Integrated Resource Plan 2019

Submitted to the
North Dakota Public Service Commission July 1, 2019

Volume II: Attachment A

Montana-Dakota Utilities Co.

2019 Integrated Resource Plan

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Attachment A

MONTANA-DAKOTA UTILITIES CO.

A Subsidiary of MDU Resources Group, Inc.

MONTANA-DAKOTA UTILITIES CO.
ELECTRIC LOAD FORECAST
2019–2038

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

December 31, 2018

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Executive Summary

This report presents the 2019-2038 forecasts of Montana-Dakota Utilities Co.'s (Montana-Dakota) electric energy requirements and peak demands for the Integrated System of Montana, North Dakota, and South Dakota and for the Wyoming System. The forecasts are prepared by the Electric System Operations & Planning Department. An econometric methodology of forecasting is generally used as the starting point for Montana-Dakota's load forecasts.

Attention: Montana-Dakota typically conducts a 20-year load forecast study annually, with the last such study conducted in 2017. Actual load to forecast plan for the Integrated System of Montana, North Dakota, and South Dakota, was comparatively close throughout 2018, with the year ending under 1% from plan. Therefore, a full study was not conducted in 2018; instead, the 2017 study results were adjusted in the years and sectors where growth is confidently anticipated. Adjusted content will be noted inline whereas adjusted charts and graphs will have **2017 UPDATED** added to their titles.

INTEGRATED SYSTEM

Total annual energy for the Integrated System is projected to grow at an average rate of 2.42% per year for the next five years and at an average rate of 1.32% per year through 2038. Integrated System summer peak demand is projected to grow at an average rate of 1.8% per year for the next five years and an average rate of 1.2% per year through 2038 prior to any reductions due to demand response programs. Integrated System winter peak demand is projected to grow at an average rate of 2.0% per year for the next five years and an average rate of 1.3% per year through 2038.

As described in Montana-Dakota's 2017 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.

WYOMING SYSTEM

Total annual energy for the Wyoming System is projected to grow at an average rate of 1.03% per year for the next five years and at a rate of 0.8% per year through 2038. The Wyoming System summer peak demand is projected to grow at an average rate of 1.4% per year for the next five years and an average rate of 1.3% per year through 2038, while the winter peak demand is projected to grow at 0.7% per year for the next five years and an average rate of 0.5% per year through 2038.

No new Demand-Side Management (DSM) programs are planned for the Wyoming System at this time.

Econometric Overview

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

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

The strengths of econometric forecasting models include:

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

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

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

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

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

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

Prior to the forecast developed in 2012, forecasts for the Integrated System had always been developed on a total Integrated System basis followed by allocations to the states of Montana, North Dakota, and South Dakota. The forecast published in this report is now the sixth 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 2017) and the Wyoming System (September 2018), the most recent year for which a complete set of weather and actual monthly sales by sector was available was 2016 and 2017 respectively.

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

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

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

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

While national economic conditions can change quite quickly, data from W&P is provided once per year and therefore may not reflect the most current economic climate. For Montana-Dakota's service territory, this is not always a concern since this area is somewhat isolated from factors affecting the rest of the country; economic trends felt nationally usually take a year or two or more before their impact reaches this area. While the 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. According to the U.S. Bureau of Labor Statistics (BLS) as of December 2018, Montana's unemployment rate was at 3.7 percent, North Dakota's unemployment rate was at 2.6 percent, and South Dakota's unemployment rate was at 2.9 percent, all well below the national rate of 3.9 percent. Wyoming's unemployment was at 4.1 percent. Therefore, the forecasts for the Integrated System and the Wyoming System continue to reflect growth.

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

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

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

There are also no NOAA NCDC stations in South Dakota that are in Montana-Dakota's electric service territory. After reviewing available data, it was decided

that Aberdeen, SD HDDs and CDDs would be used to represent Montana-Dakota's service territory in South Dakota.

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

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

Historical company data used in the development of the forecasts are included in Appendix A for the Integrated System and Appendix H for the Wyoming System. Appendices A-1 through A-4 list annual sales by customer class for Montana, North Dakota, South Dakota, and the Integrated System for the years 1966-2018, respectively. Appendix A-5 lists the seasonal peaks and load factors of the Integrated System for the years 1960-2018. Appendix A-6 lists demand by state at the time of the system peak for the summer and winter seasons. Similar information can be found in Appendix H for the Wyoming System.

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

Integrated System

Overview

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

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

At the time this analysis was begun (June 2017), 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 2016. The equations developed used historical data available through 2016 and were designed to forecast the time period 2017-2037. In 2018, adjustments for anticipated growth areas were made to this base forecast and the 2037 forecast values were held for 2038 to create an **Updated** 2019-2038 forecast.

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

Counties by State in Montana-Dakota's Integrated System

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

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

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

1. Forecast Methodology - Sales

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

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

The LC&I sector was further broken down into five end-use categories which were forecasted individually in 2017, and a sixth end-use was forecasted individually in 2018. The remainder of the LC&I sales fall into a seventh 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
    - TransCanada Corporation

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 often increased at a faster rate than expected despite the many gains in efficiency being made in lighting and other electric devices. The U.S. Energy Information Administration's Annual Energy Outlook 2018 states, "However, increased adoption of electronic devices contributes to growth in residential use of electricity." Therefore, for the forecast developed for the last several years, a modification was made to Montana and North Dakota use per residential customer to reflect the residential power use that is expected. The final residential use per customer models for Montana and North Dakota have use per customer growing at 0.25% per year through 2022 and then remaining flat for the remainder of the forecast. The starting point for this 0.25% yearly growth is actual use per customer in 2010 which was the most recent year with close to normal HDDs and CDDs. The year 2010 also reflects a time that mostly preceded the surging Bakken activity. The lower starting point and growth rate for residential use per customer reflects 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 10,400 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:

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

In this equation, *a* and b^{hhld} 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.

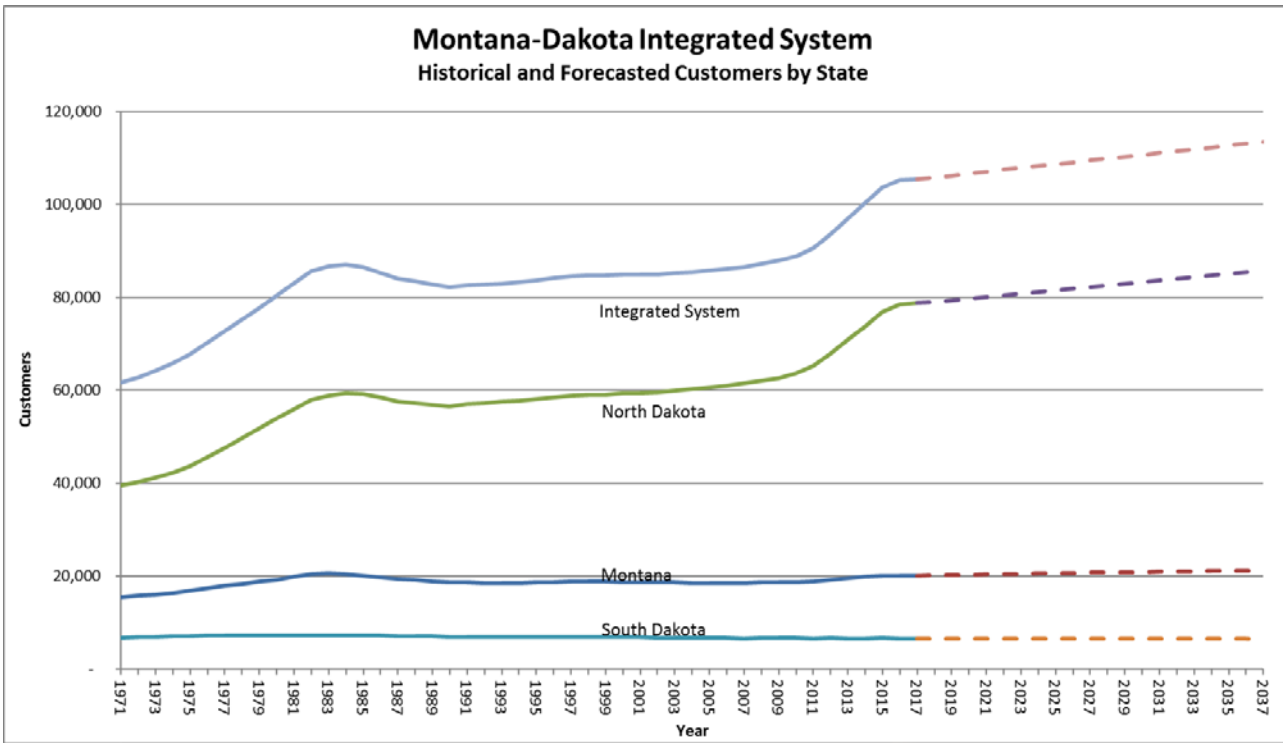
The forecast for number of customers by state was initially developed as described above. However, adjustments were made to the residential customer forecasts for North Dakota and Montana to reflect the higher rate of growth being experienced in parts of North Dakota and Montana due to the Bakken oil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

In North Dakota, growth in residential customers for 2017 through 2022 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 gradually taper off to the growth levels experienced prior to the development of the Bakken oil field.

For Montana where the Bakken development lags the development in North Dakota, customer growth for 2017 through 2022 was set to the approximate residential customer growth currently experienced. Residential customer growth for 2023 and beyond was set to two thirds that level.

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 chart below while the values are given in Appendix B-6.



1.2. Small Commercial & Industrial

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

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

North Dakota:

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

where:

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

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

Montana:

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

where:

ln	= natural logarithm;
sci_kwh_t	= small commercial & industrial sales;
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining; and
$year_t$	= year (1992-2016), which serves as a time trend variable.

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

South Dakota:

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

where:

ln	= natural logarithm;
sci_kwh_t	= small commercial & industrial sales;
HDD_t	= heating degree days; and
$year_t$	= year (1992-2016), which serves as a time trend variable.

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

The 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 higher 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 35-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) Refinery, Westmoreland and Dakota Westmoreland Coal (and the new NACC Coyote Creek Mine), 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. In 2018, the TransCanada Corporation load anticipated to begin in 2021, was added to the forecast.

1.3.1. General LC&I

General LC&I sales (sales to all other LC&I customers that are not to the Tesoro Refinery, 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 North Dakota and Montana were identical with the only statistically significant variable being the time-trend variable. For South Dakota, time (year), employment, and HDD were statistically significant variables.

The final model for both North Dakota and Montana 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 (1992-2016), which serves as a time trend variable.

The final model for South Dakota is as follows:

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

where:

ln	= natural logarithm;
lci_kwh_t	= large commercial & industrial sales;
HDD_t	= heating degree days; and
$year_t$	= year (1992-2016), which serves as a time trend variable.

For both equations, *a* and the *b*'s 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 2017. 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 2017, 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 2017 level with adjustments for LED changes anticipated to occur between 2019 through 2021, and then are held constant for the remainder of the forecast.

1.5. Miscellaneous

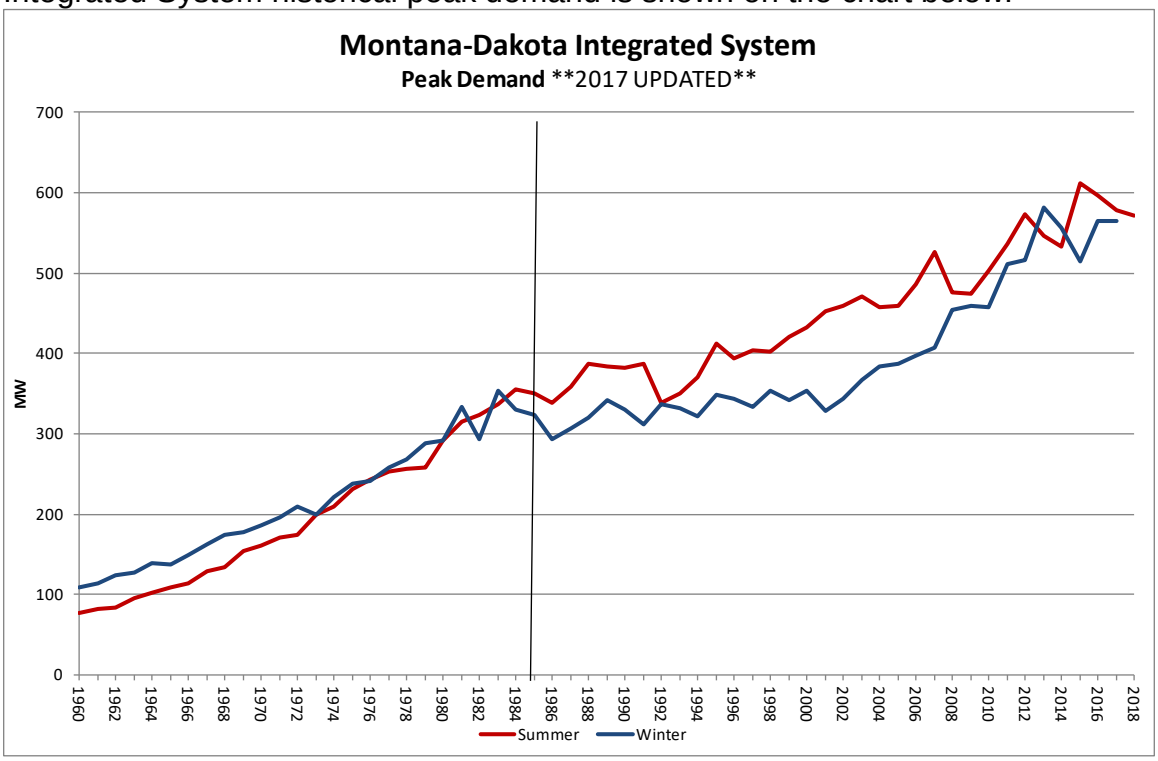
The miscellaneous sales sector is made up of sales for the following three end-uses:

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 2016 levels. The forecast for Other Public Sales was also held constant at the actual 2016 level for South Dakota, while the Other Public Sales forecast for both North Dakota and Montana were based on a linear regression on actual 1997-2016 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 the gap between winter and summer seasonal peaks has narrowed once more.

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

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

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

The summer peak demand model is as follows:

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

where:

$peak\_load_t$	= summer peak demand;
CDD_t	= cooling degree days;
$peak\_temp_t$	= weighted average temp at time of summer peak;
$system\_kwh_t$	= annual energy requirements; and
$year_t$	= year (1987-2016), which serves as a time trend variable.

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

The winter peak demand forecast is developed in a manner similar to the summer peak demand forecast except that HDDs were tested for statistical significance in the model rather than CDDs. It was found that HDDs are not statistically significant. The same historical period of time was used in developing the winter peak demand model that was used in the development of the summer peak demand model: 1987-2016.

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 three years.

The winter peak demand model is as follows:

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

where:

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

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

In 2018, adjustments were made to both summer and winter peaks for the anticipated impact attributed to the change in street lights and large end-use loads.

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 2017 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
  - 0.35 percent of annual sales for 2017 through 2035, achieved by growing from 0.13% of total sales in 2017 to 0.43% of total sales in 2025 through 2035, for an overall savings of 0.35% for the 20-year forecast horizon.

- Peak Demand savings
  - Demand Response programs of 31.0 MW for 2018-2035 for the commercial sales sector.
  - Energy Efficiency programs of 0.66 MW in 2018 and 0.82 MW by 2035
  - Residential A/C Demand Response reductions beginning at 4.0 MW in 2018 and growing to 10.0 MW in 2021 and remaining flat at that level through 2035.

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 8.173%. 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.

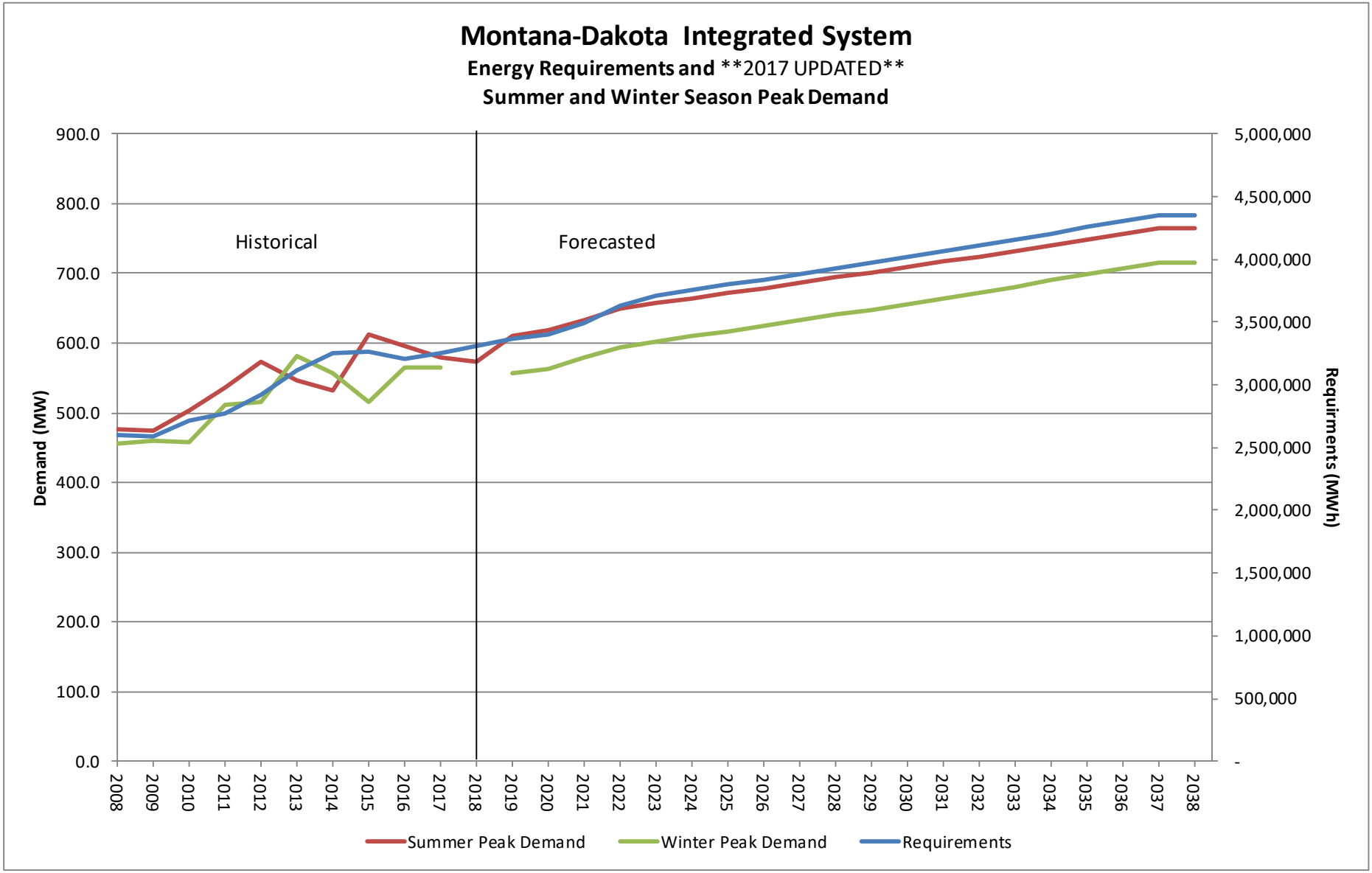
The final forecast results from the 2017 study, along with anticipated updates, are presented on the following several pages. A table summarizing the Integrated System energy requirements and seasonal peak demand is given first, followed by a graph with historical and forecasted seasonal peak demand 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 **2017 UPDATED**
Integrated System
Reflecting Demand-Side Management Programs from 2017 IRP
Calendar Month Basis

	Total Energy Requirements (net of DSM and EE)		Summer Peak - MW				Winter Peak 2/				Demand Response		
Year	MWh	% Change	Total Demand Before any DSM or EE	Energy Efficiency (EE)	Demand Net of EE 1/	% Change	Total Demand Before any DSM or EE	Energy Efficiency (EE)	Demand Net of EE 1/	% Change	Rate 38/39 Interrupt Loads	Commercial Demand Response	Residential Demand Response
2008	2,596,990				476.6				455.0				
2009	2,593,368	-0.14%			473.8	-0.59%			459.6	1.01%			
2010	2,718,192	4.81%			502.5	6.06%			457.8	-0.39%			
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%							
2019	3,371,540	1.76%	611.9	0.7	611.2	6.79%	556.6	0.7	555.9		20.0	25.0	0.0
2020	3,406,504	1.04%	619.1	0.7	618.4	1.18%	564.0	0.7	563.3	1.33%	20.0	25.0	0.0
2021	3,498,444	2.70%	634.7	0.7	634.0	2.52%	579.8	0.7	579.1	2.80%	20.0	25.0	0.0
2022	3,631,116	3.79%	649.3	0.7	648.6	2.30%	594.8	0.7	594.1	2.59%	20.0	25.0	0.0
2023	3,714,673	2.30%	658.2	0.7	657.5	1.37%	603.6	0.7	602.9	1.48%	20.0	25.0	0.0
2024	3,756,568	1.13%	665.4	0.7	664.7	1.09%	611.0	0.7	610.3	1.23%	20.0	25.0	0.0
2025	3,797,247	1.08%	672.5	0.7	671.8	1.07%	618.2	0.7	617.5	1.18%	20.0	25.0	0.0
2026	3,840,320	1.13%	679.8	0.7	679.1	1.09%	625.8	0.7	625.1	1.23%	20.0	25.0	0.0
2027	3,884,011	1.14%	687.2	0.7	686.5	1.09%	633.5	0.8	632.7	1.23%	20.0	25.0	0.0
2028	3,928,323	1.14%	694.6	0.8	693.8	1.08%	641.3	0.8	640.5	1.23%	20.0	25.0	0.0
2029	3,973,283	1.14%	702.1	0.8	701.3	1.08%	649.2	0.8	648.4	1.23%	20.0	25.0	0.0
2030	4,018,879	1.15%	709.7	0.8	708.9	1.08%	657.2	0.8	656.4	1.23%	20.0	25.0	0.0
2031	4,065,122	1.15%	717.4	0.8	716.6	1.08%	665.4	0.8	664.6	1.25%	20.0	25.0	0.0
2032	4,112,016	1.15%	725.1	0.8	724.3	1.07%	673.6	0.8	672.8	1.23%	20.0	25.0	0.0
2033	4,159,613	1.16%	732.8	0.8	732.0	1.06%	682.0	0.8	681.2	1.25%	20.0	25.0	0.0
2034	4,207,909	1.16%	740.7	0.8	739.9	1.08%	690.5	0.8	689.7	1.25%	20.0	25.0	0.0
2035	4,256,904	1.16%	748.6	0.8	747.8	1.07%	699.2	0.8	698.4	1.26%	20.0	25.0	0.0
2036	4,306,885	1.17%	756.6	0.8	755.8	1.07%	708.0	0.8	707.2	1.26%	20.0	25.0	0.0
2037	4,357,582	1.18%	764.7	0.8	763.9	1.07%	716.9	0.8	716.1	1.27%	20.0	25.0	0.0
2038	4,357,582	0.00%	764.7	0.8	763.9	0.00%	716.9	0.8	716.1	0.00%	20.0	25.0	0.0

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 **2017 UPDATED**
Summer and Winter Season Peak Demand
Historical
Forecasted
Demand (MW)
Requirments (MWh)
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
5,000,000
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
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2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
Summer Peak Demand
Winter Peak Demand
Requirements

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
Montana **2017 UPDATED**
Billing Month Basis
Reflecting Demand-Side Programs

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2008	162,182		108,595		408,686		7,244		7,637		694,344	
2009	167,421	3.23%	110,380	1.64%	407,647	-0.25%	7,244	0.00%	7,701	0.84%	700,393	0.87%
2010	171,661	2.53%	109,188	-1.08%	415,946	2.04%	7,203	-0.57%	7,511	-2.47%	711,509	1.59%
2011	185,153	7.86%	119,643	9.58%	427,887	2.87%	7,089	-1.58%	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	-1.10%	7,742	-4.82%	776,598	2.72%
2014	200,088	2.66%	137,799	7.65%	451,687	2.91%	7,108	1.14%	7,900	2.04%	804,582	3.60%
2015	191,420	-4.33%	135,202	-1.88%	473,740	4.88%	7,103	-0.07%	7,991	1.15%	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%	7,408	-1.45%	805,919	0.10%
2018	192,080	1.77%	138,485	3.66%	469,653	0.11%	4,451	-36.73%	6,303	-14.92%	810,972	0.63%
2019	187,248	-2.52%	139,558	0.77%	481,274	2.47%	2,486	-44.15%	7,579	20.24%	818,145	0.88%
2020	188,345	0.59%	142,213	1.90%	483,294	0.42%	2,486	0.00%	7,600	0.28%	823,938	0.71%
2021	189,447	0.58%	144,909	1.90%	512,589	6.06%	2,486	0.00%	7,620	0.26%	857,050	4.02%
2022	190,568	0.59%	147,648	1.89%	575,812	12.33%	2,486	0.00%	7,641	0.28%	924,154	7.83%
2023	191,034	0.24%	150,044	1.62%	619,331	7.56%	2,486	0.00%	7,662	0.27%	970,557	5.02%
2024	191,499	0.24%	152,648	1.73%	621,994	0.43%	2,486	0.00%	7,682	0.26%	976,308	0.59%
2025	191,965	0.24%	155,292	1.73%	624,699	0.44%	2,486	0.00%	7,703	0.27%	982,145	0.60%
2026	192,430	0.24%	157,977	1.73%	627,449	0.44%	2,486	0.00%	7,724	0.27%	988,066	0.60%
2027	192,896	0.24%	160,703	1.73%	630,243	0.45%	2,486	0.00%	7,745	0.27%	994,073	0.61%
2028	193,361	0.24%	163,474	1.72%	633,084	0.45%	2,486	0.00%	7,765	0.26%	1,000,170	0.61%
2029	193,827	0.24%	166,281	1.72%	635,970	0.46%	2,486	0.00%	7,786	0.27%	1,006,350	0.62%
2030	194,292	0.24%	169,137	1.72%	638,903	0.46%	2,486	0.00%	7,807	0.27%	1,012,625	0.62%
2031	194,758	0.24%	172,030	1.71%	641,883	0.47%	2,486	0.00%	7,827	0.26%	1,018,983	0.63%
2032	195,223	0.24%	174,966	1.71%	644,911	0.47%	2,486	0.00%	7,848	0.27%	1,025,434	0.63%
2033	195,689	0.24%	177,950	1.71%	647,989	0.48%	2,486	0.00%	7,869	0.27%	1,031,982	0.64%
2034	196,154	0.24%	180,977	1.70%	651,117	0.48%	2,486	0.00%	7,889	0.25%	1,038,622	0.64%
2035	196,620	0.24%	184,043	1.69%	654,295	0.49%	2,486	0.00%	7,910	0.27%	1,045,354	0.65%
2036	197,085	0.24%	187,172	1.70%	657,542	0.50%	2,486	0.00%	7,931	0.27%	1,052,216	0.66%
2037	197,551	0.24%	190,341	1.69%	660,841	0.50%	2,486	0.00%	7,951	0.25%	1,059,170	0.66%
2038	197,551	-	190,341	-	660,841	-	2,486	-	7,951	-	1,059,170	-
2008-2018 Average Yearly Growth (10 Years History)		1.53%		2.60%		1.77%		-2.33%		-0.99%		1.78%
2013-2018 Average Yearly Growth (5 Years History)		-0.81%		0.79%		1.30%		-6.40%		-3.60%		0.60%
2019-2024 Average Yearly Growth (5 Years)		0.46%		1.81%		6.31%		0.00%		0.27%		4.23%
2019-2029 Average Yearly Growth (10 Years)		0.32%		1.75%		3.02%		0.00%		0.27%		2.21%
2019-2038 Average Yearly Growth (19 Years)		0.26%		1.70%		1.37%		0.00%		0.26%		1.18%

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
North Dakota **2017 UPDATED**
Billing Month Basis
Reflecting Demand-Side Programs

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2008	585,609		320,093		583,502		21,201		43,308		1,553,713	
2009	609,179	4.02%	340,496	6.37%	551,114	-5.55%	20,582	-2.92%	43,934	1.45%	1,565,305	0.75%
2010	632,068	3.76%	382,985	12.48%	530,341	-3.77%	20,373	-1.02%	43,216	-1.63%	1,608,983	2.79%
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	795,141	-0.57%	641,770	13.45%	645,758	-6.46%	13,863	-29.16%	51,473	-11.68%	2,148,006	0.68%
2020	800,577	0.68%	657,294	2.42%	655,815	1.56%	7,339	-47.06%	52,111	1.24%	2,173,137	1.17%
2021	806,032	0.68%	672,236	2.27%	686,803	4.73%	7,339	0.00%	52,749	1.22%	2,225,160	2.39%
2022	811,566	0.69%	688,239	2.38%	718,678	4.64%	7,339	0.00%	53,386	1.21%	2,279,209	2.43%
2023	815,096	0.43%	703,620	2.23%	728,546	1.37%	7,339	0.00%	54,024	1.20%	2,308,626	1.29%
2024	818,625	0.43%	720,128	2.35%	739,324	1.48%	7,339	0.00%	54,662	1.18%	2,340,078	1.36%
2025	822,155	0.43%	735,960	2.20%	749,542	1.38%	7,339	0.00%	55,300	1.17%	2,370,296	1.29%
2026	825,685	0.43%	752,964	2.31%	760,693	1.49%	7,339	0.00%	55,937	1.15%	2,402,618	1.36%
2027	829,215	0.43%	770,233	2.29%	772,043	1.49%	7,339	0.00%	56,575	1.14%	2,435,405	1.36%
2028	832,744	0.43%	787,764	2.28%	783,596	1.50%	7,339	0.00%	57,213	1.13%	2,468,656	1.37%
2029	836,274	0.42%	805,569	2.26%	795,355	1.50%	7,339	0.00%	57,851	1.12%	2,502,388	1.37%
2030	839,804	0.42%	823,641	2.24%	807,324	1.50%	7,339	0.00%	58,488	1.10%	2,536,596	1.37%
2031	843,334	0.42%	841,980	2.23%	819,506	1.51%	7,339	0.00%	59,126	1.09%	2,571,285	1.37%
2032	846,863	0.42%	860,601	2.21%	831,905	1.51%	7,339	0.00%	59,764	1.08%	2,606,472	1.37%
2033	850,393	0.42%	879,494	2.20%	844,526	1.52%	7,339	0.00%	60,402	1.07%	2,642,154	1.37%
2034	853,923	0.42%	898,666	2.18%	857,372	1.52%	7,339	0.00%	61,039	1.05%	2,678,340	1.37%
2035	857,453	0.41%	918,114	2.16%	870,447	1.53%	7,339	0.00%	61,677	1.05%	2,715,030	1.37%
2036	860,982	0.41%	938,000	2.17%	883,821	1.54%	7,339	0.00%	62,315	1.03%	2,752,458	1.38%
2037	864,512	0.41%	958,175	2.15%	897,434	1.54%	7,339	0.00%	62,953	1.02%	2,790,413	1.38%
2038	864,512	-	958,175	-	897,434	-	7,339	-	62,953	-	2,790,413	-

Highlighted numbers above in SC&I and LC&I for 2012 reflect the first full year of the reclassification of approximately 140 customers in the July/August 2011 time frame.

