



# Integrated Resource Plan 2021



Submitted to the  
Montana Public Service Commission  
September 15, 2021

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Volume II: Attachment A

**Montana-Dakota Utilities Co.**  
**2021 Integrated Resource Plan**

Submitted to the Montana Public Service Commission

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**Attachment A**



**MONTANA-DAKOTA  
UTILITIES CO.**

A Subsidiary of MDU Resources Group, Inc.

**MONTANA-DAKOTA UTILITIES CO.  
ELECTRIC LOAD FORECAST  
2021–2040**

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

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# Executive Summary

This report presents the 2021-2040 forecast of Montana-Dakota Utilities Co.'s (Montana-Dakota) electric energy requirements and peak demands for the Integrated System of Montana, North Dakota, and South. The forecast is 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 forecast.

## **INTEGRATED SYSTEM**

Total annual energy for the Integrated System is projected to grow at an average rate of 1.49% per year for the next five years and at an average rate of 0.84% per year through 2040. Integrated 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 0.93% per year through 2040 prior to any reductions due to demand response programs. Integrated System winter peak demand is projected to grow at an average rate of 1.47% per year for the next five years and an average rate of 0.83% per year through 2040.

As described in Montana-Dakota's 2019 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 0.35 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.

## **Econometric Overview**

Montana-Dakota uses econometric modeling as the starting point for its forecast. 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 the Integrated System forecast. 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; and Aberdeen, SD  
Cooling Degree Days (CDD) for Bismarck, ND; and Aberdeen, SD  
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

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 eighth 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 2020), the most recent year for which a complete set of weather and actual monthly sales by sector was available was 2019.

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 forecast for the Integrated System is 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 recent economic downturn was felt by the majority of the country in 2008, 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, no one could anticipate the national changes that would occur in 2020 related to COVID-19 and the worldwide crash in crude oil prices. Here is an excerpt from the U.S. Bureau of Labor Statistics in their March 3, 2021 press release titled Regional and State Unemployment, 2020 Annual Average Summary: “Annual average unemployment rates rose in 2020 in all regions, divisions, and states, the U.S. Bureau of Labor Statistics reported today. Employment-population ratios decreased across all of these geographic areas as well. The U.S. jobless rate increased by 4.4 percentage points from the prior year to 8.1 percent, while the national employment-population ratio fell by 4.0 points to 56.8 percent. The deterioration in the labor market in 2020 reflected the impact of the coronavirus (COVID-19) pandemic and efforts to contain it.” According to the U.S. Bureau of Labor Statistics (BLS) as of December 2020, Montana’s unemployment rate is at 5.9 percent, North Dakota’s unemployment is at 5.1 percent, South Dakota’s unemployment rate is at 4.6; all below the national rate of 8.1 percent.

The forecast for the Integrated System in this publication reflects growth seen up through 2019. The effects of 2020 will impact next year’s updated forecast directly and may require adjustments to 2020 sales volumes to develop an accurate forecast.

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.

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. 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 1966-2020, respectively. Appendix A-5 lists the seasonal peaks and load factors of the Integrated System for the years 1960-2020. Appendix A-6 lists demand by state at the time of the system peak for the summer and winter seasons.

Appendix B contains historical and forecasted values for the exogenous variables for the Integrated 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 2020), 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 2019. The equations developed used historical data available through 2019 and were designed to forecast the time period 2021-2040.

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**

<u>Montana</u>	<u>South Dakota</u>	<u>North Dakota</u>	
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. As the U.S. Energy Information Administration’s Annual Energy Outlook 2020 states, “Historically, although the economy has continued to grow, growth rates for electricity demand have slowed as new, efficient devices and production processes that require less electricity have replaced older, less-efficient appliances, heating, ventilation, cooling units, and capital equipment.”, residential demand growth is predicted at a modest rate. The starting points for residential use per customer reflect uncertainties and the slowdown in the Bakken oil field that has been experienced recently.

**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. The forecast for South Dakota residential use per customer is now held flat at 10,444 kWh per year for the next 20 years.

### **NUMBER OF RESIDENTIAL CUSTOMERS**

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

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

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.

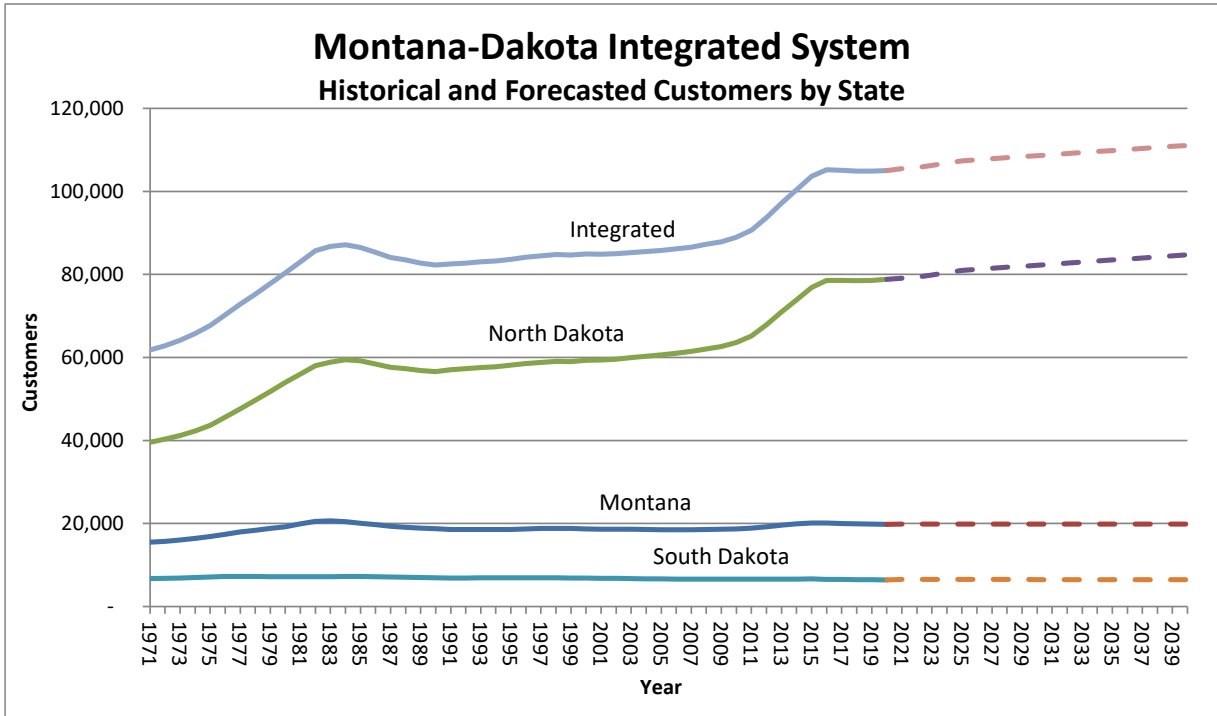
The forecast for number of customers by state was initially developed as described above. However, adjustments were made to the residential customer forecasts for North Dakota and Montana to reflect the higher rate of growth being experienced in parts of North Dakota and Montana due to the Bakken oil field activity.

In North Dakota, growth in residential customers for 2020 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 where the Bakken development lags the development in North Dakota, customer growth for 2020 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:**

$$\ln(\text{sci\_kwh}_t) = a + b^{Emp} \times \ln(\text{emp\_no\_farm\_mining}_t) + e_t$$

where:

ln = natural logarithm;  
sci\_kwh<sub>t</sub> = small comm & industrial sales; and  
emp\_no\_farm\_mining<sub>t</sub> = total employment, excluding farm and mining.

In this equation, *a* and *b* are estimated parameters; *e<sub>t</sub>* is the error term.

**Montana:**

$$\ln(\text{sci\_kwh}_t) = a + b^{Emp} \times \ln(\text{emp\_no\_farm\_mining}_t) + b^{Yr} \times \text{year}_t + e_t$$

where:

ln = natural logarithm;  
sci\_kwh<sub>t</sub> = small commercial & industrial sales;  
emp\_no\_farm\_mining<sub>t</sub> = total employment, excluding farm and mining; and  
year<sub>t</sub> = year (1995-2019), which serves as a time trend variable.

In this equation, *a* and the *b*'s are estimated parameters; *e<sub>t</sub>* is the error term.

**South Dakota:**

$$\ln(\text{sci\_kwh}_t) = a + b^{HDD} \times HDD_t + b^{Yr} \times \text{year}_t + e_t$$

where:

ln = natural logarithm;  
sci\_kwh<sub>t</sub> = small commercial & industrial sales;  
HDD<sub>t</sub> = heating degree days; and  
year<sub>t</sub> = year (1995-2019), which serves as a time trend variable.

In this equation, *a* and *b* are estimated parameters; *e<sub>t</sub>* 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 a combination of regressions and 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 (1995-2019), 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 2020. Information regarding the specific LC&I customers that come on line is provided by Montana-Dakota's field personnel who have contact with and closely monitor these customers. However, there were no additions in 2020, for Montana, North Dakota, or South Dakota so no adjustments were made to the modeled forecasts.

#### **1.4. Street Lighting**

The sales forecast for the street lighting sector (public street and highway lighting) for each state started with the actual 2019 level with adjustments for LED changes anticipated to complete in 2020, and then are held constant for the remainder of the forecast.

#### **1.5. Miscellaneous**

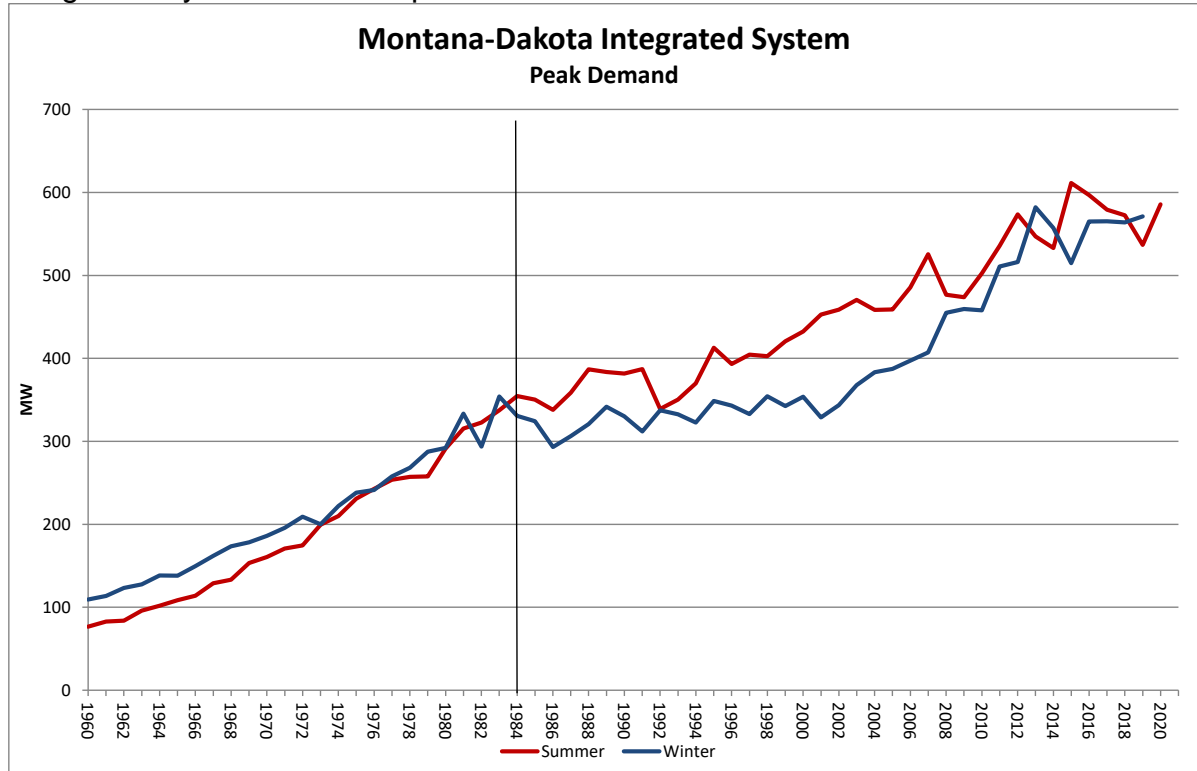
The miscellaneous sales sector is made up of sales for the following three end-uses:

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 2019 levels. The forecast for Other Public Sales was also held constant at the actual 2019 level for South Dakota, while the Other Public Sales forecast for both North Dakota and Montana were based on a linear regression on actual 2000-2019 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 <sub>t</sub>	= summer peak demand;
CDD <sub>t</sub>	= cooling degree days;
peak_temp <sub>t</sub>	= weighted average temp at time of summer peak;
system_kwh <sub>t</sub>	= annual energy requirements; and
year <sub>t</sub>	= year (1990-2019), which serves as a time trend variable.

In this equation, *a* and the *b*'s are estimated parameters; *e<sub>t</sub>* 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: 1990-2019.

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 four 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 <sub>t</sub>	= winter peak demand;
peak_temp <sub>t</sub>	= weighted average temp at time of winter peak; and
system_kwh <sub>t</sub>	= annual energy requirements.

In this equation, *a* and the *b*'s are estimated parameters; *e<sub>t</sub>* 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 2019 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
  - 0.25 percent of annual sales for 2021 through 2039, achieved by growing from 0.10% of total sales in 2021 to 0.30% of total sales in 2027 through 2039, for an overall savings of 0.25% for the 20-year forecast horizon.
- Peak Demand savings
  - Demand Response programs of 48.9 MW for 2021, 53.9 MW for 2022, 59.0 MW for 2023 to 60.0 MW for 2024-2040 for the commercial sales sector.
  - Energy Efficiency programs of 0.58 MW in 2021 and 0.75 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 8.041%. 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.



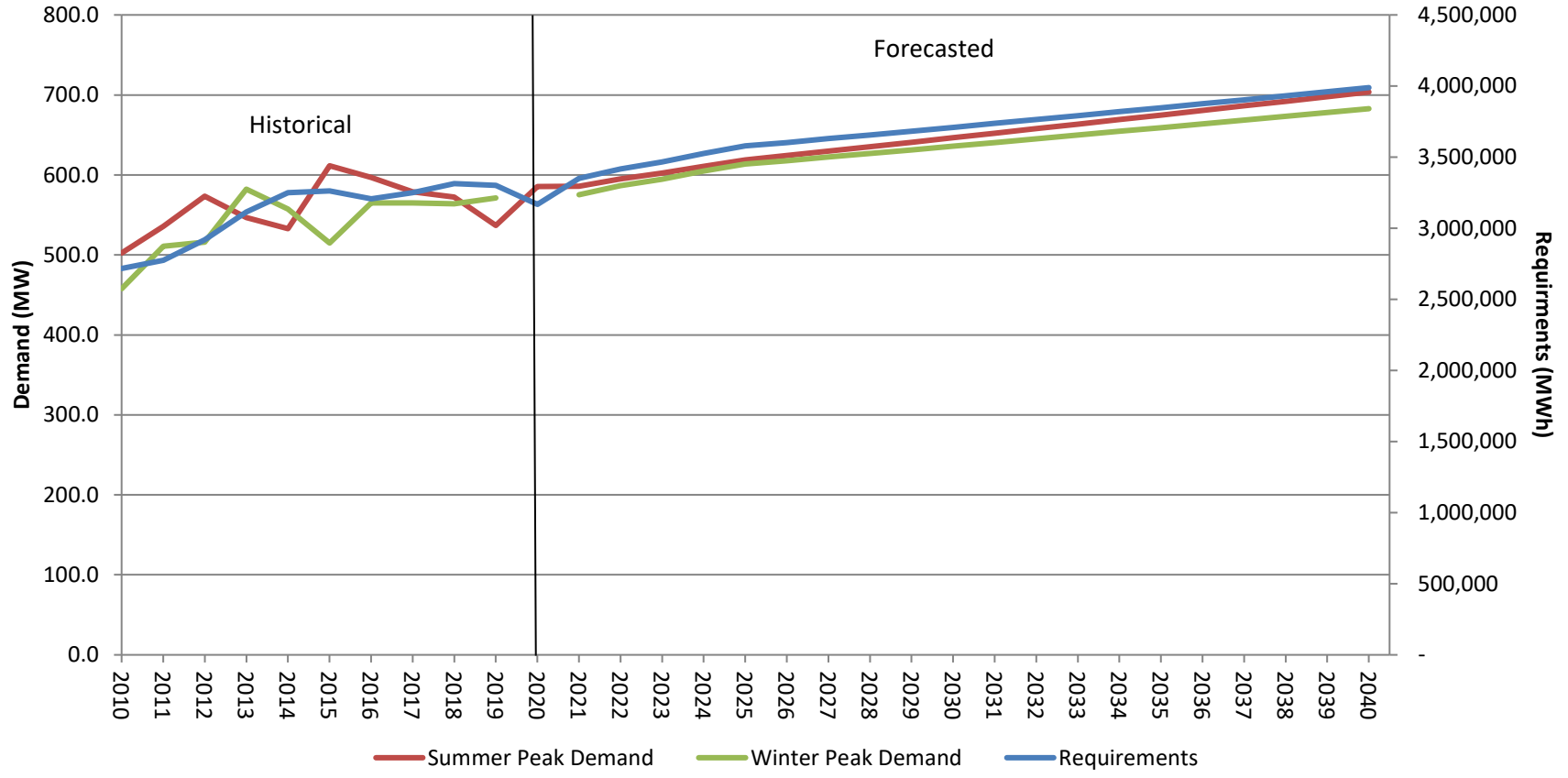
**Montana-Dakota Utilities Co.**  
**Historical and Forecasted Energy and Demand**  
**Integrated System**  
**Reflecting Demand-Side Management Programs from 2019 IRP**  
**Calendar Month Basis**

Year	Total Energy Requirements (net of DSM and EE)		Summer Peak - MW				Winter Peak 2/				Demand Response	
	MWh	% Change	<u>Total Demand</u>	<u>Energy</u>	<u>Demand</u>	% Change	<u>Total Demand</u>	<u>Energy</u>	<u>Demand</u>	% Change	<u>Rate 38/39</u>	<u>Commercial</u>
			<u>Before any</u>	<u>Efficiency</u>	<u>Net of</u>		<u>Before any</u>	<u>Efficiency</u>	<u>Net of</u>		<u>Interrupt</u>	<u>Demand</u>
			<u>DSM or EE</u>	<u>(EE)</u>	<u>EE 1/</u>		<u>DSM or EE</u>	<u>(EE)</u>	<u>EE 1/</u>		<u>Loads</u>	<u>Response</u>
2010	2,718,192				502.5				457.8			
2011	2,776,082	2.13%			535.8	6.63%			510.8	11.58%		
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%				not available		
2021	3,350,642	5.73%	586.6	0.6	586.0	0.07%	575.8	0.6	575.2		18.9	30.0
2022	3,418,187	2.02%	595.7	0.6	595.1	1.55%	587.3	0.6	586.7	1.99%	18.9	35.0
2023	3,466,208	1.40%	603.2	0.6	602.5	1.25%	595.4	0.6	594.8	1.38%	20.0	39.0
2024	3,525,523	1.71%	611.5	0.6	610.8	1.38%	605.4	0.6	604.8	1.69%	20.0	40.0
2025	3,579,075	1.52%	619.4	0.7	618.8	1.30%	614.4	0.6	613.8	1.48%	20.0	40.0
2026	3,603,363	0.68%	624.9	0.7	624.2	0.88%	618.6	0.6	617.9	0.68%	20.0	40.0
2027	3,630,492	0.75%	630.5	0.7	629.8	0.90%	623.1	0.7	622.4	0.73%	20.0	40.0
2028	3,655,892	0.70%	636.0	0.7	635.3	0.88%	627.4	0.7	626.8	0.70%	20.0	40.0
2029	3,683,062	0.74%	641.6	0.7	640.9	0.88%	632.1	0.7	631.4	0.74%	20.0	40.0
2030	3,710,355	0.74%	647.3	0.7	646.6	0.89%	636.6	0.7	635.9	0.72%	20.0	40.0
2031	3,737,747	0.74%	652.9	0.7	652.3	0.87%	641.3	0.7	640.6	0.73%	20.0	40.0
2032	3,765,210	0.73%	658.7	0.7	658.0	0.88%	645.9	0.7	645.2	0.72%	20.0	40.0
2033	3,792,755	0.73%	664.4	0.7	663.7	0.87%	650.6	0.7	649.9	0.73%	20.0	40.0
2034	3,820,414	0.73%	670.0	0.7	669.3	0.85%	655.3	0.7	654.6	0.71%	20.0	40.0
2035	3,848,154	0.73%	675.7	0.7	675.0	0.85%	660.0	0.7	659.3	0.72%	20.0	40.0
2036	3,875,972	0.72%	681.4	0.7	680.7	0.85%	664.6	0.7	663.9	0.70%	20.0	40.0
2037	3,903,936	0.72%	687.1	0.7	686.4	0.84%	669.4	0.7	668.6	0.71%	20.0	40.0
2038	3,932,005	0.72%	693.0	0.7	692.2	0.85%	674.2	0.7	673.4	0.72%	20.0	40.0
2039	3,960,348	0.72%	698.7	0.8	697.9	0.82%	678.9	0.7	678.2	0.70%	20.0	40.0
2040	3,988,844	0.72%	704.5	0.8	703.7	0.83%	683.7	0.7	683.0	0.71%	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



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

YEAR	<u>Residential</u>		<u>Small C&amp;I</u>		<u>Large C&amp;I</u>		<u>Street Lighting</u>		<u>Miscellaneous</u>		<u>Total Sales</u>		
	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	
2010	171,661		109,188		415,946		7,203		7,511		711,509		
2011	185,153	7.86%	119,643	9.58%	427,887	2.87%	7,089	-1.59%	7,789	3.70%	747,561	5.07%	
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	182,940	-1.00%	135,502	8.38%	473,461	12.40%	3,049	-0.92%	6,146	-4.33%	801,097	8.18%	
2022	182,940	0.00%	137,702	1.62%	519,099	9.64%	3,049	0.00%	6,134	-0.20%	848,924	5.97%	
2023	182,940	0.00%	139,950	1.63%	538,543	3.75%	3,049	0.00%	6,121	-0.21%	870,603	2.55%	
2024	182,940	0.00%	142,180	1.59%	552,244	2.54%	3,049	0.00%	6,109	-0.20%	886,521	1.83%	
2025	182,940	0.00%	144,350	1.53%	559,081	1.24%	3,049	0.00%	6,096	-0.21%	895,516	1.01%	
2026	182,940	0.00%	146,317	1.36%	560,017	0.17%	3,049	0.00%	6,084	-0.20%	898,407	0.32%	
2027	182,940	0.00%	148,492	1.49%	561,652	0.29%	3,049	0.00%	6,071	-0.21%	902,203	0.42%	
2028	182,940	0.00%	150,607	1.42%	563,286	0.29%	3,049	0.00%	6,059	-0.20%	905,941	0.41%	
2029	182,940	0.00%	152,664	1.37%	564,920	0.29%	3,049	0.00%	6,047	-0.20%	909,619	0.41%	
2030	182,940	0.00%	154,731	1.35%	566,553	0.29%	3,049	0.00%	6,034	-0.21%	913,307	0.41%	
2031	182,940	0.00%	156,791	1.33%	568,187	0.29%	3,049	0.00%	6,022	-0.20%	916,988	0.40%	
2032	182,940	0.00%	158,817	1.29%	569,821	0.29%	3,049	0.00%	6,009	-0.22%	920,635	0.40%	
2033	182,940	0.00%	160,818	1.26%	571,454	0.29%	3,049	0.00%	5,997	-0.20%	924,257	0.39%	
2034	182,940	0.00%	162,818	1.24%	573,087	0.29%	3,049	0.00%	5,985	-0.20%	927,879	0.39%	
2035	182,940	0.00%	164,796	1.21%	574,720	0.28%	3,049	0.00%	5,972	-0.22%	931,477	0.39%	
2036	182,940	0.00%	166,733	1.18%	576,353	0.28%	3,049	0.00%	5,960	-0.20%	935,035	0.38%	
2037	182,940	0.00%	168,696	1.18%	577,986	0.28%	3,049	0.00%	5,947	-0.22%	938,618	0.38%	
2038	182,940	0.00%	170,648	1.16%	579,619	0.28%	3,049	0.00%	5,935	-0.20%	942,190	0.38%	
2039	182,940	0.00%	172,560	1.12%	581,261	0.28%	3,049	0.00%	5,922	-0.22%	945,732	0.38%	
2040	182,940	0.00%	174,495	1.12%	582,903	0.28%	3,049	0.00%	5,910	-0.20%	949,296	0.38%	
2010-2020 Average Yearly Growth (10 Years History)													
		0.27%			1.19%			0.76%			-7.88%	-2.35%	0.62%
2015-2020 Average Yearly Growth (5 Years History)													
		-0.41%			-0.87%			-2.00%			-18.54%	-5.13%	-1.57%
2021-2026 Average Yearly Growth (5 Years)													
		0.00%			1.56%			3.16%			0.00%	-0.20%	2.17%
2021-2031 Average Yearly Growth (10 Years)													
		0.00%			1.47%			1.33%			0.00%	-0.20%	1.05%
2021-2040 Average Yearly Growth (19 Years)													
		0.00%			1.33%			0.63%			0.00%	-0.21%	0.61%

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

YEAR	<u>Residential</u>		<u>Small C&amp;I</u>		<u>Large C&amp;I</u>		<u>Street Lighting</u>		<u>Miscellaneous</u>		<u>Total Sales</u>		
	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	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	774,857	-0.61%	594,489	7.56%	708,604	8.64%	14,499	3.88%	58,463	4.91%	2,150,912	4.71%	
2022	777,307	0.32%	604,883	1.75%	708,351	-0.04%	14,499	0.00%	59,563	1.88%	2,164,604	0.64%	
2023	782,746	0.70%	615,577	1.77%	712,881	0.64%	14,499	0.00%	60,664	1.85%	2,186,367	1.01%	
2024	788,185	0.69%	625,626	1.63%	735,185	3.13%	14,499	0.00%	60,803	0.23%	2,224,298	1.73%	
2025	793,624	0.69%	636,312	1.71%	758,430	3.16%	14,499	0.00%	60,943	0.23%	2,263,808	1.78%	
2026	796,074	0.31%	646,320	1.57%	764,433	0.79%	14,499	0.00%	61,083	0.23%	2,282,410	0.82%	
2027	798,524	0.31%	656,991	1.65%	771,404	0.91%	14,499	0.00%	61,223	0.23%	2,302,641	0.89%	
2028	800,974	0.31%	666,954	1.52%	777,529	0.79%	14,499	0.00%	61,363	0.23%	2,321,319	0.81%	
2029	803,424	0.31%	677,603	1.60%	784,653	0.92%	14,499	0.00%	61,504	0.23%	2,341,683	0.88%	
2030	805,874	0.30%	688,257	1.57%	791,862	0.92%	14,499	0.00%	61,646	0.23%	2,362,138	0.87%	
2031	808,324	0.30%	698,910	1.55%	799,156	0.92%	14,499	0.00%	61,787	0.23%	2,382,677	0.87%	
2032	810,774	0.30%	709,562	1.52%	806,538	0.92%	14,499	0.00%	61,929	0.23%	2,403,302	0.87%	
2033	813,224	0.30%	720,213	1.50%	814,008	0.93%	14,499	0.00%	62,072	0.23%	2,424,016	0.86%	
2034	815,674	0.30%	730,863	1.48%	821,566	0.93%	14,499	0.00%	62,214	0.23%	2,444,817	0.86%	
2035	818,124	0.30%	741,507	1.46%	829,215	0.93%	14,499	0.00%	62,358	0.23%	2,465,703	0.85%	
2036	820,574	0.30%	752,155	1.44%	836,955	0.93%	14,499	0.00%	62,501	0.23%	2,486,684	0.85%	
2037	823,024	0.30%	762,802	1.42%	844,786	0.94%	14,499	0.00%	62,645	0.23%	2,507,756	0.85%	
2038	825,474	0.30%	773,448	1.40%	852,712	0.94%	14,499	0.00%	62,789	0.23%	2,528,921	0.84%	
2039	827,924	0.30%	784,174	1.39%	860,817	0.95%	14,499	0.00%	62,933	0.23%	2,550,347	0.85%	
2040	830,374	0.30%	794,900	1.37%	869,019	0.95%	14,499	0.00%	63,078	0.23%	2,571,870	0.84%	
2010-2020 Average Yearly Growth (10 Years History)													
		1.68%			2.93%			3.35%			-2.39%	2.78%	2.50%
2015-2020 Average Yearly Growth (5 Years History)													
		0.50%			-1.96%			2.11%			-6.87%	2.42%	0.27%
2021-2026 Average Yearly Growth (5 Years)													
		0.59%			1.69%			1.77%			0.00%	0.83%	1.29%
2021-2031 Average Yearly Growth (10 Years)													
		0.43%			1.63%			1.34%			0.00%	0.44%	1.07%
2021-2040 Average Yearly Growth (19 Years)													
		0.35%			1.54%			1.08%			0.00%	0.30%	0.93%

