Integrated Resource Plan 2017

Submitted to the
North Dakota Public Service Commission
July 1, 2017

Volume II: Attachment A

Montana-Dakota Utilities Co.

2017 Integrated Resource Plan

Submitted to the Montana Public Service Commission

July 1, 2017

Volume II

Attachment A

MONTANA-DAKOTA UTILITIES CO.

A Division of MDU Resources Group, Inc.

Attachment A

MONTANA-DAKOTA UTILITIES CO.
ELECTRIC LOAD FORECAST
2017–2036

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

December 31, 2016

ELECTRIC LOAD FORECAST

TABLE OF CONTENTS

Executive Summary

This report presents the 2017-2036 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. The forecasts are prepared by the Electric System Operations & Planning Department. An econometric methodology of forecasting is generally used as the starting point for Montana-Dakota's load forecasts.

INTEGRATED SYSTEM

Total annual energy for the Integrated System is projected to grow at an average rate of 1.6% per year for the next five years and at an average rate of 1.3% per year through 2036. Integrated 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 1.1% per year through 2036 prior to any reductions due to demand response programs. Integrated System winter peak demand is projected to grow at an average rate of 1.7% per year for the next five years and an average rate of 1.3% per year through 2036.

As described in Montana-Dakota's 2015 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 through the use of 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, the continued promotion of the Company's current Interruptible Demand Response program, and the possible implementation of a residential air conditioning cycling program. The effects of the demand-side management (DSM) programs that will be implemented in the Integrated System to achieve these goals are reflected in the sales and demand forecasts.

Econometric Overview

Montana-Dakota uses econometric modeling as the starting point for its 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 the Integrated System forecast. Various combinations of variables were tested for statistical significance when evaluating the data to be used in each equation. The following is a list of variables that were available for both the historical time period being analyzed and the forecasted time period:

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

Employment by Sector
Total Retail Sales
Temperature at the time of peak for Bismarck, ND; Williston, ND; and Miles City, MT; for the Integrated System 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 fifth 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 2016), the most recent year for which a complete set of weather and actual monthly sales by sector was available was 2015.

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

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

The forecast for the Integrated System is developed annually. Likewise, the W&P data by county are available annually from the regional model developed by W&P. W&P revises the regional model from one year to the next to reflect new computational techniques and new sources of regional economic and demographic information. Each year, W&P produces new projections based on an updated historical database and revised assumptions. Therefore, the data provided by W&P captures the economic conditions in place at the time that the W&P forecasts are produced.

While national economic conditions can change quite quickly, data from W&P is provided once per year and therefore may not reflect the most current economic climate. For Montana-Dakota's service territory, this is not always a concern since this area is somewhat isolated from factors affecting the rest if 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. North Dakota's unemployment is at 3.0 percent, still well below the national rate of 4.7 percent as of December 2016. Unemployment rates are below national averages in South Dakota and Montana as well. Therefore, the forecast for the Integrated System continues 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.

Historical personal income per household is calculated to be total personal income divided by the number of households for those counties in which Montana-Dakota provides electric utility service. Historical personal income is

available from the W&P data which come from the U.S. Department of Commerce. Historical households are also from the U.S. Department of Commerce. Forecasted personal income and number of households are projections provided by W&P.

Historical company data used in the development of the forecasts are included in Appendix A for the Integrated System. Appendices A-1 through A-4 list annual sales by customer class for Montana, North Dakota, South Dakota, and the Integrated System for the years 1966-2016, respectively. Appendix A-5 lists the seasonal peaks and load factors of the Integrated System for the years 1960-2016. Appendix A-6 lists demand by state at the time of the system peak for the summer and winter seasons.

Appendix B contains historical and forecasted values for the exogenous variables for the Integrated System.

Integrated System

Overview

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

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

At the time this analysis was begun (June 2016), 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 2015. The equations developed used historical data available through 2015 and were designed to forecast the time period 2016-2036.

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

Counties by State in Montana-Dakota's Integrated System

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

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

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

1. Forecast Methodology - Sales

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

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

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

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

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

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

1.1. Residential

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

RESIDENTIAL USE PER CUSTOMER

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

North Dakota and Montana – The econometric process used in previous years allowed residential use per customer to depend on variables such as the residential price of electricity, alternate fuel prices for residential customers (natural gas), personal income per household, heating degree days, cooling degree days, number of households, and year. In recent years, use per Montana-Dakota residential customer 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 2017 states, "Eventually, the increased adoption and saturation of new uses not currently covered by appliance standards increases consumption." 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 2021 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.