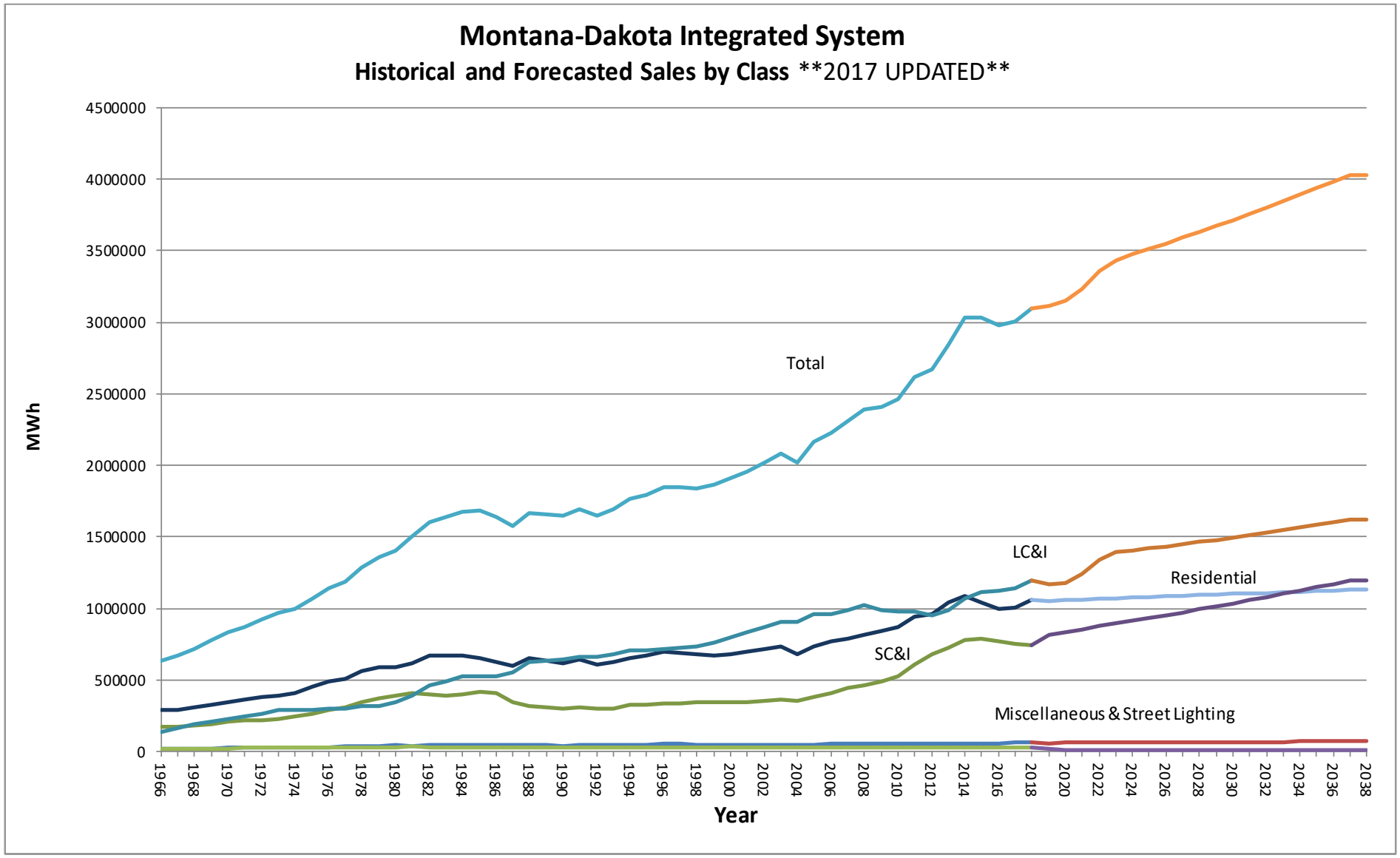
2008-2018 Average Yearly Growth (10 Years History)	3.07%	6.72%	2.18%	-0.44%	3.05%	3.62%
2013-2018 Average Yearly Growth (5 Years History)	-0.33%	-0.26%	5.17%	-0.21%	4.26%	1.41%
2019-2024 Average Yearly Growth (5 Years)	0.59%	2.32%	3.01%	-8.69%	1.21%	1.83%
2019-2029 Average Yearly Growth (10 Years)	0.49%	2.29%	2.06%	-2.85%	1.17%	1.54%
2019-2038 Average Yearly Growth (19 Years)	0.44%	2.21%	1.68%	-0.90%	1.10%	1.40%

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
South Dakota **2017 UPDATED**
Billing Month Basis
Reflecting Demand-Side Programs

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2008	67,104		36,966		30,891		2,636		2,761		140,358	
2009	69,689	3.85%	39,395	6.57%	32,856	6.36%	2,607	-1.10%	2,047	-25.86%	146,594	4.44%
2010	70,868	1.69%	37,313	-5.28%	34,339	4.51%	2,639	1.23%	1,535	-25.01%	146,694	0.07%
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	68,139	-5.40%	38,570	-1.57%	39,724	9.46%	2,517	2.28%	1,703	-1.67%	150,653	-0.69%
2020	68,146	0.01%	39,025	1.18%	40,660	2.36%	2,517	0.00%	1,703	0.00%	152,051	0.93%
2021	68,152	0.01%	39,485	1.18%	41,663	2.47%	906	-64.00%	1,703	0.00%	151,909	-0.09%
2022	68,162	0.01%	39,951	1.18%	42,682	2.45%	906	0.00%	1,703	0.00%	153,405	0.98%
2023	68,162	0.00%	40,381	1.08%	43,676	2.33%	906	0.00%	1,703	0.00%	154,828	0.93%
2024	68,162	0.00%	40,858	1.18%	44,726	2.40%	906	0.00%	1,703	0.00%	156,355	0.99%
2025	68,152	-0.01%	41,340	1.18%	45,804	2.41%	906	0.00%	1,703	0.00%	157,906	0.99%
2026	68,152	0.00%	41,827	1.18%	46,893	2.38%	906	0.00%	1,703	0.00%	159,481	1.00%
2027	68,142	-0.01%	42,322	1.18%	48,003	2.37%	906	0.00%	1,703	0.00%	161,076	1.00%
2028	68,131	-0.02%	42,821	1.18%	49,132	2.35%	906	0.00%	1,703	0.00%	162,694	1.00%
2029	68,121	-0.01%	43,326	1.18%	50,287	2.35%	906	0.00%	1,703	0.00%	164,344	1.01%
2030	68,110	-0.02%	43,838	1.18%	51,456	2.32%	906	0.00%	1,703	0.00%	166,012	1.02%
2031	68,100	-0.01%	44,355	1.18%	52,649	2.32%	906	0.00%	1,703	0.00%	167,714	1.02%
2032	68,079	-0.03%	44,878	1.18%	53,860	2.30%	906	0.00%	1,703	0.00%	169,427	1.02%
2033	68,069	-0.01%	45,408	1.18%	55,112	2.32%	906	0.00%	1,703	0.00%	171,198	1.05%
2034	68,048	-0.03%	45,944	1.18%	56,418	2.37%	906	0.00%	1,703	0.00%	173,019	1.06%
2035	68,027	-0.03%	46,486	1.18%	57,767	2.39%	906	0.00%	1,703	0.00%	174,889	1.08%
2036	68,006	-0.03%	47,036	1.18%	59,153	2.40%	906	0.00%	1,703	0.00%	176,804	1.09%
2037	67,996	-0.01%	47,593	1.18%	60,563	2.38%	906	0.00%	1,703	0.00%	178,761	1.11%
2038	67,996	-	47,593	-	60,563	-	906	-	1,703	-	178,761	-
2008-2018 Average Yearly Growth (10 Years History)		0.01%		-0.01%		1.31%		-0.64%		-2.40%		0.26%
2013-2018 Average Yearly Growth (5 Years History)		-1.54%		0.56%		-0.57%		-1.71%		-1.11%		-0.78%
2019-2024 Average Yearly Growth (5 Years)		0.01%		1.16%		2.41%		-20.83%		0.00%		0.72%
2019-2029 Average Yearly Growth (10 Years)		0.00%		1.17%		2.39%		-8.02%		0.00%		0.89%
2019-2038 Average Yearly Growth (19 Years)		-0.01%		1.16%		2.33%		-2.73%		0.00%		0.97%

Montana-Dakota Utilities Co.
Historical and Forecasted Annual Sales by Sector
Integrated System **2017 UPDATED**
Billing Month Basis
Reflecting Demand-Side Programs

YEAR	Residential Sales (MWh)	% Change	Small C&I Sales (MWh)	% Change	Large C&I Sales (MWh)	% Change	Street Lighting Sales (MWh)	% Change	Miscellaneous Sales (MWh)	% Change	Total Sales Sales (MWh)	% Change	Total Energy Requirements MWh	% Change
2008	814,895		465,654		1,023,079		31,081		53,706		2,388,415		2,596,990	
2009	846,289	3.85%	490,271	5.29%	991,617	-3.08%	30,433	-2.08%	53,682	-0.04%	2,412,292	1.00%	2,593,368	-0.14%
2010	874,597	3.34%	529,486	8.00%	980,626	-1.11%	30,215	-0.72%	52,262	-2.65%	2,467,186	2.28%	2,718,192	4.81%
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%	60,443	6.01%	3,031,849	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%	68,181	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	1,050,528	-1.24%	819,898	10.30%	1,166,757	-2.47%	18,866	-28.76%	60,755	-8.38%	3,116,804	0.66%	3,371,540	1.76%
2020	1,057,068	0.62%	838,532	2.27%	1,179,769	1.12%	12,342	-34.58%	61,414	1.08%	3,149,126	1.04%	3,406,504	1.04%
2021	1,063,631	0.62%	856,631	2.16%	1,241,055	5.19%	10,731	-13.05%	62,072	1.07%	3,234,120	2.70%	3,498,444	2.70%
2022	1,070,296	0.63%	875,838	2.24%	1,337,172	7.74%	10,731	0.00%	62,730	1.06%	3,356,767	3.79%	3,631,116	3.79%
2023	1,074,292	0.37%	894,046	2.08%	1,391,553	4.07%	10,731	0.00%	63,389	1.05%	3,434,011	2.30%	3,714,673	2.30%
2024	1,078,286	0.37%	913,633	2.19%	1,406,044	1.04%	10,731	0.00%	64,047	1.04%	3,472,741	1.13%	3,756,568	1.13%
2025	1,082,272	0.37%	932,592	2.08%	1,420,045	1.00%	10,731	0.00%	64,706	1.03%	3,510,346	1.08%	3,797,247	1.08%
2026	1,086,267	0.37%	952,768	2.16%	1,435,035	1.06%	10,731	0.00%	65,364	1.02%	3,550,165	1.13%	3,840,320	1.13%
2027	1,090,253	0.37%	973,258	2.15%	1,450,290	1.06%	10,731	0.00%	66,023	1.01%	3,590,555	1.14%	3,884,011	1.14%
2028	1,094,236	0.37%	994,059	2.14%	1,465,812	1.07%	10,731	0.00%	66,681	1.00%	3,631,519	1.14%	3,928,323	1.14%
2029	1,098,222	0.36%	1,015,177	2.12%	1,481,612	1.08%	10,731	0.00%	67,340	0.99%	3,673,082	1.14%	3,973,283	1.14%
2030	1,102,206	0.36%	1,036,616	2.11%	1,497,682	1.08%	10,731	0.00%	67,998	0.98%	3,715,233	1.15%	4,018,879	1.15%
2031	1,106,192	0.36%	1,058,365	2.10%	1,514,038	1.09%	10,731	0.00%	68,656	0.97%	3,757,982	1.15%	4,065,122	1.15%
2032	1,110,165	0.36%	1,080,445	2.09%	1,530,677	1.10%	10,731	0.00%	69,315	0.96%	3,801,333	1.15%	4,112,016	1.15%
2033	1,114,151	0.36%	1,102,851	2.07%	1,547,627	1.11%	10,731	0.00%	69,974	0.95%	3,845,334	1.16%	4,159,613	1.16%
2034	1,118,125	0.36%	1,125,587	2.06%	1,564,907	1.12%	10,731	0.00%	70,631	0.94%	3,889,981	1.16%	4,207,909	1.16%
2035	1,122,100	0.36%	1,148,643	2.05%	1,582,509	1.12%	10,731	0.00%	71,290	0.93%	3,935,274	1.16%	4,256,904	1.16%
2036	1,126,073	0.35%	1,172,208	2.05%	1,600,517	1.14%	10,731	0.00%	71,949	0.92%	3,981,478	1.17%	4,306,885	1.17%
2037	1,130,059	0.35%	1,196,109	2.04%	1,618,839	1.14%	10,731	0.00%	72,607	0.91%	4,028,345	1.18%	4,357,582	1.18%
2038	1,130,059	-	1,196,109	-	1,618,839	-	10,731	-	72,607	-	4,028,345	-	4,357,582	-
2008-2018 Average Yearly Growth (10 Years History)		2.55%		5.46%		1.98%		-0.84%		2.35%		2.93%		2.81%
2013-2018 Average Yearly Growth (5 Years History)		-0.50%		-0.03%		3.34%		-1.63%		3.16%		1.08%		0.84%
2019-2024 Average Yearly Growth (5 Years)		0.53%		2.18%		4.39%		-8.84%		1.06%		2.42%		2.42%
2019-2029 Average Yearly Growth (10 Years)		0.43%		2.15%		2.48%		-3.03%		1.03%		1.69%		1.69%
2019-2038 Average Yearly Growth (19 Years)		0.38%		2.08%		1.57%		-0.98%		0.98%		1.32%		1.32%


Montana-Dakota Integrated System
Historical and Forecasted Sales by Class **2017 UPDATED**
MWh
4500000
4000000
3500000
3000000
2500000
2000000
1500000
1000000
500000
0
Total
LC&I
Residential
SC&I
Miscellaneous & Street Lighting
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
Year

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

North Dakota

Year	Sales (MWh) /*	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2007	568,710		61,451		9,255	
2008	585,609	2.97%	62,068	617	9,435	1.95%
2009	609,179	4.02%	62,631	563	9,726	3.09%
2010	632,068	3.76%	63,619	988	9,935	2.15%
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	789,720	4.68%	79,103	539	9,985	3.98%
2019	795,141	0.69%	79,453	350	10,010	0.25%
2020	800,577	0.68%	79,803	350	10,035	0.25%
2021	806,032	0.68%	80,153	350	10,060	0.25%
2022	811,566	0.69%	80,503	350	10,085	0.25%
2023	815,096	0.43%	80,853	350	10,085	0.00%
2024	818,625	0.43%	81,203	350	10,085	0.00%
2025	822,155	0.43%	81,553	350	10,085	0.00%
2026	825,685	0.43%	81,903	350	10,085	0.00%
2027	829,215	0.43%	82,253	350	10,085	0.00%
2028	832,744	0.43%	82,603	350	10,085	0.00%
2029	836,274	0.42%	82,953	350	10,085	0.00%
2030	839,804	0.42%	83,303	350	10,085	0.00%
2031	843,334	0.42%	83,653	350	10,085	0.00%
2032	846,863	0.42%	84,003	350	10,085	0.00%
2033	850,393	0.42%	84,353	350	10,085	0.00%
2034	853,923	0.42%	84,703	350	10,085	0.00%
2035	857,453	0.41%	85,053	350	10,085	0.00%
2036	860,982	0.41%	85,403	350	10,085	0.00%
2037	864,512	0.41%	85,753	350	10,085	0.00%

	Sales	Custs	Use/Cust
2007-2017 Average Yearly Growth (10 Years History)	3.48%	2.92%	0.54%
2012-2017 Average Yearly Growth (5 Years History)	0.64%	3.12%	-2.40%
2018-2023 Average Yearly Growth (5 Years)	0.65%	0.44%	0.21%
2018-2028 Average Yearly Growth (10 Years)	0.52%	0.43%	0.09%
2018-2037 Average Yearly Growth (19 Years)	0.46%	0.43%	0.03%

South Dakota

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2007	63,018		6,593		9,558	
2008	67,104	6.48%	6,612	19	10,149	6.18%
2009	69,689	3.85%	6,619	7	10,529	3.74%
2010	70,868	1.69%	6,609	(10)	10,723	1.85%
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	68,133	1.59%	6,552	19	10,400	1.31%
2019	68,139	0.01%	6,553	1	10,400	0.00%
2020	68,146	0.01%	6,554	1	10,400	0.00%
2021	68,152	0.01%	6,555	1	10,400	0.00%
2022	68,162	0.01%	6,556	1	10,400	0.00%
2023	68,162	0.00%	6,556	-	10,400	0.00%
2024	68,162	0.00%	6,556	-	10,400	0.00%
2025	68,152	-0.01%	6,555	(1)	10,400	0.00%
2026	68,152	0.00%	6,555	-	10,400	0.00%
2027	68,142	-0.01%	6,554	(1)	10,400	0.00%
2028	68,131	-0.02%	6,553	(1)	10,400	0.00%
2029	68,121	-0.01%	6,552	(1)	10,400	0.00%
2030	68,110	-0.02%	6,551	(1)	10,400	0.00%
2031	68,100	-0.01%	6,550	(1)	10,400	0.00%
2032	68,079	-0.03%	6,548	(2)	10,400	0.00%
2033	68,069	-0.01%	6,547	(1)	10,400	0.00%
2034	68,048	-0.03%	6,545	(2)	10,400	0.00%
2035	68,027	-0.03%	6,543	(2)	10,400	0.00%
2036	68,006	-0.03%	6,541	(2)	10,400	0.00%
2037	67,996	-0.01%	6,540	(1)	10,400	0.00%

	Sales	Custs	Use/Cust
2007-2017 Average Yearly Growth (10 Years History)	0.41%	-0.07%	0.48%
2012-2017 Average Yearly Growth (5 Years History)	-1.48%	-0.20%	-1.28%
2018-2023 Average Yearly Growth (5 Years)	0.01%	0.01%	0.00%
2018-2028 Average Yearly Growth (10 Years)	0.00%	0.00%	0.00%
2018-2037 Average Yearly Growth (19 Years)	-0.01%	-0.01%	0.00%

Montana

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2007	162,186		18,531		8,752	
2008	162,182	0.00%	18,582	51	8,728	-0.28%
2009	167,421	3.23%	18,636	54	8,984	2.93%
2010	171,661	2.53%	18,716	80	9,172	2.09%
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	186,152	-1.37%	20,198	217	9,218	-2.41%
2019	187,248	0.59%	20,268	70	9,241	0.25%
2020	188,345	0.59%	20,338	70	9,264	0.25%
2021	189,447	0.58%	20,408	70	9,287	0.25%
2022	190,568	0.59%	20,478	70	9,310	0.25%
2023	191,034	0.24%	20,528	50	9,310	0.00%
2024	191,499	0.24%	20,578	50	9,310	0.00%
2025	191,965	0.24%	20,628	50	9,310	0.00%
2026	192,430	0.24%	20,678	50	9,310	0.00%
2027	192,896	0.24%	20,728	50	9,310	0.00%
2028	193,361	0.24%	20,778	50	9,310	0.00%
2029	193,827	0.24%	20,828	50	9,310	0.00%
2030	194,292	0.24%	20,878	50	9,310	0.00%
2031	194,758	0.24%	20,928	50	9,310	0.00%
2032	195,223	0.24%	20,978	50	9,310	0.00%
2033	195,689	0.24%	21,028	50	9,310	0.00%
2034	196,154	0.24%	21,078	50	9,310	0.00%
2035	196,620	0.24%	21,128	50	9,310	0.00%
2036	197,085	0.24%	21,178	50	9,310	0.00%
2037	197,551	0.24%	21,228	50	9,310	0.00%

	Sales	Custs	Use/Cust
2007-2017 Average Yearly Growth (10 Years History)	1.86%	1.00%	0.86%
2012-2017 Average Yearly Growth (5 Years History)	-0.52%	0.83%	-1.34%
2018-2023 Average Yearly Growth (5 Years)	0.54%	0.33%	0.21%
2018-2028 Average Yearly Growth (10 Years)	0.37%	0.28%	0.09%
2018-2037 Average Yearly Growth (19 Years)	0.29%	0.25%	0.03%

/* **Forecasted Sales** = (Ave Custs x Avg Use Per Cust) - AC Cycling Reduction

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

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2007	793,914		86,575		9,170	
2008	814,895	2.64%	87,262	687	9,338	1.83%
2009	846,289	3.85%	87,886	624	9,629	3.12%
2010	874,597	3.34%	88,944	1,058	9,833	2.12%
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	1,044,005	3.35%	105,853	775	9,863	2.59%
2019	1,050,527	0.62%	106,274	421	9,885	0.23%
2020	1,057,068	0.62%	106,695	421	9,907	0.23%
2021	1,063,630	0.62%	107,116	421	9,930	0.23%
2022	1,070,295	0.63%	107,537	421	9,953	0.23%
2023	1,074,291	0.37%	107,937	400	9,953	0.00%
2024	1,078,285	0.37%	108,337	400	9,953	0.00%
2025	1,082,271	0.37%	108,736	399	9,953	0.00%
2026	1,086,266	0.37%	109,136	400	9,953	0.00%
2027	1,090,252	0.37%	109,535	399	9,953	0.00%
2028	1,094,235	0.37%	109,934	399	9,954	0.00%
2029	1,098,221	0.36%	110,333	399	9,954	0.00%
2030	1,102,205	0.36%	110,732	399	9,954	0.00%
2031	1,106,191	0.36%	111,131	399	9,954	0.00%
2032	1,110,164	0.36%	111,529	398	9,954	0.00%
2033	1,114,150	0.36%	111,928	399	9,954	0.00%
2034	1,118,124	0.36%	112,326	398	9,954	0.00%
2035	1,122,099	0.36%	112,724	398	9,954	0.00%
2036	1,126,072	0.35%	113,122	398	9,954	0.00%
2037	1,130,058	0.35%	113,521	399	9,955	0.00%

	Sales	**Custs**	**Use/Cust**
2007-2017 Average Yearly Growth (10 Years History)	2.94%	2.32%	0.60%
2012-2017 Average Yearly Growth (5 Years History)	0.27%	2.44%	-2.12%
2018-2023 Average Yearly Growth (5 Years)	0.59%	0.39%	0.20%
2018-2028 Average Yearly Growth (10 Years)	0.46%	0.38%	0.08%
2018-2037 Average Yearly Growth (19 Years)	0.40%	0.37%	0.03%

4. Forecast Uncertainty

Forecasting is a process permeated with uncertainty. The demand and energy projections produced by the econometric process described in the first four 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 2017 study results indicated that each one degree increase in temperature at the time of summer peak would result in an increase of approximately 6.9 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 1987 through 2016 (prior to 1984 the company was a winter peaking utility) provided the results shown in the following table:

Temperature Probability at Peak and Effect on Peak Demand

Probability	Weighted Average Temperature	Approximate Increase in Summer Peak Demand (MW)
50%	96.8	0.0
75%	99.8	20.7
80%	100.6	26.2
85%	101.4	31.7
90%	102.5	39.3
95%	104.1	50.4
97%	105.2	58.0

*/ Using 6.9 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 102.5°F. At this temperature, 39.3 MW of capacity in addition to that which was forecasted is needed to meet the system peak demand that may occur. This is called the 90/10 forecast and provides a peak demand forecast for extreme weather conditions. It represents a 90% probability that the actual peak demand would not exceed the forecast value and a 10% probability that the actual peak demand would be higher than the forecast value.

The following table summarizes the results of the 50/50 probability and 90/10 probability demand forecasts. The updated 2019 90/10 forecasted demand is calculated to be the adjusted 2019 50/50 forecasted demand plus the 2017 study's effect on peak demand, 39.3 MW, as shown in the table above. From that point, the growth rate for the 90/10 forecast scenario is assumed to be the same as that of the 50/50 forecast scenario.

Alternate Summer Peak Demand Forecast Comparison **2017 UPDATED**

Year	Base Forecast (96.8 degrees F) 50/50 Forecast (MW)	Growth Rate	Alternate Forecast (102.5 degrees F) 90/10 Forecast (MW) */
2019	611.2		650.5
2020	618.4	1.18%	658.2
2021	634.0	2.52%	674.8
2022	648.6	2.30%	690.3
2023	657.5	1.37%	699.8
2024	664.7	1.09%	707.5
2025	671.8	1.07%	715.0
2026	679.1	1.09%	722.8
2027	686.5	1.09%	730.7
2028	693.8	1.08%	738.6
2029	701.3	1.08%	746.6
2030	708.9	1.08%	754.7
2031	716.6	1.08%	762.9
2032	724.3	1.07%	771.1
2033	732.0	1.06%	779.3
2034	739.9	1.08%	787.7
2035	747.8	1.07%	796.1
2036	755.8	1.07%	804.6
2037	763.9	1.07%	813.2
2038	763.9	0.00%	813.2

*/ 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.