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

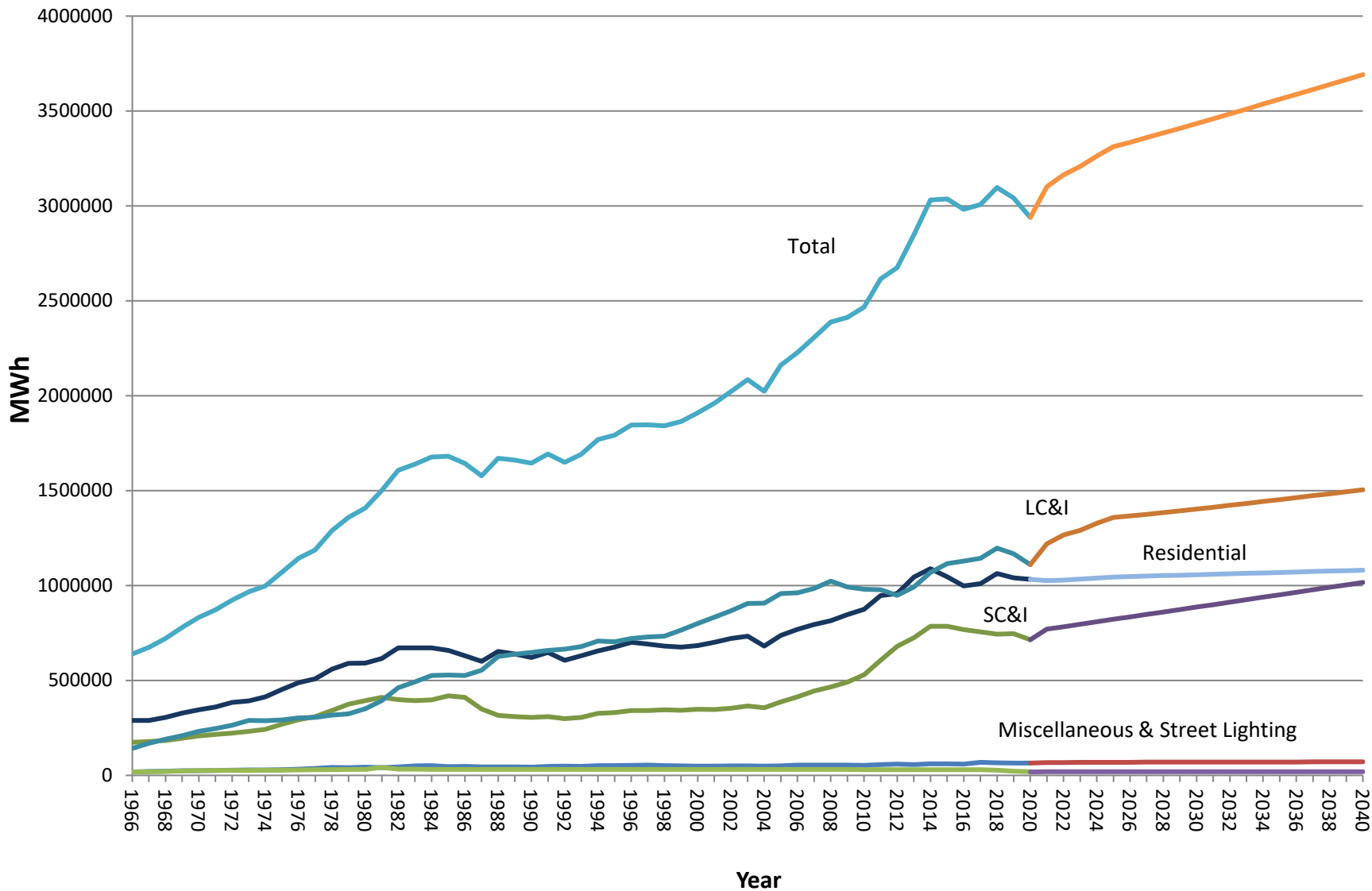
YEAR	<u>Residential</u>		<u>Small C&amp;I</u>		<u>Large C&amp;I</u>		<u>Street Lighting</u>		<u>Miscellaneous</u>		<u>Total Sales</u>		
	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	
2010	70,868		37,313		34,339		2,639		1,535		146,694		
2011	73,977	4.39%	36,712	-1.61%	34,945	1.76%	2,628	-0.42%	1,729	12.64%	149,991	2.25%	
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	-9.11%	143,775	-3.99%	
2021	67,970	-0.44%	39,999	9.81%	38,183	6.53%	1,257	-19.24%	1,851	10.03%	149,260	3.81%	
2022	67,991	0.03%	40,311	0.78%	38,848	1.74%	1,257	0.00%	1,851	0.00%	150,259	0.67%	
2023	68,004	0.02%	40,667	0.88%	39,485	1.64%	1,257	0.00%	1,851	0.00%	151,264	0.67%	
2024	68,008	0.01%	41,025	0.88%	40,174	1.74%	1,257	0.00%	1,851	0.00%	152,315	0.69%	
2025	68,008	0.00%	41,387	0.88%	40,875	1.74%	1,257	0.00%	1,851	0.00%	153,377	0.70%	
2026	68,003	-0.01%	41,709	0.78%	41,545	1.64%	1,257	0.00%	1,851	0.00%	154,365	0.64%	
2027	67,994	-0.01%	42,077	0.88%	42,269	1.74%	1,257	0.00%	1,851	0.00%	155,448	0.70%	
2028	67,979	-0.02%	42,448	0.88%	43,006	1.74%	1,257	0.00%	1,851	0.00%	156,540	0.70%	
2029	67,961	-0.03%	42,822	0.88%	43,756	1.74%	1,257	0.00%	1,851	0.00%	157,646	0.71%	
2030	67,939	-0.03%	43,199	0.88%	44,519	1.74%	1,257	0.00%	1,851	0.00%	158,765	0.71%	
2031	67,916	-0.03%	43,580	0.88%	45,295	1.74%	1,257	0.00%	1,851	0.00%	159,899	0.71%	
2032	67,888	-0.04%	43,964	0.88%	46,085	1.74%	1,257	0.00%	1,851	0.00%	161,045	0.72%	
2033	67,857	-0.05%	44,352	0.88%	46,888	1.74%	1,257	0.00%	1,851	0.00%	162,205	0.72%	
2034	67,826	-0.05%	44,743	0.88%	47,706	1.74%	1,257	0.00%	1,851	0.00%	163,382	0.73%	
2035	67,791	-0.05%	45,137	0.88%	48,537	1.74%	1,257	0.00%	1,851	0.00%	164,573	0.73%	
2036	67,756	-0.05%	45,535	0.88%	49,383	1.74%	1,257	0.00%	1,851	0.00%	165,782	0.73%	
2037	67,721	-0.05%	45,936	0.88%	50,244	1.74%	1,257	0.00%	1,851	0.00%	167,009	0.74%	
2038	67,683	-0.06%	46,341	0.88%	51,120	1.74%	1,257	0.00%	1,851	0.00%	168,252	0.74%	
2039	67,645	-0.06%	46,751	0.88%	52,015	1.75%	1,257	0.00%	1,851	0.00%	169,519	0.75%	
2040	67,609	-0.05%	47,164	0.88%	52,925	1.75%	1,257	0.00%	1,851	0.00%	170,806	0.76%	
2010-2020 Average Yearly Growth (10 Years History)													
		-0.51%			0.37%			0.29%			-3.03%	0.40%	-0.12%
2015-2020 Average Yearly Growth (5 Years History)													
		0.33%			1.00%			-0.40%			-7.32%	0.28%	0.20%
2021-2026 Average Yearly Growth (5 Years)													
		0.01%			0.85%			1.71%			0.00%	0.00%	0.68%
2021-2031 Average Yearly Growth (10 Years)													
		-0.01%			0.86%			1.72%			0.00%	0.00%	0.69%
2021-2040 Average Yearly Growth (19 Years)													
		-0.03%			0.87%			1.74%			0.00%	0.00%	0.71%

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

YEAR	<u>Residential</u>		<u>Small C&amp;I</u>		<u>Large C&amp;I</u>		<u>Street Lighting</u>		<u>Miscellaneous</u>		<u>Total Sales</u>		<u>Total Energy Requirements</u>	
	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	MWh	% Change
2010	874,597		529,486		980,626		30,215		52,262		2,467,186		2,718,192	
2011	946,595	8.23%	606,453	14.54%	977,070	-0.36%	29,776	-1.45%	55,783	6.74%	2,615,677	6.02%	2,776,082	2.13%
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%	2,938,540	-3.39%	3,169,086	-4.01%
2021	1,025,767	-0.67%	769,990	7.82%	1,220,248	10.00%	18,804	1.15%	66,460	4.11%	3,101,269	5.54%	3,350,642	5.73%
2022	1,028,238	0.24%	782,897	1.68%	1,266,299	3.77%	18,804	0.00%	67,548	1.64%	3,163,787	2.02%	3,418,187	2.02%
2023	1,033,690	0.53%	796,194	1.70%	1,290,909	1.94%	18,804	0.00%	68,636	1.61%	3,208,234	1.40%	3,466,208	1.40%
2024	1,039,133	0.53%	808,832	1.59%	1,327,602	2.84%	18,804	0.00%	68,763	0.19%	3,263,134	1.71%	3,525,523	1.71%
2025	1,044,572	0.52%	822,049	1.63%	1,358,386	2.32%	18,804	0.00%	68,890	0.18%	3,312,701	1.52%	3,579,075	1.52%
2026	1,047,017	0.23%	834,346	1.50%	1,365,995	0.56%	18,804	0.00%	69,018	0.19%	3,335,181	0.68%	3,603,363	0.68%
2027	1,049,458	0.23%	847,559	1.58%	1,375,324	0.68%	18,804	0.00%	69,145	0.18%	3,360,291	0.75%	3,630,492	0.75%
2028	1,051,893	0.23%	860,009	1.47%	1,383,821	0.62%	18,804	0.00%	69,273	0.19%	3,383,800	0.70%	3,655,892	0.70%
2029	1,054,325	0.23%	873,089	1.52%	1,393,328	0.69%	18,804	0.00%	69,402	0.19%	3,408,949	0.74%	3,683,062	0.74%
2030	1,056,753	0.23%	886,187	1.50%	1,402,934	0.69%	18,804	0.00%	69,531	0.19%	3,434,210	0.74%	3,710,355	0.74%
2031	1,059,180	0.23%	899,281	1.48%	1,412,638	0.69%	18,804	0.00%	69,660	0.19%	3,459,564	0.74%	3,737,747	0.74%
2032	1,061,602	0.23%	912,344	1.45%	1,422,443	0.69%	18,804	0.00%	69,789	0.19%	3,484,982	0.73%	3,765,210	0.73%
2033	1,064,021	0.23%	925,383	1.43%	1,432,350	0.70%	18,804	0.00%	69,920	0.19%	3,510,478	0.73%	3,792,755	0.73%
2034	1,066,440	0.23%	938,424	1.41%	1,442,359	0.70%	18,804	0.00%	70,050	0.19%	3,536,078	0.73%	3,820,414	0.73%
2035	1,068,855	0.23%	951,440	1.39%	1,452,473	0.70%	18,804	0.00%	70,181	0.19%	3,561,753	0.73%	3,848,154	0.73%
2036	1,071,270	0.23%	964,423	1.36%	1,462,692	0.70%	18,804	0.00%	70,312	0.19%	3,587,501	0.72%	3,875,972	0.72%
2037	1,073,685	0.23%	977,434	1.35%	1,473,017	0.71%	18,804	0.00%	70,443	0.19%	3,613,384	0.72%	3,903,936	0.72%
2038	1,076,097	0.22%	990,436	1.33%	1,483,451	0.71%	18,804	0.00%	70,575	0.19%	3,639,364	0.72%	3,932,005	0.72%
2039	1,078,509	0.22%	1,003,485	1.32%	1,494,092	0.72%	18,804	0.00%	70,706	0.19%	3,665,597	0.72%	3,960,348	0.72%
2040	1,080,923	0.22%	1,016,559	1.30%	1,504,847	0.72%	18,804	0.00%	70,839	0.19%	3,691,973	0.72%	3,988,844	0.72%
2010-2020	Average Yearly Growth (10 Years History)		1.26%	2.44%	2.17%	-3.53%	2.09%	1.84%	1.75%					
2015-2020	Average Yearly Growth (5 Years History)		0.32%	-1.62%	0.35%	-9.28%	1.48%	-0.22%	-0.11%					
2021-2026	Average Yearly Growth (5 Years)		0.44%	1.62%	2.32%	0.00%	0.72%	1.49%	1.49%					
2021-2031	Average Yearly Growth (10 Years)		0.33%	1.56%	1.34%	0.00%	0.37%	1.05%	1.05%					
2021-2040	Average Yearly Growth (19 Years)		0.26%	1.47%	0.92%	0.00%	0.24%	0.84%	0.84%					

# Montana-Dakota Integrated System

## Historical and Forecasted Sales by Class



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

North Dakota						
Year	Sales (MWh) / <sup>*</sup>	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2010	632,068		63,619		9,935	
2011	687,465	8.76%	65,196	1,577	10,545	6.13%
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	774,857	-0.61%	79,067	255	9,800	-0.93%
2022	777,307	0.32%	79,317	250	9,800	0.00%
2023	782,746	0.70%	79,872	555	9,800	0.00%
2024	788,185	0.69%	80,427	555	9,800	0.00%
2025	793,624	0.69%	80,982	555	9,800	0.00%
2026	796,074	0.31%	81,232	250	9,800	0.00%
2027	798,524	0.31%	81,482	250	9,800	0.00%
2028	800,974	0.31%	81,732	250	9,800	0.00%
2029	803,424	0.31%	81,982	250	9,800	0.00%
2030	805,874	0.30%	82,232	250	9,800	0.00%
2031	808,324	0.30%	82,482	250	9,800	0.00%
2032	810,774	0.30%	82,732	250	9,800	0.00%
2033	813,224	0.30%	82,982	250	9,800	0.00%
2034	815,674	0.30%	83,232	250	9,800	0.00%
2035	818,124	0.30%	83,482	250	9,800	0.00%
2036	820,574	0.30%	83,732	250	9,800	0.00%
2037	823,024	0.30%	83,982	250	9,800	0.00%
2038	825,474	0.30%	84,232	250	9,800	0.00%
2039	827,924	0.30%	84,482	250	9,800	0.00%
2040	830,374	0.30%	84,732	250	9,800	0.00%
	<b>Sales</b>		<b>Custs</b>		<b>Use/Cust</b>	
2010-2020 Average Yearly Growth (10 Years History)	1.68%		2.32%		-0.62%	
2015-2020 Average Yearly Growth (5 Years History)	0.50%		0.35%		0.15%	
2021-2026 Average Yearly Growth (5 Years)	0.59%		0.59%		0.00%	
2021-2031 Average Yearly Growth (10 Years)	0.43%		0.43%		0.00%	
2021-2040 Average Yearly Growth (19 Years)	0.35%		0.35%		0.00%	

South Dakota						
Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2010	70,868		6,609		10,723	
2011	73,977	4.39%	6,602	(7)	11,205	4.50%
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	67,970	-0.44%	6,508	67	10,444	-1.47%
2022	67,991	0.03%	6,510	2	10,444	0.00%
2023	68,004	0.02%	6,511	1	10,444	0.00%
2024	68,008	0.01%	6,512	0	10,444	0.00%
2025	68,008	0.00%	6,512	-	10,444	0.00%
2026	68,003	-0.01%	6,511	(1)	10,444	0.00%
2027	67,994	-0.01%	6,510	(1)	10,444	0.00%
2028	67,979	-0.02%	6,509	(1)	10,444	0.00%
2029	67,961	-0.03%	6,507	(2)	10,444	0.00%
2030	67,939	-0.03%	6,505	(2)	10,444	0.00%
2031	67,916	-0.03%	6,503	(2)	10,444	0.00%
2032	67,888	-0.04%	6,500	(3)	10,444	0.00%
2033	67,857	-0.05%	6,497	(3)	10,444	0.00%
2034	67,826	-0.05%	6,494	(3)	10,444	0.00%
2035	67,791	-0.05%	6,491	(3)	10,444	0.00%
2036	67,756	-0.05%	6,488	(3)	10,444	0.00%
2037	67,721	-0.05%	6,484	(3)	10,444	0.00%
2038	67,683	-0.06%	6,481	(4)	10,444	0.00%
2039	67,645	-0.06%	6,477	(4)	10,444	0.00%
2040	67,609	-0.05%	6,473	(3)	10,444	0.00%
	<b>Sales</b>		<b>Custs</b>		<b>Use/Cust</b>	
2010-2020 Average Yearly Growth (10 Years History)	-0.51%		-0.28%		-0.23%	
2015-2020 Average Yearly Growth (5 Years History)	0.33%		-0.63%		0.97%	
2021-2026 Average Yearly Growth (5 Years)	0.009%		0.009%		0.00%	
2021-2031 Average Yearly Growth (10 Years)	-0.009%		-0.009%		0.00%	
2021-2040 Average Yearly Growth (19 Years)	-0.03%		-0.03%		0.00%	

Montana						
Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2010	171,661		18,716		9,172	
2011	185,153	7.86%	18,883	167	9,805	6.91%
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	195,573	5.84%	19,896	98	9,830	5.32%
2022	195,573	0.00%	19,896	-	9,830	0.00%
2023	195,573	0.00%	19,896	-	9,830	0.00%
2024	195,573	0.00%	19,896	-	9,830	0.00%
2025	195,573	0.00%	19,896	-	9,830	0.00%
2026	195,573	0.00%	19,896	-	9,830	0.00%
2027	195,573	0.00%	19,896	-	9,830	0.00%
2028	195,573	0.00%	19,896	-	9,830	0.00%
2029	195,573	0.00%	19,896	-	9,830	0.00%
2030	195,573	0.00%	19,896	-	9,830	0.00%
2031	195,573	0.00%	19,896	-	9,830	0.00%
2032	195,573	0.00%	19,896	-	9,830	0.00%
2033	195,573	0.00%	19,896	-	9,830	0.00%
2034	195,573	0.00%	19,896	-	9,830	0.00%
2035	195,573	0.00%	19,896	-	9,830	0.00%
2036	195,573	0.00%	19,896	-	9,830	0.00%
2037	195,573	0.00%	19,896	-	9,830	0.00%
2038	195,573	0.00%	19,896	-	9,830	0.00%
2039	195,573	0.00%	19,896	-	9,830	0.00%
2040	195,573	0.00%	19,896	-	9,830	0.00%
	<b>Sales</b>		<b>Custs</b>		<b>Use/Cust</b>	
2010-2020 Average Yearly Growth (10 Years History)	0.27%		0.59%		-0.32%	
2015-2020 Average Yearly Growth (5 Years History)	-0.41%		-0.35%		-0.06%	
2021-2026 Average Yearly Growth (5 Years)	0.00%		0.00%		0.00%	
2021-2031 Average Yearly Growth (10 Years)	0.00%		0.00%		0.00%	
2021-2040 Average Yearly Growth (19 Years)	0.00%		0.00%		0.00%	

<sup>\*</sup> 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**

<u>Year</u>	<u>Sales (MWh)</u>	<u>% Change</u>	<u>Avg Custs</u>	<u>Cust No Inc/(Dec)</u>	<u>Avg Use Per Cust (kWh/Yr)</u>	<u>% Change</u>
2010	874,597		88,944		9,833	
2011	946,595	8.23%	90,681	1,737	10,439	6.16%
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	1,038,400	0.55%	105,471	420	9,845	0.15%
2022	1,040,871	0.24%	105,723	252	9,845	0.00%
2023	1,046,323	0.52%	106,279	556	9,845	0.00%
2024	1,051,766	0.52%	106,835	555	9,845	0.00%
2025	1,057,205	0.52%	107,390	555	9,845	0.00%
2026	1,059,650	0.23%	107,639	249	9,844	0.00%
2027	1,062,091	0.23%	107,888	249	9,844	0.00%
2028	1,064,526	0.23%	108,137	249	9,844	0.00%
2029	1,066,958	0.23%	108,385	248	9,844	0.00%
2030	1,069,386	0.23%	108,633	248	9,844	0.00%
2031	1,071,813	0.23%	108,881	248	9,844	0.00%
2032	1,074,235	0.23%	109,128	247	9,844	0.00%
2033	1,076,654	0.23%	109,375	247	9,844	0.00%
2034	1,079,073	0.22%	109,622	247	9,844	0.00%
2035	1,081,488	0.22%	109,869	247	9,843	0.00%
2036	1,083,903	0.22%	110,116	247	9,843	0.00%
2037	1,086,318	0.22%	110,362	247	9,843	0.00%
2038	1,088,730	0.22%	110,609	246	9,843	0.00%
2039	1,091,142	0.22%	110,855	246	9,843	0.00%
2040	1,093,556	0.22%	111,101	247	9,843	0.00%

	<u>Sales</u>	<u>Custs</u>	<u>Use/Cust</u>
2010-2020 Average Yearly Growth (10 Years History)	1.26%	1.80%	-0.53%
2015-2020 Average Yearly Growth (5 Years History)	0.32%	0.16%	0.17%
2021-2026 Average Yearly Growth (5 Years)	0.44%	0.44%	0.00%
2021-2031 Average Yearly Growth (10 Years)	0.32%	0.32%	0.00%
2021-2040 Average Yearly Growth (19 Years)	0.26%	0.26%	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 2020 study results indicated that each one degree increase in temperature at the time of summer peak would result in an increase of approximately 7.0 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 1990 through 2019 (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**

<u>Probability</u>	<u>Weighted Average Temperature</u>	<u>Approximate Increase in Summer Peak Demand (MW)</u>
50%	96.0	0.0
75%	100.0	28.0
80%	101.0	35.0
85%	102.1	42.7
90%	103.6	53.2
95%	105.7	67.9
97%	107.1	77.7

\*/ Using 7.0 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 103.6°F. At this temperature, 53.2 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 2021 90/10 forecasted demand is calculated to be the 2021 50/50 forecasted demand plus 53.2 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

<u>Year</u>	<u>Base Forecast (96.0 degrees F) 50/50 Forecast (MW)</u>	<u>Growth Rate</u>	<u>Alternate Forecast (103.6 degrees F) 90/10 Forecast (MW) */</u>
2021	586.0		639.2
2022	595.1	1.55%	649.1
2023	602.5	1.25%	657.2
2024	610.8	1.38%	666.3
2025	618.8	1.30%	675.0
2026	624.2	0.88%	680.9
2027	629.8	0.90%	687.0
2028	635.3	0.88%	693.0
2029	640.9	0.88%	699.1
2030	646.6	0.89%	705.3
2031	652.3	0.87%	711.4
2032	658.0	0.88%	717.6
2033	663.7	0.87%	723.8
2034	669.3	0.85%	729.9
2035	675.0	0.85%	736.1
2036	680.7	0.85%	742.3
2037	686.4	0.84%	748.5
2038	692.2	0.85%	754.8
2039	697.9	0.82%	761.0
2040	703.7	0.83%	767.3

\*/ 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)**

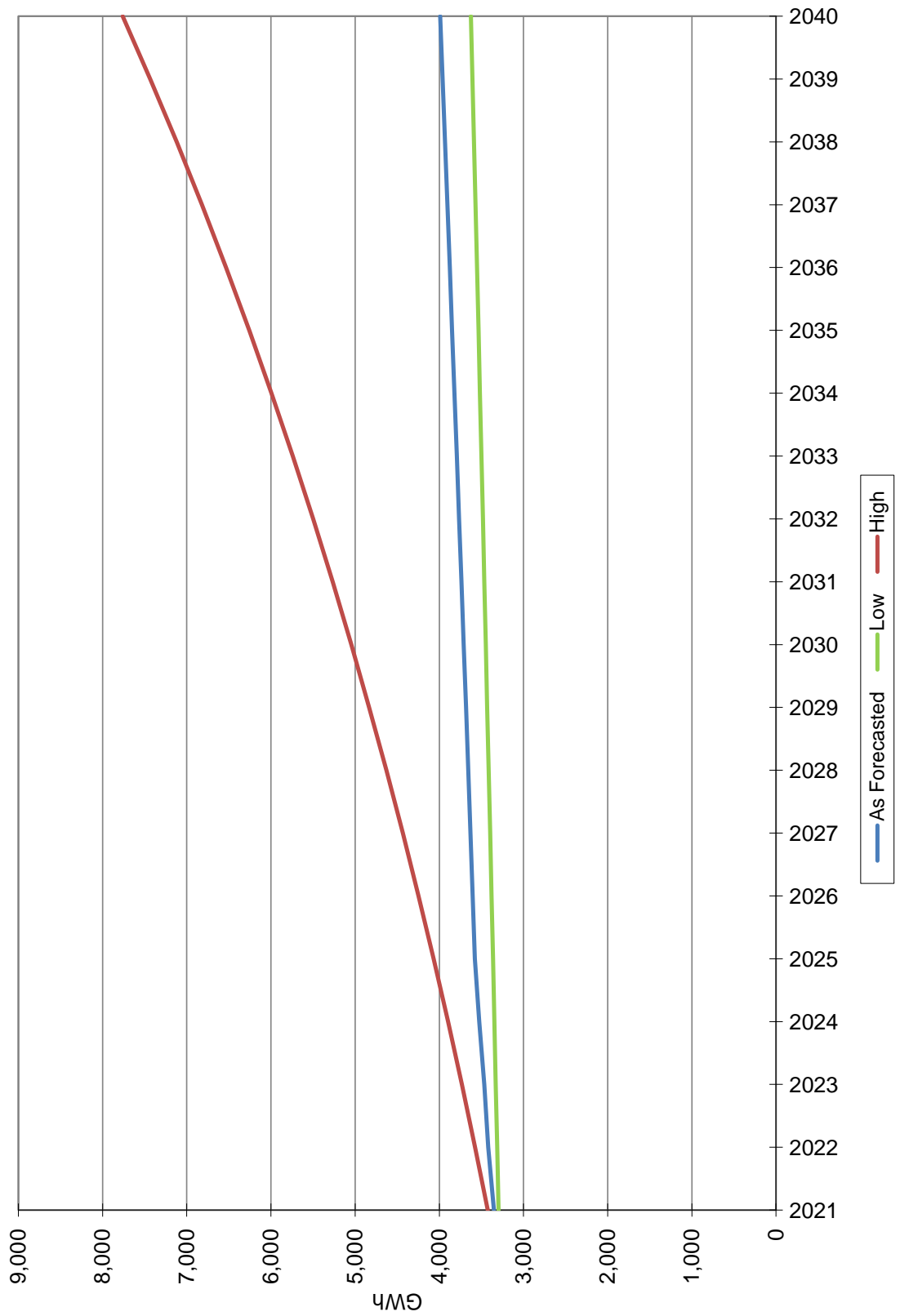
	<b>ENERGY</b>			<b>DEMAND</b>		
	<u>Forecast</u>	<u>HIGH 1/</u>	<u>LOW 2/</u>	<u>Forecast</u>	<u>HIGH</u>	<u>LOW</u>
2021	3,350.6	3,424.6	3,296.7	586.0	597.3	575.0
2022	3,418.2	3,575.3	3,313.2	595.1	622.4	576.8
2023	3,466.2	3,732.6	3,329.8	602.5	648.8	578.8
2024	3,525.5	3,896.8	3,346.4	610.8	677.0	581.4
2025	3,579.1	4,068.3	3,363.1	618.8	701.4	579.9
2026	3,603.4	4,247.3	3,379.9	624.2	735.7	585.5
2027	3,630.5	4,434.2	3,396.8	629.8	769.2	589.3
2028	3,655.9	4,629.3	3,413.8	635.3	806.7	594.9
2029	3,683.1	4,833.0	3,430.9	640.9	838.8	595.4
2030	3,710.4	5,045.7	3,448.1	646.6	879.4	600.9
2031	3,737.7	5,267.7	3,465.3	652.3	919.2	604.7
2032	3,765.2	5,499.5	3,482.6	658.0	963.7	610.2
2033	3,792.8	5,741.5	3,500.0	663.7	1001.9	610.8
2034	3,820.4	5,994.1	3,517.5	669.3	1050.1	616.2
2035	3,848.2	6,257.8	3,535.1	675.0	1097.7	620.1
2036	3,876.0	6,533.1	3,552.8	680.7	1150.5	625.6
2037	3,903.9	6,820.6	3,570.6	686.4	1195.9	626.1
2038	3,932.0	7,120.7	3,588.5	692.2	1253.6	631.7
2039	3,960.3	7,434.0	3,606.4	697.9	1310.1	635.5
2040	3,988.8	7,761.1	3,624.4	703.7	1373.0	641.2

