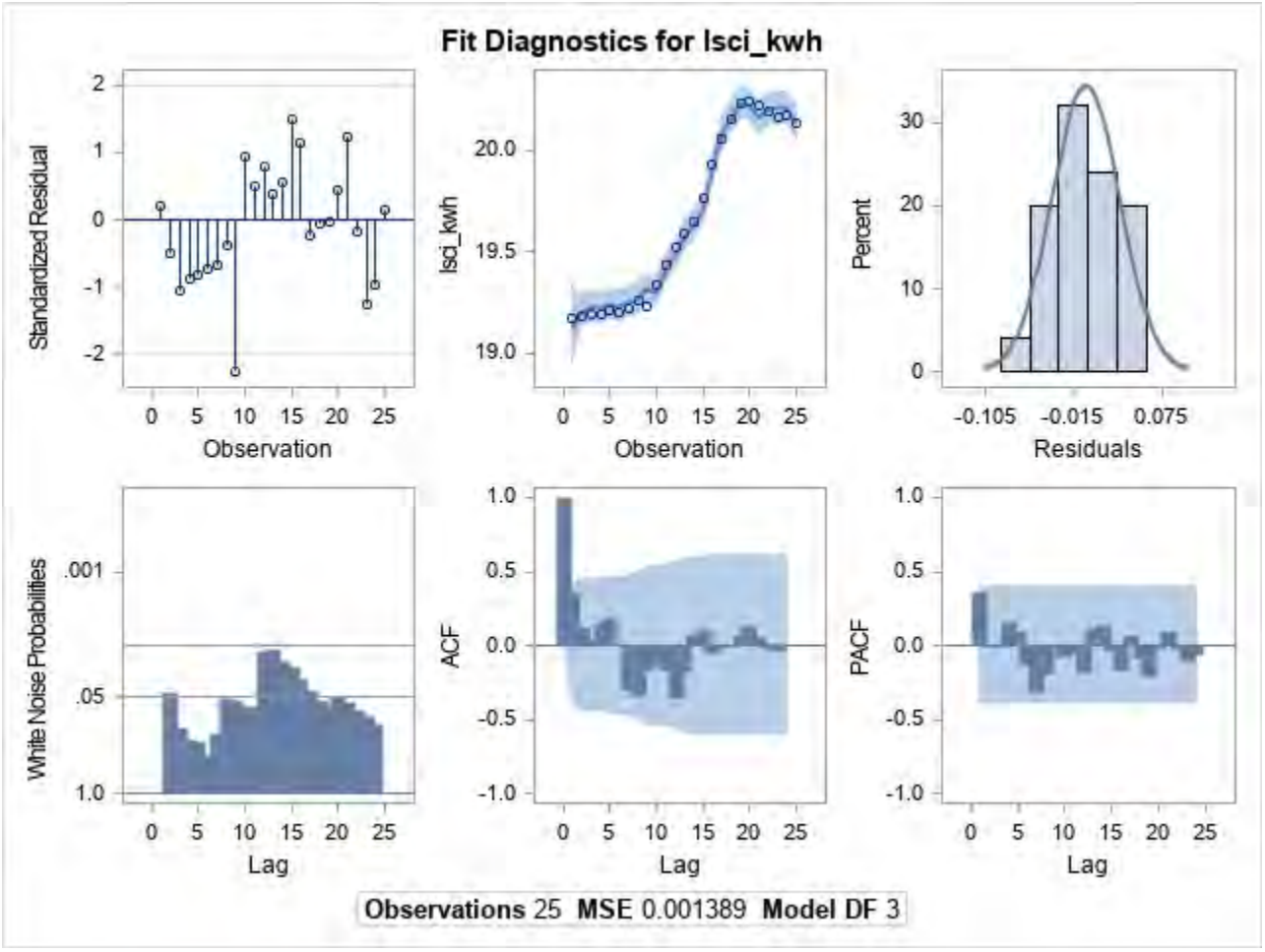
NOTE: Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation.

Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	-30.1955	11.1668	-2.70	0.0133
lemp_no_farm_mining	1	1.3580	0.2400	5.66	<.0001
year	1	0.0168	0.006526	2.57	0.0177
AR1	1	-0.8766	0.0970	-9.03	<.0001

Autoregressive parameters assumed given					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	-30.1955	11.0771	-2.73	0.0127
lemp_no_farm_mining	1	1.3580	0.2317	5.86	<.0001
year	1	0.0168	0.006437	2.61	0.0163

Log(small commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure



Outputs from small commercial forecasting model

Obs	year	sci_kwh	pr_scik
1	1984	.	.
2	1985	.	.
3	1986	.	.
4	1987	226151695	.
5	1988	199876624	.
6	1989	195738987	.
7	1990	192983257	.
8	1991	196030842	.
9	1992	188693144	.
10	1993	191672169	.
11	1994	203783580	.
12	1995	207631769	.
13	1996	212394753	.
14	1997	215341328	.
15	1998	216137378	.
16	1999	215933149	.
17	2000	220082001	.
18	2001	219718551	.
19	2002	223725158	.
20	2003	230831463	.
21	2004	224924291	.
22	2005	250022338	.
23	2006	274848931	.
24	2007	300164522	.
25	2008	321114845	.
26	2009	342073924	.
27	2010	384640589	.
28	2011	452357861	.
29	2012	514825777	.
30	2013	562098209	.
31	2014	611303169	.
32	2015	616385594	.

33	2016	601953539	.
34	2017	587433829	.
35	2018	567951260	.
36	2019	576215599	.
37	2020	554941917	550244589.33
38	2021	.	568506093.65
39	2022	.	588557177.66
40	2023	.	609539454.64
41	2024	.	631178056.51
42	2025	.	653548748.29
43	2026	.	675934109.03
44	2027	.	698996152.79
45	2028	.	722748418.94
46	2029	.	747220056.36
47	2030	.	772420379.56
48	2031	.	798379963.25
49	2032	.	825108694.38
50	2033	.	852632994.82
51	2034	.	880974526.11
52	2035	.	910149615.13
53	2036	.	940192689.89
54	2037	.	971115205.62
55	2038	.	1002953260.63
56	2039	.	1035719002.42
57	2040	.	1069443742.24
58	2041	.	1104153289.93
59	.	.	.
60	.	.	.
61	.	.	.
62	.	.	.
63	.	.	.
64	.	.	.
65	.	.	.
66	.	.	.
67	.	.	.

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
North Dakota
Billing Month Basis
Reflecting Demand-Side Programs