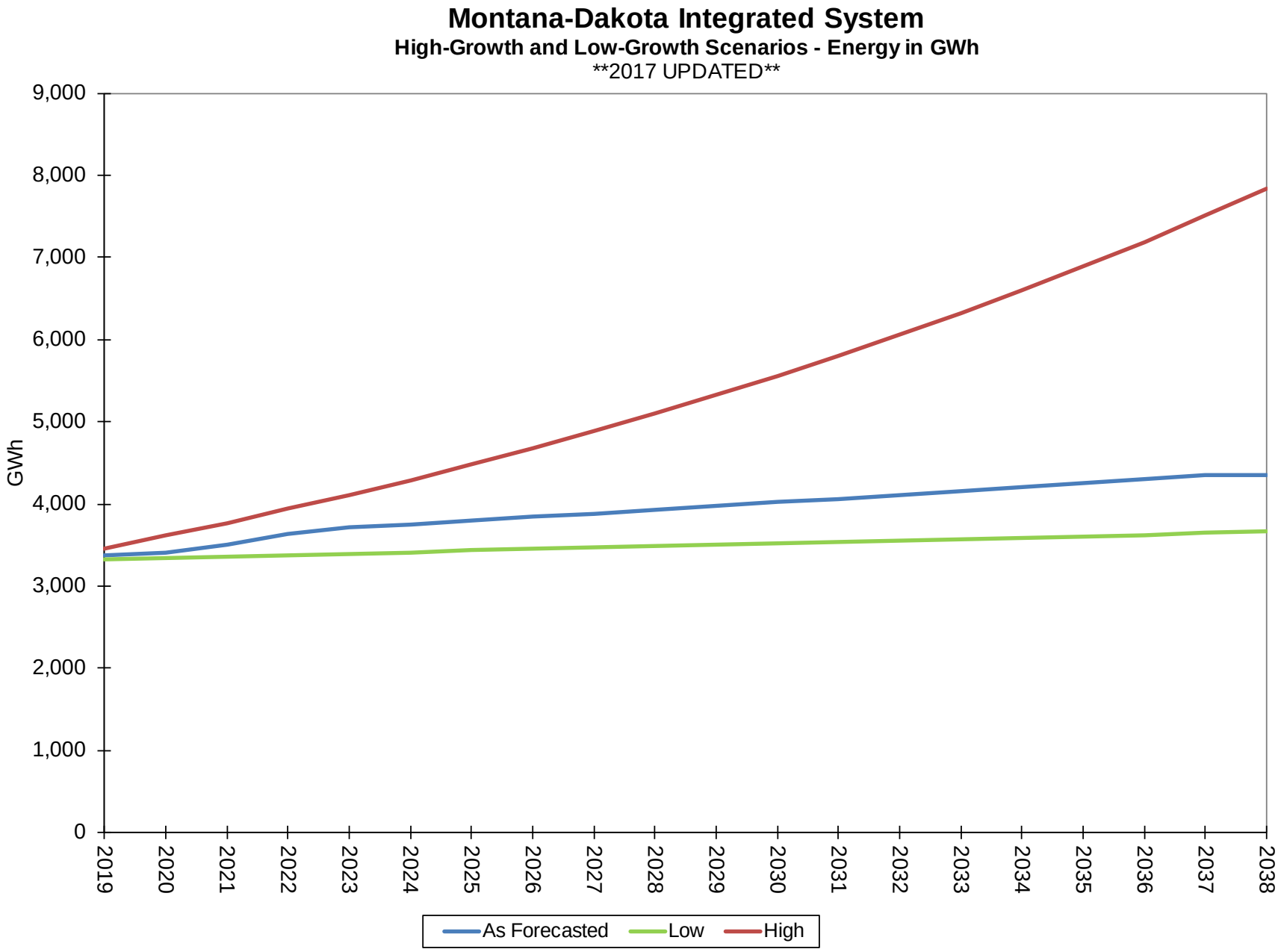
Demand for each scenario was derived by applying the load factors calculated from the base forecast to the high-growth and low-growth scenario forecasted energy.

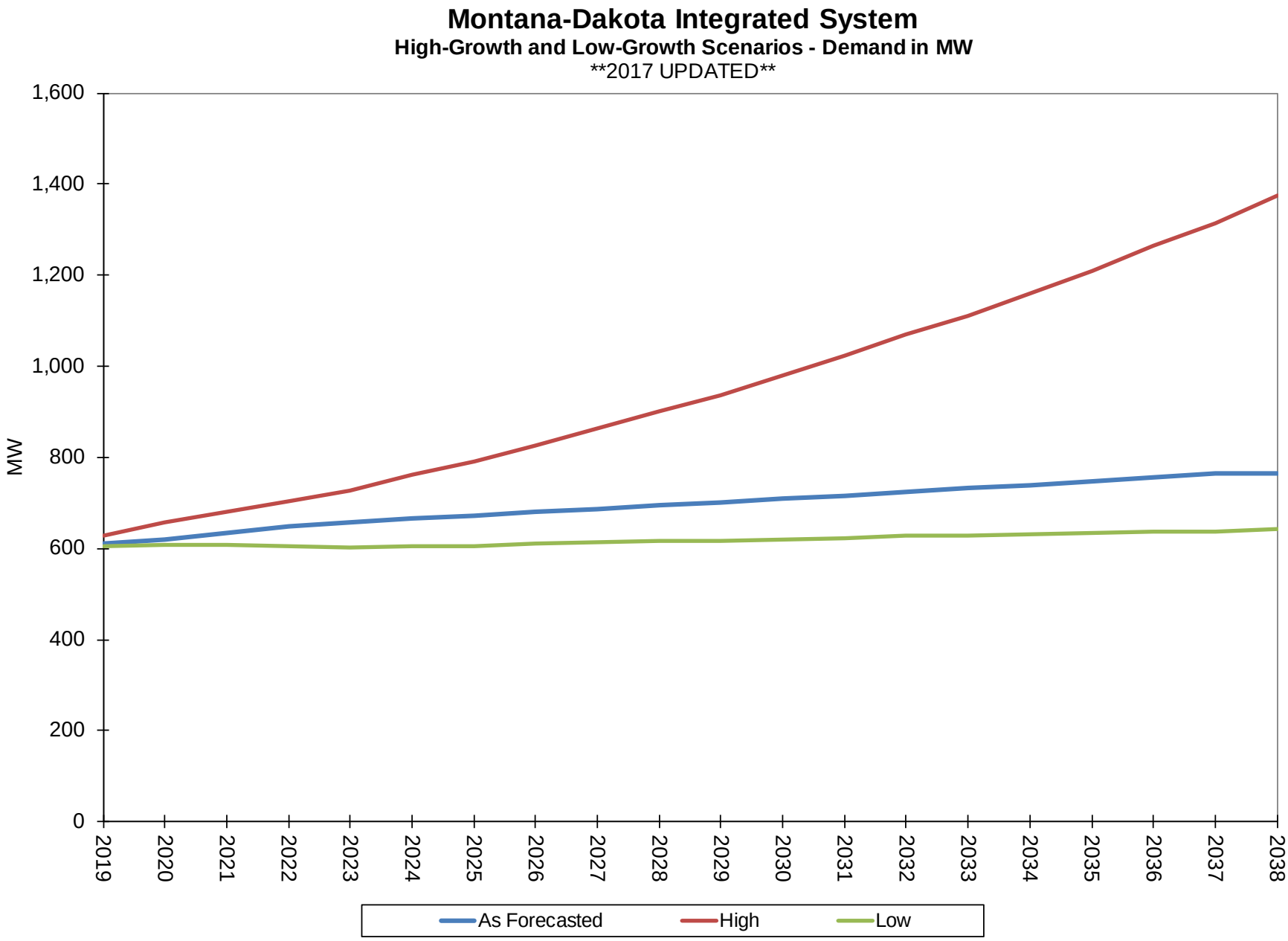
The results of the high-growth and low-growth scenarios for energy and demand are given below. The following two pages present the graphs of the numeric results.

High-Growth and Low-Growth Scenarios **2017 UPDATED**
Total Annual Energy (GWh) and
Summer Peak Demand (MW)

	ENERGY			DEMAND		
	Forecast	HIGH 1/	LOW 2/	Forecast	HIGH	LOW
2019	3,371.5	3,459.2	3,330.0	611.2	627.1	603.7
2020	3,406.5	3,611.4	3,346.7	618.4	657.4	609.2
2021	3,498.4	3,770.3	3,363.4	634.0	681.4	607.9
2022	3,631.1	3,936.2	3,380.2	648.6	703.1	603.8
2023	3,714.7	4,109.4	3,397.1	657.5	727.4	601.3
2024	3,756.6	4,290.2	3,414.1	664.7	761.2	605.7
2025	3,797.2	4,479.0	3,431.2	671.8	790.2	605.4
2026	3,840.3	4,676.1	3,448.4	679.1	826.9	609.8
2027	3,884.0	4,881.8	3,465.6	686.5	862.8	612.5
2028	3,928.3	5,096.6	3,482.9	693.8	902.7	616.9
2029	3,973.3	5,320.9	3,500.3	701.3	936.6	616.2
2030	4,018.9	5,555.0	3,517.8	708.9	979.9	620.5
2031	4,065.1	5,799.4	3,535.4	716.6	1022.4	623.2
2032	4,112.0	6,054.6	3,553.1	724.3	1069.4	627.6
2033	4,159.6	6,321.0	3,570.9	732.0	1109.3	626.7
2034	4,207.9	6,599.1	3,588.8	739.9	1160.4	631.0
2035	4,256.9	6,889.5	3,606.7	747.8	1210.2	633.6
2036	4,306.9	7,192.6	3,624.7	755.8	1265.6	637.8
2037	4,357.6	7,509.1	3,642.8	763.9	1312.8	636.8
2038	4,357.6	7,839.5	3,661.0	763.9	1374.2	641.8

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
2017 UPDATED
GWh
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
As Forecasted
Low
High


Montana-Dakota Integrated System
High-Growth and Low-Growth Scenarios - Demand in MW
2017 UPDATED
MW
1,600
1,400
1,200
1,000
800
600
400
200
0
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
As Forecasted
High
Low

5. Allocations

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

5.1. Sales and Customer Allocations by Month

The Financial Forecasting Department requires a calendar month forecast for each state. This is accomplished through a two-step process. First, monthly estimates of energy and customers by sector are determined by calculating the ratio of the monthly bill cycle value to the annual amount for the 5-year periods of time for 2012-2016 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 2002 through April 2017. (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 December are the peak months for the summer and winter seasons, respectively, August and January have the second highest peaks for their respective seasons, etc. (See the table below which gives the monthly ranks by state for each month and season.)

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

			Summer Season			
		ND		SD		MT
MAY	6	0.6908	6	0.6135	6	0.6878
JUNE	3	0.8868	3	0.8545	3	0.8966
July	1	0.9742	1	0.9612	1	0.9884
August	2	0.9574	2	0.9310	2	0.9351
September	4	0.8420	4	0.8027	4	0.8518
October	5	0.6951	5	0.7094	5	0.7025
			Winter Season			
NOV	4	0.8750	4	0.8848	4	0.9025
DEC	1	0.9525	1	0.9544	1	0.9712
JAN	2	0.9868	2	0.9280	2	0.9435
FEB	3	0.9244	3	0.9069	3	0.9239
MARCH	5	0.8666	5	0.8848	5	0.8577
APRIL	6	0.7663	6	0.7496	6	0.7588

3. For each season, the monthly ratios determined in Step 1 for the May 2012 through April 2017 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	0.9580	*/	July	1.0000
February	0.9033		August	0.9579
March	0.8448		September	0.8609
April	0.7513		October	0.7507
May	0.7090		November	0.8774
June	0.9232		December	1.0000

SD 5-Year Average Monthly Ratios of Seasonal Peaks			
January	0.9477	July	1.0000
February	0.9207	August	0.9487
March	0.8486	September	0.8414
April	0.7567	October	0.7179
May	0.6178	November	0.8786
June	0.9006	December	1.0000

MT 5-Year Average Monthly Ratios of Seasonal Peaks			
January	0.9725	July	1.0000
February	0.9413	August	0.9451
March	0.8259	September	0.7850
April	0.7569	October	0.6966
May	0.6578	November	0.8911
June	0.8755	December	1.0000

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

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 2037 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 2018-2027, 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)

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

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

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

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

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

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

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

Montana-Dakota Utilities Co.
Integrated System Seasonal Peaks and Peak Month Load Factors 1/
1960 through 2017

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

1/ MDU only net peak on combined system as calculated by MDU (excludes REC adjusted peak)
2/ January and February is of the following year.

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

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

* Winter peak is in the following year.

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

North Dakota

Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.116021	0.098392	0.098419	0.079389	0.065831	0.065697	0.080144	0.087023	0.075874	0.065762	0.065815	0.101632
Small C&I	0.100366	0.088356	0.093508	0.079383	0.072782	0.074820	0.080213	0.083337	0.079227	0.078791	0.072696	0.096520
Large C&I	0.089105	0.078856	0.084750	0.079386	0.075429	0.079570	0.084484	0.091416	0.087334	0.085618	0.073933	0.090118
Street Lighting	0.101605	0.083940	0.088142	0.082216	0.075198	0.075588	0.074509	0.074604	0.078649	0.085727	0.081912	0.097910
Other Public Sales	0.085226	0.074984	0.082182	0.075279	0.074513	0.083738	0.096524	0.099610	0.092165	0.084643	0.067677	0.083457
Interdepartmental	0.107868	0.094649	0.099275	0.086005	0.095474	0.072911	0.070361	0.071154	0.068191	0.072998	0.068060	0.093054
Company Use	0.099391	0.082251	0.088096	0.078726	0.077135	0.081623	0.087993	0.086383	0.082885	0.081859	0.070230	0.083427
Tesoro Refinery	0.085522	0.070030	0.085981	0.085120	0.078345	0.087843	0.083501	0.089941	0.086735	0.087821	0.076596	0.082566
Westmoreland Coa	0.101307	0.097691	0.097766	0.087708	0.070302	0.069392	0.070702	0.073872	0.073646	0.077838	0.081662	0.098112
Customers												
Residential	0.984945	0.988921	0.991773	0.992512	0.993566	0.997749	1.000028	1.002350	1.006329	1.010352	1.013864	1.017612
Small C&I	0.986457	0.988053	0.990777	0.993588	0.996607	0.999608	1.000892	1.001690	1.015570	1.015743	1.005039	1.005975
Large C&I	0.927390	0.935142	0.946253	0.951421	0.965375	0.986305	1.009044	1.027907	1.063566	1.067183	1.052972	1.067442
Street Lighting	1.032013	0.983413	0.983413	0.985526	0.986371	0.988484	0.991442	0.995668	1.006233	1.012573	1.014263	1.020602
Other Public Sales	1.000992	1.000382	1.001603	1.004655	1.005266	1.000992	0.999466	0.997939	1.012287	1.008319	0.986644	0.981455
Peak Demand	0.9580	0.9033	0.8448	0.7513	0.7090	0.9232	1.0000	0.9579	0.8609	0.7507	0.8774	1.0000

South Dakota

Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.119445	0.102143	0.103107	0.081039	0.066560	0.062522	0.077497	0.085600	0.073187	0.064461	0.064913	0.099526
Small C&I	0.107975	0.096069	0.100153	0.081291	0.069672	0.067997	0.077844	0.085742	0.076644	0.071406	0.067093	0.098114
Large C&I	0.087191	0.079066	0.083394	0.077589	0.074039	0.074430	0.075750	0.087907	0.085434	0.090031	0.084057	0.101112
Street Lighting	0.087818	0.079761	0.085181	0.083651	0.080418	0.082744	0.082514	0.080950	0.081052	0.085232	0.077627	0.093052
Other Public Sales	0.090997	0.085816	0.091450	0.086520	0.081001	0.086421	0.081371	0.087976	0.075299	0.078397	0.070715	0.084038
Interdepartmental	0.203846	0.167058	0.132991	0.075615	0.035427	0.029925	0.031347	0.031965	0.024298	0.039199	0.055398	0.172932
Company Use	0.174847	0.163221	0.162196	0.116364	0.058505	0.034529	0.037424	0.040464	0.033684	0.031108	0.041750	0.105910
Customers												
Residential	0.996433	0.996160	0.996342	0.997525	0.998284	0.999194	1.000164	1.000195	1.012026	1.010296	0.997768	0.995614
Small C&I	0.981794	0.981903	0.983423	0.992978	0.999710	1.009483	1.009483	1.008071	1.026204	1.019038	0.993521	0.994390
Large C&I	0.996607	0.996607	0.992729	0.996607	1.002424	0.992729	1.000485	1.000485	1.010179	1.012118	0.998546	1.000485
Street Lighting	1.304813	0.941176	0.941176	0.941176	0.951872	0.941176	0.941176	0.962567	0.973262	1.016043	1.026738	1.058824
Other Public Sales	0.990528	0.978349	0.974290	0.986468	1.018945	1.018945	1.018945	1.014885	1.035183	1.010825	0.978349	0.974290
Peak Demand	0.9477	0.9207	0.8486	0.7567	0.6178	0.9006	1.0000	0.9487	0.8414	0.7179	0.8786	1.0000

Montana

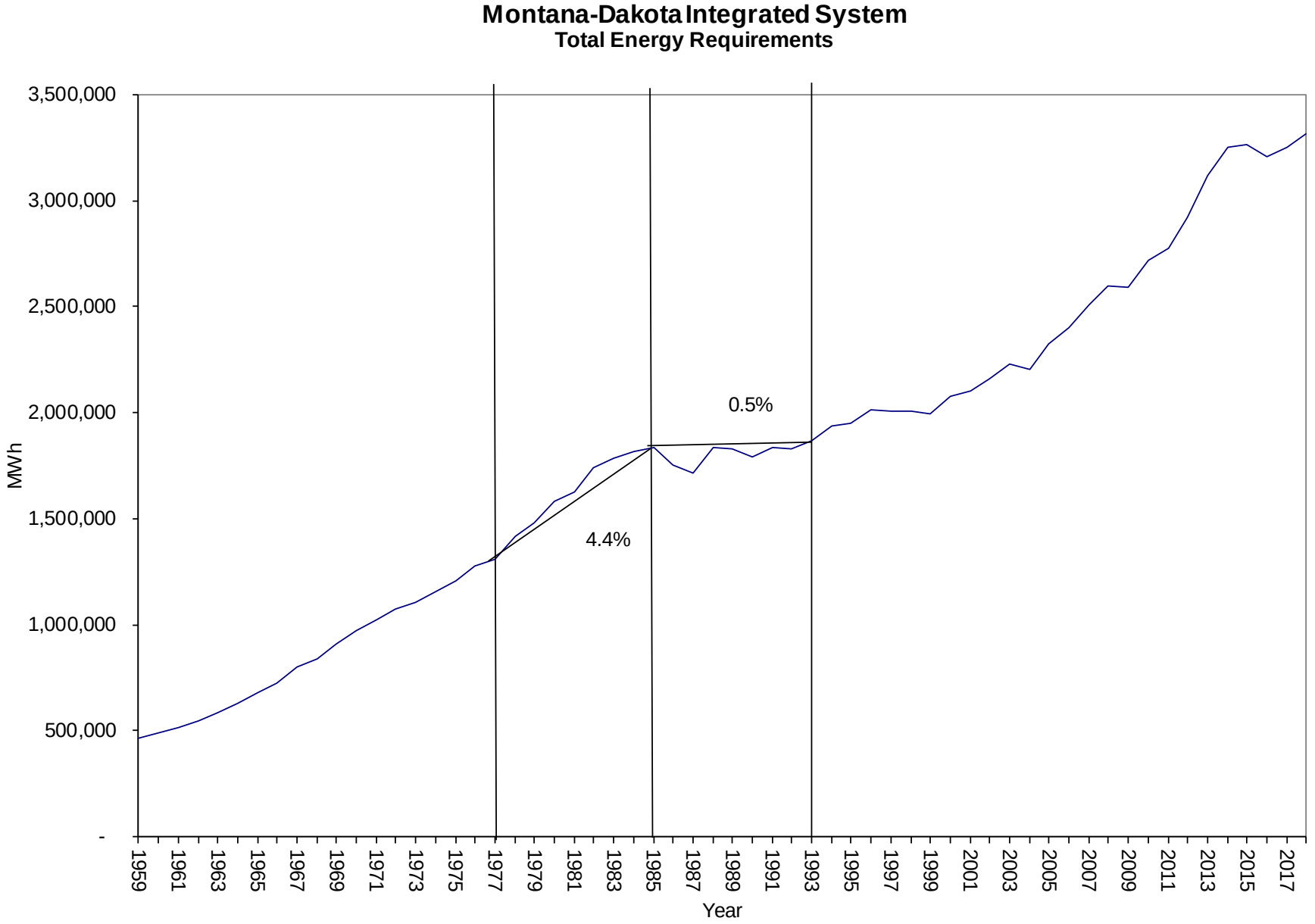
Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.112533	0.093426	0.093452	0.076462	0.064778	0.066035	0.084234	0.098425	0.082659	0.067948	0.063834	0.096216
Small C&I	0.097715	0.086834	0.087826	0.078922	0.071702	0.075150	0.087048	0.098320	0.084861	0.076429	0.067078	0.088116
Large C&I	0.095337	0.082969	0.083979	0.080548	0.076319	0.080144	0.082585	0.080991	0.080775	0.086596	0.077420	0.092337
Street Lighting	0.091873	0.077360	0.083884	0.083255	0.080229	0.083843	0.083226	0.082211	0.081915	0.084679	0.076784	0.090741
Other Public Sales	0.082195	0.072624	0.080675	0.073230	0.072244	0.085852	0.105049	0.115426	0.096206	0.083335	0.059907	0.073257
Interdepartmental	0.109688	0.092709	0.092839	0.081240	0.071873	0.072484	0.074947	0.080223	0.075890	0.078701	0.071551	0.097855
Company Use	0.106980	0.093239	0.097217	0.080698	0.069633	0.068414	0.081794	0.091141	0.082971	0.070247	0.065643	0.092021
Oil Fields	0.091678	0.077353	0.083874	0.083546	0.079076	0.082010	0.082963	0.081993	0.082930	0.086087	0.080254	0.088237
Westmoreland Coa	0.123499	0.106975	0.106643	0.090716	0.072998	0.062380	0.062114	0.057668	0.056407	0.068750	0.081094	0.110757
Customers												
Residential	0.996008	0.997159	0.999251	0.998756	0.998291	0.999059	0.998907	0.999726	1.000786	1.001908	1.004029	1.006121
Small C&I	0.986161	0.984726	0.985812	0.994809	0.999813	1.006600	1.009121	1.011060	1.015171	1.009198	0.999502	0.998028
Large C&I	0.993992	0.984526	0.992536	0.996905	1.008556	0.988895	0.993264	0.997633	1.031131	1.029674	0.993264	0.989623
Street Lighting	1.210772	0.973788	0.973788	0.978097	0.978097	0.978097	0.978097	0.978097	0.986715	0.986715	0.982406	0.995332
Other Public Sales	0.999180	0.997214	0.997214	1.007048	1.005081	1.003114	1.001147	1.001147	1.010982	1.001147	0.987379	0.989346
Peak Demand	0.9725	0.9413	0.8259	0.7569	0.6578	0.8755	1.0000	0.9451	0.7850	0.6966	0.8911	1.0000

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

Residential	January	February	March	April	May	June	July	August	September	October	November	December
North Dakota	57.3%	58.7%	59.4%	58.7%	59.3%	59.5%	54.2%	58.2%	57.7%	57.0%	57.7%	59.8%
South Dakota	62.3%	64.7%	65.8%	63.3%	64.3%	65.3%	59.3%	64.8%	62.6%	62.8%	63.5%	64.8%
Montana	61.1%	62.3%	65.4%	62.4%	64.1%	64.2%	58.9%	65.9%	61.9%	62.6%	60.7%	62.4%
Small Commercial & Industrial												
North Dakota	56.6%	58.1%	57.0%	57.2%	58.2%	59.0%	53.2%	55.7%	55.7%	54.7%	58.1%	59.2%
South Dakota	61.7%	63.9%	66.4%	62.5%	63.8%	66.0%	58.5%	65.7%	60.6%	63.5%	62.6%	65.9%
Montana	55.6%	57.6%	58.1%	54.9%	56.4%	57.1%	52.7%	59.1%	55.3%	55.5%	55.5%	56.7%
Large Commercial & Industrial												
North Dakota	57.8%	59.7%	58.7%	59.0%	60.2%	61.3%	56.5%	59.2%	59.0%	58.8%	62.0%	61.9%
South Dakota	67.3%	63.0%	71.1%	67.2%	66.3%	68.4%	64.6%	73.9%	65.1%	70.6%	67.1%	71.8%
Montana	39.0%	38.9%	36.0%	34.4%	35.3%	38.1%	34.4%	37.1%	35.7%	34.0%	37.7%	38.9%
Street Lighting												
North Dakota	53.5%	55.7%	52.6%	52.5%	53.2%	54.2%	49.9%	51.0%	51.1%	50.4%	55.4%	56.1%
South Dakota	60.5%	64.9%	61.4%	61.2%	62.4%	62.8%	60.4%	61.6%	59.9%	60.2%	64.5%	64.9%
Montana	59.2%	61.8%	58.4%	58.9%	57.4%	60.4%	57.0%	55.8%	57.8%	57.4%	61.6%	60.3%
Other Public Sales												
North Dakota	57.2%	60.3%	56.3%	56.8%	56.6%	58.3%	54.6%	56.1%	56.3%	54.6%	60.2%	60.6%
South Dakota	69.3%	69.5%	79.8%	71.3%	72.4%	72.4%	64.6%	81.0%	72.5%	83.0%	76.4%	75.0%
Montana	59.4%	56.2%	60.7%	59.4%	59.7%	55.2%	51.7%	61.8%	55.1%	59.8%	54.2%	58.9%
Interdepartmental												
North Dakota	63.1%	65.8%	64.9%	66.2%	67.1%	67.4%	62.6%	66.9%	63.3%	66.9%	65.0%	66.6%
South Dakota	25.6%	24.1%	21.0%	21.2%	20.9%	26.3%	20.6%	21.9%	19.8%	19.0%	25.9%	24.6%
Montana	56.5%	57.2%	63.1%	58.9%	62.1%	66.2%	57.5%	69.0%	58.7%	65.3%	58.6%	57.8%
Company Use												
North Dakota	50.2%	52.7%	49.0%	49.2%	49.5%	50.2%	45.1%	46.1%	46.7%	45.2%	51.0%	52.1%
South Dakota	75.7%	83.3%	75.2%	77.3%	79.3%	78.9%	74.7%	74.3%	79.5%	77.1%	84.4%	81.9%
Montana	65.5%	72.3%	68.0%	67.1%	69.4%	69.0%	63.1%	67.3%	65.9%	66.6%	72.0%	71.4%

Montana-Dakota Utilties Co.
Integrated System
Historical Energy Requirements

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


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

APPENDIX B

Integrated System
Historical and Forecasted Exogenous Variables

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

	Residential Prices			Small C&I Prices			Large C&I Prices		
Year	MT	ND	SD	MT	ND	SD	MT	ND	SD
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

SOURCE:
1991-2016: Historical prices calculated from Montana-Dakota Utilities Co., *Electric Operating Revenues Reports*

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

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

Year	Residential Price	Firm Price
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

SOURCE:
1991-2016: CSBE Rate Reporting Class Report
Gas Year-to-Date Report for Year-end

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

	HDD		CDD	
	MT & ND	SD	MT & ND	SD
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
NORMAL	8,558	8,534	520	525

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

Year	Montana	North Dakota	South Dakota
1991	1,433,858	4,639,174	677,268
1992	1,510,087	5,026,636	735,208
1993	1,546,412	5,135,910	746,968
1994	1,500,145	5,205,632	682,157
1995	1,483,165	5,166,945	694,541
1996	1,490,659	5,598,865	779,016
1997	1,487,292	5,382,372	749,044
1998	1,562,849	5,856,445	821,861
1999	1,581,934	5,852,854	849,799
2000	1,572,648	6,247,937	912,577
2001	1,628,201	6,378,161	912,793
2002	1,579,533	6,225,233	772,903
2003	1,706,066	6,743,446	927,898
2004	1,734,095	6,739,237	924,928
2005	1,759,230	7,073,724	933,078
2006	1,744,711	7,244,303	732,487
2007	1,915,710	7,879,062	944,169
2008	2,034,653	8,828,819	1,096,721
2009	2,022,936	9,072,244	990,294
2010	2,193,002	10,162,849	1,052,226
2011	2,328,966	11,988,983	1,261,896
2012	2,615,701	14,600,923	1,285,933
2013	2,650,455	15,311,825	1,186,331
2014	2,693,032	16,849,453	1,218,893
2015	2,622,716	16,134,558	1,071,085
2016	2,588,694	16,591,101	1,077,323

SOURCES:
1991-2014: U.S. Dept. of Commerce
2015- 2016: Woods & Poole Economics, Inc.