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

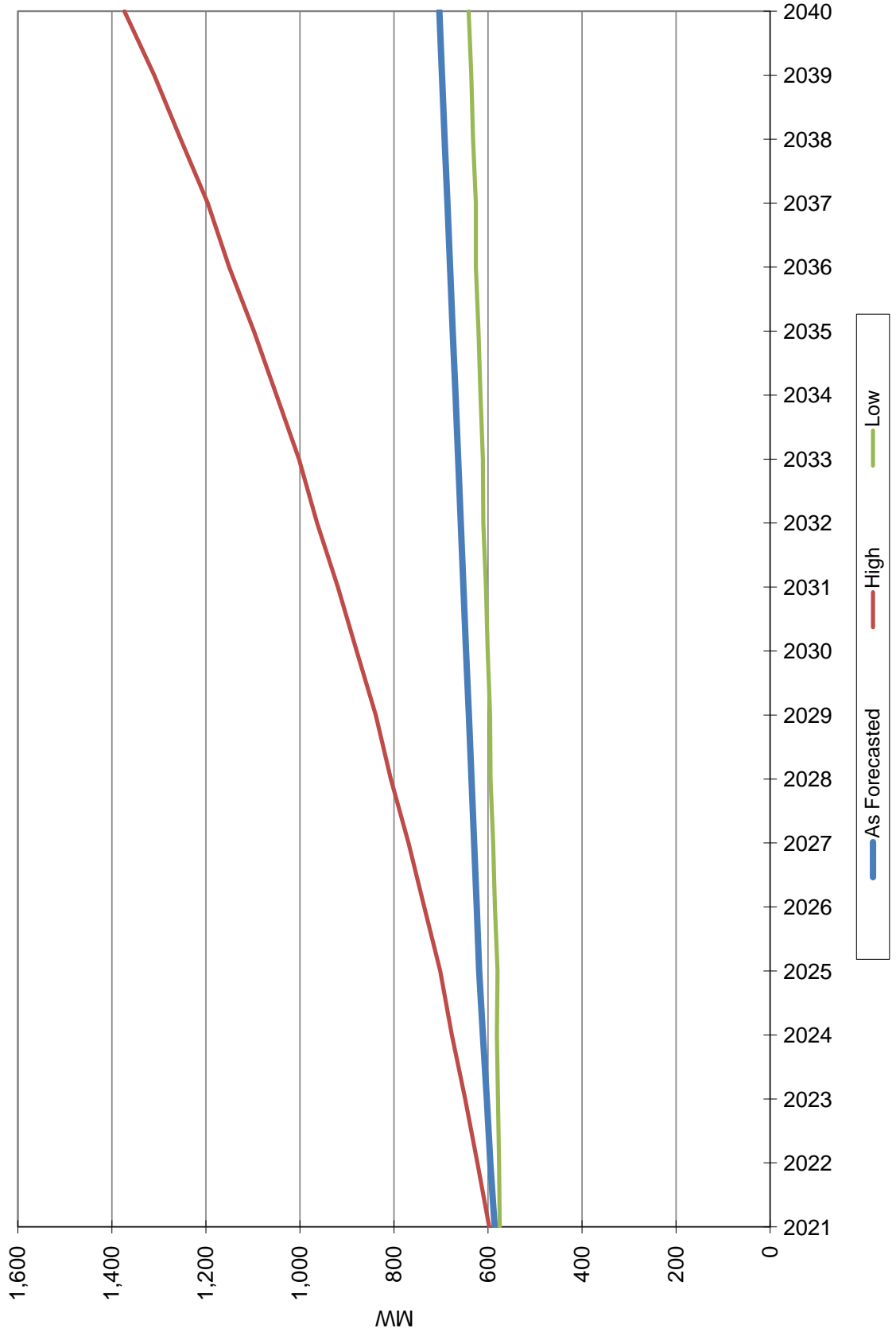
2/ Low forecast assumes 0.5% growth per year (actual 85-93 growth).

# Montana-Dakota Integrated System

## High-Growth and Low-Growth Scenarios - Energy in GWh



# Montana-Dakota Integrated System High-Growth and Low-Growth Scenarios - Demand in MW



## **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 2015-2019 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 2005 through April 2020. (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)**

	<b>Summer Season</b>					
	<b>ND</b>		<b>SD</b>		<b>MT</b>	
MAY	(6)	0.7160	(6)	0.6328	(6)	0.6878
JUNE	(3)	0.8972	(3)	0.8610	(3)	0.8870
JULY	(1)	0.9758	(1)	0.9599	(1)	0.9836
AUGUST	(2)	0.9695	(2)	0.9199	(2)	<u>0.9464</u>
SEPTEMBER	(4)	0.8458	(4)	0.7918	(4)	0.8362
OCTOBER	(5)	0.7207	(5)	0.7330	(5)	0.7048

	<b>Winter Season</b>					
	<b>ND</b>		<b>SD</b>		<b>MT</b>	
NOV	(4)	0.8666	(4)	0.8774	(4)	0.8904
DEC	(2)	0.9464	(2)	0.9444	(2)	0.9640
JAN	(1)	0.9868	(1)	0.9489	(1)	0.9311
FEB	(3)	0.9262	(3)	0.9286	(3)	0.9298
MARCH	(5)	0.8659	(5)	0.8769	(5)	0.8584
APRIL	(6)	0.7648	(6)	0.7505	(6)	0.7586

3. For each season, the monthly ratios determined in Step 1 for the May 2015 through April 2020 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	0.9235	August	0.9578
March	0.8237	September	0.8791
April	0.7629	October	0.7588
May	0.6992	November	0.8567
June	0.9129	December	0.9666

**SD 5-Year Average Monthly Ratios of Seasonal Peaks**

January	1.0000	July	1.0000
February	0.9133	August	0.9146
March	0.8485	September	0.7829
April	0.7594	October	0.6805
May	0.5879	November	0.8797
June	0.8553	December	0.9613

**MT 5-Year Average Monthly Ratios of Seasonal Peaks**

January	1.0000 */	July	1.0000
February	0.9296	August	0.9485
March	0.8267	September	0.8164
April	0.7752	October	0.7411
May	0.6797	November	0.8811
June	0.8604	December	0.9667

\*/ 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 2040 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 2021-2030, 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.

# **APPENDIX A**

## **Integrated System Historical Data**

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

<u>Year</u>	<u>Residential</u>	<u>Small C&amp;I</u>	<u>Large C&amp;I</u>	<u>Street Lighting</u>	<u>Other Public Sales</u>	<u>Interdepartmental</u>	<u>Company Use</u>	<u>Unbilled</u>	<u>Total</u>
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

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

<u>Year</u>	<u>Residential</u>	<u>Small C&amp;I</u>	<u>Large C&amp;I</u>	<u>Street Lighting</u>	<u>Other Public Sales</u>	<u>Interdepartmental</u>	<u>Company Use</u>	<u>Unbilled</u>	<u>Total</u>
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

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

<u>Year</u>	<u>Residential</u>	<u>Small C&amp;I</u>	<u>Large C&amp;I</u>	<u>Street Lighting</u>	<u>Other Public Sales</u>	<u>Interdepartmental</u>	<u>Company Use</u>	<u>Unbilled</u>	<u>Total</u>
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

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

<u>Year</u>	<u>Residential</u>	<u>Small C&amp;I</u>	<u>Large C&amp;I</u>	<u>Street Lighting</u>	<u>Other Public Sales</u>	<u>Interdepartmental</u>	<u>Company Use</u>	<u>Unbilled</u>	<u>Total</u>
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



**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).

Year	SUMMER			WINTER			Annual load Factor
	MW	Month	Load Factor	MW	2/ Month	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				

2/ January and February is of the following year.

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

<u>Year</u>	<u>SUMMER</u>				<u>WINTER</u>			
	<u>ND</u>	<u>SD</u>	<u>MT</u>	<u>Int Sys</u>	<u>ND</u>	<u>SD</u>	<u>MT</u>	<u>Int Sys</u>
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				

\* Winter peak is in the following year.

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

**North Dakota**

<b>Sales</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>December</b>
Residential	0.119670	0.102141	0.102537	0.077845	0.064486	0.068215	0.077863	0.090410	0.071726	0.064486	0.067248	0.093375
Small C&I	0.102908	0.089994	0.097996	0.079908	0.072851	0.075574	0.078474	0.085068	0.076581	0.076193	0.073037	0.091417
Large C&I	0.091581	0.080509	0.089167	0.078510	0.075696	0.081263	0.083727	0.092057	0.084052	0.083191	0.073895	0.086351
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	0.084921	0.072589	0.082238	0.074417	0.074408	0.089954	0.093711	0.110692	0.088689	0.080280	0.068066	0.080036
Interdepartmental	0.111478	0.095818	0.102634	0.088432	0.081650	0.076601	0.068509	0.070689	0.067038	0.072947	0.073616	0.090587
Company Use	0.091882	0.080706	0.091955	0.079701	0.076888	0.082493	0.086470	0.091884	0.082187	0.080954	0.071542	0.083338
Tesoro Refinery	0.087308	0.074260	0.087613	0.083375	0.073850	0.084030	0.082775	0.092179	0.088436	0.087969	0.076453	0.081752
Westmoreland Coal	0.102597	0.098181	0.101538	0.085735	0.069902	0.064944	0.068623	0.075376	0.073190	0.078661	0.082452	0.098801
<b>Customers</b>												
Residential	0.996024	0.998034	0.998719	0.997773	0.997940	0.999080	0.999343	1.000862	1.001514	1.002258	1.003631	1.004820
Small C&I	0.991514	0.992929	0.994124	0.995994	0.999075	1.000911	1.001753	1.001904	1.013372	1.011267	0.998722	0.998435
Large C&I	0.963154	0.965990	0.972724	0.980521	0.989559	0.996825	1.004091	1.014015	1.035812	1.036166	1.020749	1.020394
Street Lighting	0.987046	0.987442	0.988235	0.989822	0.991011	0.996167	0.997753	1.002512	1.009253	1.014805	1.015995	1.019960
Other Public Sales	0.996608	0.996931	0.997577	1.001777	1.003715	1.003715	1.002100	1.001454	1.016314	1.009207	0.988855	0.981748
<b>Peak Demand</b>	1.0000	0.9235	0.8237	0.7629	0.6992	0.9129	1.0000	0.9578	0.8791	0.7588	0.8567	0.9666

**South Dakota**

<b>Sales</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>December</b>
Residential	0.119470	0.102493	0.104717	0.080586	0.065918	0.066471	0.076014	0.089697	0.071133	0.063964	0.066633	0.092904
Small C&I	0.112621	0.098789	0.106055	0.082288	0.069721	0.068809	0.072779	0.085783	0.072913	0.067107	0.068754	0.094381
Large C&I	0.091677	0.078213	0.085342	0.076498	0.075824	0.076626	0.077665	0.089537	0.085412	0.083188	0.081779	0.098239
Street Lighting	0.095261	0.082165	0.085852	0.081112	0.080430	0.083718	0.077973	0.082688	0.079545	0.084185	0.078351	0.088720
Other Public Sales	0.092002	0.087156	0.093889	0.085655	0.083538	0.083846	0.077527	0.089744	0.076828	0.074485	0.069870	0.085459
Interdepartmental	0.177758	0.150884	0.116486	0.077397	0.053161	0.043194	0.048959	0.052086	0.047200	0.052673	0.072804	0.107398
Company Use	0.150904	0.175568	0.176847	0.107940	0.066402	0.037605	0.032412	0.040598	0.034848	0.030976	0.045872	0.100029
<b>Customers</b>												
Residential	0.998093	0.998032	0.997971	0.998583	0.999349	0.998982	0.998920	0.999900	1.010376	1.008140	0.996531	0.995122
Small C&I	0.984921	0.985349	0.985349	0.992839	1.001186	1.006858	1.006858	1.005573	1.024728	1.018629	0.994016	0.993695
Large C&I	0.987186	0.989084	0.989084	0.990982	0.996678	0.996678	1.000475	1.000475	1.015662	1.019459	1.006170	1.008068
Street Lighting	0.975223	0.975223	0.975223	0.975223	0.987116	0.987116	0.987116	0.987116	0.999009	1.058474	1.046581	1.046581
Other Public Sales	0.993192	0.993192	0.993192	0.988893	1.006091	1.006091	1.006091	1.006091	1.023289	1.014690	0.980294	0.988893
<b>Peak Demand</b>	1.0000	0.9133	0.8485	0.7594	0.5879	0.8553	1.0000	0.9146	0.7829	0.6805	0.8797	0.9613

**Montana**

<b>Sales</b>	<b>January</b>	<b>February</b>	<b>March</b>	<b>April</b>	<b>May</b>	<b>June</b>	<b>July</b>	<b>August</b>	<b>September</b>	<b>October</b>	<b>November</b>	<b>December</b>
Residential	0.114012	0.097411	0.099904	0.075322	0.063639	0.068077	0.081206	0.101781	0.078659	0.065682	0.065352	0.088955
Small C&I	0.098105	0.086742	0.094348	0.076419	0.068768	0.074991	0.084243	0.100844	0.084633	0.075982	0.069359	0.085567
Large C&I	0.094943	0.083001	0.089934	0.079829	0.077841	0.081308	0.079399	0.083273	0.078861	0.083514	0.078945	0.089151
Street Lighting	0.102103	0.085363	0.092205	0.085202	0.080754	0.081945	0.075498	0.079858	0.076629	0.078757	0.073156	0.088532
Other Public Sales	0.082754	0.072544	0.082975	0.072013	0.070929	0.087936	0.105595	0.122095	0.100209	0.077742	0.056114	0.069095
Interdepartmental	0.109922	0.097352	0.098593	0.080485	0.071758	0.072331	0.070558	0.079237	0.073771	0.077001	0.074907	0.094085
Company Use	0.123919	0.097396	0.101340	0.091887	0.068881	0.065204	0.071506	0.086413	0.074645	0.066944	0.066384	0.085479
Oil Fields	0.092380	0.078502	0.085556	0.083305	0.080196	0.083296	0.081681	0.082597	0.081353	0.084973	0.079912	0.086251
Westmoreland Coal	0.127966	0.110426	0.109752	0.088270	0.068167	0.060754	0.060312	0.059487	0.053554	0.068750	0.082387	0.110175
<b>Customers</b>												
Residential	1.002334	1.002354	1.002624	1.001924	1.000665	0.999235	0.998236	0.998226	0.997726	0.997656	0.999095	0.999925
Small C&I	0.986921	0.986694	0.986089	0.996193	1.004746	1.007660	1.008909	1.008909	1.014094	1.007736	0.997442	0.994604
Large C&I	0.985113	0.984372	0.987337	0.995491	1.001421	1.002903	1.002903	1.011057	1.038483	1.023658	0.985113	0.982148
Street Lighting	1.006524	1.006524	1.006524	1.000932	0.995340	1.000932	1.000932	0.989748	0.995340	0.989748	1.000932	1.006524
Other Public Sales	0.997821	0.993797	0.993797	0.997821	0.997821	0.997821	0.999832	0.999832	1.013915	1.007879	0.999832	0.999832
<b>Peak Demand</b>	1.0000	0.9296	0.8267	0.7752	0.6797	0.8604	1.0000	0.9485	0.8164	0.7411	0.8811	0.9667

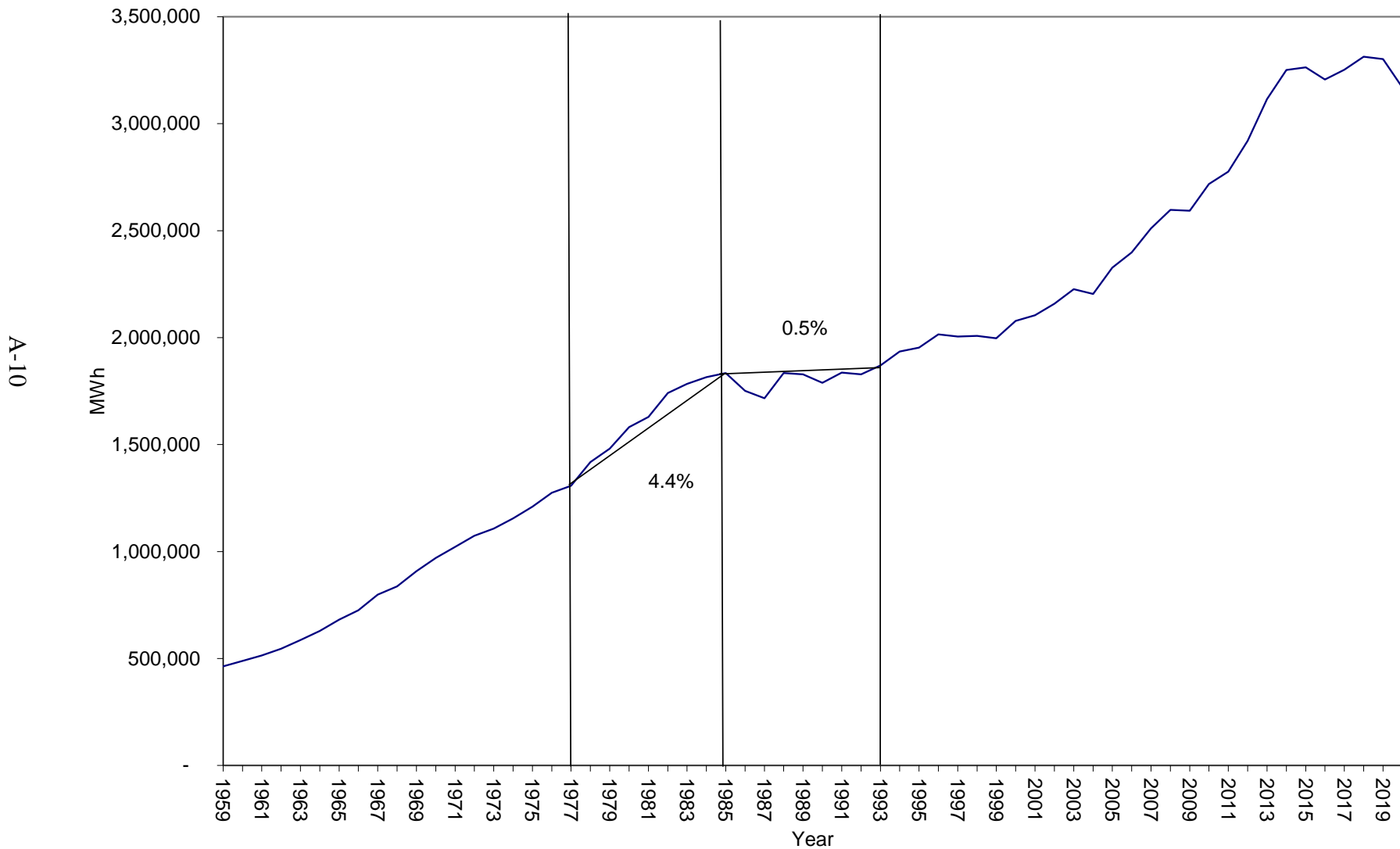
**Montana-Dakota Utilities Co.**  
**Billing-Month to Calendar-Month Allocation Factors**

	<u>January</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>	<u>November</u>	<u>December</u>
<b><u>Residential</u></b>												
North Dakota	60.8%	64.2%	61.8%	64.4%	64.4%	62.2%	58.6%	61.2%	62.6%	60.6%	63.7%	64.4%
South Dakota	67.1%	72.1%	70.0%	71.5%	65.4%	69.0%	64.8%	70.1%	68.6%	66.3%	67.2%	68.9%
Montana	58.7%	62.3%	58.4%	59.8%	61.3%	55.0%	57.6%	60.3%	59.9%	58.6%	60.8%	61.1%
<b><u>Small Commercial &amp; Industrial</u></b>												
North Dakota	59.4%	62.3%	58.4%	61.3%	61.3%	60.3%	57.0%	58.0%	59.5%	57.9%	62.6%	62.7%
South Dakota	69.7%	75.1%	72.5%	73.4%	63.4%	70.2%	67.3%	71.3%	68.7%	68.6%	70.4%	72.0%
Montana	53.5%	56.5%	52.5%	53.6%	55.1%	52.0%	51.7%	54.8%	53.5%	53.1%	54.8%	54.9%
<b><u>Large Commercial &amp; Industrial</u></b>												
North Dakota	62.3%	65.6%	60.8%	64.2%	63.9%	64.1%	61.9%	62.5%	63.6%	62.9%	66.7%	66.1%
South Dakota	75.9%	79.4%	77.5%	78.9%	65.4%	78.3%	77.4%	79.2%	76.2%	76.8%	77.4%	77.8%
Montana	37.7%	38.3%	34.0%	35.1%	35.1%	41.1%	34.1%	35.7%	34.5%	34.8%	36.3%	37.9%
<b><u>Street Lighting</u></b>												
North Dakota	58.0%	60.9%	56.6%	58.9%	59.3%	59.2%	55.1%	55.9%	56.5%	55.9%	60.7%	60.4%
South Dakota	69.4%	71.6%	68.1%	69.3%	62.3%	70.2%	66.9%	68.6%	66.8%	67.3%	70.8%	71.1%
Montana	59.1%	65.2%	60.4%	60.9%	62.3%	59.5%	58.5%	59.1%	60.8%	60.1%	63.5%	60.7%
<b><u>Other Public Sales</u></b>												
North Dakota	58.8%	62.4%	57.5%	59.1%	58.6%	59.0%	56.3%	57.2%	57.7%	56.1%	61.0%	61.5%
South Dakota	88.6%	92.1%	89.4%	91.4%	58.7%	89.2%	85.0%	86.9%	85.6%	85.8%	88.9%	85.8%
Montana	58.8%	61.9%	57.6%	58.5%	58.4%	53.4%	55.8%	59.7%	56.7%	58.1%	60.7%	60.3%
<b><u>Interdepartmental</u></b>												
North Dakota	67.3%	73.1%	71.3%	73.4%	74.5%	73.0%	69.9%	71.4%	72.8%	70.8%	73.8%	72.8%
South Dakota	27.2%	26.5%	22.5%	24.9%	70.3%	27.5%	24.3%	23.9%	24.2%	24.3%	25.2%	27.2%
Montana	59.8%	64.1%	60.7%	62.5%	64.4%	65.6%	61.0%	61.0%	61.9%	62.6%	64.7%	64.2%
<b><u>Company Use</u></b>												
North Dakota	55.2%	57.1%	52.3%	55.2%	55.0%	54.6%	50.7%	51.8%	52.8%	51.5%	57.0%	57.1%
South Dakota	90.3%	94.5%	91.4%	93.4%	58.7%	92.6%	87.7%	89.8%	76.1%	73.8%	68.8%	73.3%
Montana	59.5%	64.4%	60.0%	61.1%	64.4%	55.3%	60.0%	63.1%	61.4%	60.9%	65.4%	63.4%

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

<u>Year</u>	<u>Total Requirements</u>	<u>%Inc/Dec</u>
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%

# Montana-Dakota Integrated System Total Energy Requirements



## **APPENDIX B**

### **Integrated System Historical and Forecasted Exogenous Variables**

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

<u>Year</u>	<u>Residential Prices</u>			<u>Small C&amp;I Prices</u>			<u>Large C&amp;I Prices</u>		
	<u>MT</u>	<u>ND</u>	<u>SD</u>	<u>MT</u>	<u>ND</u>	<u>SD</u>	<u>MT</u>	<u>ND</u>	<u>SD</u>
1991	7.426	6.955	9.103	6.205	7.908	8.602	4.769	5.702	6.349
1992	7.469	6.953	9.197	6.278	7.890	8.597	4.766	5.604	6.294
1993	7.449	6.918	9.102	6.245	7.897	8.581	4.773	5.502	6.252
1994	7.432	6.930	8.940	6.186	7.741	8.439	4.743	5.472	6.260
1995	7.422	6.795	8.815	6.208	7.617	8.347	4.777	5.426	6.134
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

**SOURCE:**

1991-2019: 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**

<u>Year</u>	<u>Residential Price</u>	<u>Firm Price</u>
1991	4.57	4.20
1992	4.84	4.46
1993	5.05	4.69
1994	4.86	4.43
1995	4.38	3.91
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

SOURCE:  
1991-2019: CSBE Rate Reporting Class R  
Gas Year-to-Date Report for Y

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

	<b>HDD</b>		<b>CDD</b>	
	<b><u>MT &amp; ND</u></b>	<b><u>SD</u></b>	<b><u>MT &amp; ND</u></b>	<b><u>SD</u></b>
1991	8,052	7,650	709	826
1992	8,162	7,771	255	289
1993	9,144	8,650	217	415
1994	8,866	8,474	432	612
1995	9,027	8,926	522	622
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
NORMAL	8,558	8,534	520	525

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

<u>Year</u>	<u>Montana</u>	<u>North Dakota</u>	<u>South Dakota</u>
1991	1,523,131	4,809,892	703,231
1992	1,598,189	5,220,819	765,668
1993	1,636,426	5,335,176	776,958
1994	1,588,280	5,412,533	708,749
1995	1,565,635	5,355,823	722,810
1996	1,575,746	5,813,385	811,231
1997	1,574,043	5,567,230	780,437
1998	1,652,587	6,076,583	864,339
1999	1,665,969	6,107,009	890,294
2000	1,657,843	6,520,311	952,672
2001	1,729,208	6,753,255	960,715
2002	1,675,863	6,587,290	807,029
2003	1,809,970	7,148,891	972,063
2004	1,835,962	7,173,616	976,099
2005	1,874,441	7,527,785	987,375
2006	1,859,774	7,724,932	782,690
2007	2,043,731	8,374,460	1,004,951
2008	2,161,261	9,269,713	1,133,266
2009	2,152,947	9,516,434	1,039,761
2010	2,360,494	10,697,199	1,088,216
2011	2,488,409	12,386,443	1,324,459
2012	2,816,833	14,805,307	1,345,127
2013	2,875,420	15,161,971	1,302,253
2014	2,954,178	16,684,375	1,254,587
2015	2,843,527	15,700,123	1,131,391
2016	2,576,326	14,152,381	1,020,178
2017	2,570,283	13,953,887	1,027,006
2018	2,641,370	14,461,811	1,098,388
2019	2,717,003	14,909,808	1,126,264

**SOURCES:**

1991-2018: U.S. Dept. of Commerce

2019: Woods & Poole Economics, Inc.