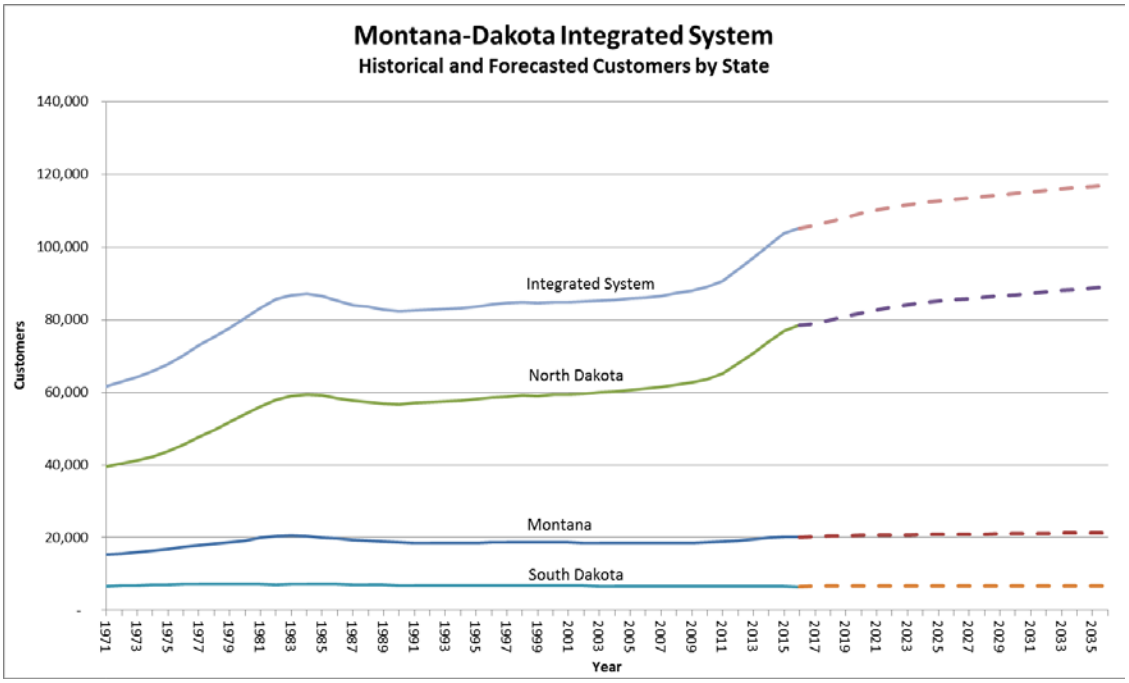
The forecast for number of customers by state was initially developed as described above. However, adjustments were made to the residential customer forecasts for North Dakota and Montana to reflect the higher rate of growth being experienced in parts of North Dakota and Montana due to the Bakken oil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

In North Dakota, growth in residential customers for 2016 through 2020 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 2016 through 2020 was set to the approximate residential customer growth currently experienced. Residential customer growth for 2021 and beyond was set to half 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:

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

where:

ln	= natural logarithm;
sci_kwh_t	= small commercial & industrial sales;
CDD_t	= cooling degree days;
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining; and
$year_t$	= year (1991-2015), 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 (1991-2015), 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 (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.

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 (1991-2015), which serves as a time trend variable.

The final model for South Dakota is as follows:

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

where:

ln	= natural logarithm;
lci_kwh_t	= large commercial & industrial sales;
HDD_t	= heating degree days;
$emp\_no\_farm\_mining_t$	= total employment, excluding farm and mining; and
$year_t$	= year (1991-2015), 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 the addition of several new General LC&I customers that were added in 2016. Information regarding the specific LC&I customers that are expected to come on line is provided by Montana-Dakota's field personnel who have contact with and closely monitor these customers.

1.4. Street Lighting

The sales forecast for the street lighting sector (public street and highway lighting) for each state was held constant at the actual 2015 levels.