Integrated System
Personal Consumption Expediture Deflator

Year	Personal Consumption Expenditure Deflator (2009 = 100)	Inflation Rate
1991	69.65	
1992	71.49	2.6%
1993	73.28	2.5%
1994	74.80	2.1%
1995	76.36	2.1%
1996	77.98	2.1%
1997	79.33	1.7%
1998	79.94	0.8%
1999	81.11	1.5%
2000	83.13	2.5%
2001	84.74	1.9%
2002	85.87	1.3%
2003	87.57	2.0%
2004	89.70	2.4%
2005	92.26	2.9%
2006	94.73	2.7%
2007	97.10	2.5%
2008	100.07	3.1%
2009	100.00	-0.1%
2010	101.65	1.7%
2011	104.15	2.5%
2012	106.12	1.9%
2013	107.57	1.4%
2014	109.11	1.4%
2015	109.43	0.3%
2016	110.37	0.9%
2017	111.77	1.3%
2018	113.42	1.5%
2019	115.43	1.8%
2020	117.75	2.0%
2021	120.36	2.2%
2022	123.20	2.4%
2023	126.22	2.5%
2024	129.73	2.8%
2025	133.68	3.0%
2026	137.99	3.2%
2027	142.66	3.4%
2028	147.64	3.5%
2029	152.86	3.5%
2030	158.44	3.6%
2031	164.32	3.7%
2032	170.50	3.8%
2033	176.96	3.8%
2034	183.69	3.8%
2035	190.70	3.8%
2036	198.01	3.8%
2037	205.61	3.8%

SOURCES:
1991-2014 U.S. Department of Commerce
2015-2037 Woods & Poole Economics, Inc.

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

	Montana		North Dakota		South Dakota	
Year	Number of Households	Average Customers	Number of Households	Average Customers	Number of Households	Average Customers
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	25,789	20,128	102,185	78,553	11,038	6,546
2017	26,030	20,128	104,060	78,803	11,109	6,549
2018	26,227	20,198	105,784	79,103	11,161	6,552
2019	26,393	20,268	107,416	79,453	11,196	6,553
2020	26,541	20,338	108,996	79,803	11,227	6,554
2021	26,677	20,408	110,535	80,153	11,251	6,555
2022	26,776	20,478	111,938	80,503	11,259	6,556
2023	26,854	20,528	113,282	80,853	11,261	6,556
2024	26,919	20,578	114,582	81,203	11,255	6,556
2025	26,974	20,628	115,852	81,553	11,247	6,555
2026	27,020	20,678	117,105	81,903	11,233	6,555
2027	27,063	20,728	118,341	82,253	11,216	6,554
2028	27,096	20,778	119,567	82,603	11,200	6,553
2029	27,120	20,828	120,762	82,953	11,175	6,552
2030	27,134	20,878	121,923	83,303	11,151	6,551
2031	27,141	20,928	123,064	83,653	11,121	6,550
2032	27,136	20,978	124,174	84,003	11,086	6,548
2033	27,124	21,028	125,256	84,353	11,051	6,547
2034	27,107	21,078	126,320	84,703	11,013	6,545
2035	27,083	21,128	127,361	85,053	10,971	6,543
2036	27,065	21,178	128,437	85,403	10,932	6,541
2037	27,056	21,228	129,576	85,753	10,895	6,540

*/ 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
1991-2016: Actuals from Montana-Dakota Utilities Co. Customer Information System Active Customers Report
2017-2037: Montana-Dakota forecast

Integrated System
Employment Data
Total Employment less Farming and Mining Employment

	Montana				North Dakota				South Dakota	
Year	Number of Employees	Growth Rate	Adjusted Employment	Growth Rate	Number of Employees	Growth Rate	Adjusted Employment	Growth Rate	Number of Employees	Growth Rate
1991	28,864				100,243				11,146	
1992	28,561	-1.05%			101,399	1.15%			11,165	0.17%
1993	29,083	1.83%			104,316	2.88%			11,205	0.36%
1994	30,411	4.57%			109,202	4.68%			12,067	7.69%
1995	30,128	-0.93%			109,891	0.63%			11,806	-2.16%
1996	30,045	-0.28%			112,041	1.96%			11,999	1.63%
1997	30,400	1.18%			113,702	1.48%			11,878	-1.01%
1998	30,871	1.55%			116,236	2.23%			11,950	0.61%
1999	30,631	-0.78%			117,243	0.87%			11,905	-0.38%
2000	30,657	0.08%			119,154	1.63%			12,040	1.13%
2001	30,189	-1.53%			119,164	0.01%			12,170	1.08%
2002	30,154	-0.12%			120,617	1.22%			12,151	-0.16%
2003	30,347	0.64%			122,062	1.20%			11,840	-2.56%
2004	30,517	0.56%			124,771	2.22%			11,965	1.06%
2005	30,665	0.48%			127,589	2.26%			12,005	0.33%
2006	30,907	0.79%			131,788	3.29%			12,152	1.22%
2007	31,646	2.39%			134,807	2.29%			12,194	0.35%
2008	32,096	1.42%			137,932	2.32%			12,281	0.71%
2009	32,366	0.84%			140,393	1.78%			12,391	0.90%
2010	32,686	0.99%			144,468	2.90%			12,407	0.13%
2011	33,992	4.00%			156,148	8.08%			12,428	0.17%
2012	34,900	2.67%			172,190	10.27%			12,467	0.31%
2013	35,792	2.56%			182,976	6.26%			12,766	2.40%
2014	35,843	0.14%			193,363	5.68%			12,838	0.56%
2015	35,248	-1.66%			191,598	-0.91%			12,919	0.63%
2016	35,703	1.29%			195,619	2.10%			13,019	0.77%

2017	36,168	1.30%	36,083	1.06%	199,780	2.13%	198,491	1.47%	13,134	0.88%
2018	36,623	1.26%	36,381	0.83%	203,994	2.11%	201,470	1.50%	13,238	0.79%
2019	37,074	1.23%	36,680	0.82%	208,301	2.11%	204,595	1.55%	13,341	0.78%
2020	37,540	1.26%	36,981	0.82%	212,719	2.12%	207,739	1.54%	13,436	0.71%
2021	37,987	1.19%	37,283	0.82%	217,260	2.13%	210,903	1.52%	13,543	0.80%
2022	38,448	1.21%	37,586	0.81%	221,933	2.15%	214,087	1.51%	13,646	0.76%
2023	38,914	1.21%	37,853	0.71%	226,720	2.16%	217,290	1.50%	13,751	0.77%
2024	39,381	1.20%	38,121	0.71%	231,550	2.13%	220,513	1.48%	13,839	0.64%
2025	39,835	1.15%	38,390	0.71%	236,436	2.11%	223,756	1.47%	13,941	0.74%
2026	40,301	1.17%	38,660	0.70%	241,367	2.09%	227,018	1.46%	14,031	0.65%
2027	40,743	1.10%	38,931	0.70%	246,341	2.06%	230,300	1.45%	14,122	0.65%
2028	41,195	1.11%	39,203	0.70%	251,338	2.03%	233,601	1.43%	14,211	0.63%
2029	41,646	1.09%	39,475	0.69%	256,391	2.01%	236,923	1.42%	14,302	0.64%
2030	42,090	1.07%	39,749	0.69%	261,480	1.98%	240,264	1.41%	14,380	0.55%
2031	42,532	1.05%	40,023	0.69%	266,611	1.96%	243,624	1.40%	14,460	0.56%
2032	42,970	1.03%	40,298	0.69%	271,789	1.94%	247,005	1.39%	14,531	0.49%
2033	43,398	1.00%	40,574	0.68%	277,015	1.92%	250,405	1.38%	14,617	0.59%
2034	43,826	0.99%	40,851	0.68%	282,275	1.90%	253,825	1.37%	14,687	0.48%
2035	44,257	0.98%	41,128	0.68%	287,581	1.88%	257,264	1.35%	14,759	0.49%
2036	44,674	0.94%	41,407	0.68%	292,971	1.87%	260,723	1.34%	14,831	0.49%
2037	45,099	0.95%	41,686	0.67%	298,417	1.86%	264,202	1.33%	14,894	0.42%

SOURCES:

Number of Employees:

1991-2014: U.S. Department of Commerce

2015-2037: Woods & Poole Economics Inc.

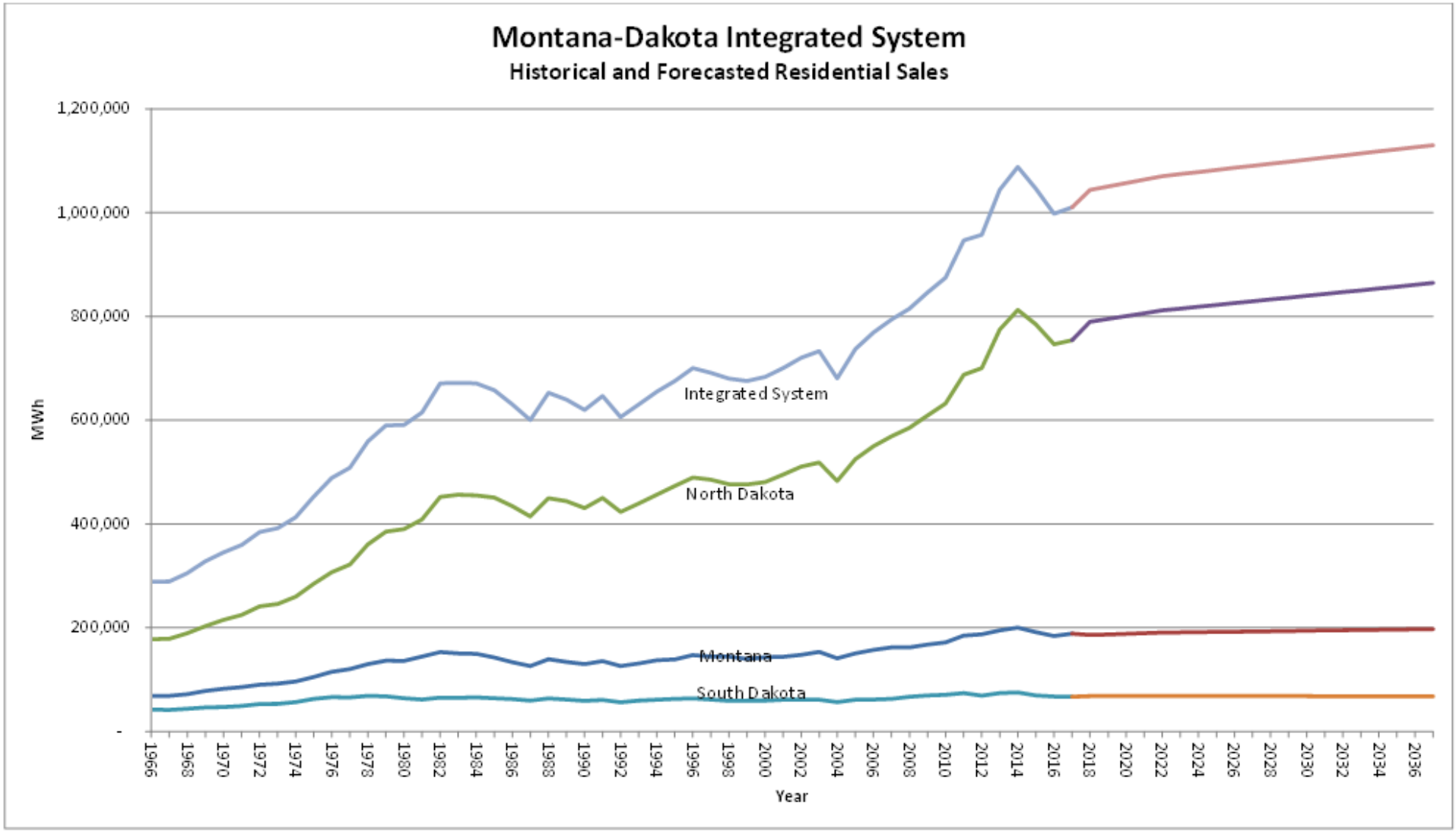
Adjusted Employment:

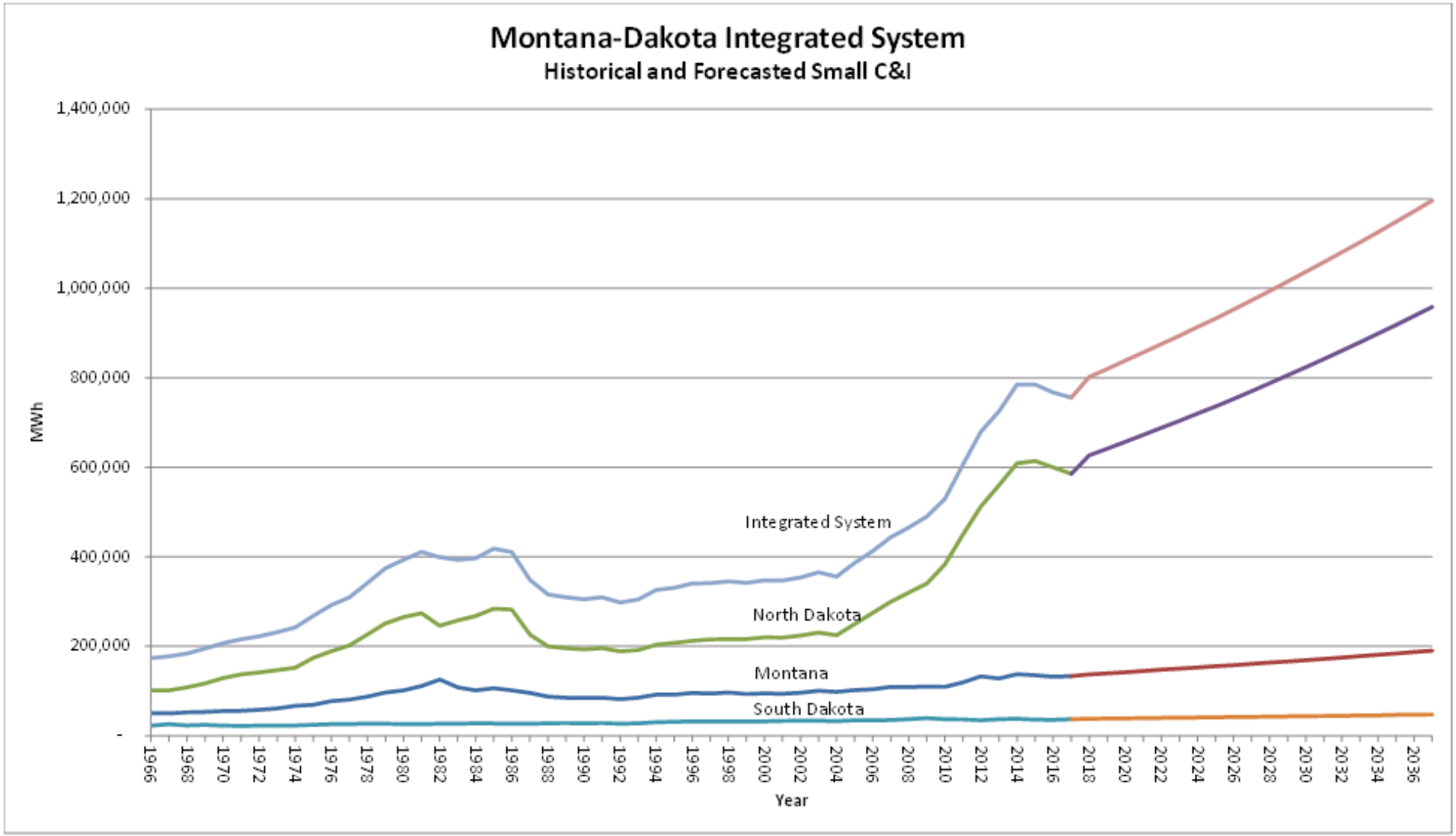
2017-2037: For Montana and North Dakota, employment was tied to the growth in residential customers by running a regression on the historical (1981-2015) ratio of actual residential customer numbers to employees. Those regression results were then applied on a forecasted basis to the adjusted forecast of residential customer numbers to arrive an adjusted forecast of number of employees. No adjustment was made to South Dakota employment.

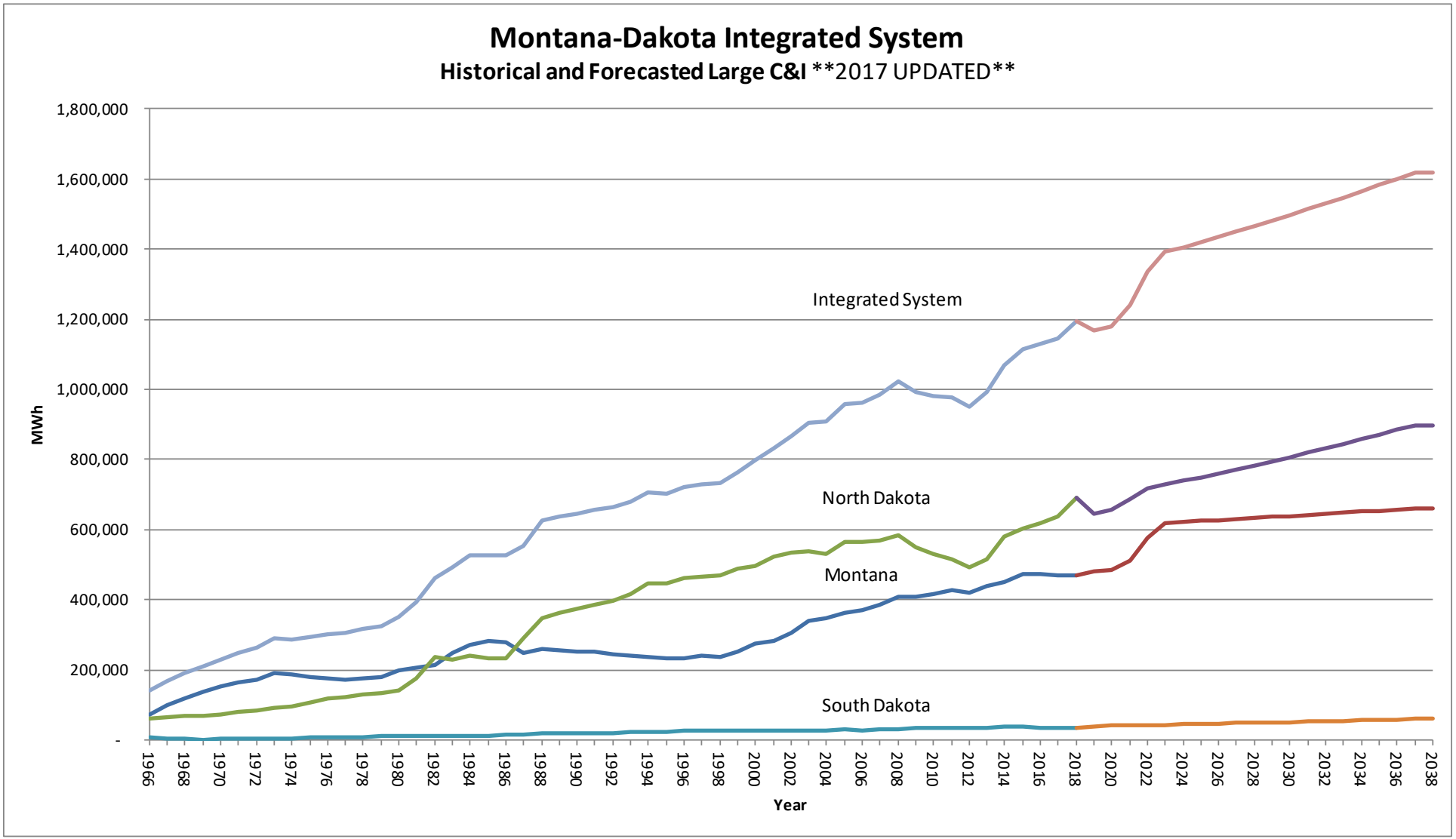
NOTE: The number of employees used for the forecast is total employment less farming and mining employment (most farms are not served by Montana-Dakota and the mining sector (oil fields and coal mining) is forecasted separately).

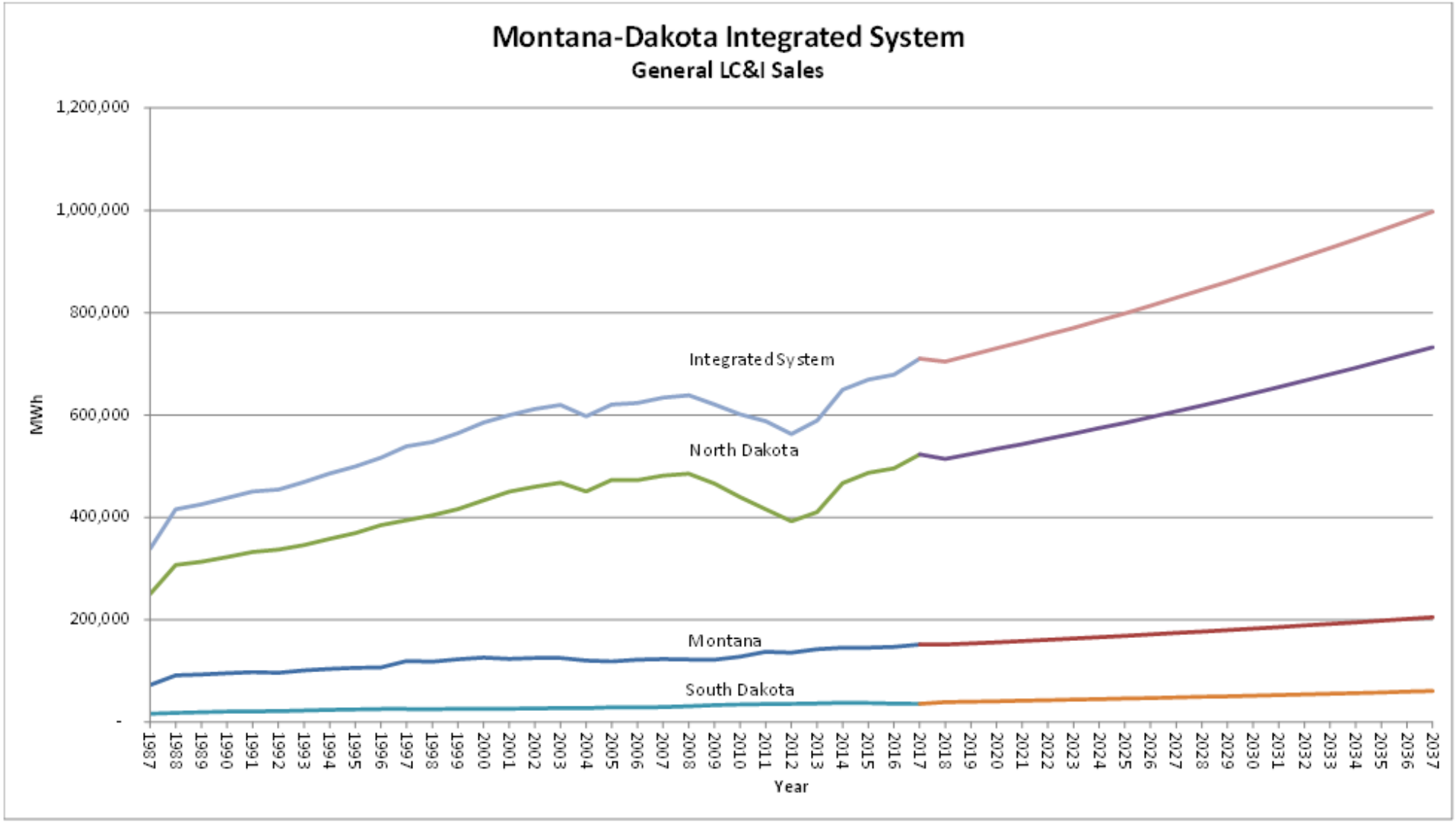
APPENDIX C

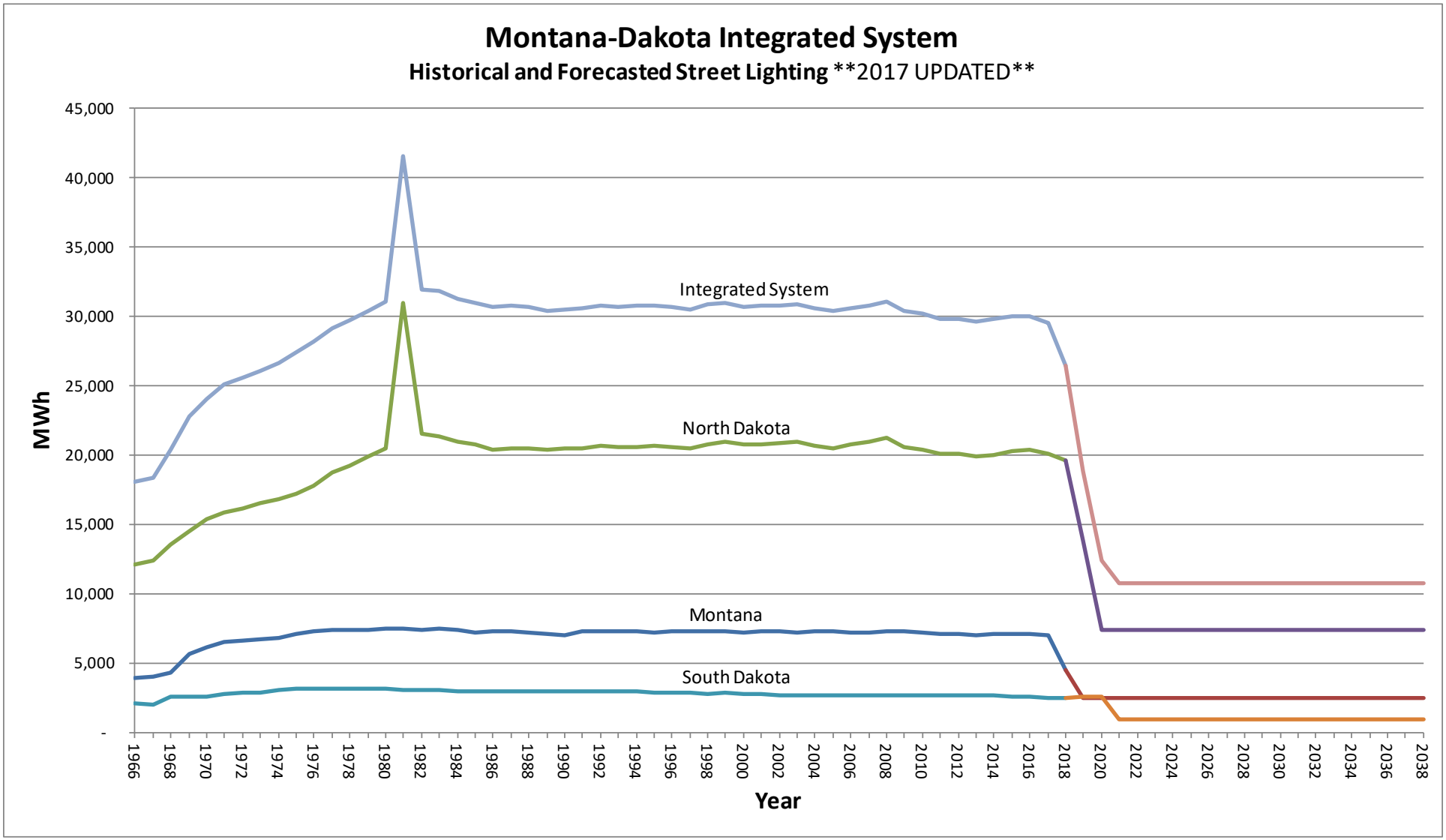
Integrated System Forecast Results

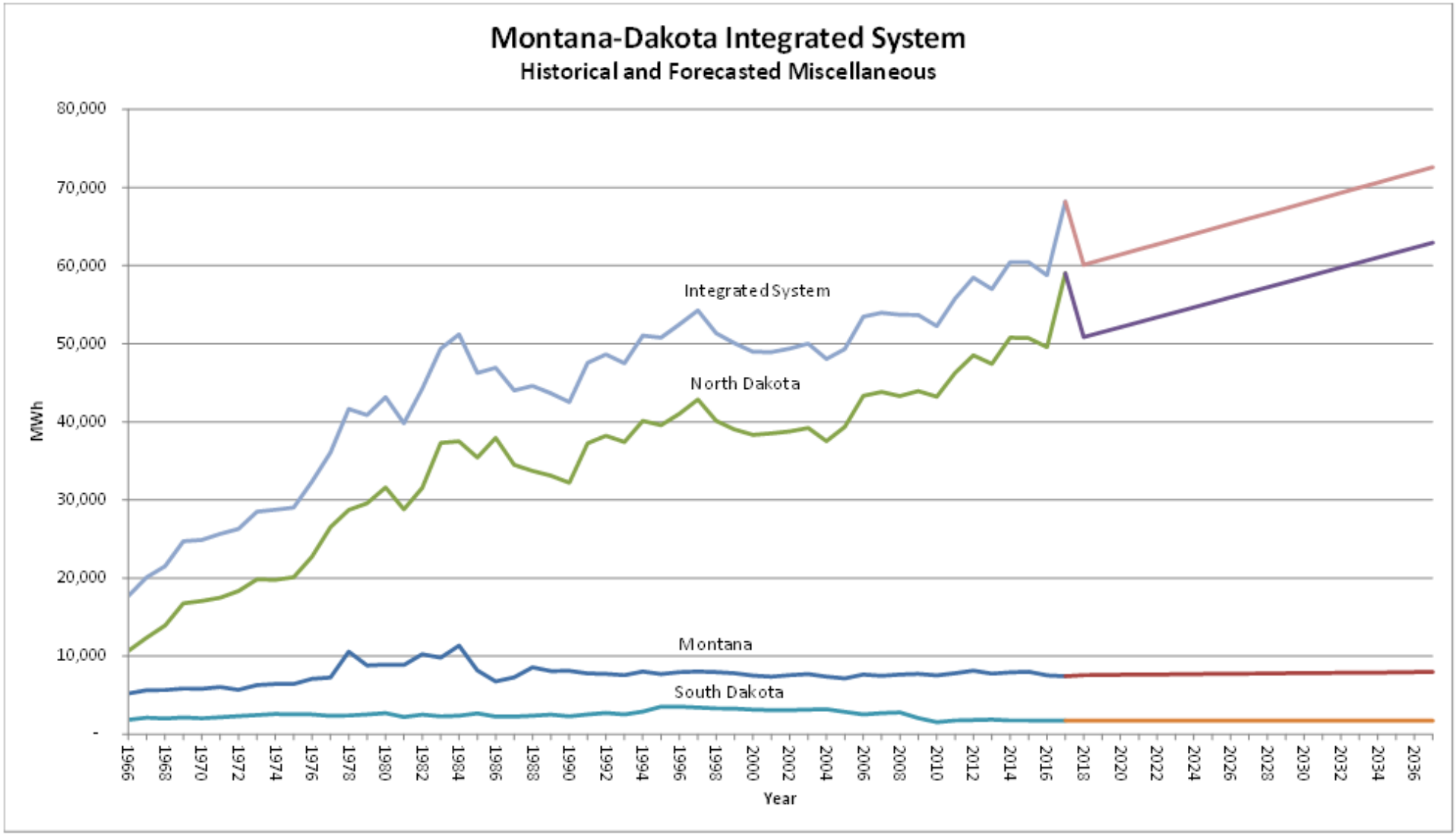

Montana-Dakota Integrated System
Historical and Forecasted Residential Sales
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
Year