YEAR	Residential Sales (MWh)	% Change	Small C&I Sales (MWh)	% Change	Large C&I Sales (MWh)	% Change	Street Lighting Sales (MWh)	% Change	Miscellaneous Sales (MWh)	% Change	Total Sales Sales (MWh)	% Change
2010	632,068		382,985		530,341		20,373		43,216		1,608,983	
2011	687,465	8.76%	450,098	17.52%	514,238	-3.04%	20,059	-1.54%	46,265	7.06%	1,718,125	6.78%
2012	700,451	1.89%	512,566	13.88%	492,981	-4.13%	20,076	0.08%	48,519	4.87%	1,774,593	3.29%
2013	774,916	10.63%	559,839	9.22%	516,813	4.83%	19,895	-0.90%	47,406	-2.29%	1,918,869	8.13%
2014	812,654	4.87%	609,044	8.79%	579,346	12.10%	20,015	0.60%	50,790	7.14%	2,071,849	7.97%
2015	784,977	-3.41%	614,126	0.83%	603,879	4.23%	20,313	1.49%	50,730	-0.12%	2,074,025	0.11%
2016	746,374	-4.92%	599,694	-2.35%	617,934	2.33%	20,387	0.36%	49,560	-2.31%	2,033,949	-1.93%
2017	754,400	1.08%	585,174	-2.42%	638,719	3.36%	20,042	-1.69%	59,021	19.09%	2,057,356	1.15%
2018	799,661	6.00%	565,692	-3.33%	690,345	8.08%	19,569	-2.36%	58,278	-1.26%	2,133,545	3.70%
2019	784,808	-1.86%	573,956	1.46%	675,579	-2.14%	16,733	-14.49%	56,260	-3.46%	2,107,336	-1.23%
2020	779,619	-0.66%	552,682	-3.71%	652,236	-3.46%	13,957	-16.59%	55,728	-0.95%	2,054,222	-2.52%
2021	773,825	-0.74%	565,340	2.29%	701,991	7.63%	13,957	0.00%	56,970	2.23%	2,112,083	2.82%
2022	776,520	0.35%	585,375	3.54%	693,564	-1.20%	13,957	0.00%	58,116	2.01%	2,127,532	0.73%
2023	779,509	0.38%	606,029	3.53%	671,577	-3.17%	13,957	0.00%	59,261	1.97%	2,130,334	0.13%
2024	782,498	0.38%	627,646	3.57%	676,182	0.69%	13,957	0.00%	60,407	1.93%	2,160,690	1.42%
2025	785,536	0.39%	649,351	3.46%	680,096	0.58%	13,957	0.00%	60,546	0.23%	2,189,486	1.33%
2026	787,986	0.31%	671,704	3.44%	684,806	0.69%	13,957	0.00%	60,684	0.23%	2,219,138	1.35%
2027	790,436	0.31%	694,069	3.33%	688,783	0.58%	13,957	0.00%	60,824	0.23%	2,248,069	1.30%
2028	792,886	0.31%	717,779	3.42%	693,568	0.69%	13,957	0.00%	60,963	0.23%	2,279,153	1.38%
2029	795,336	0.31%	741,520	3.31%	697,603	0.58%	13,957	0.00%	61,103	0.23%	2,309,519	1.33%
2030	797,786	0.31%	766,667	3.39%	702,464	0.70%	13,957	0.00%	61,244	0.23%	2,342,118	1.41%
2031	800,236	0.31%	792,573	3.38%	707,367	0.70%	13,957	0.00%	61,384	0.23%	2,375,517	1.43%
2032	802,686	0.31%	819,249	3.37%	712,312	0.70%	13,957	0.00%	61,525	0.23%	2,409,729	1.44%
2033	805,136	0.31%	846,720	3.35%	717,300	0.70%	13,957	0.00%	61,667	0.23%	2,444,780	1.45%
2034	807,586	0.30%	875,008	3.34%	722,331	0.70%	13,957	0.00%	61,808	0.23%	2,480,690	1.47%
2035	810,036	0.30%	904,130	3.33%	727,405	0.70%	13,957	0.00%	61,950	0.23%	2,517,478	1.48%
2036	812,486	0.30%	934,120	3.32%	732,524	0.70%	13,957	0.00%	62,093	0.23%	2,555,179	1.50%
2037	814,936	0.30%	964,989	3.30%	737,686	0.70%	13,957	0.00%	62,235	0.23%	2,593,803	1.51%
2038	817,386	0.30%	996,773	3.29%	742,892	0.71%	13,957	0.00%	62,379	0.23%	2,633,388	1.53%
2039	819,836	0.30%	1,029,486	3.28%	748,144	0.71%	13,957	0.00%	62,522	0.23%	2,673,944	1.54%
2040	822,286	0.30%	1,063,210	3.28%	753,482	0.71%	13,957	0.00%	62,666	0.23%	2,715,602	1.56%
2041	824,736	0.30%	1,097,920	3.26%	758,867	0.71%	13,957	0.00%	62,810	0.23%	2,758,290	1.57%

	Sales as modeled and prior to DSM reductions		DSM REDUCTIONS		Subtract Existing/Historical DSM				"Other" New
	SC&I	Gen LC&I	SC&I	LC&I	SC&I	Gen LC&I	SC&I	Gen LC&I	Gen LC&I
2021	568,506	488,229	907	1,063	2,259	5,272	565,340	481,894	(10,000)
2022	588,557	492,800	923	1,069	2,259	5,272	585,375	486,459	(10,000)
2023	609,539	497,411	1,251	1,470	2,259	5,272	606,029	490,668	(10,000)
2024	631,178	502,061	1,273	1,517	2,259	5,272	627,646	495,272	(10,000)
2025	653,549	506,752	1,939	2,293	2,259	5,272	649,351	499,187	(10,000)
2026	675,934	511,484	1,971	2,314	2,259	5,272	671,704	503,897	(10,000)
2027	698,996	516,256	2,668	3,110	2,259	5,272	694,069	507,874	(10,000)
2028	722,748	521,070	2,710	3,139	2,259	5,272	717,779	512,659	(10,000)
2029	747,220	525,925	3,441	3,959	2,259	5,272	741,520	516,694	(10,000)
2030	772,420	530,823	3,495	3,996	2,259	5,272	766,667	521,555	(10,000)
2031	798,380	535,762	3,548	4,033	2,259	5,272	792,573	526,458	(10,000)
2032	825,109	540,745	3,601	4,070	2,259	5,272	819,249	531,403	(10,000)
2033	852,633	545,771	3,654	4,108	2,259	5,272	846,720	536,391	(10,000)
2034	880,975	550,840	3,708	4,146	2,259	5,272	875,008	541,422	(10,000)
2035	910,150	555,953	3,761	4,185	2,259	5,272	904,130	546,496	(10,000)
2036	940,193	561,110	3,814	4,224	2,259	5,272	934,120	551,614	(10,000)
2037	971,115	566,312	3,867	4,264	2,259	5,272	964,989	556,777	(10,000)
2038	1,002,953	571,560	3,921	4,304	2,259	5,272	996,773	561,983	(10,000)
2039	1,035,719	576,852	3,975	4,345	2,259	5,272	1,029,486	567,235	(10,000)
2040	1,069,444	582,190	3,975	4,345	2,259	5,272	1,063,210	572,573	(10,000)
2041	1,104,153	587,575	3,975	4,345	2,259	5,272	1,097,920	577,958	(10,000)