**Integrated System**  
**Personal Consumption Expenditure Deflator**

<u>Year</u>	<u>Personal Consumption Expenditure Deflator (2012 = 100)</u>	<u>Inflation Rate</u>
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	103.05	0.2%
2016	104.09	1.0%
2017	105.93	1.8%
2018	108.14	2.1%
2019	109.65	1.4%
2020	110.39	0.7%
2021	112.77	2.2%
2022	115.40	2.3%
2023	118.28	2.5%
2024	121.42	2.7%
2025	124.83	2.8%
2026	128.49	2.9%
2027	132.40	3.0%
2028	136.56	3.1%
2029	140.94	3.2%
2030	145.55	3.3%
2031	150.36	3.3%
2032	155.36	3.3%
2033	160.55	3.3%
2034	165.95	3.4%
2035	171.54	3.4%
2036	177.35	3.4%
2037	183.36	3.4%
2038	189.59	3.4%
2039	196.04	3.4%
2040	202.72	3.4%

**SOURCES:**

1991-2018 U.S. Department of Commerce  
2019-2040 Woods & Poole Economics, Inc.

**Households and Customers for Service Territory Counties**

Year	Montana		North Dakota		South Dakota	
	Number of Households	Average Customers	Number of Households	Average Customers	Number of Households	Average Customers
1991	24,091	18,594	77,087	57,076	11,956	6,885
1992	24,049	18,557	77,651	57,305	11,846	6,868
1993	23,940	18,552	77,781	57,586	11,661	6,900
1994	23,950	18,534	78,009	57,794	11,681	6,914
1995	24,045	18,597	78,348	58,130	11,660	6,912
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	26,040	19,896	105,609	78,567	11,025	6,442
2020	26,228	19,896	107,231	78,817	11,072	6,505
2021	26,412	19,896	108,847	79,067	11,117	6,508
2022	26,550	19,896	110,302	79,317	11,146	6,510
2023	26,665	19,896	111,658	79,872	11,163	6,511
2024	26,755	19,896	112,935	80,427	11,168	6,512
2025	26,828	19,896	114,150	80,982	11,168	6,512
2026	26,885	19,896	115,311	81,232	11,161	6,511
2027	26,931	19,896	116,427	81,482	11,149	6,510
2028	26,964	19,896	117,503	81,732	11,129	6,509
2029	26,980	19,896	118,525	81,982	11,106	6,507
2030	26,986	19,896	119,495	82,232	11,077	6,505
2031	26,983	19,896	120,431	82,482	11,046	6,503
2032	26,969	19,896	121,325	82,732	11,009	6,500
2033	26,945	19,896	122,183	82,982	10,969	6,497
2034	26,917	19,896	123,021	83,232	10,928	6,494
2035	26,881	19,896	123,834	83,482	10,883	6,491
2036	26,843	19,896	124,634	83,732	10,837	6,488
2037	26,803	19,896	125,423	83,982	10,792	6,484
2038	26,760	19,896	126,198	84,232	10,743	6,481
2039	26,714	19,896	126,971	84,482	10,694	6,477
2040	26,671	19,896	127,756	84,732	10,648	6,473

\*/ 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

1991-2019: Actuals from Montana-Dakota Utilities Co. Customer Information System Active Customers Report

2020-2040: Montana-Dakota forecast

**Integrated System  
Employment Data  
Total Employment less Farming and Mining Employment**

Year	Montana				North Dakota				South Dakota	
	Number of Employees	Growth Rate	Adjusted Employment	Growth Rate	Number of Employees	Growth Rate	Adjusted Employment	Growth Rate	Number of Employees	Growth Rate
1991	28,907				99,873				11,332	
1992	28,608	-1.03%			101,097	1.23%			11,321	-0.10%
1993	29,119	1.79%			103,952	2.82%			11,396	0.66%
1994	30,469	4.64%			108,742	4.61%			12,276	7.72%
1995	30,203	-0.87%			109,356	0.56%			12,013	-2.14%
1996	30,110	-0.31%			111,578	2.03%			12,250	1.97%
1997	30,456	1.15%			113,382	1.62%			12,141	-0.89%
1998	30,879	1.39%			115,817	2.15%			12,250	0.90%
1999	30,693	-0.60%			116,968	0.99%			12,224	-0.21%
2000	30,708	0.05%			119,272	1.97%			12,411	1.53%
2001	30,199	-1.66%			119,114	-0.13%			12,163	-2.00%
2002	30,149	-0.17%			120,576	1.23%			12,158	-0.04%
2003	30,335	0.62%			121,968	1.15%			11,849	-2.54%
2004	30,475	0.46%			124,627	2.18%			11,972	1.04%
2005	30,631	0.51%			127,435	2.25%			12,010	0.32%
2006	30,874	0.79%			131,649	3.31%			12,148	1.15%
2007	31,588	2.31%			134,585	2.23%			12,196	0.40%
2008	32,029	1.40%			137,596	2.24%			12,266	0.57%
2009	32,267	0.74%			139,826	1.62%			12,368	0.83%
2010	32,664	1.23%			144,307	3.20%			12,384	0.13%
2011	33,935	3.89%			155,925	8.05%			12,409	0.20%
2012	34,859	2.72%			172,061	10.35%			12,457	0.39%
2013	35,768	2.61%			182,891	6.29%			12,760	2.43%
2014	35,853	0.24%			193,399	5.75%			12,877	0.92%
2015	35,022	-2.32%			190,737	-1.38%			12,793	-0.65%
2016	33,605	-4.05%			179,216	-6.04%			12,755	-0.30%
2017	33,315	-0.86%			177,258	-1.09%			12,713	-0.33%
2018	33,008	-0.92%			178,142	0.50%			12,759	0.36%
2019	33,303	0.89%			181,655	1.97%			12,881	0.96%
2020	33,536	0.70%	33,414	0.33%	184,783	1.72%	183,583	1.06%	12,963	0.64%
2021	33,818	0.84%	33,524	0.33%	188,288	1.90%	185,511	1.05%	13,081	0.91%
2022	34,074	0.76%	33,635	0.33%	191,706	1.82%	187,439	1.04%	13,180	0.76%
2023	34,303	0.67%	33,745	0.33%	195,007	1.72%	189,366	1.03%	13,261	0.61%
2024	34,527	0.65%	33,856	0.33%	198,245	1.66%	191,294	1.02%	13,345	0.63%
2025	34,735	0.60%	33,966	0.32%	201,488	1.64%	193,222	1.01%	13,417	0.54%
2026	34,931	0.56%	34,077	0.33%	204,775	1.63%	195,150	1.00%	13,498	0.60%
2027	35,141	0.60%	34,187	0.32%	208,040	1.59%	197,078	0.99%	13,566	0.50%
2028	35,335	0.55%	34,298	0.32%	211,303	1.57%	199,006	0.98%	13,634	0.50%
2029	35,513	0.50%	34,408	0.32%	214,579	1.55%	200,933	0.97%	13,703	0.51%
2030	35,694	0.51%	34,519	0.32%	217,850	1.52%	202,861	0.96%	13,763	0.44%
2031	35,873	0.50%	34,629	0.32%	221,144	1.51%	204,789	0.95%	13,833	0.51%
2032	36,043	0.47%	34,740	0.32%	224,469	1.50%	206,717	0.94%	13,891	0.42%
2033	36,206	0.45%	34,850	0.32%	227,778	1.47%	208,645	0.93%	13,951	0.43%
2034	36,369	0.45%	34,961	0.32%	231,113	1.46%	210,573	0.92%	14,001	0.36%
2035	36,526	0.43%	35,071	0.31%	234,471	1.45%	212,500	0.92%	14,067	0.47%
2036	36,672	0.40%	35,182	0.32%	237,843	1.44%	214,428	0.91%	14,119	0.37%
2037	36,825	0.42%	35,292	0.31%	241,229	1.42%	216,356	0.90%	14,174	0.39%
2038	36,975	0.41%	35,403	0.31%	244,637	1.41%	218,284	0.89%	14,229	0.39%
2039	37,112	0.37%	35,514	0.31%	248,086	1.41%	220,212	0.88%	14,279	0.35%
2040	37,255	0.39%	35,624	0.31%	251,525	1.39%	222,140	0.88%	14,332	0.37%

**SOURCES:**

Number of Employees:

1991-2018: U.S. Department of Commerce

2019-2040: Estimated and projected by Woods & Poole Economics, Inc.

Adjusted Employment:

2020-2040: For Montana and North Dakota, employment was tied to the growth in residential customers by running a regression on the historical (1984-2018) 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.

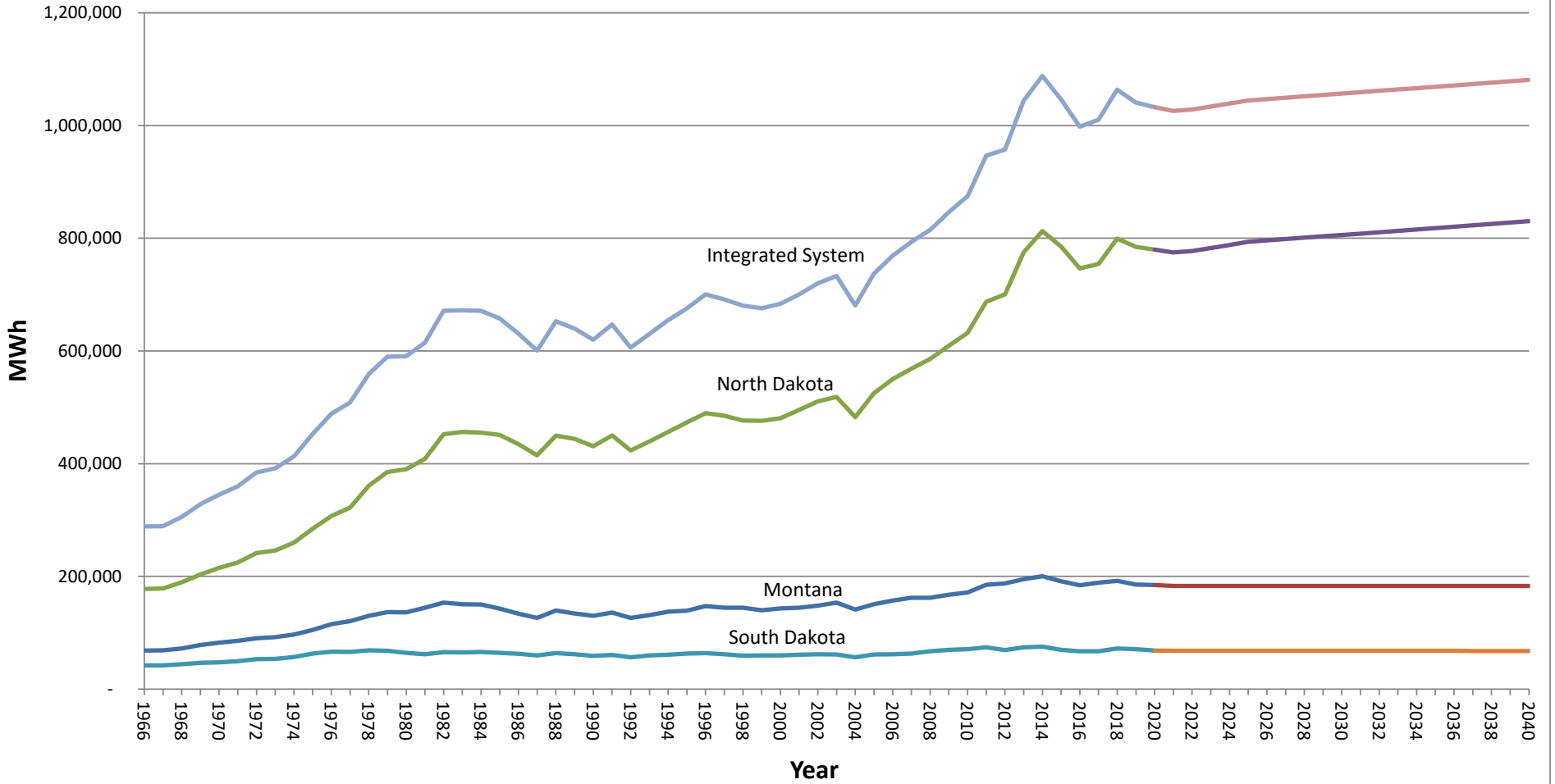
NOTE: The number of employees used for the forecast is total employment less farming and mining employment (most farms are not served by Montana-Dakota and the mining sector (oil fields and coal mining) is forecasted separately).

## **APPENDIX C**

### **Integrated System Forecast Results**

# Montana-Dakota Integrated System

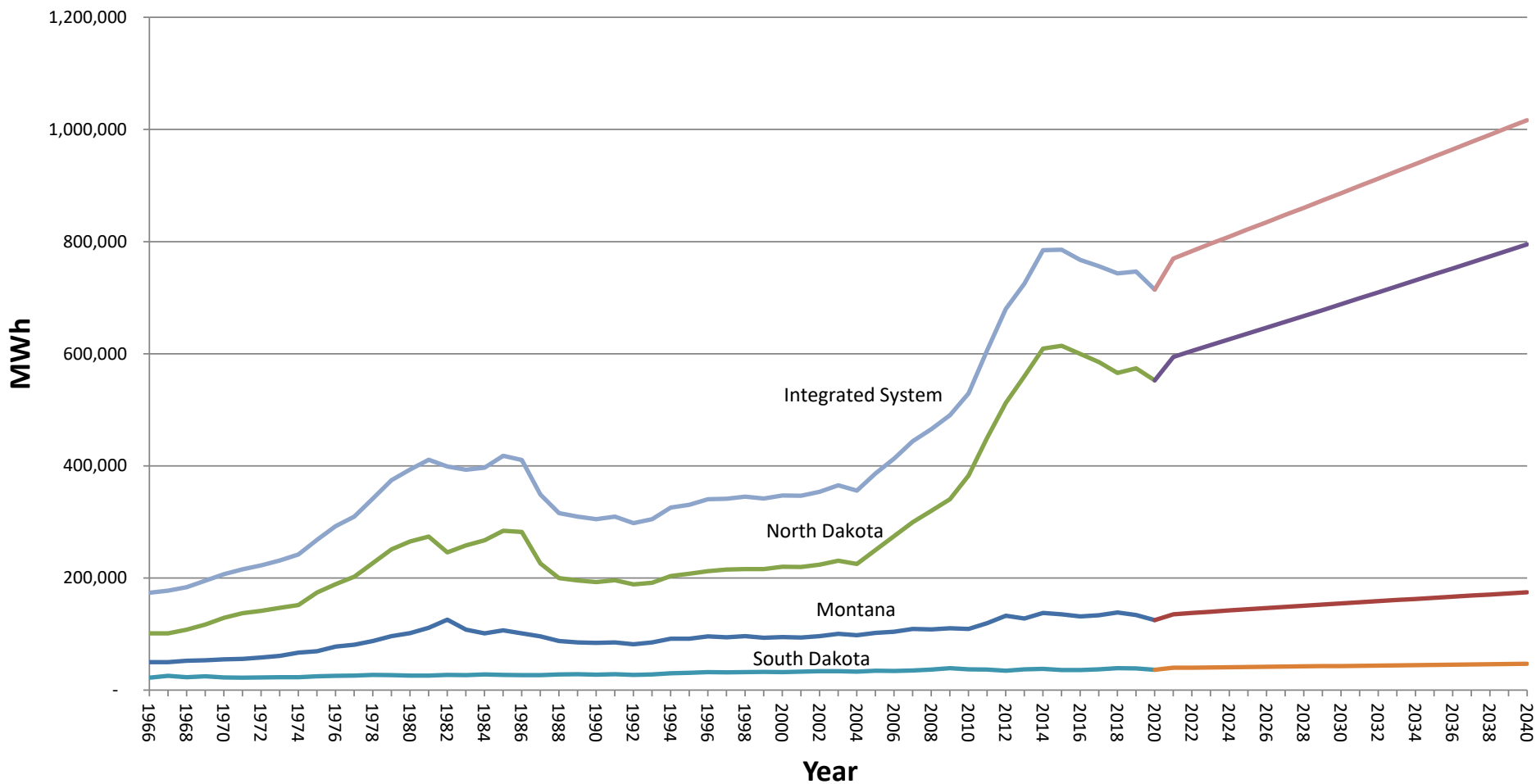
## Historical and Forecasted Residential Sales