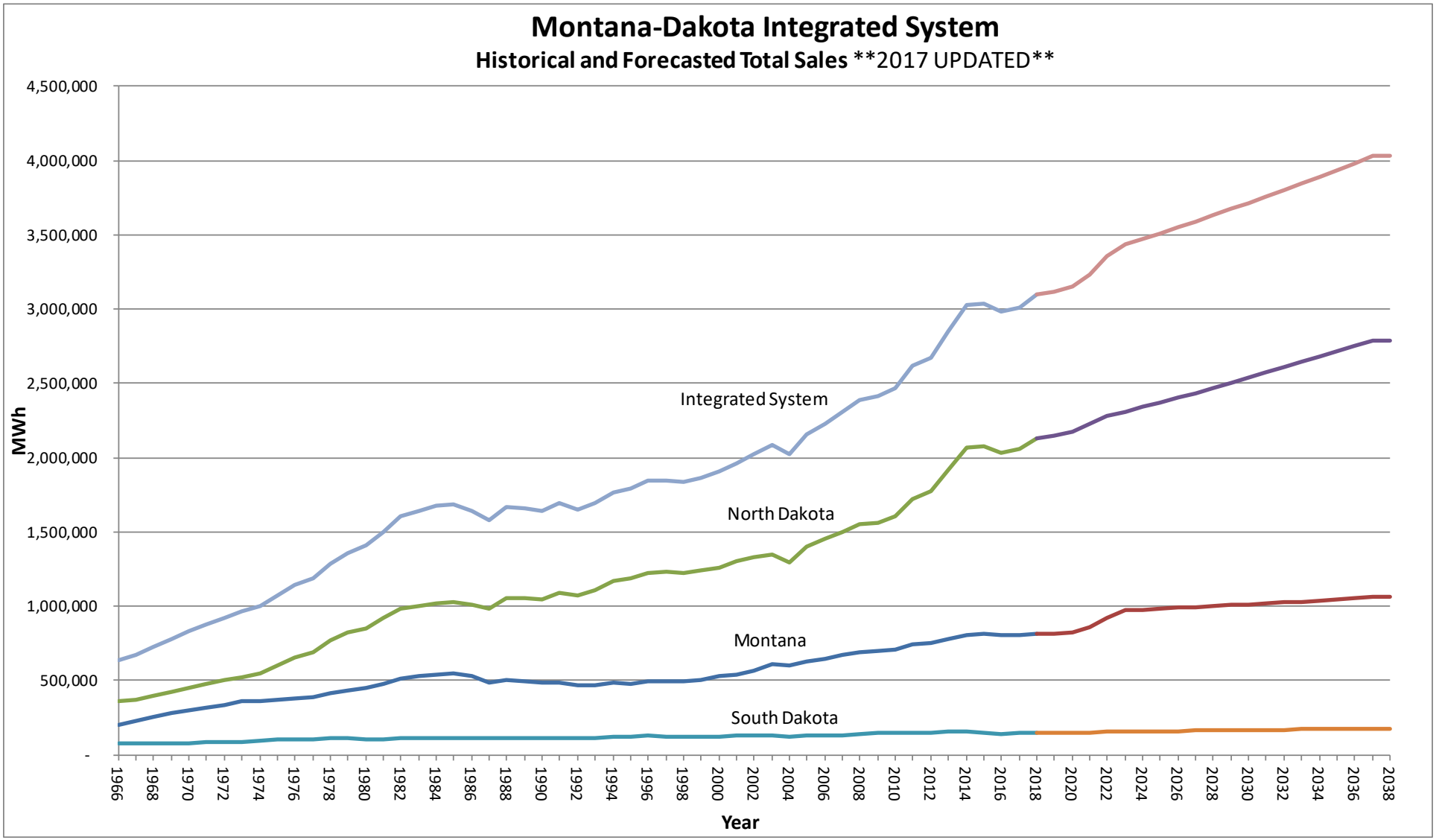

Montana-Dakota Integrated System
Historical and Forecasted Small C&I
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
Year


Montana-Dakota Integrated System
Historical and Forecasted Large C&I **2017 UPDATED**
1,800,000
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
Year


Montana-Dakota Integrated System
General LC&I Sales
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
Year


Montana-Dakota Integrated System
Historical and Forecasted Street Lighting **2017 UPDATED**
MWh
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
Year


Montana-Dakota Integrated System
Historical and Forecasted Miscellaneous
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
Year


Montana-Dakota Integrated System
Historical and Forecasted Total Sales **2017 UPDATED**
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
Year

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

Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2018	159.8		145.2		883.8		63.15%
2019	160.9	0.69%	146.3	0.81%	890.3	0.74%	63.18%
2020	162.0	0.68%	147.5	0.83%	896.6	0.71%	63.02%
2021	163.1	0.68%	148.8	0.83%	903.5	0.77%	63.25%
2022	164.2	0.68%	150.0	0.86%	910.4	0.76%	63.31%
2023	165.1	0.58%	151.0	0.67%	915.9	0.60%	63.32%
2024	166.2	0.65%	152.2	0.79%	922.1	0.68%	63.16%
2025	167.2	0.62%	153.4	0.74%	928.4	0.68%	63.37%
2026	168.3	0.64%	154.6	0.79%	934.8	0.69%	63.40%
2027	169.3	0.60%	155.7	0.75%	941.3	0.70%	63.46%
2028	170.4	0.63%	157.0	0.79%	947.9	0.70%	63.34%
2029	171.4	0.63%	158.2	0.78%	954.6	0.71%	63.56%
2030	172.5	0.63%	159.4	0.78%	961.4	0.71%	63.62%
2031	173.6	0.63%	160.7	0.79%	968.3	0.72%	63.67%
2032	174.7	0.61%	161.9	0.78%	975.3	0.72%	63.57%
2033	175.7	0.60%	163.2	0.79%	982.4	0.73%	63.83%
2034	176.8	0.65%	164.6	0.83%	989.5	0.72%	63.87%
2035	177.9	0.60%	165.9	0.80%	996.8	0.74%	63.96%
2036	179.0	0.64%	167.3	0.83%	1,004.3	0.75%	63.86%
2037	180.2	0.64%	168.6	0.83%	1,011.8	0.75%	64.11%

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

Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2018	415.7		377.7		2,299.5		63.15%
2019	421.5	1.40%	383.4	1.51%	2,332.6	1.44%	63.17%
2020	427.4	1.40%	389.4	1.56%	2,366.7	1.46%	63.04%
2021	433.1	1.33%	395.2	1.49%	2,399.9	1.40%	63.26%
2022	439.1	1.39%	401.4	1.57%	2,434.9	1.46%	63.30%
2023	444.8	1.30%	406.9	1.37%	2,466.9	1.31%	63.31%
2024	450.7	1.33%	412.9	1.47%	2,500.8	1.37%	63.17%
2025	456.5	1.29%	418.6	1.38%	2,533.7	1.32%	63.36%
2026	462.4	1.29%	424.7	1.46%	2,568.7	1.38%	63.41%
2027	468.4	1.30%	430.9	1.46%	2,604.1	1.38%	63.47%
2028	474.6	1.32%	437.2	1.46%	2,640.1	1.38%	63.33%
2029	480.7	1.29%	443.6	1.46%	2,676.7	1.39%	63.57%
2030	487.0	1.31%	450.0	1.44%	2,713.7	1.38%	63.61%
2031	493.2	1.27%	456.6	1.47%	2,751.2	1.38%	63.68%
2032	499.6	1.30%	463.2	1.45%	2,789.3	1.38%	63.56%
2033	505.9	1.26%	470.0	1.47%	2,828.0	1.39%	63.81%
2034	512.4	1.28%	476.8	1.45%	2,867.1	1.38%	63.87%
2035	518.9	1.27%	483.8	1.47%	2,906.9	1.39%	63.95%
2036	525.4	1.25%	490.9	1.47%	2,947.4	1.39%	63.86%
2037	532.1	1.28%	498.0	1.45%	2,988.5	1.39%	64.11%

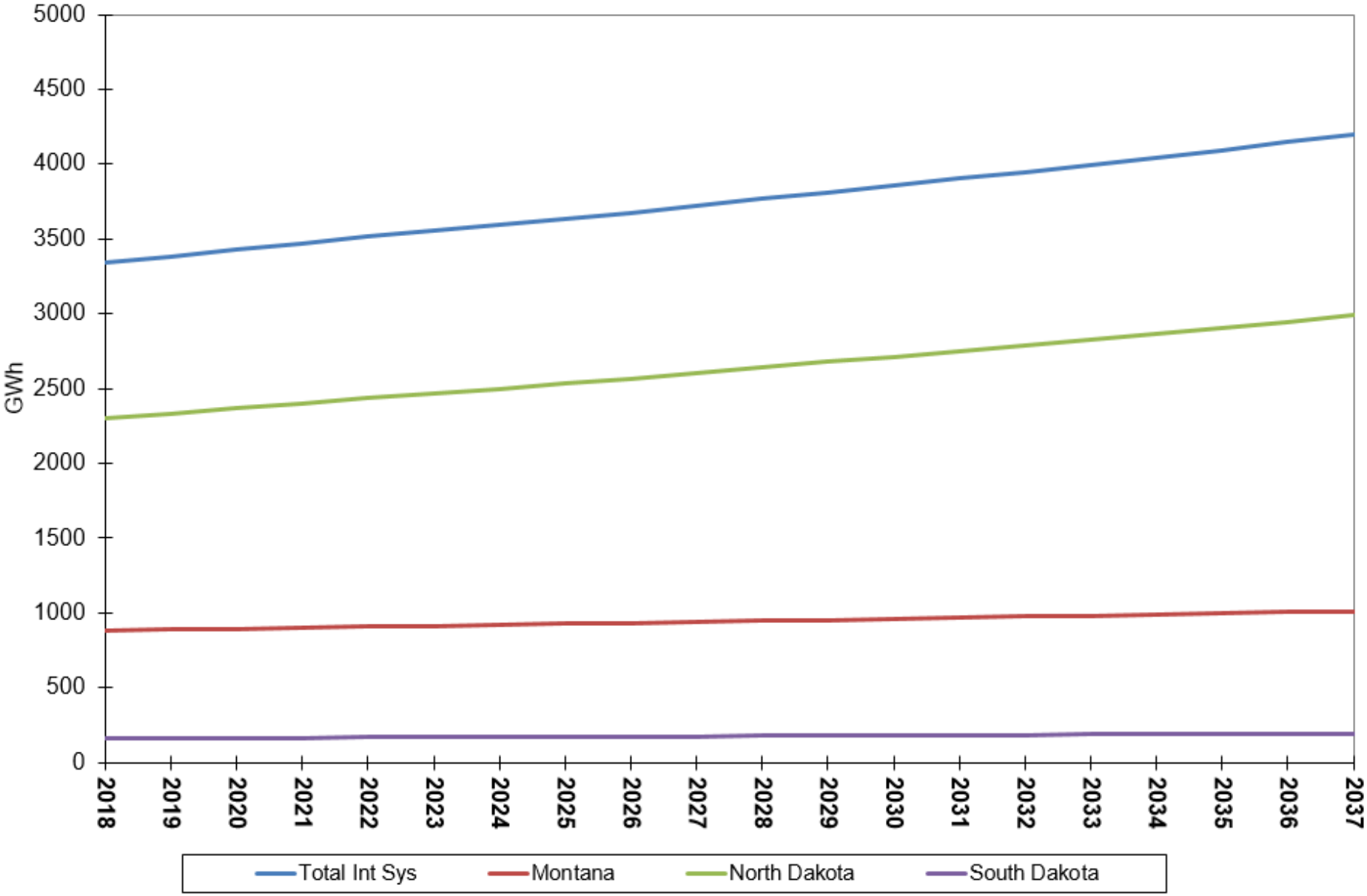
Montana-Dakota Utilities Co.
Forecasted Energy (MWh) and
Seasonal Demands (MW) Prior to Demand Response
South Dakota

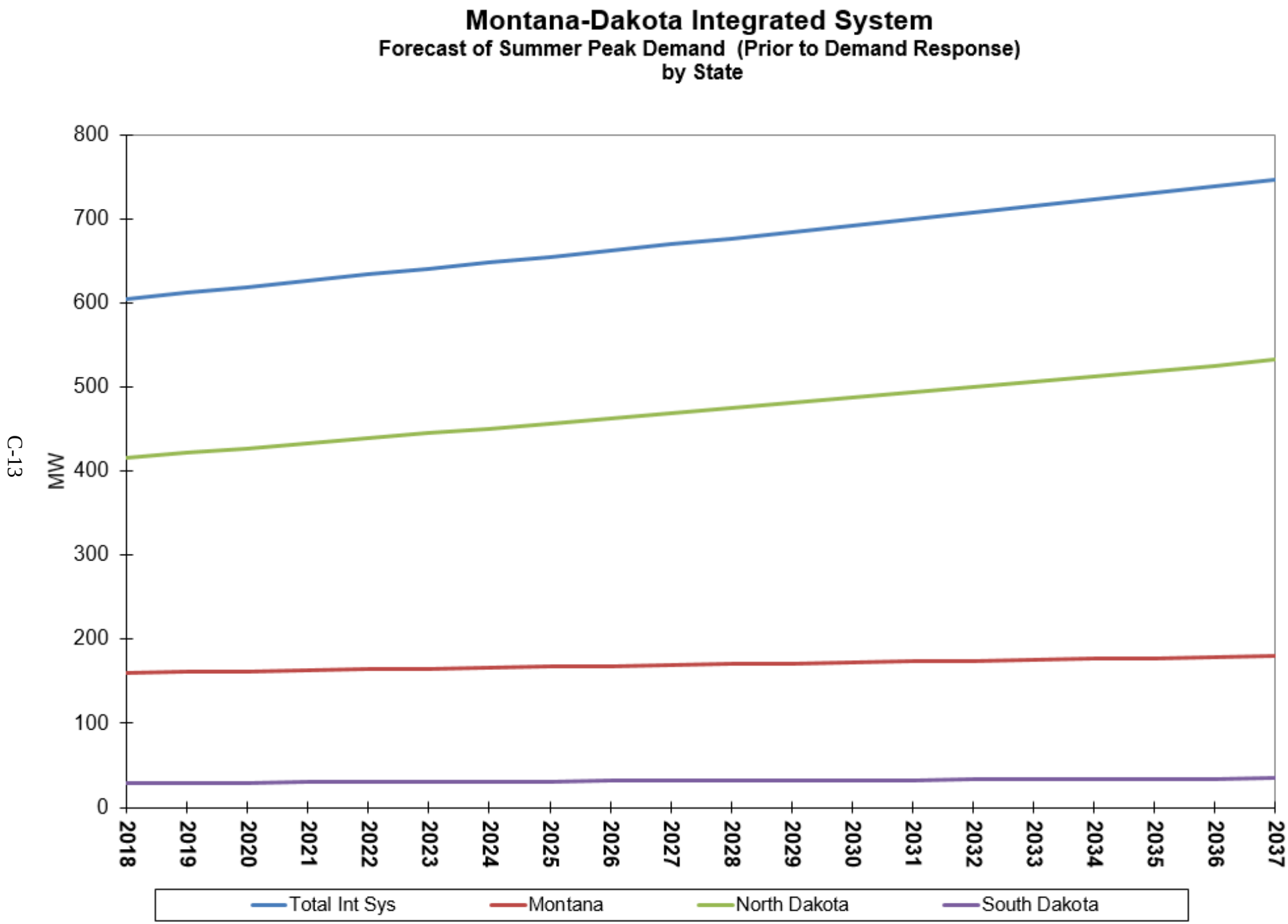
Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2018	29.2		26.5		161.6		63.18%
2019	29.5	1.03%	26.8	1.13%	163.1	0.93%	63.11%
2020	29.7	0.68%	27.1	1.12%	164.6	0.92%	63.09%
2021	30.0	1.01%	27.4	1.11%	166.2	0.97%	63.24%
2022	30.3	1.00%	27.7	1.09%	167.8	0.96%	63.22%
2023	30.6	0.99%	27.9	0.72%	169.3	0.89%	63.16%
2024	30.8	0.65%	28.2	1.08%	171.0	1.00%	63.21%
2025	31.1	0.97%	28.5	1.06%	172.7	0.99%	63.39%
2026	31.4	0.96%	28.8	1.05%	174.4	0.98%	63.40%
2027	31.7	0.96%	29.1	1.04%	176.1	0.97%	63.42%
2028	31.9	0.63%	29.4	1.03%	177.8	0.97%	63.45%
2029	32.2	0.94%	29.7	1.02%	179.6	1.01%	63.67%
2030	32.5	0.93%	30.1	1.35%	181.4	1.00%	63.72%
2031	32.9	1.23%	30.4	1.00%	183.3	1.05%	63.60%
2032	33.2	0.91%	30.8	1.32%	185.1	0.98%	63.47%
2033	33.5	0.90%	31.1	0.97%	187.1	1.08%	63.76%
2034	33.8	0.90%	31.4	0.96%	189.0	1.02%	63.83%
2035	34.1	0.89%	31.8	1.27%	191.1	1.11%	63.97%
2036	34.4	0.88%	32.2	1.26%	193.1	1.05%	63.90%
2037	34.7	0.87%	32.5	0.93%	195.2	1.09%	64.22%

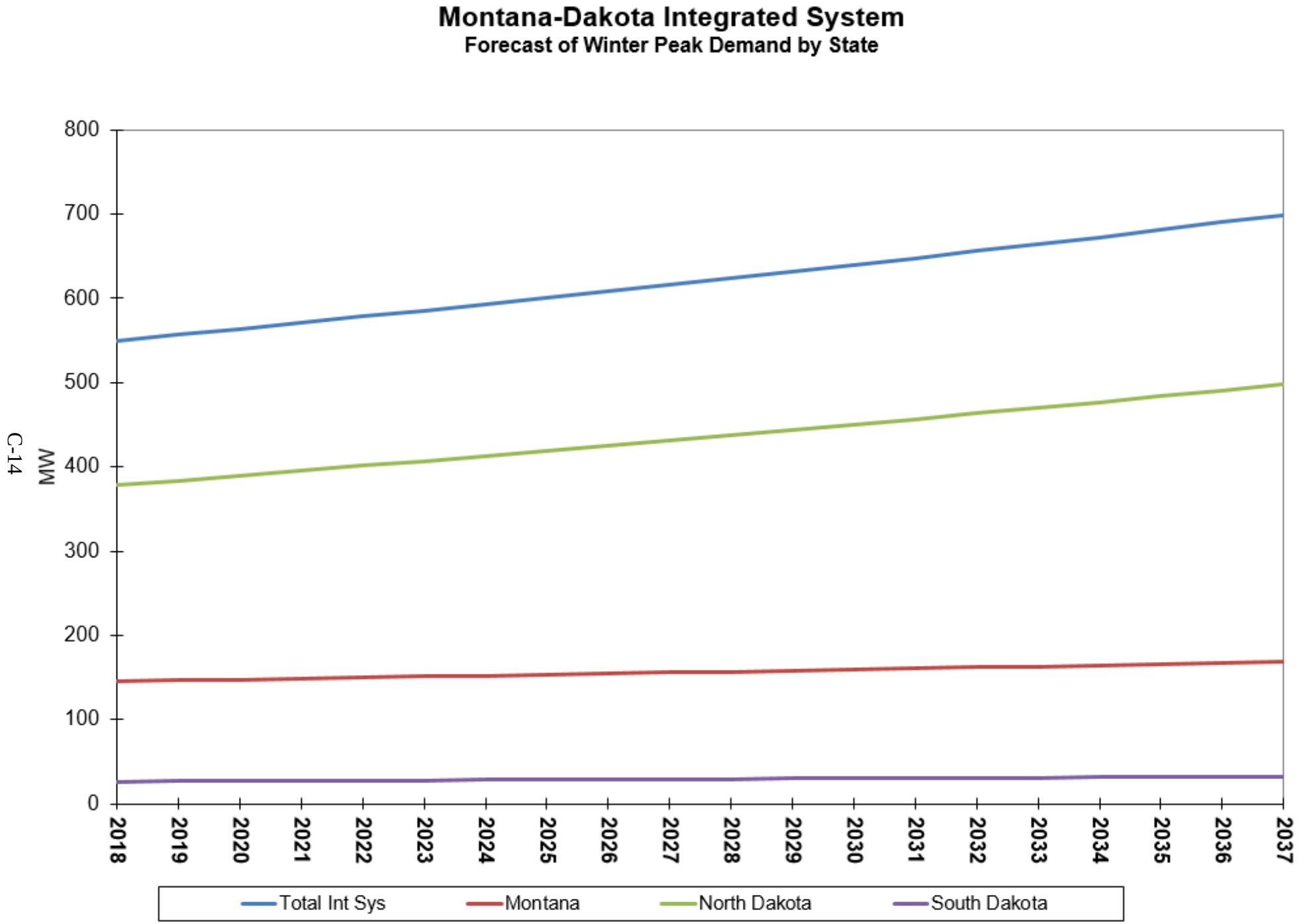
Montana-Dakota Utilities Co.
Forecasted Energy (MWh) and
Seasonal Demands (MW) Prior to Demand Response
Integrated System

Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2018	604.7		549.4		3,344.9		63.15%
2019	611.9	1.19%	556.5	1.31%	3,386.0	1.23%	63.17%
2020	619.1	1.17%	564.0	1.35%	3,427.9	1.24%	63.04%
2021	626.2	1.15%	571.4	1.30%	3,469.6	1.22%	63.25%
2022	633.6	1.18%	579.1	1.36%	3,513.1	1.25%	63.30%
2023	640.5	1.10%	585.8	1.16%	3,552.1	1.11%	63.31%
2024	647.7	1.12%	593.3	1.28%	3,593.9	1.18%	63.17%
2025	654.8	1.10%	600.5	1.20%	3,634.8	1.14%	63.36%
2026	662.1	1.11%	608.1	1.27%	3,677.9	1.19%	63.41%
2027	669.4	1.10%	615.7	1.26%	3,721.5	1.19%	63.46%
2028	676.9	1.11%	623.6	1.27%	3,765.8	1.19%	63.34%
2029	684.3	1.10%	631.5	1.27%	3,810.9	1.20%	63.57%
2030	692.0	1.12%	639.5	1.27%	3,856.5	1.20%	63.62%
2031	699.7	1.11%	647.7	1.28%	3,902.8	1.20%	63.67%
2032	707.5	1.11%	655.9	1.27%	3,949.7	1.20%	63.56%
2033	715.1	1.08%	664.3	1.28%	3,997.5	1.21%	63.81%
2034	723.0	1.11%	672.8	1.27%	4,045.6	1.20%	63.87%
2035	730.9	1.09%	681.5	1.29%	4,094.8	1.22%	63.95%
2036	738.8	1.09%	690.4	1.30%	4,144.8	1.22%	63.87%
2037	747.0	1.10%	699.1	1.27%	4,195.5	1.22%	64.12%

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
MW
800
700
600
500
400
300
200
100
0
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
Total Int Sys
Montana
North Dakota
South Dakota


Montana-Dakota Integrated System
Forecast of Winter Peak Demand by State
MW
800
700
600
500
400
300
200
100
0
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
Total Int Sys
Montana
North Dakota
South Dakota

APPENDIX D

Monthly Forecasts – Montana **2017 UPDATED** (2019-2028)

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

MONTANA YEAR 2019

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	946.0	892.6	740.0	650.1	607.6	677.4	920.1	783.0	683.4	591.6	783.3	967.2	9,242.5
# of Residential Customers	20,187	20,210	20,253	20,243	20,233	20,249	20,246	20,262	20,284	20,307	20,350	20,392	20,268
Total Residential Sales - MWh	19,096	18,040	14,988	13,159	12,293	13,717	18,628	15,866	13,862	12,014	15,940	19,724	187,327
Use per Small Comm & Ind Customer - kWh	2,421.1	2,279.9	2,077.3	1,953.4	1,896.3	1,983.4	2,514.5	2,203.1	2,022.9	1,804.4	2,041.0	2,395.1	25,586.1
# of Small Comm & Ind Customers	5,384	5,377	5,383	5,432	5,459	5,496	5,510	5,520	5,543	5,510	5,457	5,449	5,460
Total Small Comm & Ind Sales - MWh	13,035	12,259	11,182	10,611	10,352	10,901	13,855	12,161	11,213	9,942	11,138	13,051	139,700
Large Comm & Ind Sales	42,579	38,210	39,442	39,058	39,002	37,807	40,640	38,673	39,403	41,701	40,552	44,280	481,347
Total Sales (Residential, SC&I and LC&I)	74,710	68,509	65,612	62,828	61,647	62,425	73,123	66,700	64,478	63,657	67,630	77,055	808,374
Other Public Sales	525	572	533	516	542	657	864	687	659	467	500	560	7,082
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	75,464	69,293	66,368	63,556	62,411	63,294	74,205	67,607	65,358	64,343	68,355	77,858	818,112
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	75,498	69,323	66,396	63,581	62,433	63,318	74,235	67,635	65,383	64,366	68,382	77,890	818,440
Total Requirements (Energy + Losses)	81,668	74,989	71,823	68,777	67,536	68,493	80,302	73,163	70,727	69,627	73,971	84,256	885,332
# of Large Comm & Ind Customers	262	260	262	263	266	261	262	263	272	272	262	261	264
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	141.0	136.5	119.7	109.7	105.5	140.4	160.4	151.6	125.9	111.7	130.0	145.9	160.4

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

MONTANA YEAR 2020

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	948.2	894.7	741.8	651.6	609.0	679.0	922.3	784.9	685.0	593.0	785.2	969.6	9,264.5
# of Residential Customers	20,257	20,280	20,323	20,313	20,303	20,319	20,316	20,332	20,354	20,377	20,420	20,462	20,338
Total Residential Sales - MWh	19,207	18,145	15,076	13,236	12,365	13,797	18,737	15,958	13,943	12,084	16,033	19,840	188,421
Use per Small Comm & Ind Customer - kWh	2,446.7	2,304.6	2,099.7	1,974.6	1,916.4	2,004.7	2,541.7	2,226.4	2,044.6	1,823.4	2,062.9	2,420.6	25,859.8
# of Small Comm & Ind Customers	5,429	5,421	5,427	5,476	5,504	5,541	5,555	5,566	5,589	5,556	5,502	5,494	5,505
Total Small Comm & Ind Sales - MWh	13,283	12,493	11,395	10,813	10,548	11,108	14,119	12,392	11,427	10,131	11,350	13,299	142,358
Large Comm & Ind Sales	42,761	38,373	39,607	39,219	39,163	37,965	40,810	38,834	39,568	41,875	40,723	45,375	484,273
Total Sales (Residential, SC&I and LC&I)	75,251	69,011	66,078	63,268	62,076	62,870	73,666	67,184	64,938	64,090	68,106	78,514	815,052
Other Public Sales	527	574	534	517	543	659	867	690	661	469	501	561	7,103
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	76,007	69,797	66,835	63,997	62,841	63,741	74,751	68,094	65,820	64,778	68,832	79,318	824,811
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	76,041	69,827	66,863	64,022	62,863	63,765	74,781	68,122	65,845	64,801	68,859	79,350	825,139
Total Requirements (Energy + Losses)	82,256	75,534	72,328	69,255	68,001	68,977	80,893	73,690	71,227	70,097	74,487	85,835	892,580
# of Large Comm & Ind Customers	264	262	264	265	268	263	264	265	274	274	264	263	266
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	141.9	137.3	120.5	110.4	106.5	141.7	161.9	153.0	127.1	112.8	131.4	147.5	161.9