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by LC&I End Use
North Dakota
Billing Month Basis
Reflecting Demand-Side Programs

YEAR	General LC&I 1/ Sales (MWh)	% Change	+ 4 End Uses	Total LC&I Sales (MWh)	% Change
2010	439,107		91,234	530,340	
2011	414,966	-5.50%	99,273	514,238	-3.04%
2012	391,046	-5.76%	101,935	492,982	-4.13%
2013	409,451	4.71%	107,362	516,813	4.83%
2014	465,513	13.69%	113,833	579,346	12.10%
2015	485,447	4.28%	118,431	603,879	4.23%
2016	485,925	0.10%	132,009	617,934	2.33%
2017	487,433	0.31%	151,286	638,719	3.36%
2018	527,227	8.16%	163,117	690,345	8.08%
2019	513,715	-2.56%	161,863	675,578	-2.14%
2020	478,425	-6.87%	173,810	652,235	-3.46%
2021	471,894	-1.37%	230,097	701,991	7.63%
2022	476,459	0.97%	217,105	693,564	-1.20%
2023	480,668	0.88%	190,909	671,577	-3.17%
2024	485,272	0.96%	190,909	676,182	0.69%
2025	489,187	0.81%	190,909	680,096	0.58%
2026	493,897	0.96%	190,909	684,806	0.69%
2027	497,874	0.81%	190,909	688,783	0.58%
2028	502,659	0.96%	190,909	693,568	0.69%
2029	506,694	0.80%	190,909	697,603	0.58%
2030	511,555	0.96%	190,909	702,464	0.70%
2031	516,458	0.96%	190,909	707,367	0.70%
2032	521,403	0.96%	190,909	712,312	0.70%
2033	526,391	0.96%	190,909	717,300	0.70%
2034	531,422	0.96%	190,909	722,331	0.70%
2035	536,496	0.95%	190,909	727,405	0.70%
2036	541,614	0.95%	190,909	732,524	0.70%
2037	546,777	0.95%	190,909	737,686	0.70%
2038	551,983	0.95%	190,909	742,892	0.71%
2039	557,235	0.95%	190,909	748,144	0.71%
2040	562,573	0.96%	190,909	753,482	0.71%
2041	567,958	0.96%	190,909	758,867	0.71%

Case No. PU-22-194
Exhibit No.____(DJN-5)
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Means on large commercial estimation sample

The MEANS Procedure

Variable	N	N Miss	Mean	Std Dev	Minimum	Maximum
year	25	0	2008.00	7.3598007	1996.00	2020.00
llci_kwh	25	0	19.9343631	0.0879558	19.7683399	20.0930927
cdd	25	0	579.1200000	122.5184748	331.0000000	793.0000000
hdd	25	0	8362.48	671.1975690	7235.00	10027.00
ln_lci_p_elec	25	0	1.9832798	0.0744311	1.8704225	2.1534477
ln_p_gas_firm	25	0	1.8766154	0.2533294	1.5467510	2.4278810
lemp_no_farm_mining	25	0	11.8774294	0.1918274	11.6222999	12.1724073

Log(large commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure

Dependent Variable	llci_kwh

Log(large commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure

Ordinary Least Squares Estimates			
SSE	0.10616815	DFE	23
MSE	0.00462	Root MSE	0.06794
SBC	-59.155495	AIC	-61.593247
MAE	0.05343292	AICC	-61.047792
MAPE	0.26833971	HQC	-60.917118
Log Likelihood	32.7966234	Total R-Square	0.4282
Durbin-Watson	0.4765	Observations	25

Durbin-Watson Statistics			
Order	DW	Pr < DW	Pr > DW
1	0.4765	<.0001	1.0000

NOTE: Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation.

Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	4.2315	3.7838	1.12	0.2750
year	1	0.007820	0.001884	4.15	0.0004

Estimates of Autocorrelations

Lag	Covariance	Correlation	-1.0 -0.5 0.0 0.5 1.0
0	0.0042	1.0000	
1	0.0031	0.7326	

Preliminary MSE	0.00197

Estimates of Autoregressive Parameters			
Lag	Coefficient	Standard Error	t Value

1	-0.732596	0.145118	-5.05

Algorithm converged.

Log(large commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure

Maximum Likelihood Estimates			
SSE	0.04545253	DFE	22
MSE	0.00207	Root MSE	0.04545
SBC	-76.321315	AIC	-79.977942
MAE	0.03355923	AICC	-78.835085
MAPE	0.16834444	HQC	-78.963749
Log Likelihood	42.9889712	Transformed Regression R-Square	0.2009
Durbin-Watson	1.1358	Total R-Square	0.7552
		Observations	25

Durbin-Watson Statistics			
Order	DW	Pr < DW	Pr > DW
1	1.1358	0.0084	0.9916

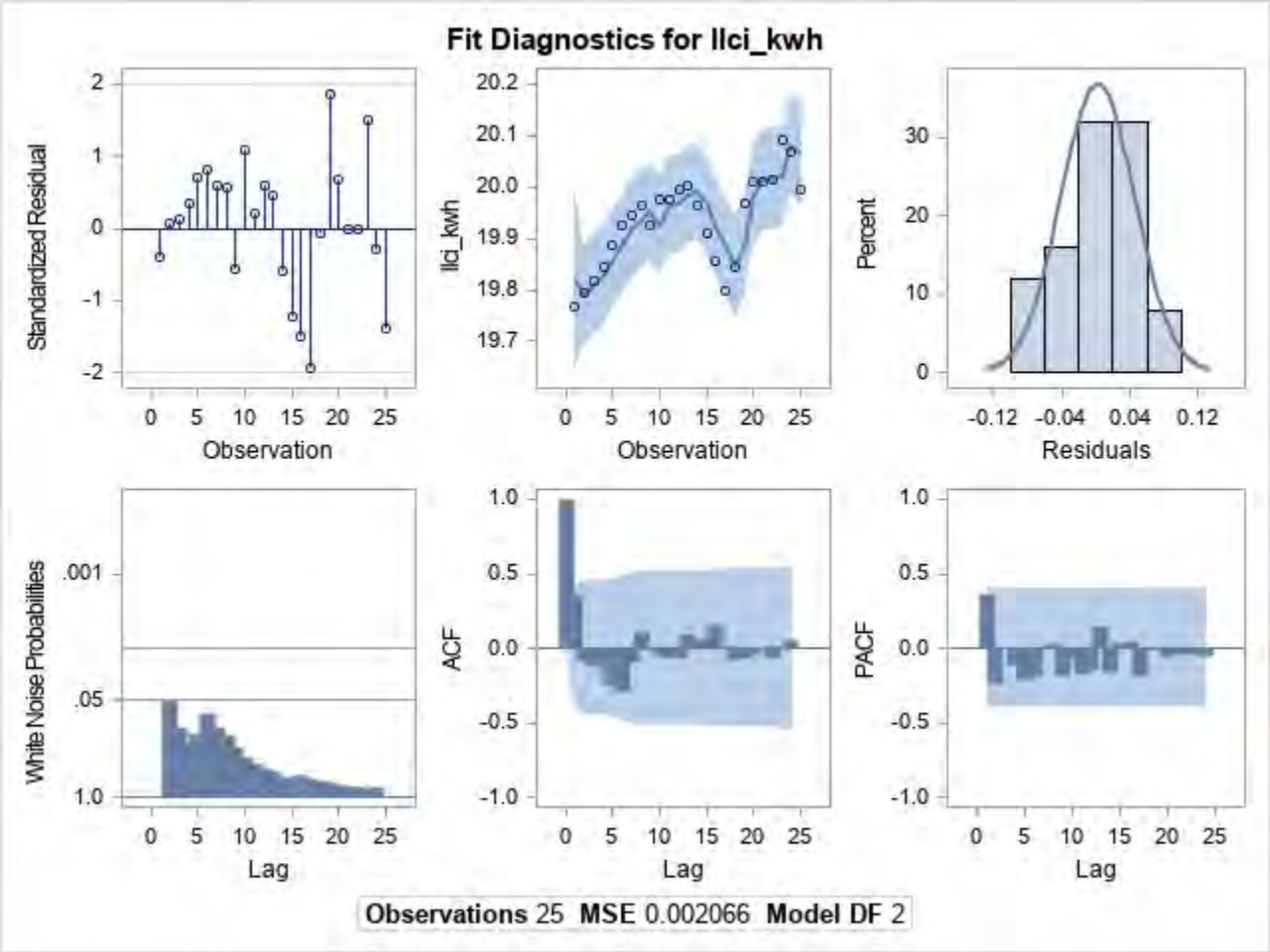
NOTE: Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation.