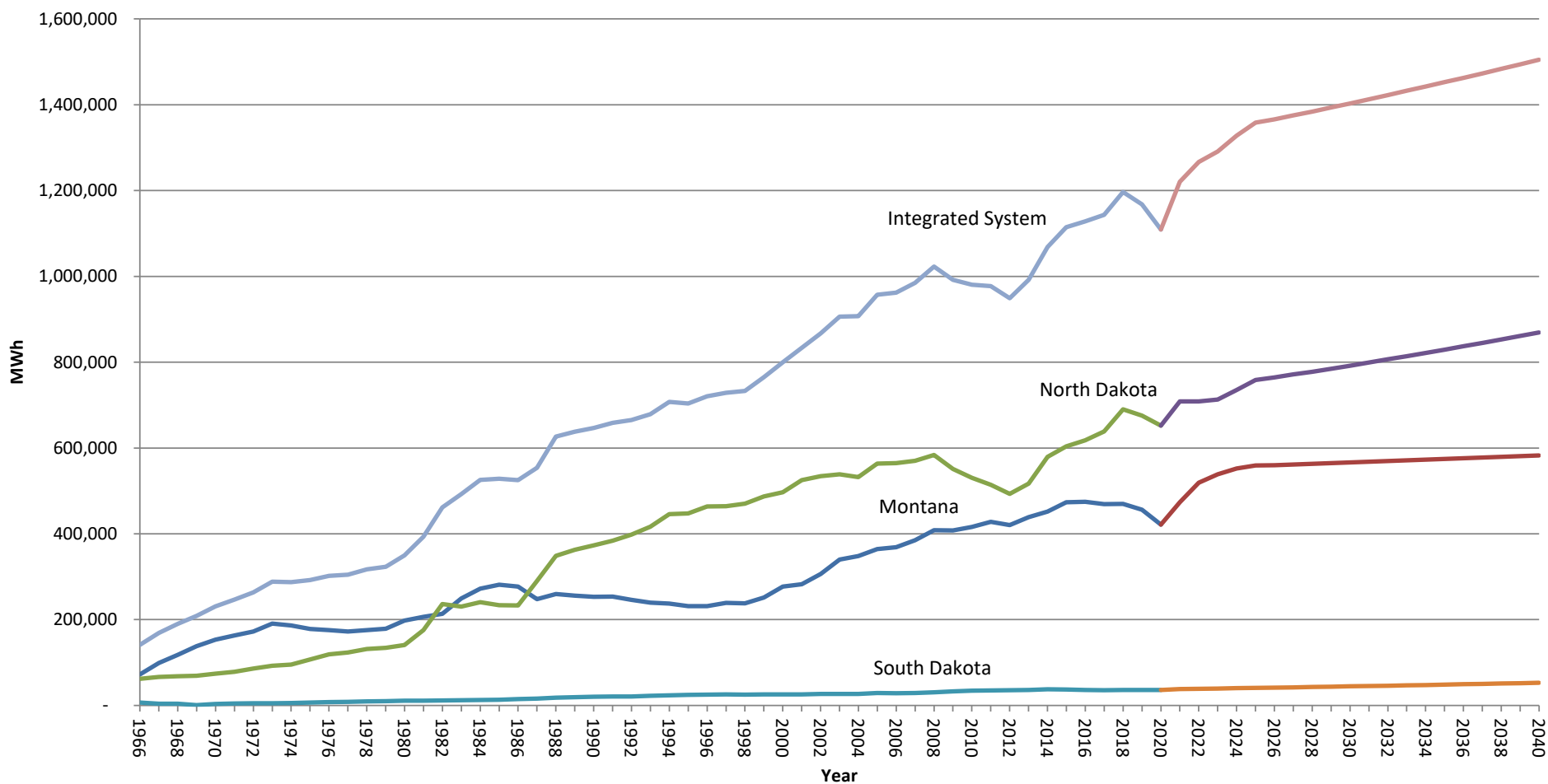
# Montana-Dakota Integrated System

## Historical and Forecasted Small C&I



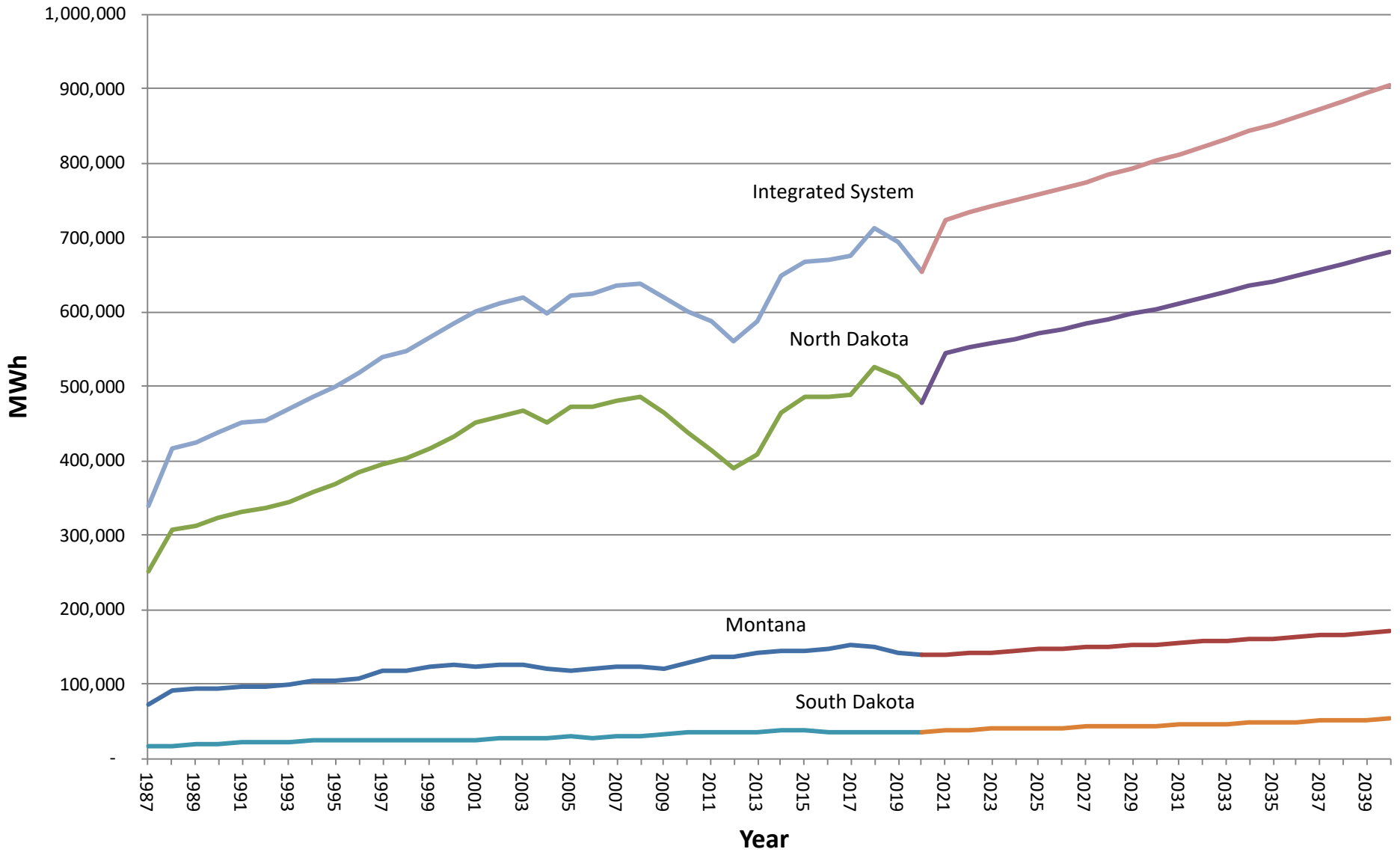
# Montana-Dakota Integrated System

## Historical and Forecasted Large C&I

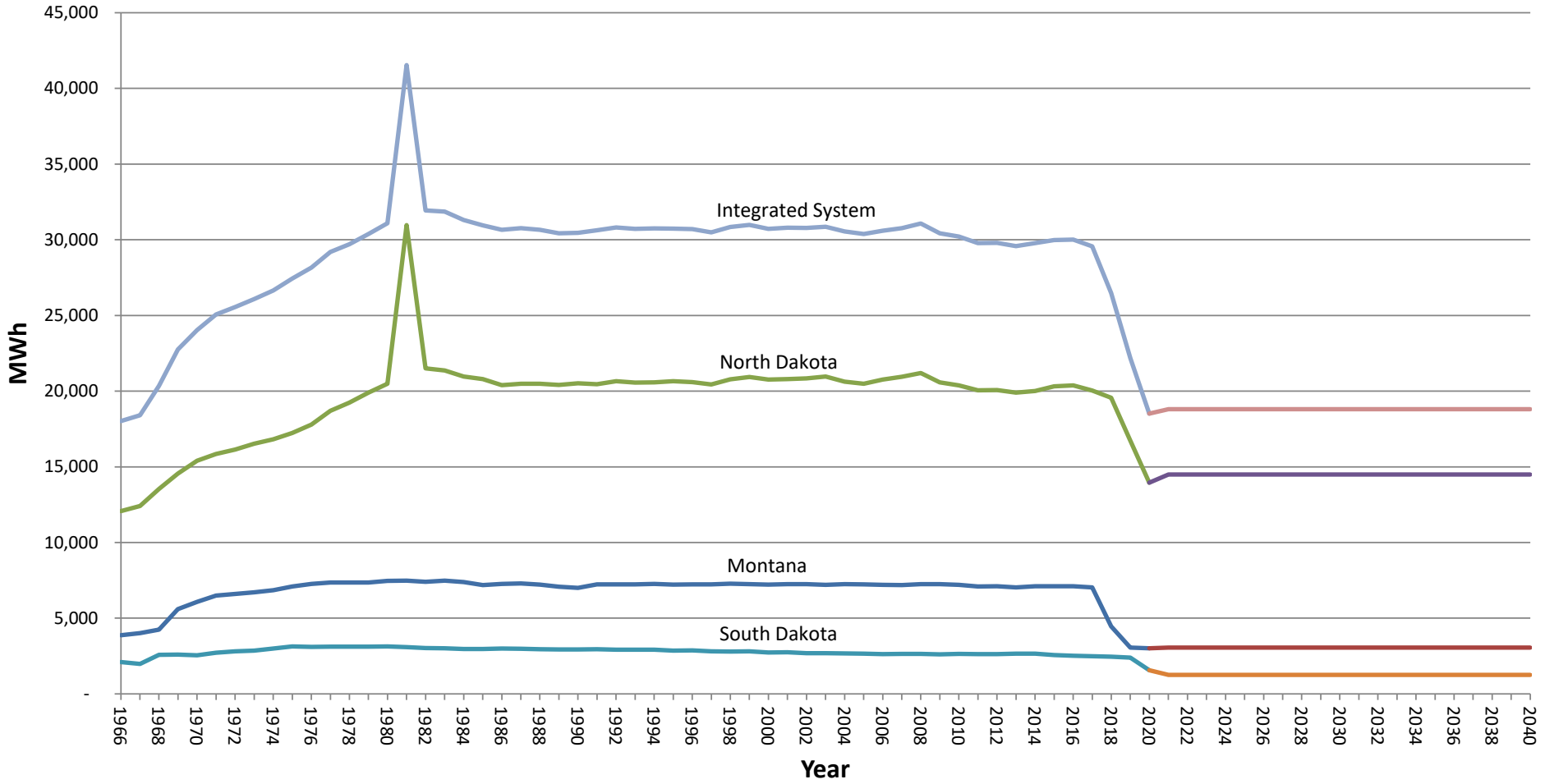


# Montana-Dakota Integrated System

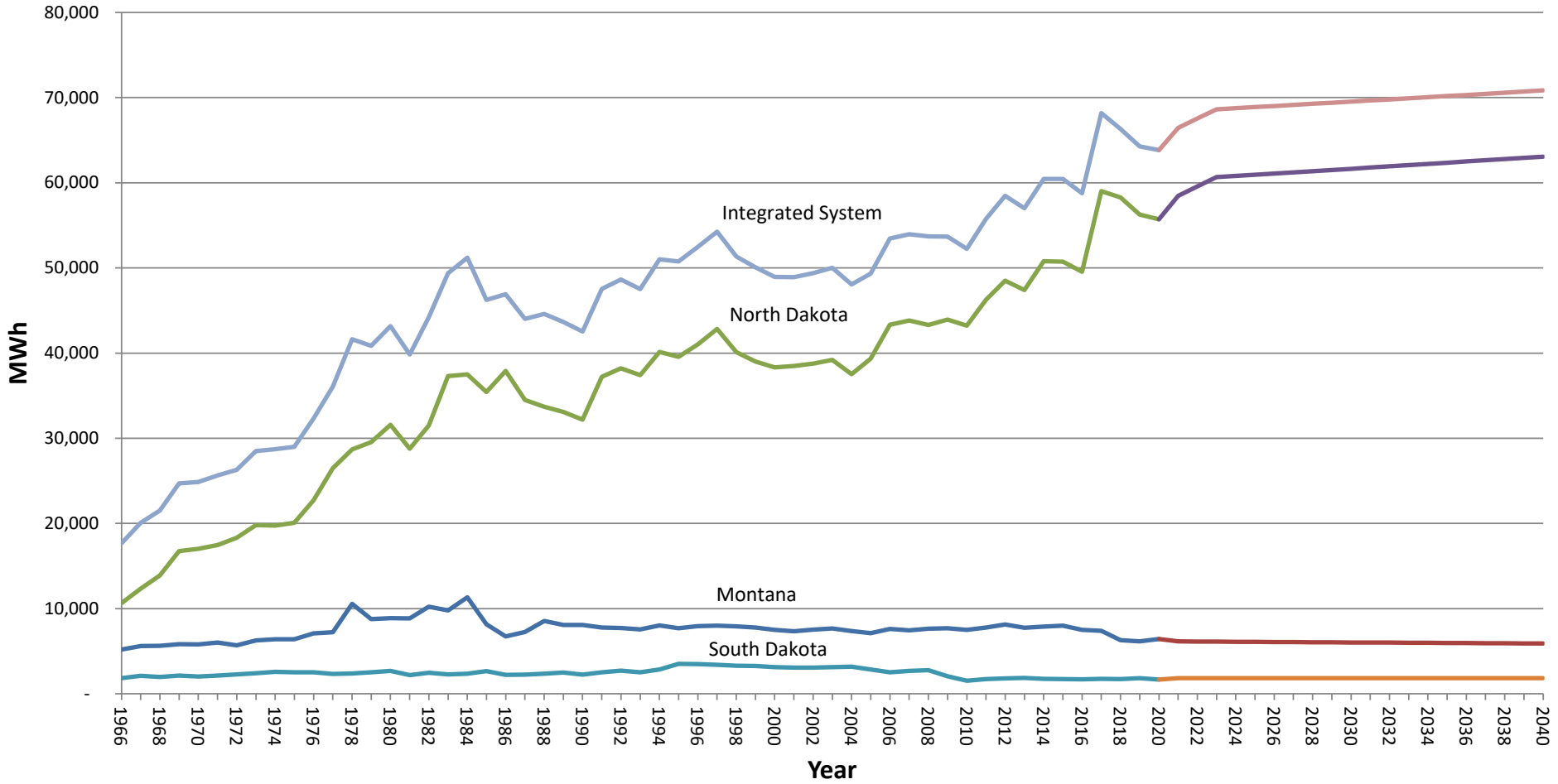
## General LC&I Sales



# Montana-Dakota Integrated System Historical and Forecasted Street Lighting

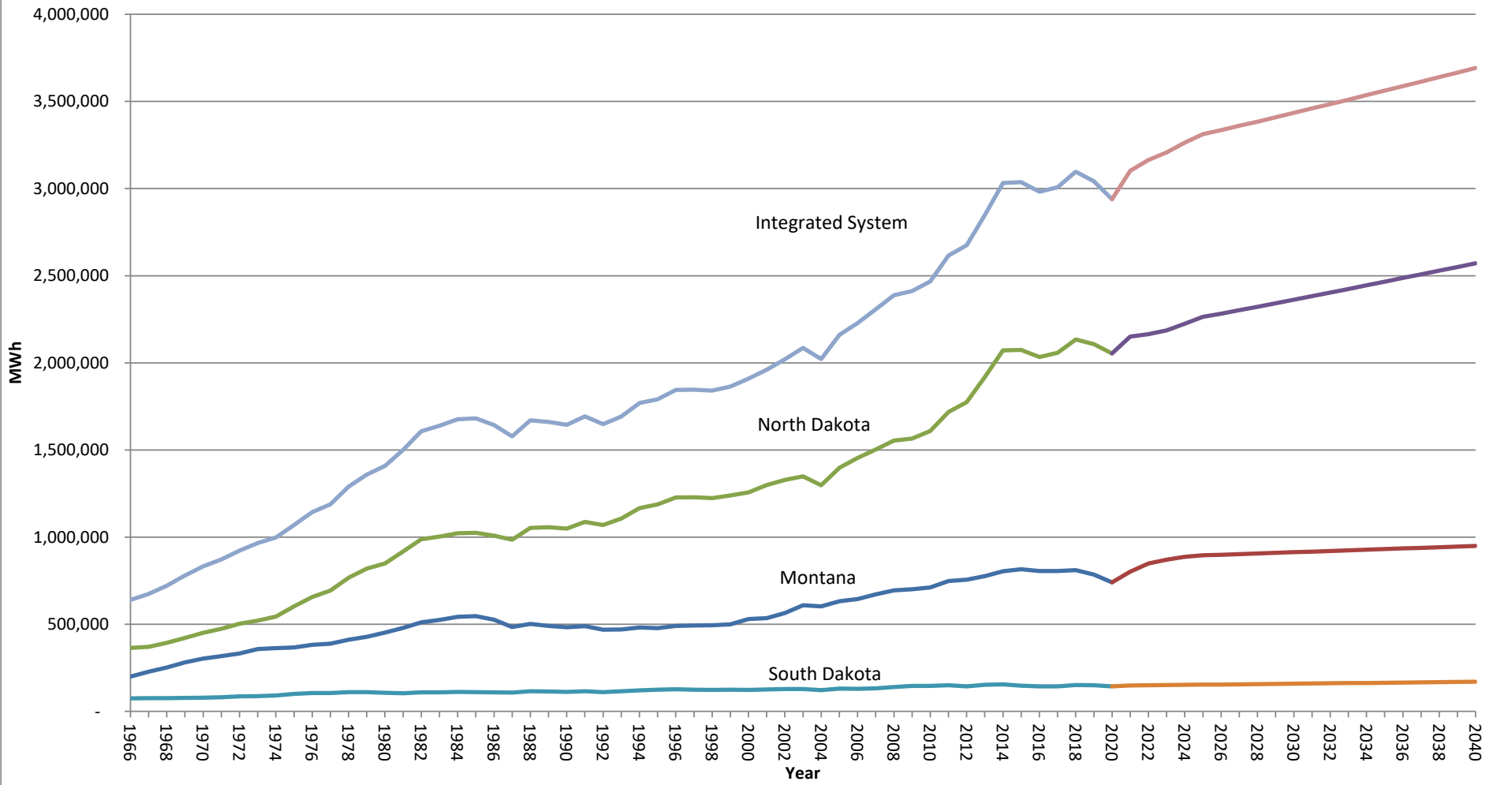


# Montana-Dakota Integrated System Historical and Forecasted Miscellaneous



# Montana-Dakota Integrated System

## Historical and Forecasted Total Sales



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

<u>Year</u>	<u>Summer Peak net of Energy Efficiency Programs</u>		<u>Winter Peak net of Energy Efficiency Programs</u>		<u>Annual Energy Requirments</u>		<u>Load Factor</u>
	<u>(MW)</u>	<u>% Chg</u>	<u>(MW)</u>	<u>% Chg</u>	<u>(GWh)</u>	<u>% Chg</u>	<u>(%)</u>
2021	586.0		575.2		3,353.4		65.33%
2022	595.1	1.55%	586.7	1.99%	3,420.6	2.00%	65.62%
2023	602.6	1.26%	594.8	1.38%	3,469.3	1.43%	65.54%
2024	610.9	1.38%	604.8	1.68%	3,528.5	1.70%	65.93%
2025	618.8	1.29%	613.7	1.48%	3,580.6	1.48%	66.05%
2026	624.2	0.87%	617.9	0.68%	3,605.0	0.68%	65.93%
2027	629.8	0.90%	622.5	0.74%	3,631.9	0.75%	65.65%
2028	635.4	0.89%	626.8	0.69%	3,657.5	0.70%	65.71%
2029	640.9	0.87%	631.5	0.75%	3,684.6	0.74%	65.63%
2030	646.6	0.89%	636.0	0.72%	3,711.9	0.74%	65.53%
2031	652.2	0.87%	640.6	0.72%	3,739.3	0.74%	65.27%
2032	658.0	0.89%	645.2	0.73%	3,766.8	0.74%	65.35%
2033	663.7	0.87%	649.9	0.72%	3,794.3	0.73%	65.26%
2034	669.3	0.84%	654.5	0.71%	3,822.1	0.73%	65.19%
2035	675.0	0.85%	659.3	0.74%	3,849.8	0.73%	64.93%
2036	680.7	0.84%	663.9	0.70%	3,877.6	0.72%	65.03%
2037	686.4	0.84%	668.6	0.71%	3,905.6	0.72%	64.95%
2038	692.1	0.83%	673.4	0.71%	3,933.7	0.72%	64.88%
2039	697.9	0.84%	678.2	0.71%	3,961.9	0.72%	64.63%
2040	703.8	0.85%	683.0	0.71%	3,990.5	0.72%	64.73%

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

<u>Year</u>	<u>Summer Peak net of Energy Efficiency Programs</u>		<u>Winter Peak net of Energy Efficiency Programs</u>		<u>Annual Energy Requirments</u>		<u>Load Factor</u>
	<u>(MW)</u>	<u>% Chg</u>	<u>(MW)</u>	<u>% Chg</u>	<u>(GWh)</u>	<u>% Chg</u>	<u>(%)</u>
2021	151.6		148.8		867.4		65.31%
2022	159.7	5.34%	157.5	5.82%	918.1	5.84%	65.62%
2023	163.5	2.38%	161.4	2.48%	941.2	2.53%	65.54%
2024	165.9	1.47%	164.3	1.80%	958.2	1.80%	65.93%
2025	167.3	0.84%	165.9	1.00%	967.7	0.99%	66.03%
2026	168.1	0.48%	166.4	0.30%	970.8	0.33%	65.93%
2027	169.0	0.54%	167.1	0.40%	974.9	0.42%	65.67%
2028	170.1	0.65%	167.8	0.43%	979.0	0.41%	65.70%
2029	171.0	0.53%	168.5	0.40%	982.9	0.41%	65.62%
2030	171.9	0.53%	169.1	0.38%	986.9	0.41%	65.54%
2031	172.8	0.52%	169.8	0.39%	990.9	0.40%	65.28%
2032	173.8	0.58%	170.4	0.38%	994.8	0.40%	65.34%
2033	174.7	0.52%	171.1	0.39%	998.7	0.39%	65.26%
2034	175.6	0.52%	171.7	0.37%	1,002.7	0.39%	65.18%
2035	176.5	0.51%	172.4	0.41%	1,006.5	0.39%	64.92%
2036	177.4	0.51%	173.0	0.36%	1,010.4	0.38%	65.02%
2037	178.3	0.51%	173.6	0.36%	1,014.3	0.38%	64.94%
2038	179.1	0.45%	174.3	0.37%	1,018.1	0.38%	64.89%
2039	180.0	0.50%	174.9	0.35%	1,021.9	0.38%	64.63%
2040	180.9	0.50%	175.6	0.40%	1,025.8	0.38%	64.73%



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

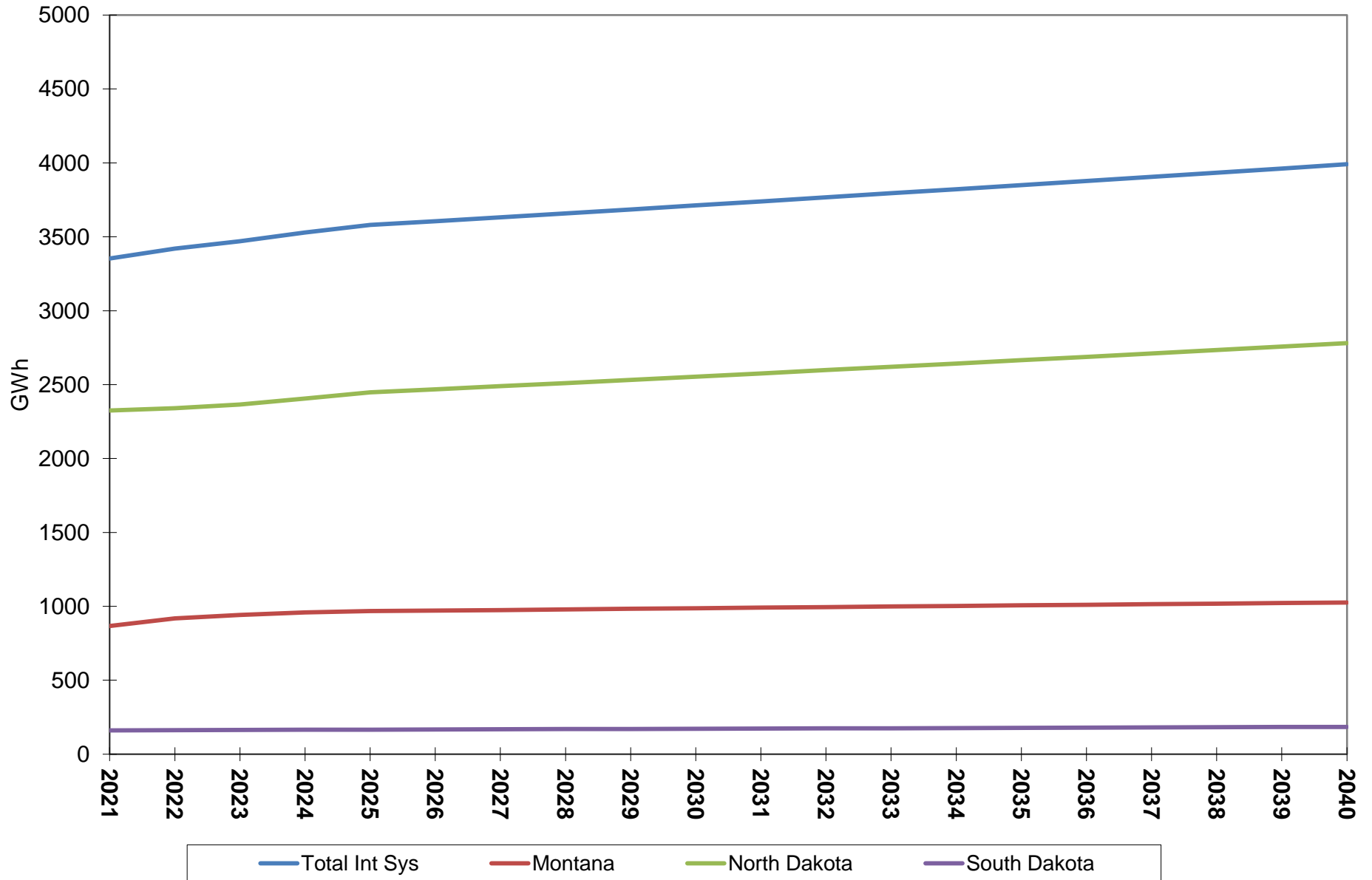
<u>Year</u>	<u>Summer Peak net of Energy Efficiency Programs</u>		<u>Winter Peak net of Energy Efficiency Programs</u>		<u>Annual Energy Requirments</u>		<u>Load Factor</u>
	<u>(MW)</u>	<u>% Chg</u>	<u>(MW)</u>	<u>% Chg</u>	<u>(GWh)</u>	<u>% Chg</u>	<u>(%)</u>
2021	406.2		398.7		2,324.7		65.33%
2022	407.1	0.22%	401.3	0.65%	2,340.1	0.66%	65.62%
2023	410.7	0.88%	405.4	1.02%	2,364.6	1.05%	65.55%
2024	416.5	1.41%	412.3	1.70%	2,405.7	1.74%	65.94%
2025	422.9	1.54%	419.4	1.72%	2,447.1	1.72%	66.06%
2026	427.2	1.02%	422.9	0.83%	2,467.3	0.83%	65.93%
2027	431.6	1.03%	426.6	0.87%	2,489.0	0.88%	65.65%
2028	435.9	1.00%	430.0	0.80%	2,509.3	0.82%	65.71%
2029	440.3	1.01%	433.8	0.88%	2,531.3	0.88%	65.63%
2030	444.8	1.02%	437.5	0.85%	2,553.4	0.87%	65.53%
2031	449.3	1.01%	441.2	0.85%	2,575.6	0.87%	65.26%
2032	453.8	1.00%	445.0	0.86%	2,597.9	0.87%	65.35%
2033	458.3	0.99%	448.8	0.85%	2,620.3	0.86%	65.27%
2034	462.8	0.98%	452.6	0.85%	2,642.8	0.86%	65.19%
2035	467.3	0.97%	456.4	0.84%	2,665.4	0.86%	64.93%
2036	471.9	0.98%	460.2	0.83%	2,688.0	0.85%	65.02%
2037	476.4	0.95%	464.1	0.85%	2,710.8	0.85%	64.96%
2038	481.0	0.97%	468.0	0.84%	2,733.7	0.84%	64.88%
2039	485.6	0.96%	471.9	0.83%	2,756.8	0.85%	64.63%
2040	490.3	0.97%	475.8	0.83%	2,780.1	0.85%	64.73%

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

<u>Year</u>	<u>Summer Peak net of Energy Efficiency Programs</u>		<u>Winter Peak net of Energy Efficiency Programs</u>		<u>Annual Energy Requirments</u>		<u>Load Factor</u>
	<u>(MW)</u>	<u>% Chg</u>	<u>(MW)</u>	<u>% Chg</u>	<u>(GWh)</u>	<u>% Chg</u>	<u>(%)</u>
2021	28.2		27.7		161.3		65.30%
2022	28.3	0.35%	27.9	0.72%	162.4	0.68%	65.51%
2023	28.4	0.35%	28.0	0.36%	163.5	0.68%	65.54%
2024	28.5	0.35%	28.2	0.71%	164.6	0.67%	65.93%
2025	28.6	0.35%	28.4	0.71%	165.8	0.73%	66.18%
2026	28.9	1.05%	28.6	0.70%	166.9	0.66%	65.93%
2027	29.2	1.04%	28.8	0.70%	168.0	0.66%	65.50%
2028	29.4	0.68%	29.0	0.69%	169.2	0.71%	65.70%
2029	29.6	0.68%	29.2	0.69%	170.4	0.71%	65.72%
2030	29.9	1.01%	29.4	0.68%	171.6	0.70%	65.52%
2031	30.1	0.67%	29.6	0.68%	172.8	0.70%	65.36%
2032	30.4	1.00%	29.8	0.68%	174.1	0.75%	65.38%
2033	30.7	0.99%	30.0	0.67%	175.3	0.69%	65.18%
2034	30.9	0.65%	30.2	0.67%	176.6	0.74%	65.24%
2035	31.2	0.97%	30.5	0.99%	177.9	0.74%	64.91%
2036	31.4	0.64%	30.7	0.66%	179.2	0.73%	65.15%
2037	31.7	0.96%	30.9	0.65%	180.5	0.73%	65.00%
2038	32.0	0.95%	31.1	0.65%	181.9	0.78%	64.89%
2039	32.3	0.94%	31.4	0.96%	183.2	0.71%	64.57%
2040	32.6	0.93%	31.6	0.64%	184.6	0.76%	64.64%

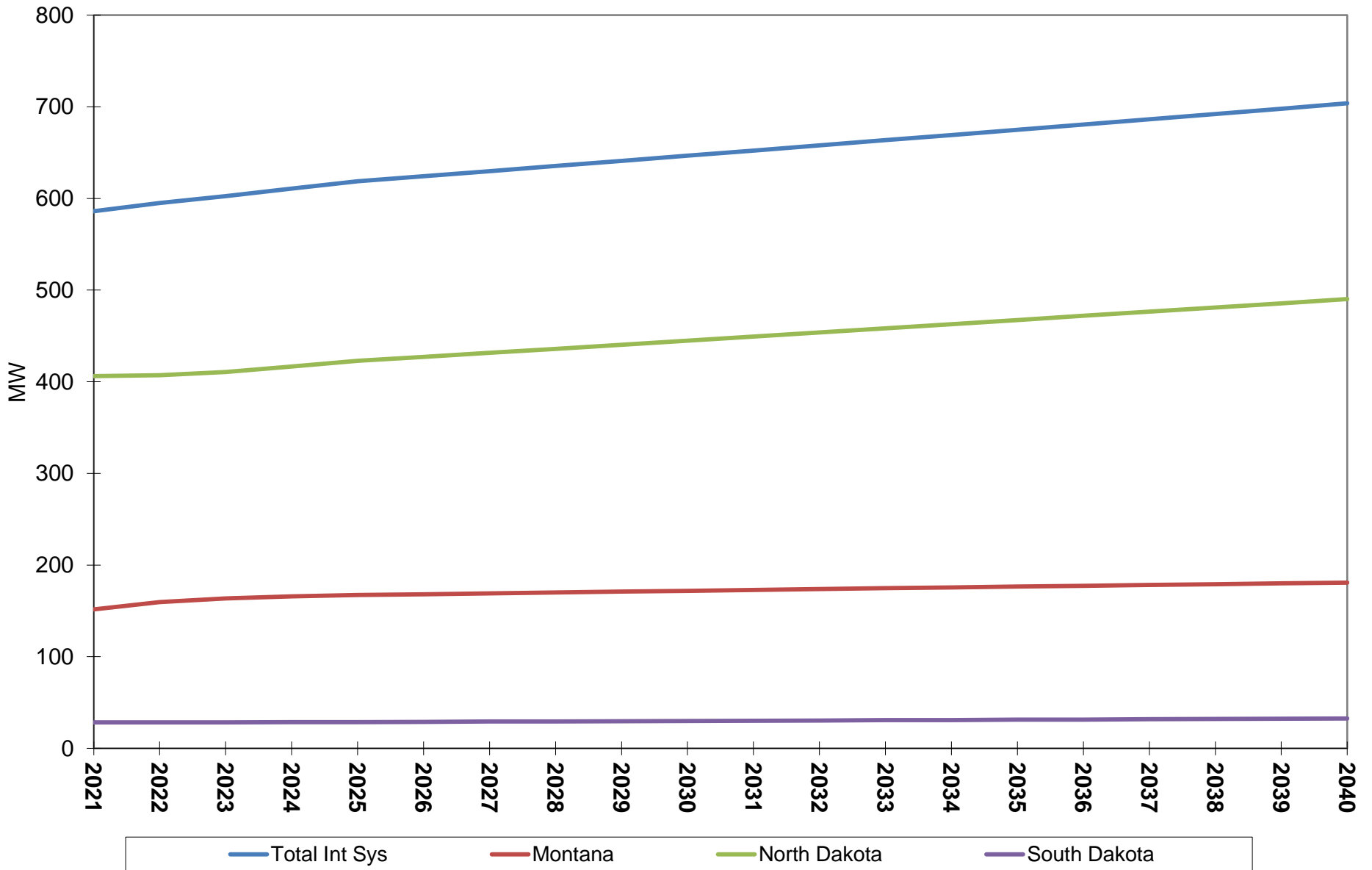
# Montana-Dakota Integrated System

## Forecast of Annual Energy by State



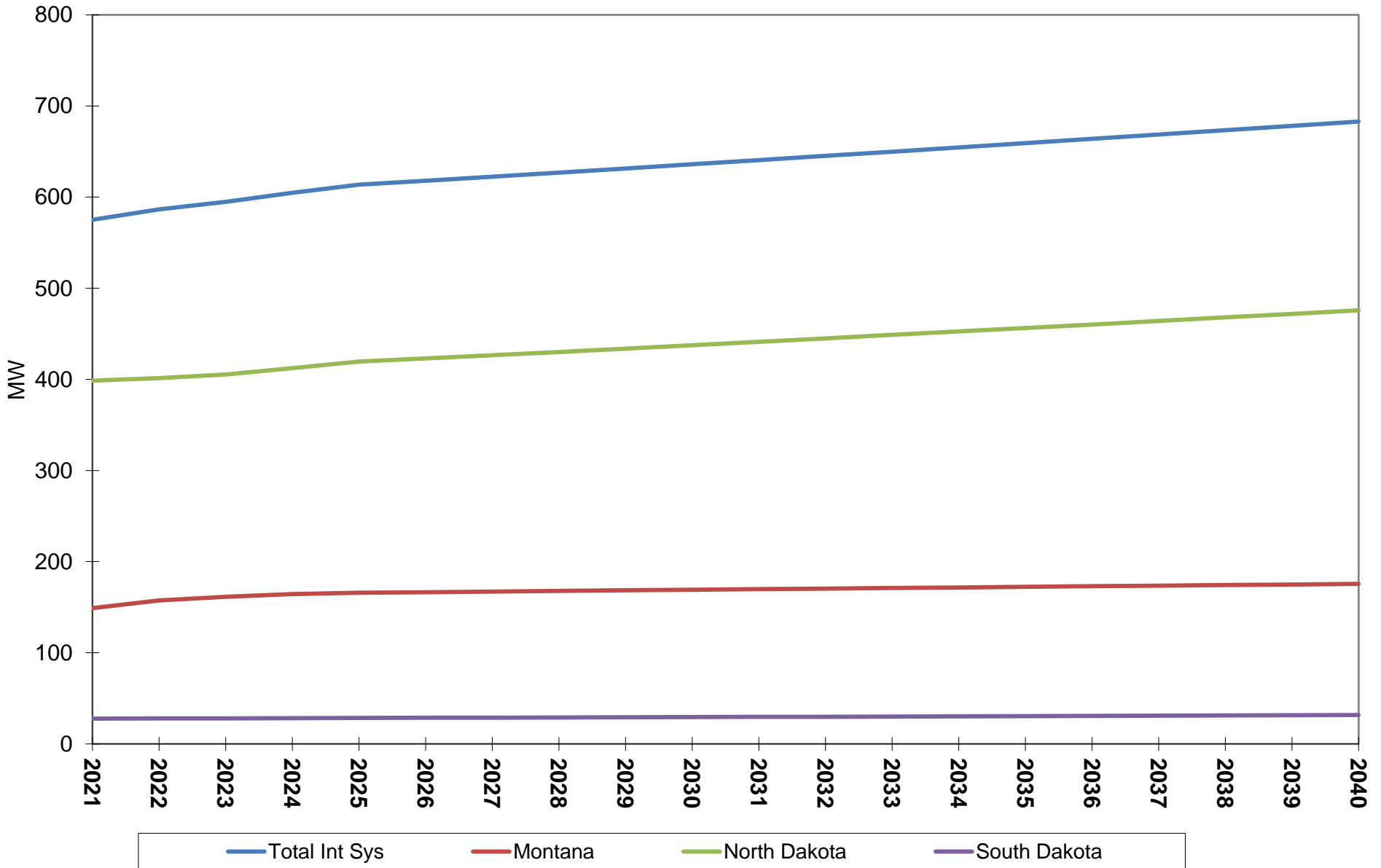
# Montana-Dakota Integrated System

## 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 (2021-2030)**

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

**MONTANA YEAR 2021**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,409.7	2,222.7	2,186.0	1,850.5	1,747.5	1,984.0	2,390.1	2,263.2	1,975.1	1,836.4	1,973.4	2,322.6	25,152.1
# of Small Comm & Ind Customers	5,321	5,320	5,317	5,371	5,418	5,433	5,440	5,440	5,468	5,434	5,378	5,363	5,392
Total Small Comm & Ind Sales - MWh	12,822	11,825	11,623	9,939	9,468	10,779	13,002	12,312	10,800	9,979	10,613	12,456	135,618
Large Comm & Ind Sales	42,347	37,807	41,014	38,138	40,245	35,910	39,114	38,316	38,672	39,628	39,706	44,191	475,088
Total Sales (Residential, SC&I and LC&I)	74,885	67,023	68,480	60,753	61,068	60,850	69,643	66,640	62,284	61,850	64,948	75,220	793,644
Other Public Sales	441	421	431	398	427	557	667	591	494	372	355	424	5,578
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	75,640	67,720	69,196	61,419	61,748	61,654	70,562	67,485	63,027	62,472	65,563	75,950	802,436
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	75,685	67,758	69,235	61,451	61,772	61,683	70,595	67,516	63,055	62,500	65,594	75,992	802,836
Total Requirements (Energy + Losses)	81,771	73,206	74,802	66,392	66,739	66,643	76,272	72,945	68,125	67,526	70,868	82,103	867,392
# of Large Comm & Ind Customers	259	259	260	262	263	264	264	266	273	269	259	258	263
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	144.2	134.0	119.2	111.7	103.0	130.4	151.6	143.8	123.8	112.4	131.1	143.8	151.6