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

MONTANA YEAR 2021

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	950.5	896.9	743.6	653.1	610.5	680.7	924.5	786.7	686.7	594.5	787.1	971.9	9,286.7
# of Residential Customers	20,327	20,350	20,393	20,383	20,373	20,389	20,386	20,402	20,424	20,447	20,490	20,533	20,408
Total Residential Sales - MWh	19,320	18,251	15,164	13,313	12,437	13,878	18,846	16,051	14,025	12,155	16,127	19,957	189,524
Use per Small Comm & Ind Customer - kWh	2,473.0	2,329.4	2,122.5	1,995.7	1,936.9	2,026.0	2,568.5	2,250.4	2,066.6	1,843.1	2,084.9	2,446.3	26,136.6
# of Small Comm & Ind Customers	5,473	5,465	5,471	5,521	5,549	5,587	5,601	5,611	5,634	5,601	5,547	5,539	5,550
Total Small Comm & Ind Sales - MWh	13,535	12,730	11,612	11,018	10,748	11,319	14,386	12,627	11,643	10,323	11,565	13,550	145,056
Large Comm & Ind Sales	45,176	40,651	42,025	41,667	41,675	40,306	43,356	41,251	41,961	44,424	43,191	49,012	514,695
Total Sales (Residential, SC&I and LC&I)	78,031	71,632	68,801	65,998	64,860	65,503	76,588	69,929	67,629	66,902	70,883	82,519	849,275
Other Public Sales	528	575	536	519	545	661	869	691	663	470	503	563	7,123
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	78,788	72,419	69,560	66,729	65,627	66,376	77,675	70,840	68,513	67,591	71,611	83,325	859,054
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	78,822	72,449	69,588	66,754	65,649	66,400	77,705	70,868	68,538	67,614	71,638	83,357	859,382
Total Requirements (Energy + Losses)	85,264	78,370	75,275	72,210	71,014	71,827	84,056	76,660	74,140	73,140	77,493	90,170	929,619
# of Large Comm & Ind Customers	266	264	266	267	270	265	266	267	276	276	266	265	268
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	143.4	138.8	121.8	111.6	110.7	147.3	168.3	159.0	132.1	117.2	137.0	153.7	168.3

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

MONTANA YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.8	899.1	745.4	654.8	612.0	682.3	926.8	788.7	688.4	595.9	789.0	972.2	9,307.7
# of Residential Customers	20,396	20,420	20,463	20,453	20,443	20,459	20,456	20,472	20,494	20,517	20,561	20,603	20,478
Total Residential Sales - MWh	19,434	18,359	15,254	13,392	12,511	13,960	18,958	16,147	14,108	12,227	16,223	20,030	190,603
Use per Small Comm & Ind Customer - kWh	2,499.1	2,353.9	2,144.9	2,017.1	1,957.8	2,047.8	2,596.4	2,274.5	2,088.7	1,863.1	2,107.3	2,468.7	26,412.7
# of Small Comm & Ind Customers	5,518	5,510	5,516	5,566	5,594	5,632	5,646	5,657	5,680	5,646	5,592	5,584	5,595
Total Small Comm & Ind Sales - MWh	13,790	12,970	11,831	11,227	10,952	11,533	14,659	12,867	11,864	10,519	11,784	13,785	147,781
Large Comm & Ind Sales	50,361	45,556	47,246	46,960	47,113	45,364	48,863	46,476	47,127	49,925	48,516	53,754	577,261
Total Sales (Residential, SC&I and LC&I)	83,585	76,885	74,331	71,579	70,576	70,857	82,480	75,490	73,099	72,671	76,523	87,569	915,645
Other Public Sales	530	577	537	520	546	662	872	694	664	471	504	565	7,142
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	84,344	77,674	75,091	72,311	71,344	71,731	83,570	76,404	73,984	73,361	77,252	88,377	925,443
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	84,378	77,704	75,119	72,336	71,366	71,755	83,600	76,432	74,009	73,384	77,279	88,409	925,771
Total Requirements (Energy + Losses)	91,274	84,055	81,258	78,248	77,199	77,620	90,433	82,679	80,058	79,382	83,595	95,635	1,001,436
# of Large Comm & Ind Customers	269	267	269	270	273	268	269	270	279	279	269	268	271
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# of Street & Highway Lighting Customers	36	36	36	36	36	36	36	36	36	36	36	36	36
Peak Demand Net of Energy Efficiency Progs	149.5	144.7	126.9	116.3	117.5	156.4	178.7	168.9	140.3	124.5	145.8	163.7	178.7

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

MONTANA YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.9	899.1	745.5	654.8	612.0	682.3	926.8	788.7	688.4	595.9	789.0	972.1	9,307.6
# of Residential Customers	20,446	20,470	20,513	20,502	20,493	20,509	20,506	20,522	20,544	20,567	20,611	20,654	20,528
Total Residential Sales - MWh	19,482	18,405	15,292	13,425	12,541	13,994	19,005	16,186	14,142	12,256	16,262	20,078	191,068
Use per Small Comm & Ind Customer - kWh	2,522.0	2,375.4	2,164.4	2,035.0	1,975.3	2,066.5	2,619.8	2,295.1	2,107.7	1,879.5	2,126.2	2,492.5	26,652.7
# of Small Comm & Ind Customers	5,557	5,549	5,555	5,606	5,634	5,672	5,686	5,697	5,720	5,687	5,632	5,624	5,635
Total Small Comm & Ind Sales - MWh	14,015	13,181	12,023	11,408	11,129	11,721	14,896	13,075	12,056	10,689	11,975	14,018	150,186
Large Comm & Ind Sales	53,932	48,934	50,840	50,602	50,853	48,845	52,653	50,071	50,683	53,711	52,183	56,121	619,428
Total Sales (Residential, SC&I and LC&I)	87,429	80,520	78,155	75,435	74,523	74,560	86,554	79,332	76,881	76,656	80,420	90,217	960,682
Other Public Sales	531	579	539	522	548	665	875	696	666	473	506	567	7,167
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	88,189	81,311	78,917	76,169	75,293	75,437	87,647	80,248	77,768	77,348	81,151	91,027	970,505
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	88,223	81,341	78,945	76,194	75,315	75,461	87,677	80,276	77,793	77,371	81,178	91,059	970,833
Total Requirements (Energy + Losses)	95,433	87,989	85,397	82,421	81,470	81,628	94,843	86,837	84,151	83,695	87,813	98,501	1,050,178
# of Large Comm & Ind Customers	270	268	270	271	274	269	270	271	280	280	270	269	272
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	159.2	154.1	135.2	123.9	122.2	162.6	185.7	175.6	145.8	129.4	151.8	170.3	185.7

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

MONTANA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.8	899.1	745.5	654.8	612.0	682.3	926.8	788.7	688.4	595.9	789.0	972.1	9,307.5
# of Residential Customers	20,496	20,520	20,563	20,552	20,543	20,559	20,556	20,572	20,594	20,617	20,661	20,704	20,578
Total Residential Sales - MWh	19,529	18,449	15,329	13,457	12,572	14,028	19,051	16,225	14,176	12,286	16,301	20,127	191,530
Use per Small Comm & Ind Customer - kWh	2,547.9	2,399.6	2,186.4	2,055.6	1,995.4	2,087.5	2,646.2	2,318.2	2,129.1	1,898.7	2,147.9	2,517.8	26,923.9
# of Small Comm & Ind Customers	5,596	5,588	5,594	5,646	5,674	5,712	5,727	5,738	5,761	5,727	5,672	5,664	5,675
Total Small Comm & Ind Sales - MWh	14,258	13,409	12,231	11,606	11,322	11,924	15,155	13,302	12,266	10,874	12,183	14,261	152,791
Large Comm & Ind Sales	54,173	49,150	51,057	50,815	51,066	49,053	52,877	50,284	50,899	53,941	52,407	56,372	622,094
Total Sales (Residential, SC&I and LC&I)	87,960	81,008	78,617	75,878	74,960	75,005	87,083	79,811	77,341	77,101	80,891	90,760	966,415
Other Public Sales	533	581	540	523	550	667	877	697	668	474	507	568	7,185
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	88,722	81,801	79,380	76,613	75,732	75,884	88,178	80,728	78,230	77,794	81,623	91,571	976,256
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	88,756	81,831	79,408	76,638	75,754	75,908	88,208	80,756	78,255	77,817	81,650	91,603	976,584
Total Requirements (Energy + Losses)	96,010	88,519	85,898	82,902	81,945	82,112	95,417	87,356	84,651	84,177	88,323	99,090	1,056,400
# of Large Comm & Ind Customers	272	270	272	273	276	271	272	273	283	282	272	271	274
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	165.6	160.3	140.7	128.9	122.9	163.5	186.8	176.5	146.6	130.1	152.8	171.5	186.8

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

MONTANA YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.8	899.1	745.5	654.8	612.0	682.3	926.8	788.7	688.4	596.0	789.0	972.1	9,307.7
# of Residential Customers	20,546	20,569	20,613	20,602	20,593	20,609	20,605	20,622	20,644	20,667	20,711	20,754	20,628
Total Residential Sales - MWh	19,577	18,494	15,366	13,490	12,602	14,062	19,097	16,265	14,211	12,317	16,341	20,176	191,998
Use per Small Comm & Ind Customer - kWh	2,573.6	2,424.0	2,208.6	2,077.0	2,015.8	2,108.5	2,673.3	2,342.0	2,150.6	1,918.0	2,169.8	2,543.5	27,197.9
# of Small Comm & Ind Customers	5,636	5,628	5,634	5,685	5,714	5,753	5,767	5,778	5,802	5,768	5,712	5,704	5,715
Total Small Comm & Ind Sales - MWh	14,505	13,642	12,443	11,808	11,518	12,130	15,417	13,532	12,478	11,063	12,394	14,508	155,438
Large Comm & Ind Sales	54,417	49,368	51,277	51,031	51,282	49,265	53,106	50,499	51,120	54,175	52,635	56,627	624,802
Total Sales (Residential, SC&I and LC&I)	88,499	81,504	79,086	76,329	75,402	75,457	87,620	80,296	77,809	77,555	81,370	91,311	972,238
Other Public Sales	534	582	542	525	552	669	880	700	671	476	509	570	7,210
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	89,262	82,298	79,851	77,066	76,176	76,338	88,718	81,216	78,701	78,250	82,104	92,124	982,104
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	89,296	82,328	79,879	77,091	76,198	76,362	88,748	81,244	78,726	78,273	82,131	92,156	982,432
Total Requirements (Energy + Losses)	96,594	89,057	86,408	83,392	82,426	82,603	96,001	87,884	85,160	84,670	88,844	99,688	1,062,727
# of Large Comm & Ind Customers	274	272	274	275	278	273	274	275	285	284	274	273	276
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	166.8	161.4	141.6	129.8	123.6	164.5	187.9	177.6	147.5	130.9	153.9	172.7	187.9

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

MONTANA YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.9	899.1	745.5	654.8	612.0	682.3	926.8	788.7	688.4	595.9	789.0	972.1	9,307.7
# of Residential Customers	20,595	20,619	20,663	20,652	20,643	20,659	20,655	20,672	20,694	20,717	20,761	20,805	20,678
Total Residential Sales - MWh	19,624	18,539	15,404	13,523	12,633	14,096	19,143	16,304	14,245	12,346	16,381	20,225	192,463
Use per Small Comm & Ind Customer - kWh	2,600.2	2,448.7	2,231.3	2,098.0	2,036.3	2,130.2	2,700.9	2,365.7	2,172.9	1,937.7	2,191.9	2,569.3	27,476.2
# of Small Comm & Ind Customers	5,675	5,667	5,673	5,725	5,754	5,793	5,807	5,819	5,842	5,808	5,752	5,744	5,755
Total Small Comm & Ind Sales - MWh	14,756	13,877	12,658	12,011	11,717	12,340	15,684	13,766	12,694	11,254	12,608	14,758	158,123
Large Comm & Ind Sales	54,666	49,591	51,501	51,250	51,502	49,479	53,337	50,719	51,343	54,412	52,866	56,886	627,552
Total Sales (Residential, SC&I and LC&I)	89,046	82,007	79,563	76,784	75,852	75,915	88,164	80,789	78,282	78,012	81,855	91,869	978,138
Other Public Sales	536	584	543	526	553	670	882	702	672	477	510	571	7,226
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	89,811	82,803	80,329	77,522	76,627	76,797	89,264	81,711	79,175	78,708	82,590	92,683	988,020
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	89,845	82,833	80,357	77,547	76,649	76,821	89,294	81,739	79,200	78,731	82,617	92,715	988,348
Total Requirements (Energy + Losses)	97,188	89,603	86,925	83,885	82,914	83,100	96,592	88,420	85,673	85,166	89,369	100,293	1,069,128
# of Large Comm & Ind Customers	276	274	276	277	280	275	276	277	287	286	276	275	278
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	168.0	162.6	142.6	130.7	124.3	165.4	188.9	178.6	148.3	131.6	155.0	173.9	188.9

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

MONTANA YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.9	899.1	745.5	654.8	612.0	682.3	926.8	788.7	688.4	595.9	789.0	972.1	9,307.7
# of Residential Customers	20,645	20,669	20,712	20,702	20,693	20,708	20,705	20,722	20,744	20,768	20,812	20,855	20,728
Total Residential Sales - MWh	19,672	18,584	15,441	13,555	12,664	14,130	19,190	16,344	14,280	12,376	16,420	20,273	192,929
Use per Small Comm & Ind Customer - kWh	2,626.4	2,474.1	2,254.0	2,119.5	2,057.3	2,152.1	2,728.3	2,390.0	2,194.8	1,957.6	2,214.4	2,595.6	27,757.2
# of Small Comm & Ind Customers	5,715	5,706	5,713	5,765	5,794	5,833	5,848	5,859	5,883	5,848	5,792	5,784	5,795
Total Small Comm & Ind Sales - MWh	15,010	14,117	12,877	12,219	11,920	12,553	15,955	14,003	12,912	11,448	12,826	15,013	160,853
Large Comm & Ind Sales	54,919	49,817	51,729	51,473	51,725	49,697	53,573	50,942	51,571	54,653	53,101	57,149	630,349
Total Sales (Residential, SC&I and LC&I)	89,601	82,518	80,047	77,247	76,309	76,380	88,718	81,289	78,763	78,477	82,347	92,435	984,131
Other Public Sales	538	585	545	528	555	672	885	704	674	478	512	573	7,249
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	90,368	83,315	80,815	77,987	77,086	77,264	89,821	82,213	79,658	79,174	83,084	93,251	994,036
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	90,402	83,345	80,843	78,012	77,108	77,288	89,851	82,241	79,683	79,197	83,111	93,283	994,364
Total Requirements (Energy + Losses)	97,791	90,157	87,450	84,388	83,410	83,605	97,195	88,963	86,195	85,670	89,904	100,907	1,075,635
# of Large Comm & Ind Customers	278	276	278	279	282	277	278	279	289	288	278	277	280
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	169.1	163.7	143.6	131.6	125.0	166.3	190.0	179.6	149.2	132.4	156.1	175.1	190.0

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

MONTANA YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	952.8	899.1	745.5	654.8	612.0	682.4	926.8	788.7	688.4	595.9	789.0	972.1	9,307.7
# of Residential Customers	20,695	20,719	20,762	20,752	20,742	20,758	20,755	20,772	20,794	20,818	20,862	20,905	20,778
Total Residential Sales - MWh	19,719	18,628	15,478	13,588	12,695	14,165	19,236	16,383	14,314	12,406	16,460	20,322	193,394
Use per Small Comm & Ind Customer - kWh	2,653.2	2,498.7	2,276.9	2,140.7	2,078.0	2,173.4	2,756.0	2,414.2	2,216.9	1,977.2	2,236.9	2,622.1	28,037.1
# of Small Comm & Ind Customers	5,755	5,747	5,753	5,806	5,835	5,875	5,889	5,901	5,925	5,890	5,833	5,824	5,836
Total Small Comm & Ind Sales - MWh	15,269	14,360	13,099	12,429	12,125	12,769	16,230	14,246	13,135	11,646	13,048	15,271	163,627
Large Comm & Ind Sales	55,176	50,047	51,960	51,700	51,952	49,919	53,811	51,168	51,802	54,899	53,340	57,417	633,191
Total Sales (Residential, SC&I and LC&I)	90,164	83,035	80,537	77,717	76,772	76,853	89,277	81,797	79,251	78,951	82,848	93,010	990,212
Other Public Sales	539	587	546	529	556	674	887	706	676	479	513	574	7,266
Street & Highway Lighting Sales	212	195	209	199	210	200	203	208	207	207	210	225	2,485
Interdepartmental Sales	17	17	14	13	12	12	15	12	14	12	15	18	171
Total Billed Sales - MWh	90,932	83,834	81,306	78,458	77,550	77,739	90,382	82,723	80,148	79,649	83,586	93,827	1,000,134
Company Use	34	30	28	25	22	24	30	28	25	23	27	32	328
Total Energy	90,966	83,864	81,334	78,483	77,572	77,763	90,412	82,751	80,173	79,672	83,613	93,859	1,000,462
Total Requirements (Energy + Losses)	98,401	90,718	87,981	84,897	83,912	84,119	97,801	89,514	86,726	86,184	90,447	101,530	1,082,230
# of Large Comm & Ind Customers	280	278	280	281	284	279	280	281	291	290	280	279	282
# of Other Public Customers	100	100	100	101	101	100	100	100	101	100	99	99	100
# 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	170.3	164.9	144.7	132.6	125.6	167.2	191.0	180.5	149.9	133.1	157.1	176.3	191.0

APPENDIX E

Monthly Forecasts - North Dakota **2017 UPDATED**
(2019-2028)

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

NORTH DAKOTA YEAR 2019

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,090.2	1,002.8	873.5	724.2	663.6	702.6	874.2	800.3	691.9	656.2	874.7	1,060.1	10,012.2
# of Residential Customers	78,257	78,573	78,799	78,858	78,942	79,274	79,455	79,640	79,956	80,275	80,555	80,852	79,453
Total Residential Sales - MWh	85,317	78,796	68,827	57,111	52,386	55,696	69,459	63,735	55,325	52,680	70,462	85,709	795,503
Use per Small Comm & Ind Customer - kWh	5,052.3	4,801.2	4,538.7	4,035.1	3,929.5	3,854.0	4,405.7	4,249.5	4,044.2	4,029.7	4,577.7	5,093.7	52,594.0
# of Small Comm & Ind Customers	12,054	12,073	12,106	12,141	12,178	12,214	12,230	12,240	12,409	12,411	12,281	12,292	12,219
Total Small Comm & Ind Sales - MWh	60,900	57,965	54,946	48,990	47,854	47,073	53,882	52,014	50,184	50,012	56,219	62,612	642,651
Large Comm & Ind Sales	54,523	52,617	53,432	50,768	51,344	50,765	58,085	56,870	55,393	52,706	54,009	55,763	646,275
Total Sales (Residential, SC&I and LC&I)	200,740	189,378	177,205	156,869	151,584	153,534	181,426	172,619	160,902	155,398	180,690	204,084	2,084,429
Other Public Sales	3,786	3,524	3,646	3,462	3,761	4,061	4,620	4,431	4,008	3,669	3,592	3,814	46,374
Street & Highway Lighting Sales	1,304	1,158	1,178	1,096	1,056	995	1,045	1,064	1,132	1,219	1,268	995	13,510
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	205,847	194,077	182,045	161,443	156,414	158,601	187,104	178,126	166,054	160,298	185,565	208,910	2,144,484
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	206,308	194,484	182,460	161,830	156,810	158,999	187,541	178,549	166,457	160,698	185,951	209,356	2,149,443
Total Requirements (Energy + Losses)	223,170	210,379	197,372	175,056	169,626	171,994	202,869	193,142	180,062	173,832	201,149	226,467	2,325,118
# of Large Comm & Ind Customers	916	924	935	940	954	974	997	1,016	1,051	1,054	1,040	1,055	988
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	361.5	340.8	318.7	283.5	298.7	389.0	421.3	403.6	362.7	316.3	336.2	383.2	421.3

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

NORTH DAKOTA YEAR 2020

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,092.8	1,005.3	875.6	726.0	665.2	704.3	876.3	802.2	693.6	657.8	876.8	1,062.6	10,036.5
# of Residential Customers	78,602	78,919	79,146	79,205	79,290	79,623	79,805	79,991	80,308	80,629	80,909	81,208	79,803
Total Residential Sales - MWh	85,899	79,334	69,298	57,502	52,745	56,077	69,933	64,170	55,704	53,041	70,944	86,294	800,941
Use per Small Comm & Ind Customer - kWh	5,160.3	4,903.5	4,635.4	4,121.4	4,013.8	3,936.4	4,499.8	4,340.2	4,130.3	4,115.5	4,675.5	5,198.1	53,712.7
# of Small Comm & Ind Customers	12,087	12,107	12,140	12,174	12,211	12,248	12,264	12,274	12,444	12,446	12,315	12,326	12,253
Total Small Comm & Ind Sales - MWh	62,373	59,367	56,274	50,174	49,012	48,213	55,186	53,272	51,398	51,222	57,579	64,072	658,142
Large Comm & Ind Sales	55,374	53,437	54,256	51,552	52,137	51,555	58,999	57,763	56,259	53,521	54,852	56,599	656,304
Total Sales (Residential, SC&I and LC&I)	203,646	192,138	179,828	159,228	153,894	155,845	184,118	175,205	163,361	157,784	183,375	206,965	2,115,387
Other Public Sales	3,838	3,572	3,696	3,510	3,813	4,117	4,684	4,492	4,064	3,720	3,642	3,867	47,015
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	208,191	196,340	184,163	163,334	158,279	160,500	189,369	180,272	168,036	162,161	187,703	211,564	2,169,912
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	208,652	196,747	184,578	163,721	158,675	160,898	189,806	180,695	168,439	162,561	188,089	212,010	2,174,871
Total Requirements (Energy + Losses)	225,705	212,827	199,664	177,102	171,644	174,048	205,319	195,463	182,206	175,847	203,462	229,338	2,352,625
# of Large Comm & Ind Customers	915	923	934	939	953	973	996	1,015	1,050	1,053	1,039	1,054	987
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	367.1	346.1	323.7	287.9	302.5	393.9	426.7	408.7	367.3	320.3	341.1	388.7	426.7

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

NORTH DAKOTA YEAR 2021

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,095.5	1,007.7	877.7	727.7	666.8	706.0	878.4	804.2	695.3	659.4	879.0	1,065.2	10,060.8
# of Residential Customers	78,946	79,265	79,494	79,553	79,637	79,973	80,155	80,341	80,660	80,983	81,264	81,565	80,153
Total Residential Sales - MWh	86,485	79,875	69,770	57,894	53,104	56,459	70,410	64,607	56,083	53,402	71,427	86,885	806,401
Use per Small Comm & Ind Customer - kWh	5,262.8	5,001.4	4,727.6	4,203.4	4,093.7	4,014.7	4,589.4	4,426.6	4,212.7	4,197.6	4,768.6	5,305.0	54,785.4
# of Small Comm & Ind Customers	12,121	12,140	12,174	12,208	12,245	12,282	12,298	12,308	12,478	12,480	12,349	12,360	12,287
Total Small Comm & Ind Sales - MWh	63,791	60,717	57,554	51,315	50,127	49,308	56,440	54,483	52,566	52,386	58,887	65,570	673,144
Large Comm & Ind Sales	58,004	55,859	56,858	54,058	54,710	54,068	61,688	60,432	58,844	56,117	57,415	59,286	687,339
Total Sales (Residential, SC&I and LC&I)	208,280	196,451	184,182	163,267	157,941	159,835	188,538	179,522	167,493	161,905	187,729	211,741	2,166,884
Other Public Sales	3,891	3,621	3,747	3,557	3,865	4,173	4,748	4,554	4,119	3,770	3,691	3,918	47,654
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	212,878	200,702	188,568	167,420	162,378	164,546	193,853	184,651	172,223	166,332	192,106	216,391	2,222,048
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	213,339	201,109	188,983	167,807	162,774	164,944	194,290	185,074	172,626	166,732	192,492	216,837	2,227,007
Total Requirements (Energy + Losses)	230,775	217,546	204,429	181,522	176,078	178,425	210,169	200,200	186,735	180,359	208,224	234,559	2,409,021
# of Large Comm & Ind Customers	915	923	934	939	953	973	996	1,015	1,050	1,053	1,039	1,054	987
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	372.4	351.1	328.4	292.0	309.1	402.5	436.0	417.6	375.4	327.3	349.5	398.3	436.0

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

NORTH DAKOTA YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.5	668.5	707.7	880.6	806.2	697.0	661.1	881.1	1,066.2	10,084.1
# of Residential Customers	79,291	79,611	79,841	79,900	79,985	80,322	80,505	80,692	81,013	81,336	81,619	81,921	80,503
Total Residential Sales - MWh	87,079	80,424	70,249	58,291	53,468	56,846	70,893	65,051	56,468	53,768	71,917	87,345	811,799
Use per Small Comm & Ind Customer - kWh	5,373.5	5,106.1	4,827.1	4,291.5	4,179.4	4,098.9	4,685.7	4,519.5	4,301.0	4,285.5	4,868.7	5,411.4	55,929.8
# of Small Comm & Ind Customers	12,154	12,174	12,207	12,242	12,279	12,316	12,332	12,342	12,513	12,515	12,383	12,395	12,321
Total Small Comm & Ind Sales - MWh	65,310	62,162	58,924	52,536	51,319	50,482	57,784	55,780	53,818	53,633	60,289	67,074	689,111
Large Comm & Ind Sales	60,708	58,354	59,532	56,635	57,352	56,649	64,457	63,180	61,505	58,785	60,053	61,974	719,184
Total Sales (Residential, SC&I and LC&I)	213,097	200,940	188,705	167,462	162,139	163,977	193,134	184,011	171,791	166,186	192,259	216,393	2,220,094
Other Public Sales	3,943	3,670	3,797	3,605	3,917	4,228	4,811	4,614	4,174	3,821	3,740	3,970	48,290
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	217,747	205,240	193,141	171,663	166,628	168,743	198,512	189,200	176,576	170,664	196,685	221,095	2,275,894
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	218,208	205,647	193,556	172,050	167,024	169,141	198,949	189,623	176,979	171,064	197,071	221,541	2,280,853
Total Requirements (Energy + Losses)	236,042	222,455	209,375	186,112	180,675	182,965	215,209	205,121	191,443	185,045	213,178	239,648	2,467,268
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	381.6	359.8	336.5	299.2	312.2	406.5	440.3	421.8	379.1	330.6	353.9	403.3	440.3

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

NORTH DAKOTA YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.6	668.5	707.7	880.6	806.2	697.0	661.1	881.1	1,066.2	10,084.1
# of Residential Customers	79,636	79,957	80,188	80,248	80,333	80,671	80,855	81,043	81,365	81,690	81,974	82,277	80,853
Total Residential Sales - MWh	87,457	80,773	70,554	58,545	53,701	57,093	71,201	65,334	56,714	54,003	72,231	87,724	815,330
Use per Small Comm & Ind Customer - kWh	5,477.8	5,205.7	4,920.8	4,374.9	4,260.8	4,178.7	4,776.8	4,607.5	4,384.8	4,368.7	4,963.4	5,520.3	57,021.5
# of Small Comm & Ind Customers	12,189	12,208	12,242	12,277	12,314	12,351	12,367	12,377	12,548	12,551	12,418	12,430	12,356
Total Small Comm & Ind Sales - MWh	66,769	63,551	60,241	53,711	52,467	51,611	59,075	57,027	55,021	54,832	61,636	68,617	704,558
Large Comm & Ind Sales	61,544	59,160	60,340	57,403	58,130	57,424	65,353	64,056	62,355	59,585	60,880	62,868	729,098
Total Sales (Residential, SC&I and LC&I)	215,770	203,484	191,135	169,659	164,298	166,128	195,629	186,417	174,090	168,420	194,747	219,209	2,248,986
Other Public Sales	3,994	3,718	3,847	3,652	3,968	4,284	4,876	4,675	4,229	3,871	3,790	4,023	48,927
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	220,471	207,832	195,621	173,907	168,838	170,950	201,072	191,667	178,930	172,948	199,223	223,964	2,305,423
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	220,932	208,239	196,036	174,294	169,234	171,348	201,509	192,090	179,333	173,348	199,609	224,410	2,310,382
Total Requirements (Energy + Losses)	238,989	225,258	212,058	188,539	183,065	185,352	217,978	207,790	193,990	187,516	215,923	242,751	2,499,209
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	386.4	364.3	340.7	303.0	313.4	408.2	442.1	423.5	380.6	331.9	355.7	405.4	442.1