Parameter Estimates					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	2.6156	7.4339	0.35	0.7283
year	1	0.008620	0.003702	2.33	0.0295
AR1	1	-0.7493	0.1376	-5.45	<.0001

Autoregressive parameters assumed given					
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|
Intercept	1	2.6156	7.3594	0.36	0.7257
year	1	0.008620	0.003665	2.35	0.0280

Log(large commercial kwh estimated w/1996-2020 sample

The AUTOREG Procedure



Outputs from large commercial forecasting model

Obs	year	lci_kwh	pr_lcik
1	1984	.	.
2	1985	.	.
3	1986	.	.
4	1987	250264631	.
5	1988	306828133	.
6	1989	313193833	.
7	1990	322260322	.
8	1991	332340942	.
9	1992	336904552	.
10	1993	345826382	.
11	1994	358142747	.
12	1995	369146119	.
13	1996	384840630	.
14	1997	394420587	.
15	1998	403918973	.
16	1999	416106310	.
17	2000	433427983	.
18	2001	450171097	.
19	2002	459788471	.
20	2003	467539518	.
21	2004	450339905	.
22	2005	473361271	.
23	2006	473046177	.
24	2007	482434914	.
25	2008	487260173	.
26	2009	468955895	.
27	2010	442968669	.
28	2011	420237632	.
29	2012	396318360	.
30	2013	414723298	.
31	2014	470785511	.
32	2015	490719410	.

33	2016	491196633	.
34	2017	492704965	.
35	2018	532499619	.
36	2019	518987596	.
37	2020	483697147	523480553.44
38	2021	.	528012407.11
39	2022	.	532583493.76
40	2023	.	537194153.02
41	2024	.	541844727.49
42	2025	.	546535562.72
43	2026	.	551267007.25
44	2027	.	556039412.63
45	2028	.	560853133.49
46	2029	.	565708527.48
47	2030	.	570605955.38
48	2031	.	575545781.09
49	2032	.	580528371.65
50	2033	.	585554097.29
51	2034	.	590623331.42
52	2035	.	595736450.71
53	2036	.	600893835.08
54	2037	.	606095867.74
55	2038	.	611342935.21
56	2039	.	616635427.38
57	2040	.	621973737.48
58	2041	.	627358262.18
59	.	.	.
60	.	.	.
61	.	.	.
62	.	.	.
63	.	.	.
64	.	.	.
65	.	.	.
66	.	.	.
67	.	.	.

SAS output General LCI sales

year	pr_lcik	PR_LCI MW
2020	523480553.44	523480.6
2021	528012407.11	528012
2022	532583493.76	532583
2023	537194153.02	537194
2024	541844727.49	541845
2025	546535562.72	546536
2026	551267007.25	551267
2027	556039412.63	556039
2028	560853133.49	560853
2029	565708527.48	565709
2030	570605955.38	570606
2031	575545781.09	575546
2032	580528371.65	580528
2033	585554097.29	585554
2034	590623331.42	590623
2035	595736450.71	595736
2036	600893835.08	600894
2037	606095867.74	606096
2038	611342935.21	611343
2039	616635427.38	616635
2040	621973737.48	621974
2041	627358262.18	627358
	12,102,932,478	12,102,932