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

**MONTANA YEAR 2022**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,440.7	2,251.2	2,214.1	1,874.4	1,770.1	2,009.5	2,420.7	2,292.2	2,000.5	1,860.1	1,998.9	2,352.7	25,475.8
# of Small Comm & Ind Customers	5,339	5,338	5,335	5,389	5,436	5,451	5,458	5,458	5,486	5,452	5,396	5,381	5,410
Total Small Comm & Ind Sales - MWh	13,031	12,017	11,812	10,101	9,622	10,954	13,212	12,511	10,975	10,141	10,786	12,660	137,822
Large Comm & Ind Sales	46,466	41,504	44,984	41,765	44,095	39,350	42,876	42,014	42,378	43,433	43,535	47,392	519,792
Total Sales (Residential, SC&I and LC&I)	79,213	70,912	72,639	64,542	65,072	64,465	73,615	70,537	66,165	65,817	68,950	78,625	840,552
Other Public Sales	440	420	430	397	426	556	666	590	493	371	355	423	5,567
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	79,967	71,608	73,354	65,207	65,751	65,268	74,533	71,381	66,907	66,438	69,565	79,354	849,333
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	80,012	71,646	73,393	65,239	65,775	65,297	74,566	71,412	66,935	66,466	69,596	79,396	849,733
Total Requirements (Energy + Losses)	86,446	77,407	79,295	70,485	71,064	70,548	80,562	77,154	72,317	71,811	75,192	85,780	918,061
# of Large Comm & Ind Customers	260	260	261	263	264	265	265	267	274	270	260	259	264
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	138.3	123.0	115.3	108.5	137.4	159.7	151.5	130.4	118.4	138.7	152.2	159.7



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

**MONTANA YEAR 2023**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,472.3	2,280.2	2,242.9	1,898.5	1,793.0	2,035.3	2,452.2	2,322.1	2,026.2	1,884.3	2,024.8	2,382.5	25,804.7
# of Small Comm & Ind Customers	5,357	5,356	5,352	5,407	5,454	5,470	5,476	5,476	5,505	5,470	5,414	5,399	5,428
Total Small Comm & Ind Sales - MWh	13,244	12,213	12,004	10,265	9,779	11,133	13,428	12,716	11,154	10,307	10,962	12,863	140,068
Large Comm & Ind Sales	48,214	43,070	46,673	43,322	45,740	40,818	44,477	43,586	43,959	45,054	45,167	48,943	539,023
Total Sales (Residential, SC&I and LC&I)	81,174	72,674	74,520	66,263	66,874	66,112	75,432	72,314	67,925	67,604	70,758	80,379	862,029
Other Public Sales	439	419	429	396	424	554	664	589	492	370	354	422	5,552
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	81,927	73,369	75,234	66,927	67,551	66,913	76,348	73,157	68,666	68,224	71,372	81,107	870,795
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	81,972	73,407	75,273	66,959	67,575	66,942	76,381	73,188	68,694	68,252	71,403	81,149	871,195
Total Requirements (Energy + Losses)	88,563	79,310	81,326	72,343	73,009	72,325	82,523	79,073	74,218	73,740	77,145	87,674	941,249
# of Large Comm & Ind Customers	261	261	262	264	265	266	266	268	275	271	261	260	265
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	157.5	146.4	130.2	122.1	111.1	140.7	163.5	155.1	133.5	121.2	142.2	156.0	163.5

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

**MONTANA YEAR 2024**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,503.1	2,308.7	2,270.9	1,922.2	1,815.4	2,060.9	2,482.8	2,350.9	2,051.8	1,907.8	2,050.1	2,411.5	26,126.6
# of Small Comm & Ind Customers	5,375	5,374	5,370	5,425	5,472	5,488	5,495	5,495	5,523	5,488	5,432	5,417	5,446
Total Small Comm & Ind Sales - MWh	13,454	12,407	12,195	10,428	9,934	11,310	13,643	12,918	11,332	10,470	11,136	13,063	142,290
Large Comm & Ind Sales	49,442	44,168	47,862	44,422	46,903	41,855	45,609	44,695	45,077	46,201	46,317	49,932	552,483
Total Sales (Residential, SC&I and LC&I)	82,612	73,966	75,900	67,526	68,192	67,326	76,779	73,625	69,221	68,914	72,082	81,568	877,711
Other Public Sales	438	418	428	395	424	553	663	588	491	369	353	421	5,541
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	83,364	74,660	76,613	68,189	68,869	68,126	77,694	74,467	69,961	69,533	72,695	82,295	886,466
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	83,409	74,698	76,652	68,221	68,893	68,155	77,727	74,498	69,989	69,561	72,726	82,337	886,866
Total Requirements (Energy + Losses)	90,116	80,704	82,816	73,707	74,433	73,635	83,977	80,488	75,617	75,154	78,574	88,958	958,179
# of Large Comm & Ind Customers	262	262	263	265	266	267	267	269	276	272	262	261	266
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	161.4	150.0	133.4	125.1	112.8	142.7	165.9	157.4	135.4	123.0	144.7	158.8	165.9

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

**MONTANA YEAR 2025**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,533.2	2,337.1	2,298.5	1,945.6	1,837.5	2,085.9	2,512.9	2,379.5	2,076.7	1,931.2	2,075.1	2,438.4	26,442.0
# of Small Comm & Ind Customers	5,392	5,390	5,387	5,442	5,489	5,505	5,512	5,512	5,540	5,505	5,449	5,434	5,463
Total Small Comm & Ind Sales - MWh	13,659	12,597	12,382	10,588	10,086	11,483	13,851	13,116	11,505	10,631	11,307	13,250	144,455
Large Comm & Ind Sales	50,048	44,705	48,450	44,979	47,489	42,378	46,176	45,249	45,640	46,776	46,890	50,334	559,114
Total Sales (Residential, SC&I and LC&I)	83,423	74,693	76,675	68,243	68,930	68,022	77,554	74,377	69,957	69,650	72,826	82,157	886,507
Other Public Sales	437	417	427	394	423	552	661	586	490	368	352	420	5,527
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	84,174	75,386	77,387	68,905	69,606	68,821	78,467	75,217	70,696	70,268	73,438	82,883	895,248
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	84,219	75,424	77,426	68,937	69,630	68,850	78,500	75,248	70,724	70,296	73,469	82,925	895,648
Total Requirements (Energy + Losses)	90,991	81,489	83,652	74,480	75,229	74,386	84,812	81,299	76,411	75,949	79,377	89,593	967,668
# of Large Comm & Ind Customers	263	263	264	266	267	268	268	270	277	273	263	262	267
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	164.3	152.7	135.8	127.3	113.7	143.9	167.3	158.7	136.6	124.0	146.2	160.4	167.3

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

**MONTANA YEAR 2026**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,559.8	2,361.1	2,321.9	1,965.6	1,856.4	2,107.4	2,538.7	2,404.0	2,098.1	1,950.9	2,096.2	2,465.6	26,716.0
# of Small Comm & Ind Customers	5,409	5,408	5,405	5,460	5,507	5,523	5,530	5,530	5,558	5,523	5,467	5,451	5,481
Total Small Comm & Ind Sales - MWh	13,846	12,769	12,550	10,732	10,223	11,639	14,039	13,294	11,661	10,775	11,460	13,440	146,428
Large Comm & Ind Sales	50,132	44,782	48,532	45,053	47,568	42,449	46,253	45,324	45,716	46,854	46,969	50,444	560,076
Total Sales (Residential, SC&I and LC&I)	83,694	74,942	76,925	68,461	69,146	68,249	77,819	74,630	70,189	69,872	73,058	82,457	889,442
Other Public Sales	436	416	426	393	422	551	660	585	489	368	352	419	5,517
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	84,444	75,634	77,636	69,122	69,821	69,047	78,731	75,469	70,927	70,490	73,670	83,182	898,173
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	84,489	75,672	77,675	69,154	69,845	69,076	78,764	75,500	70,955	70,518	73,701	83,224	898,573
Total Requirements (Energy + Losses)	91,283	81,757	83,921	74,715	75,461	74,630	85,097	81,571	76,660	76,188	79,627	89,916	970,826
# of Large Comm & Ind Customers	264	264	265	267	268	269	269	271	278	274	264	263	268
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	165.9	154.2	137.1	128.6	114.3	144.6	168.1	159.4	137.2	124.6	146.6	160.9	168.1

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

**MONTANA YEAR 2027**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,589.1	2,388.1	2,348.7	1,988.3	1,877.8	2,131.7	2,568.1	2,431.9	2,122.1	1,973.3	2,120.5	2,493.1	27,023.0
# of Small Comm & Ind Customers	5,427	5,426	5,423	5,478	5,525	5,541	5,548	5,548	5,577	5,542	5,485	5,469	5,499
Total Small Comm & Ind Sales - MWh	14,051	12,958	12,737	10,892	10,375	11,812	14,248	13,492	11,835	10,936	11,631	13,635	148,602
Large Comm & Ind Sales	50,281	44,915	48,675	45,183	47,705	42,571	46,388	45,456	45,847	46,989	47,106	50,593	561,709
Total Sales (Residential, SC&I and LC&I)	84,048	75,264	77,255	68,751	69,435	68,544	78,163	74,960	70,494	70,168	73,366	82,801	893,249
Other Public Sales	434	415	425	392	421	550	658	584	488	367	351	418	5,503
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	84,796	75,955	77,965	69,411	70,109	69,341	79,073	75,798	71,231	70,785	73,977	83,525	901,966
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	84,841	75,993	78,004	69,443	70,133	69,370	79,106	75,829	71,259	70,813	74,008	83,567	902,366
Total Requirements (Energy + Losses)	91,663	82,104	84,276	75,027	75,772	74,948	85,467	81,926	76,989	76,507	79,959	90,287	974,925
# of Large Comm & Ind Customers	265	265	266	268	269	270	270	272	279	275	265	264	269
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	166.4	154.7	137.6	129.0	114.9	145.4	169.0	160.3	138.0	125.3	147.2	161.5	169.0

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

**MONTANA YEAR 2028**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,617.4	2,414.2	2,374.6	2,010.0	1,898.4	2,155.2	2,596.3	2,458.5	2,145.3	1,994.8	2,143.7	2,519.6	27,318.3
# of Small Comm & Ind Customers	5,445	5,444	5,440	5,496	5,543	5,559	5,566	5,566	5,595	5,560	5,503	5,487	5,517
Total Small Comm & Ind Sales - MWh	14,252	13,143	12,918	11,047	10,523	11,981	14,451	13,684	12,003	11,091	11,797	13,825	150,715
Large Comm & Ind Sales	50,430	45,049	48,818	45,312	47,842	42,694	46,521	45,588	45,979	47,125	47,244	50,743	563,345
Total Sales (Residential, SC&I and LC&I)	84,398	75,583	77,579	69,035	69,720	68,836	78,499	75,284	70,794	70,459	73,670	83,141	896,998
Other Public Sales	433	414	424	392	420	549	657	582	486	366	350	417	5,490
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	85,145	76,273	78,288	69,695	70,393	69,632	79,408	76,120	71,529	71,075	74,280	83,864	905,702
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	85,190	76,311	78,327	69,727	70,417	69,661	79,441	76,151	71,557	71,103	74,311	83,906	906,102
Total Requirements (Energy + Losses)	92,040	82,447	84,625	75,334	76,079	75,262	85,829	82,274	77,311	76,820	80,286	90,653	978,960
# of Large Comm & Ind Customers	266	266	267	269	270	271	271	273	280	276	266	265	270
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	167.1	155.3	138.1	129.5	115.6	146.3	170.1	161.3	138.9	126.1	147.8	162.2	170.1

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

**MONTANA YEAR 2029**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,644.8	2,439.9	2,399.7	2,031.0	1,918.5	2,177.9	2,623.7	2,484.5	2,168.0	2,016.0	2,166.3	2,546.0	27,606.3
# of Small Comm & Ind Customers	5,462	5,460	5,457	5,513	5,560	5,576	5,583	5,583	5,612	5,577	5,520	5,504	5,534
Total Small Comm & Ind Sales - MWh	14,446	13,322	13,095	11,197	10,667	12,144	14,648	13,871	12,167	11,243	11,958	14,013	152,771
Large Comm & Ind Sales	50,578	45,182	48,960	45,441	47,979	42,816	46,656	45,720	46,111	47,261	47,381	50,891	564,976
Total Sales (Residential, SC&I and LC&I)	84,740	75,895	77,898	69,314	70,001	69,121	78,831	75,603	71,090	70,747	73,968	83,477	900,685
Other Public Sales	433	414	424	391	419	548	655	581	485	365	350	416	5,481
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	85,487	76,585	78,607	69,973	70,673	69,916	79,738	76,438	71,824	71,362	74,578	84,199	909,380
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	85,532	76,623	78,646	70,005	70,697	69,945	79,771	76,469	71,852	71,390	74,609	84,241	909,780
Total Requirements (Energy + Losses)	92,410	82,784	84,970	75,634	76,382	75,569	86,185	82,618	77,630	77,130	80,608	91,015	982,935
# of Large Comm & Ind Customers	266	266	267	269	270	271	271	273	280	276	266	265	270
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	167.8	156.0	138.7	130.1	116.2	147.1	171.0	162.2	139.6	126.7	148.4	162.8	171.0

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

**MONTANA YEAR 2030**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	988.7	872.0	794.2	635.9	570.3	712.3	882.5	806.2	645.4	616.8	735.9	933.6	9,194.7
# of Residential Customers	19,942	19,943	19,948	19,934	19,909	19,881	19,861	19,861	19,851	19,849	19,878	19,895	19,896
Total Residential Sales - MWh	19,716	17,391	15,843	12,676	11,355	14,161	17,527	16,012	12,812	12,243	14,629	18,573	182,938
Use per Small Comm & Ind Customer - kWh	2,672.4	2,465.0	2,424.1	2,052.1	1,938.1	2,200.0	2,650.8	2,510.1	2,190.4	2,036.6	2,188.5	2,571.7	27,889.6
# of Small Comm & Ind Customers	5,479	5,478	5,475	5,531	5,578	5,595	5,601	5,601	5,630	5,595	5,538	5,522	5,552
Total Small Comm & Ind Sales - MWh	14,642	13,503	13,272	11,350	10,811	12,309	14,847	14,059	12,332	11,395	12,120	14,201	154,841
Large Comm & Ind Sales	50,727	45,316	49,103	45,571	48,116	42,938	46,790	45,852	46,243	47,397	47,518	51,040	566,611
Total Sales (Residential, SC&I and LC&I)	85,085	76,210	78,218	69,597	70,282	69,408	79,164	75,923	71,387	71,035	74,267	83,814	904,390
Other Public Sales	432	413	423	390	418	546	653	580	484	364	349	415	5,467
Street & Highway Lighting Sales	297	260	270	255	241	236	239	242	236	237	245	290	3,048
Interdepartmental Sales	17	16	15	13	12	11	13	12	13	13	15	16	166
Total Billed Sales - MWh	85,831	76,899	78,926	70,255	70,953	70,201	80,069	76,757	72,120	71,649	74,876	84,535	913,071
Company Use	45	38	39	32	24	29	33	31	28	28	31	42	400
Total Energy	85,876	76,937	78,965	70,287	70,977	70,230	80,102	76,788	72,148	71,677	74,907	84,577	913,471
Total Requirements (Energy + Losses)	92,781	83,124	85,315	75,939	76,684	75,877	86,543	82,963	77,949	77,441	80,930	91,378	986,924
# of Large Comm & Ind Customers	267	267	268	270	271	272	272	274	281	277	267	266	271
# of Other Public Customers	102	101	101	102	102	102	102	102	103	103	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	168.5	156.6	139.3	130.6	116.8	147.9	171.9	163.0	140.3	127.4	149.0	163.5	171.9

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## **APPENDIX E**

### **Monthly Forecasts - North Dakota (2021-2030)**

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

**NORTH DAKOTA YEAR 2021**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.1	9,802.3
# of Residential Customers	78,753	78,912	78,966	78,891	78,904	78,994	79,015	79,135	79,187	79,246	79,354	79,448	79,067
Total Residential Sales - MWh	87,160	77,435	69,196	53,652	50,665	55,335	67,852	61,973	51,066	52,880	65,510	82,313	775,037
Use per Small Comm & Ind Customer - kWh	4,770.7	4,438.3	4,364.4	3,668.5	3,569.3	3,609.7	4,009.4	3,922.8	3,584.4	3,719.1	4,096.9	4,662.5	48,395.6
# of Small Comm & Ind Customers	12,193	12,210	12,225	12,248	12,286	12,308	12,319	12,320	12,461	12,436	12,281	12,278	12,297
Total Small Comm & Ind Sales - MWh	58,169	54,192	53,355	44,932	43,852	44,428	49,392	48,329	44,665	46,251	50,314	57,246	595,125
Large Comm & Ind Sales	61,689	57,945	60,894	54,359	56,234	57,129	62,885	62,218	58,982	57,299	57,951	60,963	708,548
Total Sales (Residential, SC&I and LC&I)	207,018	189,572	183,445	152,943	150,751	156,892	180,129	172,520	154,713	156,430	173,775	200,522	2,078,710
Other Public Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Street & Highway Lighting Sales	4,293	3,988	4,221	3,960	4,486	4,794	5,576	5,270	4,415	4,105	4,052	4,373	53,533
Interdepartmental Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Total Billed Sales - MWh	212,720	194,801	188,949	158,051	156,335	162,702	186,772	178,887	160,276	161,779	179,141	206,329	2,146,742
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	213,141	195,200	189,372	158,427	156,719	163,094	187,207	179,310	160,664	162,165	179,519	206,746	2,151,564
Total Requirements (Energy + Losses)	230,299	210,913	204,617	171,181	169,335	176,220	202,273	193,740	173,595	175,218	193,969	223,388	2,324,748
# of Large Comm & Ind Customers	1,232	1,236	1,244	1,254	1,266	1,275	1,284	1,297	1,325	1,325	1,306	1,305	1,279
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	391.6	361.6	322.6	298.7	284.0	370.8	406.2	389.1	357.1	308.2	341.6	385.4	406.2

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

**NORTH DAKOTA YEAR 2022**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.7	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,038.8	9,805.0
# of Residential Customers	79,002	79,161	79,215	79,140	79,154	79,244	79,265	79,385	79,437	79,496	79,605	79,699	79,317
Total Residential Sales - MWh	87,435	77,680	69,414	53,822	50,825	55,510	68,065	62,168	51,227	53,047	65,717	82,791	777,701
Use per Small Comm & Ind Customer - kWh	4,804.1	4,469.5	4,395.1	3,694.4	3,594.2	3,635.0	4,037.6	3,950.0	3,609.4	3,745.2	4,125.6	4,695.6	48,735.1
# of Small Comm & Ind Customers	12,320	12,337	12,352	12,375	12,414	12,436	12,447	12,449	12,591	12,565	12,409	12,406	12,425
Total Small Comm & Ind Sales - MWh	59,186	55,140	54,288	45,718	44,618	45,205	50,256	49,174	45,446	47,059	51,194	58,254	605,538
Large Comm & Ind Sales	61,564	57,836	60,811	54,347	56,294	57,206	62,966	62,281	59,005	57,254	57,859	61,172	708,595
Total Sales (Residential, SC&I and LC&I)	208,185	190,656	184,513	153,887	151,737	157,921	181,287	173,623	155,678	157,360	174,770	202,217	2,091,834
Other Public Sales	4,382	4,070	4,308	4,041	4,578	4,893	5,691	5,378	4,506	4,190	4,135	4,462	54,634
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	213,994	195,983	190,120	159,090	157,426	163,841	188,057	180,109	161,343	162,806	180,233	208,129	2,161,131
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	214,415	196,382	190,543	159,466	157,810	164,233	188,492	180,532	161,731	163,192	180,611	208,546	2,165,953
Total Requirements (Energy + Losses)	231,656	212,173	205,865	172,289	170,500	177,439	203,649	195,049	174,736	176,314	195,134	225,315	2,340,119
# of Large Comm & Ind Customers	1,244	1,248	1,257	1,267	1,279	1,288	1,297	1,310	1,338	1,339	1,319	1,318	1,292
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	398.7	368.2	328.4	304.2	284.3	371.2	406.6	389.4	357.5	308.5	343.8	387.9	406.6

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

**NORTH DAKOTA YEAR 2023**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,038.8	9,805.0
# of Residential Customers	79,554	79,715	79,770	79,694	79,707	79,799	79,820	79,941	79,993	80,052	80,162	80,257	79,872
Total Residential Sales - MWh	88,047	78,223	69,900	54,199	51,181	55,898	68,542	62,604	51,586	53,418	66,177	83,367	783,142
Use per Small Comm & Ind Customer - kWh	4,839.5	4,502.1	4,427.3	3,721.3	3,620.8	3,661.6	4,067.1	3,978.9	3,635.6	3,772.7	4,155.6	4,726.2	49,087.9
# of Small Comm & Ind Customers	12,446	12,464	12,479	12,503	12,541	12,564	12,575	12,577	12,721	12,694	12,537	12,533	12,553
Total Small Comm & Ind Sales - MWh	60,232	56,114	55,248	46,527	45,408	46,004	51,144	50,043	46,249	47,891	52,099	59,233	616,192
Large Comm & Ind Sales	61,927	58,177	61,178	54,695	56,681	57,606	63,406	62,708	59,395	57,608	58,205	62,524	714,110
Total Sales (Residential, SC&I and LC&I)	210,206	192,514	186,326	155,421	153,270	159,508	183,092	175,355	157,230	158,917	176,481	205,124	2,113,444
Other Public Sales	4,470	4,153	4,395	4,122	4,671	4,991	5,806	5,487	4,596	4,274	4,219	4,503	55,687
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	216,103	197,924	192,020	160,705	159,052	165,526	189,977	181,950	162,985	164,447	182,028	211,077	2,183,794
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	216,524	198,323	192,443	161,081	159,436	165,918	190,412	182,373	163,373	164,833	182,406	211,494	2,188,616
Total Requirements (Energy + Losses)	233,935	214,270	207,917	174,034	172,256	179,259	205,723	197,038	176,510	178,087	197,073	228,500	2,364,602
# of Large Comm & Ind Customers	1,258	1,262	1,270	1,281	1,292	1,302	1,311	1,324	1,353	1,353	1,333	1,333	1,306
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	401.3	370.6	330.6	306.1	284.7	371.7	407.2	390.0	358.0	309.0	347.2	391.8	407.2

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

**NORTH DAKOTA YEAR 2024**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,038.7	9,804.9
# of Residential Customers	80,107	80,269	80,324	80,248	80,261	80,353	80,374	80,496	80,549	80,609	80,719	80,815	80,427
Total Residential Sales - MWh	88,659	78,767	70,386	54,575	51,537	56,286	69,018	63,039	51,945	53,789	66,637	83,944	788,582
Use per Small Comm & Ind Customer - kWh	4,868.8	4,529.5	4,454.2	3,744.0	3,642.7	3,683.5	4,091.9	4,003.1	3,657.6	3,795.5	4,180.8	4,757.0	49,387.8
# of Small Comm & Ind Customers	12,573	12,591	12,606	12,630	12,669	12,693	12,703	12,705	12,851	12,824	12,665	12,661	12,681
Total Small Comm & Ind Sales - MWh	61,216	57,031	56,150	47,287	46,149	46,755	51,979	50,860	47,004	48,673	52,950	60,229	626,283
Large Comm & Ind Sales	63,781	59,953	63,122	56,409	58,471	59,419	65,395	64,717	61,321	59,453	59,990	64,434	736,465
Total Sales (Residential, SC&I and LC&I)	213,656	195,751	189,658	158,271	156,157	162,460	186,392	178,616	160,270	161,915	179,577	208,607	2,151,330
Other Public Sales	4,481	4,163	4,406	4,133	4,682	5,004	5,820	5,501	4,608	4,285	4,229	4,514	55,826
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	219,564	201,171	195,363	163,566	161,950	168,491	193,291	185,225	166,037	167,456	185,134	214,571	2,221,819
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	219,985	201,570	195,786	163,942	162,334	168,883	193,726	185,648	166,425	167,842	185,512	214,988	2,226,641
Total Requirements (Energy + Losses)	237,674	217,778	211,529	177,125	175,387	182,463	209,304	200,576	179,807	181,338	200,429	232,275	2,405,685
# of Large Comm & Ind Customers	1,270	1,274	1,283	1,293	1,305	1,315	1,324	1,337	1,366	1,367	1,346	1,346	1,319
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	405.3	374.3	333.9	309.2	286.7	374.3	410.0	392.7	360.4	311.1	353.1	398.4	410.0

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

**NORTH DAKOTA YEAR 2025**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.0	9,802.3
# of Residential Customers	80,660	80,823	80,878	80,802	80,815	80,907	80,929	81,052	81,105	81,165	81,276	81,372	80,982
Total Residential Sales - MWh	89,271	79,311	70,872	54,952	51,893	56,675	69,495	63,474	52,303	54,161	67,097	84,303	793,807
Use per Small Comm & Ind Customer - kWh	4,902.4	4,560.8	4,484.8	3,769.7	3,667.8	3,709.1	4,120.3	4,030.9	3,683.1	3,821.8	4,209.6	4,785.8	49,725.0
# of Small Comm & Ind Customers	12,700	12,718	12,734	12,758	12,797	12,821	12,831	12,833	12,980	12,953	12,793	12,789	12,809
Total Small Comm & Ind Sales - MWh	62,261	58,004	57,109	48,094	46,937	47,554	52,867	51,728	47,806	49,504	53,854	61,206	636,924
Large Comm & Ind Sales	65,718	61,806	65,148	58,196	60,335	61,309	67,470	66,809	63,324	61,373	61,853	65,432	758,773
Total Sales (Residential, SC&I and LC&I)	217,250	199,121	193,129	161,242	159,165	165,538	189,832	182,011	163,433	165,038	182,804	210,941	2,189,504
Other Public Sales	4,493	4,173	4,417	4,143	4,694	5,016	5,835	5,515	4,619	4,295	4,240	4,526	55,966
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	223,170	204,551	198,845	166,547	164,970	171,581	196,746	188,634	169,211	170,589	188,372	216,917	2,260,133
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	223,591	204,950	199,268	166,923	165,354	171,973	197,181	189,057	169,599	170,975	188,750	217,334	2,264,955
Total Requirements (Energy + Losses)	241,570	221,430	215,291	180,345	178,650	185,801	213,036	204,259	183,236	184,723	203,927	234,810	2,447,078
# of Large Comm & Ind Customers	1,283	1,287	1,296	1,306	1,318	1,328	1,337	1,351	1,380	1,380	1,360	1,359	1,332
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	412.2	380.7	339.5	314.5	290.8	379.7	415.9	398.3	365.6	315.6	359.3	405.4	415.9