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

NORTH DAKOTA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.5	668.5	707.7	880.6	806.2	697.0	661.1	881.1	1,066.2	10,084.1
# of Residential Customers	79,980	80,303	80,535	80,595	80,681	81,020	81,205	81,394	81,717	82,044	82,329	82,633	81,203
Total Residential Sales - MWh	87,836	81,123	70,860	58,798	53,933	57,341	71,510	65,617	56,959	54,236	72,543	88,102	818,858
Use per Small Comm & Ind Customer - kWh	5,590.8	5,312.7	5,021.9	4,464.8	4,348.3	4,264.6	4,875.1	4,702.3	4,474.9	4,458.8	5,065.7	5,629.0	58,189.7
# of Small Comm & Ind Customers	12,223	12,243	12,277	12,312	12,349	12,386	12,402	12,412	12,584	12,586	12,453	12,465	12,391
Total Small Comm & Ind Sales - MWh	68,336	65,043	61,654	54,971	53,697	52,821	60,461	58,365	56,312	56,119	63,083	70,166	721,028
Large Comm & Ind Sales	62,457	60,038	61,222	58,244	58,979	58,270	66,333	65,014	63,284	60,460	61,785	63,764	739,850
Total Sales (Residential, SC&I and LC&I)	218,629	206,204	193,736	172,013	166,609	168,432	198,304	188,996	176,555	170,815	197,411	222,032	2,279,736
Other Public Sales	4,047	3,766	3,897	3,700	4,020	4,340	4,939	4,736	4,284	3,922	3,839	4,075	49,565
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	223,383	210,600	198,272	176,309	171,201	173,310	203,810	194,307	181,450	175,394	201,936	226,839	2,336,811
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	223,844	211,007	198,687	176,696	171,597	173,708	204,247	194,730	181,853	175,794	202,322	227,285	2,341,770
Total Requirements (Energy + Losses)	242,139	228,253	214,926	191,137	185,622	187,905	220,940	210,645	196,716	190,162	218,858	245,861	2,533,164
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	388.4	366.2	342.5	304.6	317.6	413.5	447.9	429.0	385.6	336.3	360.9	411.3	447.9

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

NORTH DAKOTA YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.5	668.5	707.7	880.6	806.2	697.0	661.1	881.1	1,066.2	10,084.1
# of Residential Customers	80,325	80,649	80,882	80,942	81,028	81,369	81,555	81,745	82,069	82,397	82,684	82,989	81,553
Total Residential Sales - MWh	88,214	81,473	71,165	59,051	54,166	57,588	71,818	65,899	57,205	54,470	72,856	88,482	822,387
Use per Small Comm & Ind Customer - kWh	5,697.3	5,413.9	5,118.2	4,550.5	4,431.4	4,346.1	4,968.2	4,792.2	4,560.5	4,543.8	5,162.1	5,740.5	59,305.2
# of Small Comm & Ind Customers	12,258	12,278	12,311	12,346	12,384	12,421	12,437	12,447	12,619	12,622	12,489	12,500	12,426
Total Small Comm & Ind Sales - MWh	69,838	66,472	63,010	56,180	54,879	53,983	61,790	59,648	57,549	57,352	64,470	71,756	736,927
Large Comm & Ind Sales	63,322	60,871	62,058	59,040	59,784	59,073	67,261	65,921	64,164	61,288	62,641	64,689	750,112
Total Sales (Residential, SC&I and LC&I)	221,374	208,816	196,233	174,271	168,829	170,644	200,869	191,468	178,918	173,110	199,967	224,927	2,309,426
Other Public Sales	4,099	3,815	3,947	3,747	4,071	4,396	5,003	4,797	4,340	3,972	3,889	4,126	50,202
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	226,180	213,261	200,819	178,614	173,472	175,578	206,439	196,840	183,869	177,739	204,542	229,785	2,367,138
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	226,641	213,668	201,234	179,001	173,868	175,976	206,876	197,263	184,272	178,139	204,928	230,231	2,372,097
Total Requirements (Energy + Losses)	245,164	231,131	217,681	193,631	188,078	190,359	223,784	213,385	199,333	192,698	221,677	249,048	2,565,969
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	394.0	371.5	347.5	309.0	321.6	418.8	453.6	434.5	390.5	340.5	365.9	417.0	453.6

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

NORTH DAKOTA YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.5	668.5	707.7	880.6	806.2	697.0	661.1	881.1	1,066.2	10,084.1
# of Residential Customers	80,670	80,996	81,229	81,290	81,376	81,719	81,905	82,095	82,421	82,751	83,039	83,345	81,903
Total Residential Sales - MWh	88,594	81,823	71,471	59,305	54,399	57,836	72,127	66,183	57,451	54,704	73,168	88,860	825,921
Use per Small Comm & Ind Customer - kWh	5,812.9	5,523.7	5,221.6	4,642.4	4,521.0	4,433.9	5,068.8	4,889.1	4,652.6	4,635.9	5,266.6	5,856.1	60,504.7
# of Small Comm & Ind Customers	12,292	12,312	12,346	12,381	12,419	12,456	12,472	12,482	12,655	12,657	12,524	12,535	12,461
Total Small Comm & Ind Sales - MWh	71,452	68,008	64,466	57,478	56,146	55,229	63,218	61,026	58,879	58,677	65,959	73,406	753,944
Large Comm & Ind Sales	64,266	61,780	62,970	59,910	60,664	59,948	68,275	66,912	65,125	62,193	63,577	65,657	761,277
Total Sales (Residential, SC&I and LC&I)	224,312	211,611	198,907	176,693	171,209	173,013	203,620	194,121	181,455	175,574	202,704	227,923	2,341,142
Other Public Sales	4,151	3,864	3,998	3,795	4,124	4,452	5,066	4,858	4,395	4,023	3,938	4,179	50,843
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	229,170	216,105	203,544	181,084	175,905	178,003	209,253	199,554	186,461	180,254	207,328	232,834	2,399,495
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	229,631	216,512	203,959	181,471	176,301	178,401	209,690	199,977	186,864	180,654	207,714	233,280	2,404,454
Total Requirements (Energy + Losses)	248,399	234,208	220,629	196,303	190,710	192,982	226,828	216,321	202,136	195,419	224,690	252,346	2,600,971
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	399.5	376.7	352.3	313.3	325.9	424.4	459.7	440.3	395.8	345.1	371.2	423.1	459.7

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

NORTH DAKOTA YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.6	668.5	707.7	880.6	806.2	697.0	661.1	881.2	1,066.2	10,084.2
# of Residential Customers	81,015	81,342	81,576	81,637	81,724	82,068	82,255	82,446	82,774	83,104	83,393	83,702	82,253
Total Residential Sales - MWh	88,972	82,173	71,777	59,559	54,631	58,083	72,435	66,466	57,696	54,938	73,482	89,240	829,452
Use per Small Comm & Ind Customer - kWh	5,928.8	5,633.9	5,325.8	4,735.1	4,611.3	4,522.6	5,170.1	4,986.9	4,745.4	4,728.5	5,372.0	5,972.2	61,712.3
# of Small Comm & Ind Customers	12,328	12,348	12,382	12,417	12,455	12,492	12,508	12,518	12,692	12,694	12,560	12,572	12,497
Total Small Comm & Ind Sales - MWh	73,090	69,568	65,944	58,796	57,434	56,496	64,668	62,426	60,229	60,023	67,472	75,083	771,229
Large Comm & Ind Sales	65,227	62,706	63,899	60,794	61,558	60,840	69,306	67,920	66,102	63,114	64,529	66,642	772,637
Total Sales (Residential, SC&I and LC&I)	227,289	214,447	201,620	179,149	173,623	175,419	206,409	196,812	184,027	178,075	205,483	230,965	2,373,318
Other Public Sales	4,203	3,912	4,048	3,843	4,175	4,508	5,130	4,920	4,450	4,073	3,988	4,231	51,481
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	232,199	218,989	206,307	183,588	178,370	180,465	212,106	202,307	189,088	182,805	210,157	235,928	2,432,309
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	232,660	219,396	206,722	183,975	178,766	180,863	212,543	202,730	189,491	183,205	210,543	236,374	2,437,268
Total Requirements (Energy + Losses)	251,675	237,327	223,617	199,011	193,377	195,645	229,914	219,299	204,978	198,178	227,751	255,693	2,636,465
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	405.3	382.2	357.4	317.9	330.2	429.9	465.7	446.1	400.9	349.6	376.7	429.3	465.7

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

NORTH DAKOTA YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,098.2	1,010.2	879.9	729.6	668.5	707.7	880.6	806.2	697.0	661.1	881.1	1,066.1	10,084.1
# of Residential Customers	81,359	81,688	81,923	81,984	82,072	82,417	82,605	82,797	83,126	83,458	83,748	84,058	82,603
Total Residential Sales - MWh	89,351	82,522	72,082	59,812	54,864	58,330	72,743	66,749	57,942	55,172	73,794	89,618	832,979
Use per Small Comm & Ind Customer - kWh	6,046.6	5,745.9	5,431.7	4,828.9	4,703.0	4,612.2	5,272.6	5,085.7	4,839.7	4,822.4	5,478.6	6,090.2	62,936.7
# of Small Comm & Ind Customers	12,363	12,383	12,417	12,453	12,490	12,528	12,544	12,554	12,728	12,730	12,596	12,608	12,533
Total Small Comm & Ind Sales - MWh	74,754	71,151	67,445	60,134	58,741	57,782	66,140	63,846	61,600	61,389	69,008	76,785	788,775
Large Comm & Ind Sales	66,206	63,647	64,845	61,695	62,468	61,747	70,356	68,946	67,097	64,051	65,498	67,644	784,200
Total Sales (Residential, SC&I and LC&I)	230,311	217,320	204,372	181,641	176,073	177,859	209,239	199,541	186,639	180,612	208,300	234,047	2,405,954
Other Public Sales	4,255	3,960	4,097	3,891	4,227	4,563	5,193	4,980	4,505	4,124	4,037	4,283	52,115
Street & Highway Lighting Sales	690	613	623	580	559	527	554	563	599	645	671	715	7,339
Interdepartmental Sales	17	17	16	16	13	11	13	12	12	12	15	17	171
Total Billed Sales - MWh	235,273	221,910	209,108	186,128	180,872	182,960	214,999	205,096	191,755	185,393	213,023	239,062	2,465,579
Company Use	461	407	415	387	396	398	437	423	403	400	386	446	4,959
Total Energy	235,734	222,317	209,523	186,515	181,268	183,358	215,436	205,519	192,158	185,793	213,409	239,508	2,470,538
Total Requirements (Energy + Losses)	255,001	240,487	226,647	201,759	196,083	198,344	233,044	222,316	207,863	200,978	230,851	259,083	2,672,456
# of Large Comm & Ind Customers	914	922	933	938	952	972	995	1,014	1,049	1,052	1,038	1,052	986
# of Other Public Customers	616	615	616	618	618	616	615	614	623	620	607	604	615
# of Street & Highway Lighting Customers	433	433	433	433	433	433	433	433	433	433	433	433	433
Peak Demand Net of Energy Efficiency Progs	411.3	387.8	362.7	322.5	334.4	435.5	471.7	451.8	406.1	354.1	382.1	435.5	471.7

APPENDIX F

Monthly Forecasts – South Dakota **2017 UPDATED**
(2019-2028)

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

SOUTH DAKOTA YEAR 2019

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.6	1,084.6	903.4	756.2	672.7	704.0	904.6	789.6	697.1	671.0	919.1	1,143.2	10,398.3
# of Residential Customers	6,530	6,528	6,529	6,537	6,542	6,548	6,554	6,554	6,632	6,620	6,538	6,524	6,553
Total Residential Sales - MWh	7,572	7,080	5,898	4,943	4,401	4,610	5,929	5,175	4,623	4,442	6,009	7,458	68,140
Use per Small Comm & Ind Customer - kWh	1,975.6	1,945.7	1,621.2	1,424.3	1,324.2	1,284.2	1,658.1	1,421.1	1,389.1	1,260.8	1,705.4	1,914.4	18,893.8
# of Small Comm & Ind Customers	2,006	2,006	2,009	2,029	2,042	2,062	2,062	2,059	2,097	2,082	2,030	2,032	2,043
Total Small Comm & Ind Sales - MWh	3,963	3,903	3,257	2,890	2,704	2,648	3,419	2,926	2,913	2,625	3,462	3,890	38,600
Large Comm & Ind Sales	3,112	3,518	3,029	2,961	3,014	2,878	3,646	3,121	3,709	3,292	3,983	3,519	39,782
Total Sales (Residential, SC&I and LC&I)	14,647	14,501	12,184	10,794	10,119	10,136	12,994	11,222	11,245	10,359	13,454	14,867	146,522
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	218	202	212	208	207	203	208	201	211	211	221	216	2,518
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	
Total Billed Sales - MWh	14,995	14,851	12,515	11,126	10,452	10,452	13,351	11,529	11,583	10,670	13,794	15,208	150,526
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,033	14,883	12,543	11,142	10,460	10,459	13,360	11,537	11,590	10,679	13,814	15,241	150,741
Total Requirements (Energy + Losses)	16,262	16,099	13,568	12,053	11,315	11,314	14,452	12,480	12,537	11,552	14,943	16,487	163,062
# of Large Comm & Ind Customers	115	115	114	115	115	114	115	115	116	116	115	115	115
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	25.1	24.4	22.5	20.1	18.2	26.6	29.5	28.0	24.8	21.2	23.6	26.9	29.5

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

SOUTH DAKOTA YEAR 2020

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.5	1,084.4	903.2	756.0	672.8	703.9	904.5	789.5	697.1	671.0	918.9	1,143.0	10,397.3
# of Residential Customers	6,531	6,529	6,530	6,538	6,543	6,549	6,555	6,555	6,633	6,621	6,539	6,525	6,554
Total Residential Sales - MWh	7,573	7,080	5,898	4,943	4,402	4,610	5,929	5,175	4,624	4,443	6,009	7,458	68,144
Use per Small Comm & Ind Customer - kWh	1,989.1	1,958.3	1,632.5	1,434.0	1,333.3	1,293.4	1,669.4	1,430.0	1,399.1	1,269.6	1,716.7	1,928.5	19,023.4
# of Small Comm & Ind Customers	2,016	2,016	2,019	2,039	2,052	2,072	2,072	2,070	2,107	2,092	2,040	2,041	2,053
Total Small Comm & Ind Sales - MWh	4,010	3,948	3,296	2,924	2,736	2,680	3,459	2,960	2,948	2,656	3,502	3,936	39,055
Large Comm & Ind Sales	3,185	3,601	3,100	3,030	3,084	2,946	3,732	3,194	3,797	3,370	4,076	3,604	40,719
Total Sales (Residential, SC&I and LC&I)	14,768	14,629	12,294	10,897	10,222	10,236	13,120	11,329	11,369	10,469	13,587	14,998	147,918
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	218	202	212	208	207	203	208	201	211	211	221	131	2,433
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,116	14,979	12,625	11,229	10,555	10,552	13,477	11,636	11,707	10,780	13,927	15,254	151,837
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,154	15,011	12,653	11,245	10,563	10,559	13,486	11,644	11,714	10,789	13,947	15,287	152,052
Total Requirements (Energy + Losses)	16,393	16,238	13,687	12,164	11,426	11,422	14,588	12,596	12,671	11,671	15,087	16,536	164,479
# of Large Comm & Ind Customers	116	116	115	116	116	115	116	116	117	117	116	116	116
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	25.5	24.8	22.8	20.4	18.4	26.8	29.8	28.3	25.1	21.4	23.9	27.2	29.8

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

SOUTH DAKOTA YEAR 2021

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.4	1,084.4	903.2	756.1	672.7	704.0	904.5	789.5	697.0	670.9	919.0	1,143.1	10,397.1
# of Residential Customers	6,532	6,530	6,531	6,539	6,544	6,550	6,556	6,556	6,634	6,622	6,540	6,526	6,555
Total Residential Sales - MWh	7,573	7,081	5,899	4,944	4,402	4,611	5,930	5,176	4,624	4,443	6,010	7,460	68,153
Use per Small Comm & Ind Customer - kWh	2,004.0	1,972.8	1,644.5	1,444.8	1,343.0	1,302.1	1,681.1	1,440.6	1,409.3	1,278.9	1,729.6	1,942.9	19,162.7
# of Small Comm & Ind Customers	2,024	2,025	2,028	2,048	2,061	2,082	2,082	2,079	2,116	2,101	2,049	2,050	2,062
Total Small Comm & Ind Sales - MWh	4,056	3,995	3,335	2,959	2,768	2,711	3,500	2,995	2,982	2,687	3,544	3,983	39,515
Large Comm & Ind Sales	3,263	3,689	3,177	3,106	3,161	3,019	3,823	3,273	3,890	3,453	4,177	3,693	41,724
Total Sales (Residential, SC&I and LC&I)	14,892	14,765	12,411	11,009	10,331	10,341	13,253	11,444	11,496	10,583	13,731	15,136	149,392
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,100	14,986	12,606	11,208	10,532	10,527	13,477	11,622	11,699	10,759	13,929	15,339	151,784
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,138	15,018	12,634	11,224	10,540	10,534	13,486	11,630	11,706	10,768	13,949	15,372	151,999
Total Requirements (Energy + Losses)	16,375	16,245	13,667	12,141	11,401	11,395	14,588	12,581	12,663	11,648	15,089	16,628	164,421
# of Large Comm & Ind Customers	117	117	116	117	117	116	117	117	118	118	117	117	117
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	25.8	25.0	23.1	20.6	18.4	26.7	29.7	28.2	25.0	21.3	23.9	27.2	29.7

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

SOUTH DAKOTA YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.3	1,084.4	903.2	756.1	672.7	703.9	904.5	789.5	697.1	670.9	919.0	1,142.9	10,396.9
# of Residential Customers	6,533	6,531	6,532	6,540	6,545	6,551	6,557	6,557	6,635	6,624	6,541	6,527	6,556
Total Residential Sales - MWh	7,574	7,082	5,900	4,945	4,403	4,611	5,931	5,177	4,625	4,444	6,011	7,460	68,163
Use per Small Comm & Ind Customer - kWh	2,019.2	1,987.2	1,656.4	1,456.2	1,353.1	1,311.8	1,693.4	1,451.1	1,420.2	1,288.6	1,742.5	1,955.8	19,304.7
# of Small Comm & Ind Customers	2,033	2,034	2,037	2,056	2,070	2,091	2,091	2,088	2,125	2,110	2,058	2,059	2,071
Total Small Comm & Ind Sales - MWh	4,105	4,042	3,374	2,994	2,801	2,743	3,541	3,030	3,018	2,719	3,586	4,027	39,980
Large Comm & Ind Sales	3,343	3,779	3,254	3,181	3,238	3,092	3,917	3,353	3,986	3,537	4,279	3,780	42,739
Total Sales (Residential, SC&I and LC&I)	15,022	14,903	12,528	11,120	10,442	10,446	13,389	11,560	11,629	10,700	13,876	15,267	150,882
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,230	15,124	12,723	11,319	10,643	10,632	13,613	11,738	11,832	10,876	14,074	15,470	153,274
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,268	15,156	12,751	11,335	10,651	10,639	13,622	11,746	11,839	10,885	14,094	15,503	153,489
Total Requirements (Energy + Losses)	16,516	16,395	13,793	12,261	11,522	11,509	14,735	12,706	12,807	11,775	15,246	16,770	166,035
# of Large Comm & Ind Customers	118	118	117	118	118	117	118	118	119	119	118	118	118
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	25.8	25.0	23.1	20.6	18.3	26.7	29.6	28.1	24.9	21.2	23.9	27	30

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

SOUTH DAKOTA YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.3	1,084.4	903.2	756.1	672.7	703.9	904.5	789.5	697.1	670.9	919.0	1,142.9	10,396.9
# of Residential Customers	6,533	6,531	6,532	6,540	6,545	6,551	6,557	6,557	6,635	6,624	6,541	6,527	6,556
Total Residential Sales - MWh	7,574	7,082	5,900	4,945	4,403	4,611	5,931	5,177	4,625	4,444	6,011	7,460	68,163
Use per Small Comm & Ind Customer - kWh	2,032.8	2,002.0	1,668.0	1,466.1	1,362.4	1,320.6	1,705.1	1,461.4	1,429.9	1,296.8	1,754.1	1,970.5	19,438.2
# of Small Comm & Ind Customers	2,041	2,041	2,045	2,064	2,078	2,099	2,099	2,096	2,133	2,119	2,066	2,067	2,079
Total Small Comm & Ind Sales - MWh	4,149	4,086	3,411	3,026	2,831	2,772	3,579	3,063	3,050	2,748	3,624	4,073	40,412
Large Comm & Ind Sales	3,421	3,867	3,330	3,256	3,314	3,164	4,008	3,431	4,078	3,619	4,378	3,870	43,736
Total Sales (Residential, SC&I and LC&I)	15,144	15,035	12,641	11,227	10,548	10,547	13,518	11,671	11,753	10,811	14,013	15,403	152,311
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,352	15,256	12,836	11,426	10,749	10,733	13,742	11,849	11,956	10,987	14,211	15,606	154,703
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,390	15,288	12,864	11,442	10,757	10,740	13,751	11,857	11,963	10,996	14,231	15,639	154,918
Total Requirements (Energy + Losses)	16,648	16,537	13,915	12,377	11,636	11,618	14,875	12,826	12,941	11,895	15,394	16,917	167,579
# of Large Comm & Ind Customers	119	119	118	119	119	118	119	119	120	120	119	119	119
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	25.8	25.0	23.1	20.6	18.4	26.7	29.7	28.2	25.0	21.3	23.9	27.2	29.7

SALES AND ENERGY (MWH)
PEAK DEMAND (MW)

SOUTH DAKOTA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.3	1,084.4	903.2	756.1	672.7	703.9	904.5	789.5	697.1	670.9	919.0	1,142.8	10,396.8
# of Residential Customers	6,533	6,531	6,532	6,540	6,545	6,551	6,557	6,557	6,635	6,624	6,541	6,527	6,556
Total Residential Sales - MWh	7,574	7,082	5,900	4,945	4,403	4,611	5,931	5,177	4,625	4,444	6,011	7,459	68,162
Use per Small Comm & Ind Customer - kWh	2,049.8	2,018.6	1,682.6	1,478.5	1,373.6	1,331.9	1,719.8	1,473.6	1,441.4	1,308.1	1,769.8	1,987.0	19,602.9
# of Small Comm & Ind Customers	2,048	2,048	2,051	2,071	2,085	2,106	2,106	2,103	2,141	2,126	2,072	2,074	2,086
Total Small Comm & Ind Sales - MWh	4,198	4,134	3,451	3,062	2,864	2,805	3,622	3,099	3,086	2,781	3,667	4,121	40,890
Large Comm & Ind Sales	3,503	3,960	3,410	3,333	3,393	3,241	4,105	3,514	4,177	3,707	4,484	3,963	44,790
Total Sales (Residential, SC&I and LC&I)	15,275	15,176	12,761	11,340	10,660	10,657	13,658	11,790	11,888	10,932	14,162	15,543	153,842
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,483	15,397	12,956	11,539	10,861	10,843	13,882	11,968	12,091	11,108	14,360	15,746	156,234
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,521	15,429	12,984	11,555	10,869	10,850	13,891	11,976	12,098	11,117	14,380	15,779	156,449
Total Requirements (Energy + Losses)	16,790	16,690	14,045	12,499	11,757	11,737	15,026	12,955	13,087	12,026	15,555	17,069	169,236
# of Large Comm & Ind Customers	120	120	119	120	120	119	120	120	121	121	120	120	120
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	25.8	25.0	23.1	20.6	18.5	26.9	29.9	28.4	25.2	21.5	24.2	27.5	29.9

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

SOUTH DAKOTA YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.4	1,084.4	903.2	756.1	672.7	704.0	904.5	789.5	697.0	670.9	919.0	1,143.0	10,396.9
# of Residential Customers	6,532	6,530	6,531	6,539	6,544	6,550	6,556	6,556	6,634	6,622	6,540	6,526	6,555
Total Residential Sales - MWh	7,573	7,081	5,899	4,944	4,402	4,611	5,930	5,176	4,624	4,443	6,010	7,459	68,152
Use per Small Comm & Ind Customer - kWh	2,064.7	2,033.1	1,695.1	1,489.4	1,384.0	1,341.8	1,732.9	1,484.8	1,452.6	1,318.0	1,782.8	2,001.4	19,748.8
# of Small Comm & Ind Customers	2,057	2,057	2,060	2,080	2,094	2,115	2,115	2,112	2,150	2,135	2,081	2,083	2,095
Total Small Comm & Ind Sales - MWh	4,247	4,182	3,492	3,098	2,898	2,838	3,665	3,136	3,123	2,814	3,710	4,169	41,372
Large Comm & Ind Sales	3,588	4,056	3,492	3,414	3,475	3,319	4,204	3,598	4,277	3,796	4,592	4,058	45,869
Total Sales (Residential, SC&I and LC&I)	15,408	15,319	12,883	11,456	10,775	10,768	13,799	11,910	12,024	11,053	14,312	15,686	155,393
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,616	15,540	13,078	11,655	10,976	10,954	14,023	12,088	12,227	11,229	14,510	15,889	157,785
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,654	15,572	13,106	11,671	10,984	10,961	14,032	12,096	12,234	11,238	14,530	15,922	158,000
Total Requirements (Energy + Losses)	16,933	16,845	14,177	12,625	11,882	11,857	15,179	13,085	13,234	12,156	15,718	17,223	170,914
# of Large Comm & Ind Customers	121	121	120	121	121	120	121	121	122	122	121	121	121
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	26.1	25.3	23.3	20.8	18.7	27.2	30.2	28.6	25.4	21.7	24.4	27.8	30.2

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

SOUTH DAKOTA YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.4	1,084.4	903.2	756.1	672.7	704.0	904.5	789.5	697.0	670.9	919.0	1,142.8	10,396.8
# of Residential Customers	6,532	6,530	6,531	6,539	6,544	6,550	6,556	6,556	6,634	6,622	6,540	6,526	6,555
Total Residential Sales - MWh	7,573	7,081	5,899	4,944	4,402	4,611	5,930	5,176	4,624	4,443	6,010	7,458	68,151
Use per Small Comm & Ind Customer - kWh	2,080.9	2,049.4	1,708.4	1,501.0	1,394.9	1,352.8	1,746.1	1,496.7	1,464.3	1,328.5	1,797.0	2,017.7	19,905.7
# of Small Comm & Ind Customers	2,065	2,065	2,068	2,088	2,102	2,123	2,123	2,120	2,158	2,143	2,089	2,091	2,103
Total Small Comm & Ind Sales - MWh	4,297	4,232	3,533	3,134	2,932	2,872	3,707	3,173	3,160	2,847	3,754	4,219	41,860
Large Comm & Ind Sales	3,673	4,153	3,575	3,495	3,557	3,397	4,304	3,684	4,379	3,886	4,701	4,153	46,957
Total Sales (Residential, SC&I and LC&I)	15,543	15,466	13,007	11,573	10,891	10,880	13,941	12,033	12,163	11,176	14,465	15,830	156,968
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,751	15,687	13,202	11,772	11,092	11,066	14,165	12,211	12,366	11,352	14,663	16,033	159,360
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,789	15,719	13,230	11,788	11,100	11,073	14,174	12,219	12,373	11,361	14,683	16,066	159,575
Total Requirements (Energy + Losses)	17,079	17,004	14,311	12,751	12,007	11,978	15,332	13,218	13,384	12,290	15,883	17,379	172,616
# of Large Comm & Ind Customers	121	121	120	121	121	120	121	121	122	122	121	121	121
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	26.3	25.6	23.6	21.0	18.8	27.5	30.5	28.9	25.7	21.9	24.7	28.1	30.5