	LCI taking off adj intercept:	***MW***
2020	483697149.616	483697
2021	488229003.286	488229
2022	492800089.936	492800
2023	497410749.196	497411
2024	502061323.666	502061
2025	506752158.896	506752
2026	511483603.426	511484
2027	516256008.806	516256
2028	521069729.666	521070
2029	525925123.656	525925
2030	530822551.556	530823
2031	535762377.266	535762
2032	540744967.826	540745
2033	545770693.466	545771
2034	550839927.596	550840
2035	555953046.886	555953
2036	561110431.256	561110
2037	566312463.916	566312
2038	571559531.386	571560
2039	576852023.556	576852
2040	582190333.656	582190
2041	587574858.356	587575
	11,267,480,997	11,267,481

	LCI adj intercept:
2020 actual	483697147
sas intercept	2.6156
adj intercept	Int - (fcst - actual)
	(39,783,403.82)

North Dakota Street Lighting Forecast (kWh)

	Annual Total	
2019	16,733,425	-14.5%
2020	13,956,705	-16.6%
2021	13,956,705	13,957
2022	13,956,705	13,957
2023	13,956,705	13,957
2024	13,956,705	13,957
2025	13,956,705	13,957
2026	13,956,705	13,957
2027	13,956,705	13,957
2028	13,956,705	13,957
2029	13,956,705	13,957
2030	13,956,705	13,957
2031	13,956,705	13,957
2032	13,956,705	13,957
2033	13,956,705	13,957
2034	13,956,705	13,957
2035	13,956,705	13,957
2036	13,956,705	13,957
2037	13,956,705	13,957
2038	13,956,705	13,957
2039	13,956,705	13,957
2040	13,956,705	13,957
2041	13,956,705	13,957

MWh equivalent

	Other Public Sales Annual Total			Adjust per DN Other Public Sales Annual Total		
2019	51,275,800	-3.6%				
2020	50,838,854	-0.9%				
2021	51,985,000	51,985	2.3%	51,985,000	51,985	2.25%
2022	53,131,000	53,131	2.2%	53,131,000	53,131	2.20%
2023	54,276,000	54,276	2.2%	54,276,000	54,276	2.16%
2024	55,422,000	55,422	2.1%	55,422,000	55,422	2.11%
2025	56,568,000	56,568	2.1%	55,560,555	55,561	0.25%
2026	57,714,000	57,714	2.0%	55,699,456	55,699	0.25%
2027	58,860,000	58,860	2.0%	55,838,705	55,839	0.25%
2028	60,005,000	60,005	1.9%	55,978,302	55,978	0.25%
2029	61,151,000	61,151	1.9%	56,118,248	56,118	0.25%
2030	62,297,000	62,297	1.9%	56,258,543	56,259	0.25%
2031	63,443,000	63,443	1.8%	56,399,190	56,399	0.25%
2032	64,589,000	64,589	1.8%	56,540,187	56,540	0.25%
2033	65,735,000	65,735	1.8%	56,681,538	56,682	0.25%
2034	66,880,000	66,880	1.7%	56,823,242	56,823	0.25%
2035	68,026,000	68,026	1.7%	56,965,300	56,965	0.25%
2036	69,172,000	69,172	1.7%	57,107,713	57,108	0.25%
2037	70,318,000	70,318	1.7%	57,250,482	57,250	0.25%
2038	71,464,000	71,464	1.6%	57,393,609	57,394	0.25%
2039	72,610,000	72,610	1.6%	57,537,093	57,537	0.25%
2040	73,755,000	73,755	1.6%	57,680,935	57,681	0.25%
2041	74,901,000	74,901	1.6%	57,825,138	57,825	0.25%
		MWh equivalent			*MWh equivalent*	

Regression on 2001-2020 Other Public Sales <-- Good Model! Using time

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.93656683
R Square	0.87715742
Adjusted R Square	0.87033284
Standard Error	2606328.31
Observations	20

ANOVA

	df	*SS*	*MS*	*F*	*ignificance F*
Regression	1	8.73091E+14	8.731E+14	128.529001	1.25E-09
Residual	18	1.22273E+14	6.793E+12		
Total	19	9.95364E+14			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95.0%*	*Upper 95.0%*
Intercept	-2263146292	203200214.5	-11.137519	1.6605E-09	-2.7E+09	-1.8E+09	-2.7E+09	-1836238483
X Variable 1	1145826.51	101069.0767	11.337063	1.2528E-09	933488.3	1358165	933488.3	1358164.758