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

**NORTH DAKOTA YEAR 2026**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.0	9,802.2
# of Residential Customers	80,909	81,072	81,128	81,051	81,065	81,157	81,179	81,302	81,355	81,415	81,527	81,624	81,232
Total Residential Sales - MWh	89,547	79,555	71,090	55,122	52,053	56,850	69,709	63,669	52,465	54,328	67,303	84,562	796,253
Use per Small Comm & Ind Customer - kWh	4,930.7	4,586.8	4,510.7	3,791.5	3,688.9	3,730.4	4,143.7	4,053.9	3,704.2	3,843.6	4,234.2	4,815.7	50,013.0
# of Small Comm & Ind Customers	12,826	12,845	12,860	12,884	12,924	12,948	12,959	12,961	13,109	13,082	12,919	12,916	12,936
Total Small Comm & Ind Sales - MWh	63,241	58,917	58,007	48,850	47,675	48,301	53,698	52,542	48,559	50,282	54,701	62,199	646,972
Large Comm & Ind Sales	66,242	62,298	65,660	58,656	60,812	61,795	68,006	67,337	63,822	61,854	62,344	66,005	764,831
Total Sales (Residential, SC&I and LC&I)	219,030	200,770	194,757	162,628	160,540	166,946	191,413	183,548	164,846	166,464	184,348	212,766	2,208,056
Other Public Sales	4,504	4,184	4,428	4,154	4,705	5,029	5,849	5,528	4,631	4,306	4,250	4,537	56,105
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	224,961	206,211	200,484	167,944	166,356	173,002	198,341	190,184	170,636	172,026	189,926	218,753	2,278,824
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	225,382	206,610	200,907	168,320	166,740	173,394	198,776	190,607	171,024	172,412	190,304	219,170	2,283,646
Total Requirements (Energy + Losses)	243,505	223,224	217,062	181,855	180,148	187,337	214,760	205,934	184,776	186,276	205,606	236,793	2,467,276
# of Large Comm & Ind Customers	1,296	1,300	1,309	1,320	1,332	1,342	1,352	1,365	1,394	1,395	1,374	1,373	1,346
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	419.4	387.3	345.5	319.9	293.7	383.5	420.1	402.4	369.3	318.8	362.1	408.6	420.1

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

**NORTH DAKOTA YEAR 2027**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.0	9,802.2
# of Residential Customers	81,158	81,322	81,378	81,301	81,314	81,407	81,428	81,552	81,605	81,666	81,778	81,875	81,482
Total Residential Sales - MWh	89,822	79,800	71,309	55,291	52,213	57,025	69,924	63,866	52,626	54,495	67,511	84,823	798,705
Use per Small Comm & Ind Customer - kWh	4,962.9	4,616.8	4,540.3	3,816.2	3,713.0	3,754.9	4,170.9	4,080.5	3,728.4	3,869.0	4,261.8	4,843.0	50,336.6
# of Small Comm & Ind Customers	12,953	12,972	12,987	13,012	13,052	13,076	13,087	13,089	13,239	13,211	13,047	13,044	13,064
Total Small Comm & Ind Sales - MWh	64,285	59,889	58,965	49,657	48,462	49,099	54,585	53,410	49,360	51,113	55,604	63,172	657,601
Large Comm & Ind Sales	66,851	62,869	66,255	59,188	61,366	62,360	68,630	67,950	64,400	62,413	62,913	66,559	771,754
Total Sales (Residential, SC&I and LC&I)	220,958	202,558	196,529	164,136	162,041	168,484	193,139	185,226	166,386	168,021	186,028	214,554	2,228,060
Other Public Sales	4,515	4,194	4,439	4,164	4,717	5,041	5,864	5,542	4,643	4,317	4,261	4,548	56,245
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	226,900	208,009	202,267	169,462	167,869	174,552	200,082	191,876	172,188	173,594	191,617	220,552	2,298,968
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	227,321	208,408	202,690	169,838	168,253	174,944	200,517	192,299	172,576	173,980	191,995	220,969	2,303,790
Total Requirements (Energy + Losses)	245,600	225,166	218,988	183,495	181,782	189,011	216,641	207,762	186,453	187,970	207,433	238,737	2,489,038
# of Large Comm & Ind Customers	1,309	1,313	1,322	1,333	1,345	1,355	1,365	1,378	1,408	1,408	1,387	1,387	1,359
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	422.7	390.4	348.2	322.5	296.9	387.6	424.6	406.7	373.3	322.2	365.3	412.2	424.6



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

**NORTH DAKOTA YEAR 2028**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.0	9,802.2
# of Residential Customers	81,407	81,571	81,627	81,550	81,564	81,657	81,678	81,802	81,856	81,917	82,029	82,126	81,732
Total Residential Sales - MWh	90,098	80,044	71,528	55,461	52,373	57,200	70,138	64,062	52,788	54,662	67,718	85,082	801,154
Use per Small Comm & Ind Customer - kWh	4,989.3	4,641.4	4,564.5	3,836.7	3,732.7	3,774.9	4,193.2	4,102.2	3,748.4	3,889.4	4,284.4	4,871.5	50,607.2
# of Small Comm & Ind Customers	13,080	13,099	13,114	13,139	13,180	13,204	13,215	13,217	13,368	13,341	13,175	13,171	13,192
Total Small Comm & Ind Sales - MWh	65,260	60,798	59,859	50,410	49,197	49,844	55,413	54,219	50,109	51,888	56,447	64,162	667,606
Large Comm & Ind Sales	67,386	63,371	66,778	59,657	61,853	62,856	69,177	68,489	64,908	62,903	63,413	67,145	777,936
Total Sales (Residential, SC&I and LC&I)	222,744	204,213	198,165	165,528	163,423	169,900	194,728	186,770	167,805	169,453	187,578	216,389	2,246,696
Other Public Sales	4,526	4,204	4,450	4,174	4,729	5,053	5,879	5,556	4,654	4,327	4,271	4,560	56,383
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	228,697	209,674	203,914	170,864	169,263	175,980	201,686	193,434	173,618	175,036	193,177	222,399	2,317,742
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	229,118	210,073	204,337	171,240	169,647	176,372	202,121	193,857	174,006	175,422	193,555	222,816	2,322,564
Total Requirements (Energy + Losses)	247,541	226,965	220,768	185,009	183,288	190,554	218,374	209,445	187,998	189,528	209,119	240,733	2,509,322
# of Large Comm & Ind Customers	1,321	1,325	1,335	1,345	1,358	1,368	1,378	1,391	1,421	1,422	1,400	1,400	1,372
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	426.4	393.8	351.2	325.3	299.8	391.4	428.8	410.7	377.0	325.4	368.2	415.4	428.8

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

**NORTH DAKOTA YEAR 2029**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.0	9,802.2
# of Residential Customers	81,656	81,821	81,877	81,799	81,813	81,907	81,928	82,053	82,106	82,167	82,280	82,377	81,982
Total Residential Sales - MWh	90,374	80,290	71,747	55,631	52,534	57,375	70,353	64,257	52,949	54,830	67,925	85,342	803,607
Use per Small Comm & Ind Customer - kWh	5,020.1	4,670.2	4,592.6	3,860.3	3,755.9	3,798.3	4,219.2	4,127.8	3,771.6	3,913.7	4,310.9	4,900.8	50,919.9
# of Small Comm & Ind Customers	13,207	13,226	13,242	13,267	13,308	13,332	13,343	13,345	13,498	13,470	13,303	13,299	13,320
Total Small Comm & Ind Sales - MWh	66,301	61,768	60,815	51,215	49,983	50,639	56,297	55,085	50,909	52,717	57,348	65,176	678,253
Large Comm & Ind Sales	68,009	63,954	67,386	60,202	62,418	63,433	69,815	69,116	65,499	63,475	63,996	67,765	785,068
Total Sales (Residential, SC&I and LC&I)	224,684	206,012	199,948	167,048	164,935	171,447	196,465	188,458	169,357	171,022	189,269	218,283	2,266,928
Other Public Sales	4,538	4,215	4,461	4,184	4,740	5,066	5,893	5,570	4,666	4,338	4,283	4,571	56,525
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	230,649	211,484	205,708	172,394	170,786	177,540	203,437	195,136	175,182	176,616	194,880	224,304	2,338,116
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	231,070	211,883	206,131	172,770	171,170	177,932	203,872	195,559	175,570	177,002	195,258	224,721	2,342,938
Total Requirements (Energy + Losses)	249,650	228,921	222,706	186,662	184,934	192,240	220,265	211,284	189,688	191,235	210,959	242,791	2,531,335
# of Large Comm & Ind Customers	1,334	1,338	1,347	1,358	1,371	1,381	1,391	1,404	1,435	1,435	1,414	1,413	1,385
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	429.8	396.9	354.0	327.9	302.9	395.4	433.2	414.9	380.8	328.7	371.5	419.1	433.2

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

**NORTH DAKOTA YEAR 2030**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,106.8	981.3	876.3	680.1	642.1	700.5	858.7	783.1	644.9	667.3	825.5	1,036.0	9,802.2
# of Residential Customers	81,905	82,070	82,127	82,049	82,063	82,156	82,178	82,303	82,356	82,418	82,531	82,628	82,232
Total Residential Sales - MWh	90,649	80,535	71,965	55,800	52,694	57,550	70,567	64,453	53,111	54,996	68,132	85,601	806,053
Use per Small Comm & Ind Customer - kWh	5,050.5	4,698.5	4,620.5	3,883.8	3,778.6	3,821.3	4,244.6	4,152.5	3,794.3	3,937.1	4,337.0	4,929.7	51,226.8
# of Small Comm & Ind Customers	13,334	13,353	13,369	13,394	13,436	13,460	13,472	13,474	13,628	13,600	13,431	13,427	13,448
Total Small Comm & Ind Sales - MWh	67,344	62,739	61,771	52,020	50,769	51,435	57,183	55,951	51,709	53,545	58,250	66,191	688,907
Large Comm & Ind Sales	68,638	64,545	68,001	60,753	62,990	64,017	70,459	69,750	66,096	64,052	64,584	68,392	792,277
Total Sales (Residential, SC&I and LC&I)	226,631	207,819	201,737	168,573	166,453	173,002	198,209	190,154	170,916	172,593	190,966	220,184	2,287,237
Other Public Sales	4,549	4,226	4,473	4,195	4,753	5,079	5,908	5,584	4,678	4,350	4,293	4,582	56,670
Street & Highway Lighting Sales	1,409	1,241	1,283	1,148	1,098	1,016	1,067	1,097	1,148	1,244	1,314	1,434	14,499
Interdepartmental Sales	18	16	16	14	13	11	12	11	11	12	14	16	164
Total Billed Sales - MWh	232,607	213,302	207,509	173,930	172,317	179,108	205,196	196,846	176,753	178,199	196,587	226,216	2,358,570
Company Use	421	399	423	376	384	392	435	423	388	386	378	417	4,822
Total Energy	233,028	213,701	207,932	174,306	172,701	179,500	205,631	197,269	177,141	178,585	196,965	226,633	2,363,392
Total Requirements (Energy + Losses)	251,766	230,885	224,652	188,322	186,588	193,934	222,166	213,131	191,385	192,945	212,803	244,857	2,553,434
# of Large Comm & Ind Customers	1,347	1,351	1,361	1,372	1,384	1,395	1,405	1,419	1,449	1,450	1,428	1,428	1,399
# of Other Public Customers	590	590	591	593	594	594	593	593	602	597	585	581	592
# of Street & Highway Lighting Customers	527	527	527	527	527	527	527	527	527	527	527	527	527
Peak Demand Net of Energy Efficiency Progs	433.6	400.4	357.2	330.8	305.9	399.5	437.6	419.1	384.7	332.1	374.6	422.7	437.6

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## **APPENDIX F**

### **Monthly Forecasts – South Dakota (2021-2030)**

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

**SOUTH DAKOTA YEAR 2021**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.4	1,066.4	931.6	691.0	717.7	730.5	937.2	789.9	669.3	687.2	900.1	1,144.8	10,444.5
# of Residential Customers	6,496	6,495	6,495	6,499	6,504	6,501	6,501	6,507	6,576	6,561	6,485	6,476	6,508
Total Residential Sales - MWh	7,694	6,926	6,051	4,491	4,668	4,749	6,093	5,140	4,401	4,509	5,837	7,414	67,973
Use per Small Comm & Ind Customer - kWh	2,308.5	2,161.3	1,907.3	1,397.5	1,547.7	1,448.2	1,770.7	1,558.7	1,410.1	1,431.0	1,863.9	2,228.6	20,997.9
# of Small Comm & Ind Customers	1,877	1,878	1,878	1,892	1,908	1,919	1,919	1,917	1,953	1,942	1,895	1,894	1,906
Total Small Comm & Ind Sales - MWh	4,333	4,059	3,582	2,644	2,953	2,779	3,398	2,988	2,754	2,779	3,532	4,221	40,022
Large Comm & Ind Sales	3,214	3,141	3,038	2,510	3,293	2,930	3,378	3,196	3,215	3,154	3,624	3,536	38,229
Total Sales (Residential, SC&I and LC&I)	15,241	14,126	12,671	9,645	10,914	10,458	12,869	11,324	10,370	10,442	12,993	15,171	146,224
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,487	14,366	12,909	9,824	11,190	10,668	13,108	11,540	10,588	10,655	13,223	15,427	148,985
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	15,549	14,424	12,949	9,840	11,212	10,679	13,122	11,551	10,599	10,669	13,253	15,483	149,330
Total Requirements (Energy + Losses)	16,799	15,584	13,990	10,631	12,114	11,538	14,177	12,480	11,451	11,527	14,319	16,728	161,338
# of Large Comm & Ind Customers	110	110	110	110	111	111	111	111	113	113	112	112	111
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	27.5	25.1	23.3	20.9	16.6	24.1	28.2	25.8	22.1	19.2	24.4	26.6	28.2

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

**SOUTH DAKOTA YEAR 2022**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.3	931.7	691.1	717.6	730.4	937.3	789.8	669.2	687.2	899.8	1,144.8	10,444.1
# of Residential Customers	6,498	6,497	6,497	6,501	6,506	6,503	6,503	6,509	6,578	6,563	6,488	6,478	6,510
Total Residential Sales - MWh	7,697	6,928	6,053	4,493	4,669	4,750	6,095	5,141	4,402	4,510	5,838	7,416	67,992
Use per Small Comm & Ind Customer - kWh	2,308.8	2,162.3	1,908.0	1,397.7	1,548.4	1,449.0	1,771.9	1,559.8	1,411.3	1,432.0	1,864.9	2,231.7	21,010.4
# of Small Comm & Ind Customers	1,891	1,892	1,892	1,906	1,922	1,933	1,933	1,931	1,967	1,956	1,909	1,908	1,920
Total Small Comm & Ind Sales - MWh	4,366	4,091	3,610	2,664	2,976	2,801	3,425	3,012	2,776	2,801	3,560	4,258	40,340
Large Comm & Ind Sales	3,271	3,195	3,091	2,554	3,350	2,981	3,436	3,252	3,272	3,209	3,687	3,595	38,893
Total Sales (Residential, SC&I and LC&I)	15,334	14,214	12,754	9,711	10,995	10,532	12,956	11,405	10,450	10,520	13,085	15,269	147,225
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,580	14,454	12,992	9,890	11,271	10,742	13,195	11,621	10,668	10,733	13,315	15,525	149,986
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	15,642	14,512	13,032	9,906	11,293	10,753	13,209	11,632	10,679	10,747	13,345	15,581	150,331
Total Requirements (Energy + Losses)	16,900	15,679	14,080	10,703	12,201	11,618	14,271	12,567	11,538	11,611	14,418	16,834	162,420
# of Large Comm & Ind Customers	111	111	111	111	112	112	112	112	114	114	113	113	112
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	25.3	23.5	21.0	16.6	24.1	28.2	25.8	22.1	19.2	24.5	26.7	28.2

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

**SOUTH DAKOTA YEAR 2023**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.3	931.8	691.2	717.7	730.4	937.3	789.7	669.3	687.2	899.8	1,144.6	10,444.1
# of Residential Customers	6,499	6,498	6,498	6,502	6,507	6,505	6,504	6,511	6,579	6,564	6,489	6,480	6,511
Total Residential Sales - MWh	7,698	6,929	6,055	4,494	4,670	4,751	6,096	5,142	4,403	4,511	5,839	7,417	68,005
Use per Small Comm & Ind Customer - kWh	2,316.0	2,168.7	1,913.8	1,401.7	1,553.0	1,453.7	1,777.8	1,564.4	1,414.9	1,436.2	1,871.3	2,238.1	21,074.1
# of Small Comm & Ind Customers	1,902	1,903	1,903	1,917	1,933	1,944	1,944	1,942	1,979	1,967	1,919	1,919	1,931
Total Small Comm & Ind Sales - MWh	4,405	4,127	3,642	2,687	3,002	2,826	3,456	3,038	2,800	2,825	3,591	4,295	40,694
Large Comm & Ind Sales	3,324	3,248	3,142	2,596	3,405	3,031	3,493	3,306	3,326	3,261	3,748	3,657	39,537
Total Sales (Residential, SC&I and LC&I)	15,427	14,304	12,839	9,777	11,077	10,608	13,045	11,486	10,529	10,597	13,178	15,369	148,236
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,673	14,544	13,077	9,956	11,353	10,818	13,284	11,702	10,747	10,810	13,408	15,625	150,997
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	15,735	14,602	13,117	9,972	11,375	10,829	13,298	11,713	10,758	10,824	13,438	15,681	151,342
Total Requirements (Energy + Losses)	17,000	15,776	14,172	10,774	12,290	11,700	14,367	12,655	11,623	11,694	14,519	16,942	163,512
# of Large Comm & Ind Customers	111	111	111	111	112	112	112	112	114	114	113	113	112
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	27.8	25.4	23.6	21.1	16.6	24.1	28.2	25.8	22.1	19.2	24.6	26.9	28.2

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

**SOUTH DAKOTA YEAR 2024**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.3	931.8	691.2	717.8	730.5	937.1	789.9	669.3	687.1	900.0	1,144.6	10,444.5
# of Residential Customers	6,499	6,499	6,498	6,502	6,507	6,505	6,505	6,511	6,579	6,565	6,489	6,480	6,512
Total Residential Sales - MWh	7,698	6,930	6,055	4,494	4,671	4,752	6,096	5,143	4,403	4,511	5,840	7,417	68,010
Use per Small Comm & Ind Customer - kWh	2,321.8	2,174.4	1,919.1	1,405.4	1,557.3	1,457.6	1,781.7	1,568.6	1,418.9	1,440.1	1,876.2	2,243.9	21,129.7
# of Small Comm & Ind Customers	1,914	1,915	1,915	1,929	1,945	1,956	1,956	1,954	1,991	1,979	1,931	1,931	1,943
Total Small Comm & Ind Sales - MWh	4,444	4,164	3,675	2,711	3,029	2,851	3,485	3,065	2,825	2,850	3,623	4,333	41,055
Large Comm & Ind Sales	3,382	3,305	3,196	2,640	3,464	3,083	3,554	3,363	3,383	3,318	3,813	3,720	40,221
Total Sales (Residential, SC&I and LC&I)	15,524	14,399	12,926	9,845	11,164	10,686	13,135	11,571	10,611	10,679	13,276	15,470	149,286
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,770	14,639	13,164	10,024	11,440	10,896	13,374	11,787	10,829	10,892	13,506	15,726	152,047
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	15,832	14,697	13,204	10,040	11,462	10,907	13,388	11,798	10,840	10,906	13,536	15,782	152,392
Total Requirements (Energy + Losses)	17,105	15,879	14,266	10,847	12,384	11,784	14,465	12,747	11,712	11,783	14,624	17,051	164,647
# of Large Comm & Ind Customers	112	112	112	112	113	113	113	113	115	115	114	114	113
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	25.6	23.8	21.3	16.5	23.9	28.0	25.6	21.9	19.1	24.8	27	28



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

**SOUTH DAKOTA YEAR 2025**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.3	931.8	691.2	717.8	730.5	937.1	789.9	669.3	687.1	900.0	1,144.4	10,444.3
# of Residential Customers	6,499	6,499	6,498	6,502	6,507	6,505	6,505	6,511	6,579	6,565	6,489	6,480	6,512
Total Residential Sales - MWh	7,698	6,930	6,055	4,494	4,671	4,752	6,096	5,143	4,403	4,511	5,840	7,416	68,009
Use per Small Comm & Ind Customer - kWh	2,328.8	2,181.8	1,925.7	1,410.3	1,562.4	1,462.1	1,787.5	1,573.5	1,423.6	1,445.2	1,882.1	2,248.7	21,196.3
# of Small Comm & Ind Customers	1,925	1,925	1,925	1,940	1,956	1,967	1,967	1,965	2,002	1,990	1,942	1,942	1,954
Total Small Comm & Ind Sales - MWh	4,483	4,200	3,707	2,736	3,056	2,876	3,516	3,092	2,850	2,876	3,655	4,367	41,414
Large Comm & Ind Sales	3,441	3,362	3,252	2,687	3,525	3,137	3,616	3,421	3,442	3,376	3,879	3,782	40,920
Total Sales (Residential, SC&I and LC&I)	15,622	14,492	13,014	9,917	11,252	10,765	13,228	11,656	10,695	10,763	13,374	15,565	150,343
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,868	14,732	13,252	10,096	11,528	10,975	13,467	11,872	10,913	10,976	13,604	15,821	153,104
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	15,930	14,790	13,292	10,112	11,550	10,986	13,481	11,883	10,924	10,990	13,634	15,877	153,449
Total Requirements (Energy + Losses)	17,211	15,979	14,361	10,925	12,479	11,869	14,565	12,839	11,802	11,874	14,730	17,154	165,788
# of Large Comm & Ind Customers	113	113	113	113	114	114	114	114	116	116	115	115	114
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	25.8	23.9	21.4	16.6	24.1	28.2	25.8	22.1	19.2	25.0	27.3	28.2

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

**SOUTH DAKOTA YEAR 2026**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.3	931.8	691.2	717.7	730.4	937.3	789.7	669.3	687.2	899.8	1,144.5	10,443.9
# of Residential Customers	6,499	6,498	6,498	6,502	6,507	6,505	6,504	6,511	6,579	6,564	6,489	6,479	6,511
Total Residential Sales - MWh	7,698	6,929	6,055	4,494	4,670	4,751	6,096	5,142	4,403	4,511	5,839	7,415	68,003
Use per Small Comm & Ind Customer - kWh	2,334.4	2,186.5	1,929.2	1,413.1	1,565.3	1,465.1	1,791.7	1,576.9	1,426.0	1,447.6	1,886.3	2,255.5	21,241.6
# of Small Comm & Ind Customers	1,935	1,936	1,936	1,951	1,967	1,978	1,978	1,976	2,014	2,002	1,953	1,953	1,965
Total Small Comm & Ind Sales - MWh	4,517	4,233	3,735	2,757	3,079	2,898	3,544	3,116	2,872	2,898	3,684	4,405	41,738
Large Comm & Ind Sales	3,498	3,417	3,305	2,731	3,582	3,188	3,676	3,477	3,499	3,431	3,943	3,847	41,594
Total Sales (Residential, SC&I and LC&I)	15,713	14,579	13,095	9,982	11,331	10,837	13,316	11,735	10,774	10,840	13,466	15,667	151,335
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,959	14,819	13,333	10,161	11,607	11,047	13,555	11,951	10,992	11,053	13,696	15,923	154,096
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	16,021	14,877	13,373	10,177	11,629	11,058	13,569	11,962	11,003	11,067	13,726	15,979	154,441
Total Requirements (Energy + Losses)	17,309	16,073	14,448	10,995	12,564	11,947	14,660	12,924	11,888	11,957	14,830	17,264	166,859
# of Large Comm & Ind Customers	113	113	113	113	114	114	114	114	116	116	115	115	114
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	25.9	24.1	21.6	16.7	24.3	28.4	26.0	22.2	19.3	25.2	27.5	28.4

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

**SOUTH DAKOTA YEAR 2027**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.3	931.7	691.1	717.8	730.3	937.3	789.9	669.2	687.2	900.0	1,144.3	10,443.9
# of Residential Customers	6,498	6,497	6,497	6,501	6,506	6,504	6,503	6,510	6,578	6,563	6,488	6,479	6,510
Total Residential Sales - MWh	7,697	6,928	6,053	4,493	4,670	4,750	6,095	5,142	4,402	4,510	5,839	7,414	67,993
Use per Small Comm & Ind Customer - kWh	2,343.4	2,194.2	1,936.3	1,418.2	1,571.1	1,469.6	1,796.9	1,582.6	1,431.8	1,452.8	1,892.5	2,263.9	21,317.1
# of Small Comm & Ind Customers	1,945	1,946	1,946	1,961	1,977	1,989	1,989	1,986	2,024	2,012	1,963	1,963	1,975
Total Small Comm & Ind Sales - MWh	4,558	4,270	3,768	2,781	3,106	2,923	3,574	3,143	2,898	2,923	3,715	4,444	42,103
Large Comm & Ind Sales	3,559	3,476	3,362	2,778	3,645	3,244	3,740	3,538	3,559	3,491	4,012	3,914	42,318
Total Sales (Residential, SC&I and LC&I)	15,814	14,674	13,183	10,052	11,421	10,917	13,409	11,823	10,859	10,924	13,566	15,772	152,414
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	16,060	14,914	13,421	10,231	11,697	11,127	13,648	12,039	11,077	11,137	13,796	16,028	155,175
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	16,122	14,972	13,461	10,247	11,719	11,138	13,662	12,050	11,088	11,151	13,826	16,084	155,520
Total Requirements (Energy + Losses)	17,418	16,176	14,543	11,071	12,661	12,034	14,761	13,019	11,980	12,048	14,938	17,377	168,026
# of Large Comm & Ind Customers	114	114	114	114	115	115	115	115	117	117	116	116	115
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	28.6	26.1	24.3	21.7	16.9	24.5	28.7	26.2	22.5	19.5	25.3	27.7	28.7

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

**SOUTH DAKOTA YEAR 2028**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.6	1,066.3	931.7	691.1	717.8	730.4	937.1	790.0	669.3	687.1	900.1	1,144.4	10,444.0
# of Residential Customers	6,496	6,496	6,496	6,500	6,505	6,502	6,502	6,508	6,576	6,562	6,486	6,477	6,509
Total Residential Sales - MWh	7,695	6,927	6,052	4,492	4,669	4,749	6,093	5,141	4,401	4,509	5,838	7,412	67,978
Use per Small Comm & Ind Customer - kWh	2,353.1	2,203.6	1,944.8	1,424.4	1,578.0	1,476.0	1,804.8	1,589.5	1,437.8	1,459.2	1,900.6	2,274.5	21,409.8
# of Small Comm & Ind Customers	1,954	1,955	1,955	1,970	1,986	1,998	1,998	1,995	2,033	2,021	1,972	1,971	1,984
Total Small Comm & Ind Sales - MWh	4,598	4,308	3,802	2,806	3,134	2,949	3,606	3,171	2,923	2,949	3,748	4,483	42,477
Large Comm & Ind Sales	3,621	3,537	3,422	2,827	3,708	3,300	3,805	3,600	3,622	3,552	4,082	3,982	43,058
Total Sales (Residential, SC&I and LC&I)	15,914	14,772	13,276	10,125	11,511	10,998	13,504	11,912	10,946	11,010	13,668	15,877	153,513
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	16,160	15,012	13,514	10,304	11,787	11,208	13,743	12,128	11,164	11,223	13,898	16,133	156,274
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	16,222	15,070	13,554	10,320	11,809	11,219	13,757	12,139	11,175	11,237	13,928	16,189	156,619
Total Requirements (Energy + Losses)	17,526	16,282	14,644	11,150	12,759	12,121	14,863	13,115	12,074	12,141	15,048	17,491	169,214
# of Large Comm & Ind Customers	114	114	114	114	115	115	115	115	117	117	116	116	115
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	28.8	26.3	24.4	21.9	17.0	24.7	28.9	26.4	22.6	19.7	25.5	27.9	28.9