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

SOUTH DAKOTA YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.4	1,084.4	903.2	756.0	672.6	703.9	904.5	789.5	697.1	671.0	918.9	1,142.8	10,396.9
# of Residential Customers	6,531	6,529	6,530	6,538	6,543	6,549	6,555	6,555	6,633	6,621	6,539	6,525	6,554
Total Residential Sales - MWh	7,572	7,080	5,898	4,943	4,401	4,610	5,929	5,175	4,624	4,443	6,009	7,457	68,141
Use per Small Comm & Ind Customer - kWh	2,100.5	2,069.1	1,724.1	1,515.1	1,408.2	1,365.6	1,762.7	1,511.1	1,478.0	1,340.8	1,813.8	2,036.7	20,093.3
# of Small Comm & Ind Customers	2,070	2,070	2,073	2,093	2,107	2,128	2,128	2,125	2,163	2,148	2,094	2,096	2,108
Total Small Comm & Ind Sales - MWh	4,348	4,283	3,574	3,171	2,967	2,906	3,751	3,211	3,197	2,880	3,798	4,269	42,355
Large Comm & Ind Sales	3,759	4,250	3,660	3,578	3,642	3,478	4,406	3,771	4,483	3,978	4,813	4,252	48,070
Total Sales (Residential, SC&I and LC&I)	15,679	15,613	13,132	11,692	11,010	10,994	14,086	12,157	12,304	11,301	14,620	15,978	158,566
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	15,887	15,834	13,327	11,891	11,211	11,180	14,310	12,335	12,507	11,477	14,818	16,181	160,958
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	15,925	15,866	13,355	11,907	11,219	11,187	14,319	12,343	12,514	11,486	14,838	16,214	161,173
Total Requirements (Energy + Losses)	17,227	17,163	14,447	12,880	12,136	12,101	15,489	13,352	13,537	12,425	16,051	17,539	174,347
# of Large Comm & Ind Customers	122	122	121	122	122	121	122	122	123	123	122	122	122
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	26.6	25.9	23.8	21.3	19.0	27.7	30.8	29.2	25.9	22.1	25.0	28.4	30.8

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

SOUTH DAKOTA YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,159.3	1,084.4	903.2	756.0	672.7	703.9	904.5	789.4	697.1	671.0	918.9	1,142.9	10,396.6
# of Residential Customers	6,530	6,528	6,529	6,537	6,542	6,548	6,554	6,554	6,632	6,620	6,538	6,524	6,553
Total Residential Sales - MWh	7,570	7,079	5,897	4,942	4,401	4,609	5,928	5,174	4,623	4,442	6,008	7,456	68,129
Use per Small Comm & Ind Customer - kWh	2,119.5	2,087.2	1,739.8	1,528.8	1,420.7	1,377.7	1,778.8	1,524.2	1,491.5	1,353.3	1,830.0	2,054.7	20,273.7
# of Small Comm & Ind Customers	2,076	2,076	2,079	2,099	2,113	2,134	2,134	2,131	2,169	2,154	2,100	2,102	2,114
Total Small Comm & Ind Sales - MWh	4,400	4,333	3,617	3,209	3,002	2,940	3,796	3,248	3,235	2,915	3,843	4,319	42,857
Large Comm & Ind Sales	3,848	4,350	3,746	3,662	3,727	3,560	4,509	3,860	4,588	4,072	4,926	4,352	49,200
Total Sales (Residential, SC&I and LC&I)	15,818	15,762	13,260	11,813	11,130	11,109	14,233	12,282	12,446	11,429	14,777	16,127	160,186
Other Public Sales	130	148	119	124	126	113	149	106	127	100	119	125	1,486
Street & Highway Lighting Sales	78	73	76	75	75	73	75	72	76	76	79	78	906
Interdepartmental Sales	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Billed Sales - MWh	16,026	15,983	13,455	12,012	11,331	11,295	14,457	12,460	12,649	11,605	14,975	16,330	162,578
Company Use	38	32	28	16	8	7	9	8	7	9	20	33	215
Total Energy	16,064	16,015	13,483	12,028	11,339	11,302	14,466	12,468	12,656	11,614	14,995	16,363	162,793
Total Requirements (Energy + Losses)	17,377	17,324	14,585	13,011	12,266	12,226	15,648	13,487	13,690	12,563	16,221	17,700	176,098
# of Large Comm & Ind Customers	123	123	122	123	123	122	123	123	124	124	123	123	123
# of Other Public Customers	48	47	47	47	49	49	49	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	14	14	14	14	14	14	14	15	15	15	16	14
Peak Demand Net of Energy Efficiency Progs	26.9	26.1	24.1	21.5	19.2	28.0	31.1	29.5	26.2	22.3	25.2	28.7	31.1

APPENDIX G

Monthly Forecasts – Integrated System **2017 UPDATED** (2019-2028)

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

INTEGRATED SYSTEM YEAR 2019

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,066.8	986.8	849.7	712.0	653.4	697.9	884.8	796.3	690.6	644.9	860.1	1,047.5	9,889.2
# of Residential Customers	104,974	105,311	105,581	105,638	105,717	106,071	106,255	106,456	106,872	107,202	107,443	107,768	106,274
Total Residential Sales - MWh	111,985	103,916	89,713	75,213	69,080	74,023	94,016	84,776	73,810	69,136	92,411	112,891	1,050,970
Use per Small Comm & Ind Customer - kWh	4,006.3	3,810.0	3,558.6	3,188.0	3,095.2	3,066.1	3,593.4	3,385.7	3,207.6	3,128.5	3,582.5	4,023.3	41,626.0
# of Small Comm & Ind Customers	19,444	19,456	19,498	19,602	19,679	19,772	19,802	19,819	20,049	20,003	19,768	19,773	19,722
Total Small Comm & Ind Sales - MWh	77,898	74,127	69,385	62,491	60,910	60,622	71,156	67,101	64,310	62,579	70,819	79,553	820,951
Large Comm & Ind Sales	100,214	94,345	95,903	92,787	93,360	91,450	102,371	98,664	98,505	97,699	98,544	103,562	1,167,404
Total Sales (Residential, SC&I and LC&I)	290,097	272,388	255,001	230,491	223,350	226,095	267,543	250,541	236,625	229,414	261,774	296,006	3,039,325
Other Public Sales	4,441	4,244	4,298	4,102	4,429	4,831	5,633	5,224	4,794	4,236	4,211	4,499	54,942
Street & Highway Lighting Sales	1,734	1,555	1,599	1,503	1,473	1,398	1,456	1,473	1,550	1,637	1,699	1,436	18,513
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	296,306	278,221	260,928	236,125	229,277	232,347	274,660	257,262	242,995	235,311	267,714	301,976	3,113,122
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	296,839	278,690	261,399	236,553	229,703	232,776	275,136	257,721	243,430	235,743	268,147	302,487	3,118,624
Total Requirements (Energy + Losses)	321,100	301,467	282,763	255,886	248,477	251,801	297,623	278,785	263,326	255,011	290,063	327,210	3,373,512
# of Large Comm & Ind Customers	1,293	1,299	1,311	1,318	1,335	1,349	1,374	1,394	1,439	1,442	1,417	1,431	1,367
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	527.6	501.7	460.9	413.3	422.4	556.0	611.2	583.2	513.4	449.2	489.8	556.0	611.2

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

INTEGRATED SYSTEM YEAR 2020

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,069.2	988.9	851.6	713.6	654.9	699.4	886.8	798.1	692.2	646.4	862.0	1,049.9	9,911.5
# of Residential Customers	105,390	105,728	105,999	106,056	106,136	106,491	106,676	106,878	107,295	107,627	107,868	108,195	106,695
Total Residential Sales - MWh	112,679	104,559	90,272	75,681	69,512	74,484	94,599	85,303	74,271	69,568	92,986	113,592	1,057,506
Use per Small Comm & Ind Customer - kWh	4,078.7	3,878.8	3,623.3	3,246.0	3,151.5	3,121.7	3,658.1	3,446.7	3,265.8	3,185.5	3,647.6	4,093.8	42,378.2
# of Small Comm & Ind Customers	19,532	19,544	19,586	19,689	19,767	19,861	19,891	19,910	20,140	20,094	19,857	19,861	19,811
Total Small Comm & Ind Sales - MWh	79,666	75,808	70,965	63,911	62,296	62,001	72,764	68,624	65,773	64,009	72,431	81,307	839,555
Large Comm & Ind Sales	101,320	95,411	96,963	93,801	94,384	92,466	103,541	99,791	99,624	98,766	99,651	105,578	1,181,296
Total Sales (Residential, SC&I and LC&I)	293,665	275,778	258,200	233,393	226,192	228,951	270,904	253,718	239,668	232,343	265,068	300,477	3,078,357
Other Public Sales	4,495	4,294	4,349	4,151	4,482	4,889	5,700	5,288	4,852	4,289	4,262	4,553	55,604
Street & Highway Lighting Sales	1,120	1,010	1,044	987	976	930	965	972	1,017	1,063	1,102	1,071	12,257
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	299,314	281,116	263,623	238,560	231,675	234,793	277,597	260,002	245,563	237,719	270,462	306,136	3,146,560
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	299,847	281,585	264,094	238,988	232,101	235,222	278,073	260,461	245,998	238,151	270,895	306,647	3,152,062
Total Requirements (Energy + Losses)	324,354	304,599	285,679	258,521	251,071	254,447	300,800	281,749	266,104	257,615	293,036	331,709	3,409,684
# of Large Comm & Ind Customers	1,295	1,301	1,313	1,320	1,337	1,351	1,376	1,396	1,441	1,444	1,419	1,433	1,369
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	534.5	508.2	467.0	418.7	427.4	562.4	618.4	590.0	519.5	454.5	496.4	563.4	618.4

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

INTEGRATED SYSTEM YEAR 2021

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,071.6	991.2	853.5	715.2	656.4	701.0	888.8	800.0	693.8	647.8	864.0	1,052.3	9,933.9
# of Residential Customers	105,805	106,145	106,418	106,475	106,554	106,912	107,097	107,299	107,718	108,052	108,294	108,624	107,116
Total Residential Sales - MWh	113,378	105,207	90,833	76,151	69,943	74,948	95,186	85,834	74,732	70,000	93,564	114,302	1,064,078
Use per Small Comm & Ind Customer - kWh	4,148.3	3,945.1	3,685.3	3,301.4	3,205.4	3,174.7	3,719.8	3,505.6	3,321.7	3,240.3	3,710.0	4,165.8	43,103.6
# of Small Comm & Ind Customers	19,618	19,630	19,673	19,777	19,855	19,951	19,981	19,998	20,228	20,182	19,945	19,949	19,899
Total Small Comm & Ind Sales - MWh	81,382	77,442	72,501	65,292	63,643	63,338	74,326	70,105	67,191	65,396	73,996	83,103	857,715
Large Comm & Ind Sales	106,443	100,199	102,060	98,831	99,546	97,393	108,867	104,956	104,695	103,994	104,783	111,991	1,243,758
Total Sales (Residential, SC&I and LC&I)	301,203	282,848	265,394	240,274	233,132	235,679	278,379	260,895	246,618	239,390	272,343	309,396	3,165,551
Other Public Sales	4,549	4,344	4,402	4,200	4,536	4,947	5,766	5,351	4,909	4,340	4,313	4,606	56,263
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	306,766	288,107	270,734	245,357	238,537	241,449	285,005	267,113	252,435	244,682	277,646	315,055	3,232,886
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	307,299	288,576	271,205	245,785	238,963	241,878	285,481	267,572	252,870	245,114	278,079	315,566	3,238,388
Total Requirements (Energy + Losses)	332,414	312,161	293,371	265,873	258,493	261,647	308,813	289,441	273,538	265,147	300,806	341,357	3,503,061
# of Large Comm & Ind Customers	1,298	1,304	1,316	1,323	1,340	1,354	1,379	1,399	1,444	1,447	1,422	1,436	1,372
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	541.6	514.9	473.3	424.2	438.2	576.5	634.0	604.8	532.5	465.8	510.4	579.2	634.0

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

INTEGRATED SYSTEM YEAR 2022

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.1	993.5	855.5	716.9	657.9	702.7	890.8	801.8	695.4	649.3	866.0	1,053.0	9,955.3
# of Residential Customers	106,220	106,562	106,836	106,893	106,973	107,332	107,518	107,721	108,142	108,477	108,721	109,051	107,537
Total Residential Sales - MWh	114,087	105,865	91,403	76,628	70,382	75,417	95,782	86,375	75,201	70,439	94,151	114,835	1,070,565
Use per Small Comm & Ind Customer - kWh	4,222.5	4,015.3	3,751.5	3,360.7	3,262.9	3,231.6	3,786.1	3,568.3	3,381.2	3,298.9	3,776.7	4,236.3	43,871.9
# of Small Comm & Ind Customers	19,705	19,718	19,760	19,864	19,943	20,039	20,069	20,087	20,318	20,271	20,033	20,038	19,987
Total Small Comm & Ind Sales - MWh	83,205	79,174	74,129	66,757	65,072	64,758	75,984	71,677	68,700	66,871	75,659	84,886	876,872
Large Comm & Ind Sales	114,412	107,689	110,032	106,776	107,703	105,105	117,237	113,009	112,618	112,247	112,848	119,508	1,339,184
Total Sales (Residential, SC&I and LC&I)	311,704	292,728	275,564	250,161	243,157	245,280	289,003	271,061	256,519	249,557	282,658	319,229	3,286,621
Other Public Sales	4,603	4,395	4,453	4,249	4,589	5,003	5,832	5,414	4,965	4,392	4,363	4,660	56,918
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	317,321	298,038	280,955	255,293	248,615	251,106	295,695	277,342	262,392	254,901	288,011	324,942	3,354,611
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	317,854	298,507	281,426	255,721	249,041	251,535	296,171	277,801	262,827	255,333	288,444	325,453	3,360,113
Total Requirements (Energy + Losses)	343,832	322,905	304,426	276,621	269,396	272,094	320,377	300,506	284,308	276,202	312,019	352,053	3,634,739
# of Large Comm & Ind Customers	1,301	1,307	1,319	1,326	1,343	1,357	1,382	1,402	1,447	1,450	1,425	1,438	1,375
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	556.9	529.5	486.5	436.1	448.0	589.6	648.6	618.8	544.3	476.3	523.6	594.2	648.6

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

INTEGRATED SYSTEM YEAR 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.1	993.5	855.6	716.9	658.0	702.7	890.8	801.8	695.4	649.4	866.0	1,053.0	9,955.4
# of Residential Customers	106,615	106,958	107,233	107,290	107,371	107,731	107,918	108,122	108,544	108,881	109,126	109,458	107,937
Total Residential Sales - MWh	114,513	106,260	91,746	76,915	70,645	75,698	96,137	86,697	75,481	70,703	94,504	115,262	1,074,561
Use per Small Comm & Ind Customer - kWh	4,292.4	4,082.1	3,813.9	3,416.3	3,317.0	3,285.2	3,848.3	3,627.4	3,437.4	3,353.6	3,839.5	4,309.3	44,601.9
# of Small Comm & Ind Customers	19,787	19,798	19,842	19,947	20,026	20,122	20,152	20,170	20,401	20,357	20,116	20,121	20,070
Total Small Comm & Ind Sales - MWh	84,933	80,818	75,675	68,145	66,427	66,104	77,550	73,165	70,127	68,269	77,235	86,708	895,156
Large Comm & Ind Sales	118,897	111,961	114,510	111,261	112,297	109,433	122,014	117,558	117,116	116,915	117,441	122,859	1,392,262
Total Sales (Residential, SC&I and LC&I)	318,343	299,039	281,931	256,321	249,369	251,235	295,701	277,420	262,724	255,887	289,180	324,829	3,361,979
Other Public Sales	4,655	4,445	4,505	4,298	4,642	5,062	5,900	5,477	5,022	4,444	4,415	4,715	57,580
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	324,012	304,399	287,374	261,502	254,880	257,120	302,461	283,764	268,654	261,283	294,585	330,597	3,430,631
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	324,545	304,868	287,845	261,930	255,306	257,549	302,937	284,223	269,089	261,715	295,018	331,108	3,436,133
Total Requirements (Energy + Losses)	351,070	329,784	311,370	283,337	276,171	278,598	327,696	307,453	291,082	283,106	319,130	358,169	3,716,966
# of Large Comm & Ind Customers	1,303	1,309	1,321	1,328	1,345	1,359	1,384	1,404	1,449	1,452	1,427	1,440	1,377
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	571.4	543.4	499.0	447.5	454.0	597.5	657.5	627.3	551.4	482.6	531.4	602.9	657.5

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

INTEGRATED SYSTEM YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.1	993.5	855.6	716.9	658.0	702.7	890.8	801.8	695.4	649.4	866.0	1,053.0	9,955.5
# of Residential Customers	107,009	107,354	107,630	107,687	107,769	108,130	108,318	108,523	108,946	109,285	109,531	109,864	108,337
Total Residential Sales - MWh	114,939	106,654	92,089	77,200	70,908	75,980	96,492	87,019	75,760	70,966	94,855	115,688	1,078,550
Use per Small Comm & Ind Customer - kWh	4,368.7	4,154.4	3,881.9	3,476.9	3,375.9	3,343.4	3,915.9	3,691.6	3,498.2	3,413.8	3,908.2	4,382.9	45,390.9
# of Small Comm & Ind Customers	19,867	19,879	19,922	20,029	20,108	20,204	20,235	20,253	20,486	20,439	20,197	20,203	20,152
Total Small Comm & Ind Sales - MWh	86,792	82,586	77,336	69,639	67,883	67,550	79,238	74,766	71,664	69,774	78,933	88,548	914,709
Large Comm & Ind Sales	120,133	113,148	115,689	112,392	113,438	110,564	123,315	118,812	118,360	118,108	118,676	124,099	1,406,734
Total Sales (Residential, SC&I and LC&I)	321,864	302,388	285,114	259,231	252,229	254,094	299,045	280,597	265,784	258,848	292,464	328,335	3,399,993
Other Public Sales	4,710	4,495	4,556	4,347	4,696	5,120	5,965	5,539	5,079	4,496	4,465	4,768	58,236
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	327,588	307,798	290,608	264,461	257,794	260,037	305,870	287,003	271,771	264,296	297,919	334,156	3,469,301
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	328,121	308,267	291,079	264,889	258,220	260,466	306,346	287,462	272,206	264,728	298,352	334,667	3,474,803
Total Requirements (Energy + Losses)	354,939	333,462	314,869	286,538	279,324	281,754	331,383	310,956	294,454	286,365	322,736	362,020	3,758,800
# of Large Comm & Ind Customers	1,306	1,312	1,324	1,331	1,348	1,362	1,387	1,407	1,453	1,455	1,430	1,443	1,380
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	579.8	551.5	506.3	454.1	459.0	603.9	664.6	633.9	557.4	487.9	537.9	610.3	664.6

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

INTEGRATED SYSTEM YEAR 2025

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.1	993.5	855.6	716.9	658.0	702.7	890.8	801.9	695.4	649.4	866.0	1,053.0	9,955.7
# of Residential Customers	107,403	107,748	108,026	108,083	108,165	108,528	108,716	108,923	109,347	109,686	109,935	110,269	108,736
Total Residential Sales - MWh	115,364	107,048	92,430	77,485	71,170	76,261	96,845	87,340	76,040	71,230	95,207	116,117	1,082,537
Use per Small Comm & Ind Customer - kWh	4,440.4	4,222.6	3,946.3	3,534.7	3,431.8	3,398.4	3,980.1	3,752.6	3,556.0	3,470.4	3,972.7	4,457.7	46,142.4
# of Small Comm & Ind Customers	19,951	19,963	20,005	20,111	20,192	20,289	20,319	20,337	20,571	20,525	20,282	20,287	20,236
Total Small Comm & Ind Sales - MWh	88,590	84,296	78,945	71,086	69,295	68,951	80,872	76,316	73,150	71,229	80,574	90,433	933,737
Large Comm & Ind Sales	121,327	114,295	116,827	113,485	114,541	111,657	124,571	120,018	119,561	119,259	119,868	125,374	1,420,783
Total Sales (Residential, SC&I and LC&I)	325,281	305,639	288,202	262,056	255,006	256,869	302,288	283,674	268,751	261,718	295,649	331,924	3,437,057
Other Public Sales	4,763	4,545	4,608	4,396	4,749	5,178	6,032	5,603	5,138	4,548	4,517	4,821	58,898
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	331,058	311,099	293,748	267,335	260,624	262,870	309,180	290,144	274,797	267,218	301,156	337,798	3,507,027
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	331,591	311,568	294,219	267,763	261,050	263,299	309,656	290,603	275,232	267,650	301,589	338,309	3,512,529
Total Requirements (Energy + Losses)	358,691	337,033	318,266	289,648	282,386	284,819	334,964	314,354	297,727	289,524	326,239	365,959	3,799,610
# of Large Comm & Ind Customers	1,309	1,315	1,327	1,334	1,351	1,365	1,390	1,410	1,456	1,458	1,433	1,446	1,383
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	586.9	558.2	512.4	459.6	463.9	610.5	671.7	640.7	563.4	493.1	544.2	617.5	671.7

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

INTEGRATED SYSTEM YEAR 2026

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.2	993.5	855.7	716.9	658.0	702.7	890.8	801.9	695.4	649.4	866.0	1,053.0	9,955.8
# of Residential Customers	107,797	108,145	108,423	108,481	108,563	108,928	109,116	109,323	109,749	110,090	110,340	110,676	109,136
Total Residential Sales - MWh	115,791	107,443	92,774	77,772	71,434	76,543	97,200	87,663	76,320	71,493	95,559	116,543	1,086,535
Use per Small Comm & Ind Customer - kWh	4,518.0	4,296.4	4,015.4	3,596.3	3,491.7	3,457.7	4,049.1	3,817.9	3,618.2	3,531.5	4,042.3	4,535.2	46,948.1
# of Small Comm & Ind Customers	20,032	20,044	20,087	20,194	20,275	20,372	20,402	20,421	20,655	20,608	20,365	20,370	20,319
Total Small Comm & Ind Sales - MWh	90,505	86,117	80,657	72,623	70,795	70,441	82,609	77,965	74,733	72,778	82,321	92,383	953,927
Large Comm & Ind Sales	122,605	115,524	118,046	114,655	115,723	112,824	125,916	121,315	120,847	120,491	121,144	126,696	1,435,786
Total Sales (Residential, SC&I and LC&I)	328,901	309,084	291,477	265,050	257,952	259,808	305,725	286,943	271,900	264,762	299,024	335,622	3,476,248
Other Public Sales	4,817	4,596	4,660	4,445	4,803	5,235	6,097	5,666	5,194	4,600	4,567	4,875	59,555
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	334,732	314,595	297,075	270,378	263,624	265,866	312,682	293,476	278,002	270,314	304,581	341,550	3,546,875
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	335,265	315,064	297,546	270,806	264,050	266,295	313,158	293,935	278,437	270,746	305,014	342,061	3,552,377
Total Requirements (Energy + Losses)	362,666	340,815	321,865	292,939	285,631	288,060	338,752	317,959	301,193	292,875	329,942	370,018	3,842,715
# of Large Comm & Ind Customers	1,311	1,317	1,329	1,336	1,353	1,367	1,392	1,412	1,458	1,460	1,435	1,448	1,385
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	593.8	564.9	518.5	465.0	469.0	617.3	679.1	647.8	569.8	498.6	550.9	625.1	679.1

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

INTEGRATED SYSTEM YEAR 2027

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.2	993.5	855.7	716.9	658.0	702.7	890.8	801.9	695.4	649.4	866.1	1,053.0	9,955.9
# of Residential Customers	108,191	108,540	108,818	108,877	108,960	109,325	109,515	109,723	110,151	110,493	110,744	111,082	109,535
Total Residential Sales - MWh	116,216	107,837	93,116	78,057	71,696	76,823	97,554	87,985	76,600	71,757	95,911	116,970	1,090,522
Use per Small Comm & Ind Customer - kWh	4,596.4	4,371.3	4,085.4	3,659.0	3,552.8	3,518.1	4,119.0	3,884.5	3,681.1	3,593.6	4,113.1	4,614.0	47,766.3
# of Small Comm & Ind Customers	20,113	20,124	20,168	20,275	20,356	20,453	20,484	20,502	20,738	20,690	20,446	20,452	20,400
Total Small Comm & Ind Sales - MWh	92,448	87,968	82,395	74,186	72,321	71,955	84,374	79,640	76,338	74,351	84,096	94,365	974,437
Large Comm & Ind Sales	123,905	116,773	119,288	115,845	116,925	114,015	127,285	122,633	122,156	121,745	122,443	128,043	1,451,056
Total Sales (Residential, SC&I and LC&I)	332,569	312,578	294,799	268,088	260,942	262,793	309,213	290,258	275,094	267,853	302,450	339,378	3,516,015
Other Public Sales	4,871	4,645	4,712	4,495	4,856	5,293	6,164	5,730	5,251	4,651	4,619	4,929	60,216
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	338,454	318,138	300,449	273,466	266,667	268,909	316,237	296,855	281,253	273,456	308,059	345,360	3,587,303
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	338,987	318,607	300,920	273,894	267,093	269,338	316,713	297,314	281,688	273,888	308,492	345,871	3,592,805
Total Requirements (Energy + Losses)	366,693	344,647	325,514	296,279	288,923	291,351	342,598	321,614	304,710	296,273	333,706	374,139	3,886,447
# of Large Comm & Ind Customers	1,314	1,320	1,332	1,339	1,356	1,370	1,395	1,415	1,461	1,463	1,438	1,451	1,388
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	601.0	571.8	524.8	470.8	474.2	623.9	686.5	654.9	576.0	504.1	557.8	632.8	686.5

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

INTEGRATED SYSTEM YEAR 2028

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,074.2	993.5	855.7	716.9	658.0	702.7	890.8	801.9	695.4	649.4	866.1	1,053.0	9,956.0
# of Residential Customers	108,584	108,935	109,214	109,273	109,356	109,723	109,914	110,123	110,552	110,896	111,148	111,487	109,934
Total Residential Sales - MWh	116,640	108,229	93,457	78,342	71,960	77,104	97,907	88,306	76,879	72,020	96,262	117,396	1,094,502
Use per Small Comm & Ind Customer - kWh	4,675.8	4,446.4	4,156.3	3,722.0	3,614.2	3,578.5	4,189.5	3,951.2	3,744.6	3,656.0	4,184.3	4,693.4	48,589.9
# of Small Comm & Ind Customers	20,194	20,206	20,249	20,358	20,438	20,537	20,567	20,586	20,822	20,774	20,529	20,534	20,483
Total Small Comm & Ind Sales - MWh	94,423	89,844	84,161	75,772	73,868	73,491	86,166	81,340	77,970	75,950	85,899	96,375	995,259
Large Comm & Ind Sales	125,230	118,044	120,551	117,057	118,147	115,226	128,676	123,974	123,487	123,022	123,764	129,413	1,466,591
Total Sales (Residential, SC&I and LC&I)	336,293	316,117	298,169	271,171	263,975	265,821	312,749	293,620	278,336	270,992	305,925	343,184	3,556,352
Other Public Sales	4,924	4,695	4,762	4,544	4,909	5,350	6,229	5,792	5,308	4,703	4,669	4,982	60,867
Street & Highway Lighting Sales	980	881	908	854	844	800	832	843	882	928	960	1,018	10,730
Interdepartmental Sales	34	34	30	29	25	23	28	24	26	24	30	35	342
Total Billed Sales - MWh	342,231	321,727	303,869	276,598	269,753	271,994	319,838	300,279	284,552	276,647	311,584	349,219	3,628,291
Company Use	533	469	471	428	426	429	476	459	435	432	433	511	5,502
Total Energy	342,764	322,196	304,340	277,026	270,179	272,423	320,314	300,738	284,987	277,079	312,017	349,730	3,633,793
Total Requirements (Energy + Losses)	370,779	348,529	329,213	299,667	292,261	294,689	346,493	325,317	308,279	299,725	337,519	378,313	3,930,784
# of Large Comm & Ind Customers	1,317	1,323	1,335	1,342	1,359	1,373	1,398	1,418	1,464	1,466	1,441	1,454	1,391
# of Other Public Customers	764	762	763	766	768	765	764	763	774	769	753	750	763
# of Street & Highway Lighting Customers	481	483	483	483	483	483	483	483	484	484	484	485	483
Peak Demand Net of Energy Efficiency Progs	608.5	578.8	531.5	476.6	479.2	630.7	693.8	661.8	582.2	509.5	564.4	640.5	693.8