	51,423,251.51	
Intercept adj:	(2,263,730,689.67)	=int - bck + actual
"backcast" check 2020	50838854	

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	Other Public Sales Annual Total			Adjust per DN Other Public Sales Annual Total			Interdepartmental Sales Annual Total		Company Use Annual Total		Miscellaneous Annual Total		
2019	51,275,800	-3.6%					165,045	-8.1%	4,819,419	-1.6%	56,260,264	56260	-3.5%
2020	50,838,854	-0.9%					153,386	-7.1%	4,736,174	-1.7%	55,728,414	55728	-0.9%
2021	51,985,000	51,985	2.3%	51,985,000	51,985	2.25%	165,000	165	4,820,000	4,820	56,970,000	56970	2.23%
2022	53,131,000	53,131	2.2%	53,131,000	53,131	2.20%	165,000	165	4,820,000	4,820	58,116,000	58116	2.01%
2023	54,276,000	54,276	2.2%	54,276,000	54,276	2.16%	165,000	165	4,820,000	4,820	59,261,000	59261	1.97%
2024	55,422,000	55,422	2.1%	55,422,000	55,422	2.11%	165,000	165	4,820,000	4,820	60,407,000	60407	1.93%
2025	56,568,000	56,568	2.1%	55,560,555	55,561	0.25%	165,000	165	4,820,000	4,820	60,545,555	60546	0.23%
2026	57,714,000	57,714	2.0%	55,699,456	55,699	0.25%	165,000	165	4,820,000	4,820	60,684,456	60684	0.23%
2027	58,860,000	58,860	2.0%	55,838,705	55,839	0.25%	165,000	165	4,820,000	4,820	60,823,705	60824	0.23%
2028	60,005,000	60,005	1.9%	55,978,302	55,978	0.25%	165,000	165	4,820,000	4,820	60,963,302	60963	0.23%
2029	61,151,000	61,151	1.9%	56,118,248	56,118	0.25%	165,000	165	4,820,000	4,820	61,103,248	61103	0.23%
2030	62,297,000	62,297	1.9%	56,258,543	56,259	0.25%	165,000	165	4,820,000	4,820	61,243,543	61244	0.23%
2031	63,443,000	63,443	1.8%	56,399,190	56,399	0.25%	165,000	165	4,820,000	4,820	61,384,190	61384	0.23%
2032	64,589,000	64,589	1.8%	56,540,187	56,540	0.25%	165,000	165	4,820,000	4,820	61,525,187	61525	0.23%
2033	65,735,000	65,735	1.8%	56,681,538	56,682	0.25%	165,000	165	4,820,000	4,820	61,666,538	61667	0.23%
2034	66,880,000	66,880	1.7%	56,823,242	56,823	0.25%	165,000	165	4,820,000	4,820	61,808,242	61808	0.23%
2035	68,026,000	68,026	1.7%	56,965,300	56,965	0.25%	165,000	165	4,820,000	4,820	61,950,300	61950	0.23%
2036	69,172,000	69,172	1.7%	57,107,713	57,108	0.25%	165,000	165	4,820,000	4,820	62,092,713	62093	0.23%
2037	70,318,000	70,318	1.7%	57,250,482	57,250	0.25%	165,000	165	4,820,000	4,820	62,235,482	62235	0.23%
2038	71,464,000	71,464	1.6%	57,393,609	57,394	0.25%	165,000	165	4,820,000	4,820	62,378,609	62379	0.23%
2039	72,610,000	72,610	1.6%	57,537,093	57,537	0.25%	165,000	165	4,820,000	4,820	62,522,093	62522	0.23%
2040	73,755,000	73,755	1.6%	57,680,935	57,681	0.25%	165,000	165	4,820,000	4,820	62,665,935	62666	0.23%
2041	74,901,000	74,901	1.6%	57,825,138	57,825	0.25%	165,000	165	4,820,000	4,820	62,810,138	62810	0.23%
		MWh equivalent			*MWh equivalent*			*MWh equivalent*		*MWh equivalent*		*MWh equivalent*	

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