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

**SOUTH DAKOTA YEAR 2029**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.6	1,066.4	931.8	691.1	717.7	730.3	937.2	789.8	669.2	687.2	899.9	1,144.4	10,443.9
# of Residential Customers	6,495	6,494	6,494	6,498	6,503	6,501	6,500	6,507	6,575	6,560	6,485	6,475	6,507
Total Residential Sales - MWh	7,694	6,925	6,051	4,491	4,667	4,748	6,092	5,139	4,400	4,508	5,836	7,410	67,961
Use per Small Comm & Ind Customer - kWh	2,361.5	2,211.2	1,951.7	1,429.8	1,584.2	1,482.1	1,811.8	1,595.5	1,443.5	1,464.8	1,908.2	2,283.2	21,491.0
# of Small Comm & Ind Customers	1,964	1,965	1,965	1,980	1,996	2,008	2,008	2,005	2,043	2,031	1,982	1,981	1,994
Total Small Comm & Ind Sales - MWh	4,638	4,345	3,835	2,831	3,162	2,976	3,638	3,199	2,949	2,975	3,782	4,523	42,853
Large Comm & Ind Sales	3,684	3,599	3,481	2,876	3,773	3,358	3,871	3,663	3,685	3,614	4,153	4,052	43,809
Total Sales (Residential, SC&I and LC&I)	16,016	14,869	13,367	10,198	11,602	11,082	13,601	12,001	11,034	11,097	13,771	15,985	154,623
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	16,262	15,109	13,605	10,377	11,878	11,292	13,840	12,217	11,252	11,310	14,001	16,241	157,384
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	16,324	15,167	13,645	10,393	11,900	11,303	13,854	12,228	11,263	11,324	14,031	16,297	157,729
Total Requirements (Energy + Losses)	17,637	16,387	14,742	11,229	12,857	12,212	14,968	13,211	12,169	12,235	15,159	17,607	170,413
# of Large Comm & Ind Customers	115	115	115	115	116	116	116	116	118	118	117	117	116
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	26.5	24.6	22.0	17.2	25.0	29.2	26.7	22.9	19.9	25.7	28.1	29.2

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

**SOUTH DAKOTA YEAR 2030**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,184.5	1,066.2	931.8	691.0	717.6	730.4	937.2	790.0	669.3	687.3	899.9	1,144.4	10,443.8
# of Residential Customers	6,493	6,492	6,492	6,496	6,501	6,498	6,498	6,504	6,573	6,558	6,483	6,473	6,505
Total Residential Sales - MWh	7,691	6,922	6,049	4,489	4,665	4,746	6,090	5,138	4,399	4,507	5,834	7,408	67,938
Use per Small Comm & Ind Customer - kWh	2,371.5	2,221.4	1,960.0	1,435.4	1,590.5	1,488.3	1,819.5	1,602.8	1,449.1	1,471.1	1,916.1	2,292.5	21,581.7
# of Small Comm & Ind Customers	1,973	1,974	1,974	1,989	2,005	2,017	2,017	2,014	2,053	2,040	1,991	1,990	2,003
Total Small Comm & Ind Sales - MWh	4,679	4,385	3,869	2,855	3,189	3,002	3,670	3,228	2,975	3,001	3,815	4,562	43,230
Large Comm & Ind Sales	3,748	3,662	3,542	2,927	3,839	3,417	3,938	3,726	3,749	3,677	4,225	4,122	44,572
Total Sales (Residential, SC&I and LC&I)	16,118	14,969	13,460	10,271	11,693	11,165	13,698	12,092	11,123	11,185	13,874	16,092	155,740
Other Public Sales	136	137	133	85	164	113	135	117	113	109	122	141	1,505
Street & Highway Lighting Sales	110	103	105	94	112	97	104	99	105	104	108	115	1,256
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	16,364	15,209	13,698	10,450	11,969	11,375	13,937	12,308	11,341	11,398	14,104	16,348	158,501
Company Use	62	58	40	16	22	11	14	11	11	14	30	56	345
Total Energy	16,426	15,267	13,738	10,466	11,991	11,386	13,951	12,319	11,352	11,412	14,134	16,404	158,846
Total Requirements (Energy + Losses)	17,747	16,495	14,843	11,308	12,955	12,302	15,073	13,310	12,265	12,330	15,271	17,723	171,622
# of Large Comm & Ind Customers	115	115	115	115	116	116	116	116	118	118	117	117	116
# of Other Public Customers	45	45	45	45	45	45	45	45	46	46	44	45	45
# 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	29.2	26.7	24.8	22.2	17.3	25.1	29.4	26.9	23.0	20.0	25.9	28.3	29.4

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## **APPENDIX G**

### **Monthly Forecasts – Integrated System (2021-2030)**

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

**INTEGRATED SYSTEM YEAR 2021**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.2	965.8	864.2	672.4	633.2	704.6	868.0	787.9	646.5	659.0	813.3	1,023.4	9,727.3
# of Residential Customers	105,191	105,350	105,409	105,324	105,317	105,376	105,377	105,503	105,614	105,656	105,717	105,819	105,471
Total Residential Sales - MWh	114,570	101,752	91,090	70,819	66,688	74,245	91,472	83,125	68,279	69,632	85,976	108,300	1,025,948
Use per Small Comm & Ind Customer - kWh	3,884.5	3,610.7	3,530.4	2,947.8	2,869.3	2,949.4	3,343.4	3,233.7	2,928.2	2,978.4	3,296.5	3,784.1	39,334.8
# of Small Comm & Ind Customers	19,391	19,408	19,420	19,511	19,612	19,660	19,678	19,677	19,882	19,812	19,554	19,535	19,595
Total Small Comm & Ind Sales - MWh	75,324	70,076	68,560	57,515	56,273	57,986	65,792	63,629	58,219	59,009	64,459	73,923	770,765
Large Comm & Ind Sales	107,250	98,893	104,946	95,007	99,772	95,969	105,377	103,730	100,869	100,081	101,281	108,690	1,221,865
Total Sales (Residential, SC&I and LC&I)	297,144	270,721	264,596	223,341	222,733	228,200	262,641	250,484	227,367	228,722	251,716	290,913	3,018,578
Other Public Sales	577	558	564	483	591	670	802	708	607	481	477	565	7,083
Street & Highway Lighting Sales	4,700	4,351	4,596	4,309	4,839	5,127	5,919	5,611	4,756	4,446	4,405	4,778	57,837
Interdepartmental Sales	1,426	1,257	1,298	1,161	1,110	1,027	1,080	1,109	1,161	1,257	1,329	1,450	14,665
Total Billed Sales - MWh	303,847	276,887	271,054	229,294	229,273	235,024	270,442	257,912	233,891	234,906	257,927	297,706	3,098,163
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	304,375	277,382	271,556	229,718	229,703	235,456	270,924	258,377	234,318	235,334	258,366	298,221	3,103,730
Total Requirements (Energy + Losses)	328,869	299,703	293,409	248,204	248,188	254,401	292,722	279,165	253,171	254,271	279,156	322,219	3,353,478
# of Large Comm & Ind Customers	1,601	1,605	1,614	1,626	1,640	1,650	1,659	1,674	1,711	1,707	1,677	1,675	1,653
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	563.3	520.7	465.1	431.3	403.6	525.3	586.0	558.7	503.0	439.8	497.1	555.8	586.0



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

**INTEGRATED SYSTEM YEAR 2022**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.2	965.9	864.2	672.4	633.2	704.6	868.0	787.9	646.5	659.1	813.3	1,025.5	9,729.5
# of Residential Customers	105,442	105,601	105,660	105,575	105,569	105,628	105,629	105,755	105,866	105,908	105,971	106,072	105,723
Total Residential Sales - MWh	114,848	101,999	91,310	70,991	66,849	74,421	91,687	83,321	68,441	69,800	86,184	108,780	1,028,631
Use per Small Comm & Ind Customer - kWh	3,917.3	3,641.2	3,560.4	2,973.2	2,893.8	2,974.8	3,372.0	3,261.3	2,953.4	3,004.1	3,324.5	3,816.8	39,671.0
# of Small Comm & Ind Customers	19,550	19,567	19,579	19,670	19,772	19,820	19,838	19,838	20,044	19,973	19,714	19,695	19,755
Total Small Comm & Ind Sales - MWh	76,583	71,248	69,710	58,483	57,216	58,960	66,893	64,697	59,197	60,001	65,540	75,172	783,700
Large Comm & Ind Sales	111,301	102,535	108,886	98,666	103,739	99,537	110,022	108,291	105,375	106,159	107,271	114,422	1,276,204
Total Sales (Residential, SC&I and LC&I)	302,732	275,782	269,906	228,140	227,804	232,918	268,602	256,309	233,013	235,960	258,995	298,374	3,088,535
Other Public Sales	4,958	4,627	4,871	4,523	5,168	5,562	6,492	6,085	5,112	4,670	4,612	5,026	61,706
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	309,541	282,045	276,466	234,187	234,448	239,851	276,529	263,855	239,638	242,240	265,303	305,271	3,169,374
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	310,069	282,540	276,968	234,611	234,878	240,283	277,011	264,320	240,065	242,668	265,742	305,786	3,174,941
Total Requirements (Energy + Losses)	335,002	305,259	299,240	253,477	253,765	259,605	299,286	285,574	259,369	262,180	287,110	330,374	3,430,241
# of Large Comm & Ind Customers	1,615	1,619	1,629	1,641	1,655	1,665	1,674	1,689	1,726	1,723	1,692	1,690	1,668
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	575.2	531.8	474.9	440.5	410.4	533.9	595.9	568.0	511.1	447.1	508.4	568.4	595.9

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

**INTEGRATED SYSTEM YEAR 2023**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.3	966.0	864.3	672.5	633.3	704.5	868.0	787.8	646.5	659.1	813.3	1,025.6	9,729.9
# of Residential Customers	105,995	106,156	106,216	106,130	106,123	106,185	106,185	106,313	106,423	106,465	106,529	106,632	106,279
Total Residential Sales - MWh	115,461	102,543	91,798	71,369	67,206	74,810	92,165	83,758	68,801	70,172	86,645	109,357	1,034,085
Use per Small Comm & Ind Customer - kWh	3,952.3	3,673.6	3,592.5	2,999.9	2,920.0	3,001.5	3,402.3	3,290.7	2,979.6	3,031.3	3,354.4	3,848.2	40,024.1
# of Small Comm & Ind Customers	19,705	19,723	19,734	19,827	19,928	19,978	19,995	19,995	20,205	20,131	19,870	19,851	19,912
Total Small Comm & Ind Sales - MWh	77,881	72,454	70,894	59,479	58,189	59,963	68,028	65,797	60,203	61,023	66,652	76,391	796,954
Large Comm & Ind Sales	117,991	108,583	115,519	104,993	110,352	105,835	115,902	114,126	111,060	110,449	111,500	119,650	1,345,960
Total Sales (Residential, SC&I and LC&I)	311,333	283,580	278,211	235,841	235,747	240,608	276,095	263,681	240,064	241,644	264,797	305,398	3,176,999
Other Public Sales	5,045	4,709	4,957	4,603	5,259	5,658	6,605	6,193	5,201	4,753	4,695	5,066	62,744
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	318,229	289,925	284,857	241,968	242,482	247,637	284,135	271,335	246,778	248,007	271,188	312,335	3,258,876
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	318,757	290,420	285,359	242,392	242,912	248,069	284,617	271,800	247,205	248,435	271,627	312,850	3,264,443
Total Requirements (Energy + Losses)	344,388	313,772	308,305	261,883	262,445	268,016	307,503	293,656	267,083	268,411	293,469	338,006	3,526,937
# of Large Comm & Ind Customers	1,630	1,634	1,643	1,656	1,669	1,680	1,689	1,704	1,742	1,738	1,707	1,706	1,683
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	588.2	543.8	485.7	450.5	418.2	543.8	607.4	578.9	520.5	455.7	522.6	584.2	607.4

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

**INTEGRATED SYSTEM YEAR 2024**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.4	966.0	864.3	672.5	633.3	704.5	867.9	787.8	646.5	659.1	813.4	1,025.6	9,730.3
# of Residential Customers	106,548	106,711	106,770	106,684	106,677	106,739	106,740	106,868	106,979	107,023	107,086	107,190	106,835
Total Residential Sales - MWh	116,073	103,088	92,284	71,745	67,563	75,199	92,641	84,194	69,160	70,543	87,106	109,934	1,039,530
Use per Small Comm & Ind Customer - kWh	3,983.2	3,702.3	3,620.7	3,023.7	2,942.9	3,025.1	3,428.9	3,316.6	3,003.2	3,055.2	3,380.7	3,879.5	40,340.0
# of Small Comm & Ind Customers	19,862	19,880	19,891	19,984	20,086	20,137	20,154	20,154	20,365	20,291	20,028	20,009	20,070
Total Small Comm & Ind Sales - MWh	79,114	73,602	72,020	60,426	59,112	60,916	69,107	66,843	61,161	61,993	67,709	77,625	809,628
Large Comm & Ind Sales	125,280	115,541	122,855	111,866	117,513	112,752	123,233	121,450	118,176	117,647	118,515	126,761	1,431,589
Total Sales (Residential, SC&I and LC&I)	320,467	292,231	287,159	244,037	244,188	248,867	284,981	272,487	248,497	250,183	273,330	314,320	3,280,747
Other Public Sales	5,055	4,718	4,967	4,613	5,270	5,670	6,618	6,206	5,212	4,763	4,704	5,076	62,872
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	327,373	298,585	293,815	250,174	250,934	255,908	293,034	280,154	255,222	256,556	279,730	321,267	3,362,752
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	327,901	299,080	294,317	250,598	251,364	256,340	293,516	280,619	255,649	256,984	280,169	321,782	3,368,319
Total Requirements (Energy + Losses)	354,267	323,129	317,983	270,749	271,576	276,952	317,119	303,184	276,206	277,648	302,697	347,656	3,639,166
# of Large Comm & Ind Customers	1,644	1,648	1,658	1,670	1,684	1,695	1,704	1,719	1,757	1,754	1,722	1,721	1,698
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	604.5	559.0	499.2	463.2	427.0	555.0	620.2	591.1	531.1	465.2	539.2	602.5	620.2

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

**INTEGRATED SYSTEM YEAR 2025**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.5	966.1	864.4	672.5	633.4	704.5	867.9	787.8	646.5	659.2	813.5	1,023.6	9,728.6
# of Residential Customers	107,101	107,265	107,324	107,238	107,231	107,293	107,295	107,424	107,535	107,579	107,643	107,747	107,390
Total Residential Sales - MWh	116,685	103,632	92,770	72,122	67,919	75,588	93,118	84,629	69,518	70,915	87,566	110,292	1,044,754
Use per Small Comm & Ind Customer - kWh	4,016.7	3,733.9	3,651.5	3,049.6	2,968.0	3,051.0	3,458.1	3,345.0	3,029.0	3,081.5	3,409.4	3,908.9	40,680.3
# of Small Comm & Ind Customers	20,017	20,033	20,046	20,140	20,242	20,293	20,310	20,310	20,522	20,448	20,184	20,165	20,226
Total Small Comm & Ind Sales - MWh	80,403	74,801	73,198	61,418	60,079	61,913	70,234	67,936	62,161	63,011	68,816	78,823	822,793
Large Comm & Ind Sales	128,636	118,390	126,279	114,987	120,778	115,949	126,691	124,908	121,531	120,954	121,747	128,977	1,469,827
Total Sales (Residential, SC&I and LC&I)	325,724	296,823	292,247	248,527	248,776	253,450	290,043	277,473	253,210	254,880	278,129	318,092	3,337,374
Other Public Sales	5,066	4,727	4,977	4,622	5,281	5,681	6,631	6,218	5,222	4,772	4,714	5,087	62,998
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	332,641	303,186	298,913	254,673	255,533	260,502	298,109	285,152	259,945	261,262	284,539	325,050	3,419,505
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	333,169	303,681	299,415	255,097	255,963	260,934	298,591	285,617	260,372	261,690	284,978	325,565	3,425,072
Total Requirements (Energy + Losses)	359,959	328,100	323,491	275,609	276,545	281,915	322,600	308,584	281,308	282,733	307,892	351,744	3,700,480
# of Large Comm & Ind Customers	1,659	1,663	1,673	1,685	1,699	1,710	1,719	1,735	1,773	1,769	1,738	1,736	1,713
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	623.5	576.7	514.8	477.8	433.0	562.8	628.9	599.4	538.6	471.8	548.5	612.9	628.9

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

**INTEGRATED SYSTEM YEAR 2026**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.5	966.2	864.4	672.6	633.4	704.5	867.8	787.8	646.5	659.2	813.5	1,023.6	9,728.7
# of Residential Customers	107,350	107,513	107,574	107,487	107,481	107,543	107,544	107,674	107,785	107,828	107,894	107,998	107,639
Total Residential Sales - MWh	116,961	103,875	92,988	72,292	68,078	75,762	93,332	84,823	69,680	71,082	87,771	110,550	1,047,194
Use per Small Comm & Ind Customer - kWh	4,045.8	3,760.4	3,677.6	3,071.6	2,989.4	3,072.9	3,482.7	3,368.9	3,050.7	3,103.6	3,434.0	3,939.2	40,974.5
# of Small Comm & Ind Customers	20,170	20,189	20,201	20,295	20,398	20,449	20,467	20,467	20,681	20,607	20,339	20,320	20,382
Total Small Comm & Ind Sales - MWh	81,604	75,919	74,292	62,339	60,977	62,838	71,281	68,952	63,092	63,955	69,845	80,044	835,138
Large Comm & Ind Sales	129,301	119,014	126,926	115,565	121,391	116,557	127,364	125,567	122,162	121,568	122,381	129,725	1,477,521
Total Sales (Residential, SC&I and LC&I)	327,866	298,808	294,206	250,196	250,446	255,157	291,977	279,342	254,934	256,605	279,997	320,319	3,359,853
Other Public Sales	5,076	4,737	4,987	4,632	5,291	5,693	6,644	6,230	5,233	4,783	4,724	5,097	63,127
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	334,793	305,181	300,882	256,352	257,213	262,221	300,056	287,033	261,680	262,998	286,417	327,287	3,442,113
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	335,321	305,676	301,384	256,776	257,643	262,653	300,538	287,498	262,107	263,426	286,856	327,802	3,447,680
Total Requirements (Energy + Losses)	362,284	330,256	325,618	277,423	278,360	283,773	324,705	310,616	283,183	284,609	309,922	354,160	3,724,909
# of Large Comm & Ind Customers	1,673	1,677	1,687	1,700	1,714	1,725	1,735	1,750	1,788	1,785	1,753	1,751	1,728
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	634.2	586.4	523.7	486.0	436.6	567.6	634.2	604.5	543.1	475.7	552.0	616.7	634.2

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

**INTEGRATED SYSTEM YEAR 2027**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.6	966.2	864.4	672.6	633.4	704.5	867.8	787.8	646.5	659.2	813.5	1,023.7	9,728.9
# of Residential Customers	107,598	107,762	107,823	107,736	107,729	107,792	107,792	107,923	108,034	108,078	108,144	108,249	107,888
Total Residential Sales - MWh	117,235	104,119	93,205	72,460	68,238	75,936	93,546	85,020	69,840	71,248	87,979	110,810	1,049,636
Use per Small Comm & Ind Customer - kWh	4,078.4	3,790.7	3,707.5	3,096.7	3,013.7	3,097.8	3,510.8	3,396.5	3,075.5	3,128.9	3,461.8	3,968.1	41,303.7
# of Small Comm & Ind Customers	20,325	20,344	20,356	20,451	20,554	20,606	20,624	20,623	20,840	20,765	20,495	20,476	20,538
Total Small Comm & Ind Sales - MWh	82,894	77,117	75,470	63,330	61,943	63,834	72,407	70,045	64,093	64,972	70,950	81,251	848,306
Large Comm & Ind Sales	130,120	119,777	127,721	116,274	122,145	117,300	128,187	126,373	122,931	122,322	123,156	130,495	1,486,801
Total Sales (Residential, SC&I and LC&I)	330,249	301,013	296,396	252,064	252,326	257,070	294,140	281,438	256,864	258,542	282,085	322,556	3,384,743
Other Public Sales	5,085	4,746	4,997	4,641	5,302	5,704	6,657	6,243	5,244	4,793	4,734	5,107	63,253
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	337,185	307,395	303,082	258,229	259,104	264,145	302,232	289,142	263,621	264,945	288,515	329,534	3,467,129
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	337,713	307,890	303,584	258,653	259,534	264,577	302,714	289,607	264,048	265,373	288,954	330,049	3,472,696
Total Requirements (Energy + Losses)	364,868	332,647	327,994	279,452	280,403	285,852	327,056	312,895	285,281	286,712	312,189	356,588	3,751,937
# of Large Comm & Ind Customers	1,688	1,692	1,702	1,715	1,729	1,740	1,750	1,765	1,804	1,800	1,768	1,767	1,743
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	638.2	590.2	527.0	489.1	440.7	572.7	640.0	610.0	548.2	480.1	555.9	621.2	640.0

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

**INTEGRATED SYSTEM YEAR 2028**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.6	966.2	864.5	672.6	633.4	704.5	867.8	787.8	646.5	659.2	813.6	1,023.7	9,729.1
# of Residential Customers	107,845	108,010	108,071	107,984	107,978	108,040	108,041	108,171	108,283	108,328	108,393	108,498	108,137
Total Residential Sales - MWh	117,509	104,362	93,423	72,629	68,397	76,110	93,758	85,215	70,001	71,414	88,185	111,067	1,052,070
Use per Small Comm & Ind Customer - kWh	4,107.1	3,817.4	3,733.9	3,118.8	3,035.1	3,120.0	3,535.8	3,420.6	3,097.5	3,151.1	3,486.3	3,997.8	41,598.7
# of Small Comm & Ind Customers	20,479	20,498	20,509	20,605	20,709	20,761	20,779	20,778	20,996	20,922	20,650	20,629	20,693
Total Small Comm & Ind Sales - MWh	84,110	78,249	76,579	64,263	62,854	64,774	73,470	71,074	65,035	65,928	71,992	82,470	860,798
Large Comm & Ind Sales	130,866	120,474	128,447	116,921	122,832	117,975	128,932	127,106	123,634	123,009	123,864	131,299	1,495,359
Total Sales (Residential, SC&I and LC&I)	332,485	303,085	298,449	253,813	254,083	258,859	296,160	283,395	258,670	260,351	284,041	324,836	3,408,227
Other Public Sales	5,095	4,755	5,007	4,651	5,313	5,715	6,671	6,255	5,253	4,802	4,743	5,118	63,378
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	339,431	309,476	305,145	259,988	260,872	265,945	304,266	291,111	265,436	266,763	290,480	331,825	3,490,738
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	339,959	309,971	305,647	260,412	261,302	266,377	304,748	291,576	265,863	267,191	290,919	332,340	3,496,305
Total Requirements (Energy + Losses)	367,294	334,896	330,224	281,351	282,313	287,796	329,253	315,021	287,242	288,677	314,312	359,064	3,777,443
# of Large Comm & Ind Customers	1,701	1,705	1,716	1,728	1,743	1,754	1,764	1,779	1,818	1,815	1,782	1,781	1,757
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	642.8	594.5	530.7	492.6	444.4	577.7	645.5	615.2	552.9	484.3	559.6	625.3	645.5

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

**INTEGRATED SYSTEM YEAR 2029**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.7	966.3	864.5	672.6	633.5	704.4	867.8	787.7	646.5	659.3	813.6	1,023.7	9,729.2
# of Residential Customers	108,093	108,258	108,319	108,231	108,225	108,289	108,289	108,421	108,532	108,576	108,643	108,747	108,385
Total Residential Sales - MWh	117,784	104,606	93,641	72,798	68,556	76,284	93,972	85,408	70,161	71,581	88,390	111,325	1,054,506
Use per Small Comm & Ind Customer - kWh	4,138.3	3,846.5	3,762.3	3,142.7	3,058.5	3,144.0	3,562.8	3,446.9	3,121.3	3,175.6	3,513.0	4,027.7	41,916.8
# of Small Comm & Ind Customers	20,633	20,651	20,664	20,760	20,864	20,916	20,934	20,933	21,153	21,078	20,805	20,784	20,848
Total Small Comm & Ind Sales - MWh	85,385	79,435	77,745	65,243	63,812	65,759	74,583	72,155	66,025	66,935	73,088	83,712	873,877
Large Comm & Ind Sales	131,700	121,252	129,256	117,644	123,599	118,732	129,771	127,928	124,420	123,779	124,655	132,137	1,504,873
Total Sales (Residential, SC&I and LC&I)	334,869	305,293	300,642	255,685	255,967	260,775	298,326	285,491	260,606	262,295	286,133	327,174	3,433,256
Other Public Sales	5,107	4,766	5,018	4,660	5,323	5,727	6,683	6,268	5,264	4,812	4,755	5,128	63,511
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	341,827	311,695	307,349	261,869	262,766	267,873	306,444	293,220	267,383	268,717	292,584	334,173	3,515,900
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	342,355	312,190	307,851	262,293	263,196	268,305	306,926	293,685	267,810	269,145	293,023	334,688	3,521,467
Total Requirements (Energy + Losses)	369,884	337,294	332,605	283,384	284,360	289,880	331,606	317,300	289,345	290,788	316,585	361,600	3,804,631
# of Large Comm & Ind Customers	1,715	1,719	1,729	1,742	1,757	1,768	1,778	1,793	1,833	1,829	1,797	1,795	1,771
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	647.0	598.4	534.2	495.8	448.4	582.8	651.2	620.7	557.8	488.5	563.7	629.8	651.2



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

**INTEGRATED SYSTEM YEAR 2030**

	<b>JAN</b>	<b>FEB</b>	<b>MAR</b>	<b>APR</b>	<b>MAY</b>	<b>JUN</b>	<b>JUL</b>	<b>AUG</b>	<b>SEP</b>	<b>OCT</b>	<b>NOV</b>	<b>DEC</b>	<b>ANNUAL</b>
Use per Residential Customer - kWh	1,089.7	966.3	864.5	672.6	633.5	704.4	867.8	787.7	646.5	659.3	813.6	1,023.7	9,729.3
# of Residential Customers	108,340	108,505	108,567	108,479	108,473	108,535	108,537	108,668	108,780	108,825	108,892	108,996	108,633
Total Residential Sales - MWh	118,056	104,848	93,857	72,965	68,714	76,457	94,184	85,603	70,322	71,746	88,595	111,582	1,056,929
Use per Small Comm & Ind Customer - kWh	4,169.4	3,875.4	3,790.6	3,166.5	3,081.5	3,167.5	3,589.4	3,472.8	3,144.7	3,199.5	3,539.4	4,057.2	42,230.7
# of Small Comm & Ind Customers	20,786	20,805	20,818	20,914	21,019	21,072	21,090	21,089	21,311	21,235	20,960	20,939	21,003
Total Small Comm & Ind Sales - MWh	86,665	80,627	78,912	66,225	64,769	66,746	75,700	73,238	67,016	67,941	74,185	84,954	886,978
Large Comm & Ind Sales	132,542	122,040	130,075	118,376	124,374	119,497	130,616	128,757	125,213	124,555	125,452	132,983	1,514,480
Total Sales (Residential, SC&I and LC&I)	337,263	307,515	302,844	257,566	257,857	262,700	300,500	287,598	262,551	264,242	288,232	329,519	3,458,387
Other Public Sales	5,117	4,776	5,029	4,670	5,335	5,738	6,696	6,281	5,275	4,823	4,764	5,138	63,642
Street & Highway Lighting Sales	1,816	1,604	1,658	1,497	1,451	1,349	1,410	1,438	1,489	1,585	1,667	1,839	18,803
Interdepartmental Sales	35	32	31	27	25	22	25	23	24	25	29	32	330
Total Billed Sales - MWh	344,231	313,927	309,562	263,760	264,668	269,809	308,631	295,340	269,339	270,675	294,692	336,528	3,541,162
Company Use	528	495	502	424	430	432	482	465	427	428	439	515	5,567
Total Energy	344,759	314,422	310,064	264,184	265,098	270,241	309,113	295,805	269,766	271,103	295,131	337,043	3,546,729
Total Requirements (Energy + Losses)	372,481	339,705	334,997	285,428	286,414	291,972	333,969	319,591	291,458	292,903	318,863	364,145	3,831,926
# of Large Comm & Ind Customers	1,729	1,733	1,744	1,757	1,771	1,783	1,793	1,809	1,848	1,845	1,812	1,811	1,786
# of Other Public Customers	737	736	737	740	741	741	740	740	751	746	731	728	739
# of Street & Highway Lighting Customers	575	583	583	583	583	583	583	583	583	584	584	584	583
Peak Demand Net of Energy Efficiency Progs	651.7	602.7	538.2	499.5	452.1	587.8	656.7	625.9	562.6	492.7	567.5	634.3	656.7