1.5. Miscellaneous

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

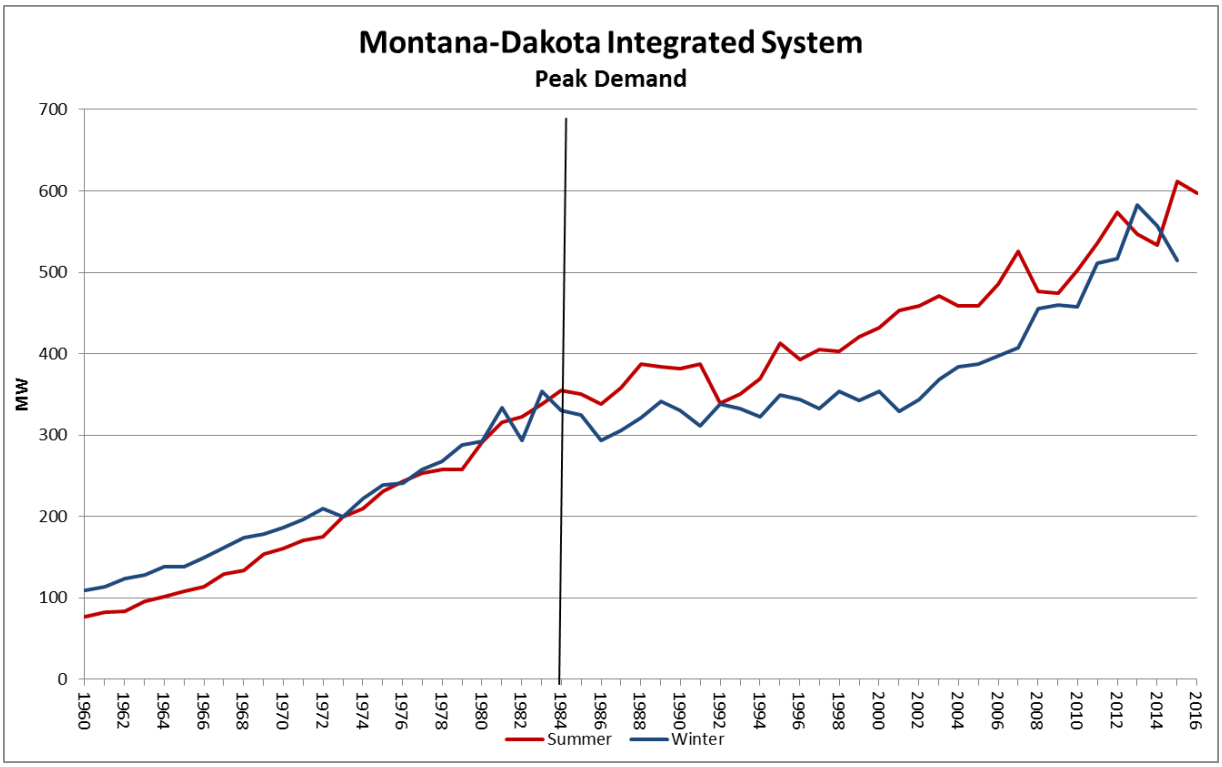
1. Interdepartmental Sales – gas utility use of electricity
2. Other Public Sales – sales to government authorities which includes municipal pumping and some city sales (these sales are served under special contracts that are applicable only to public authorities)

3. Company Use - Montana-Dakota offices

The forecasts for Interdepartmental Sales and Company Use for each state were held constant at the actual 2015 levels. The forecast for Other Public Sales was also held constant at the actual 2015 level for South Dakota, while the Other Public Sales forecast for both North Dakota and Montana were based on a linear regression on actual 1996-2015 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 (1986-2015), 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: 1986-2015.

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 two years.

The winter peak demand model is as follows:

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

where:

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

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

3. Forecast Results – Sales and Demand

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

3.1. Demand-Side Management (DSM) Reductions

As reflected in the 2015 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 2015 through 2034, achieved by growing from 0.08% of total sales in 2015 to 0.43% of total sales in 2024 through 2034, for an overall savings of 0.35% for the 20-year forecast horizon.

- Peak Demand savings
  - Demand Response programs of 31.0 MW for 2017-2034 for the commercial sales sector.
  - Energy Efficiency programs of 0.69 MW in 2017 and 0.91 MW by 2034
  - Residential A/C Demand Response reductions beginning at 2.0 MW in 2017 and growing to 10.0 MW in 2021 and remaining flat at that level through 2034.

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 8.198%. Using this value for all future years for each state, the total energy requirements are calculated for each year during the study period.

3.3. Final Energy Requirements Forecast

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

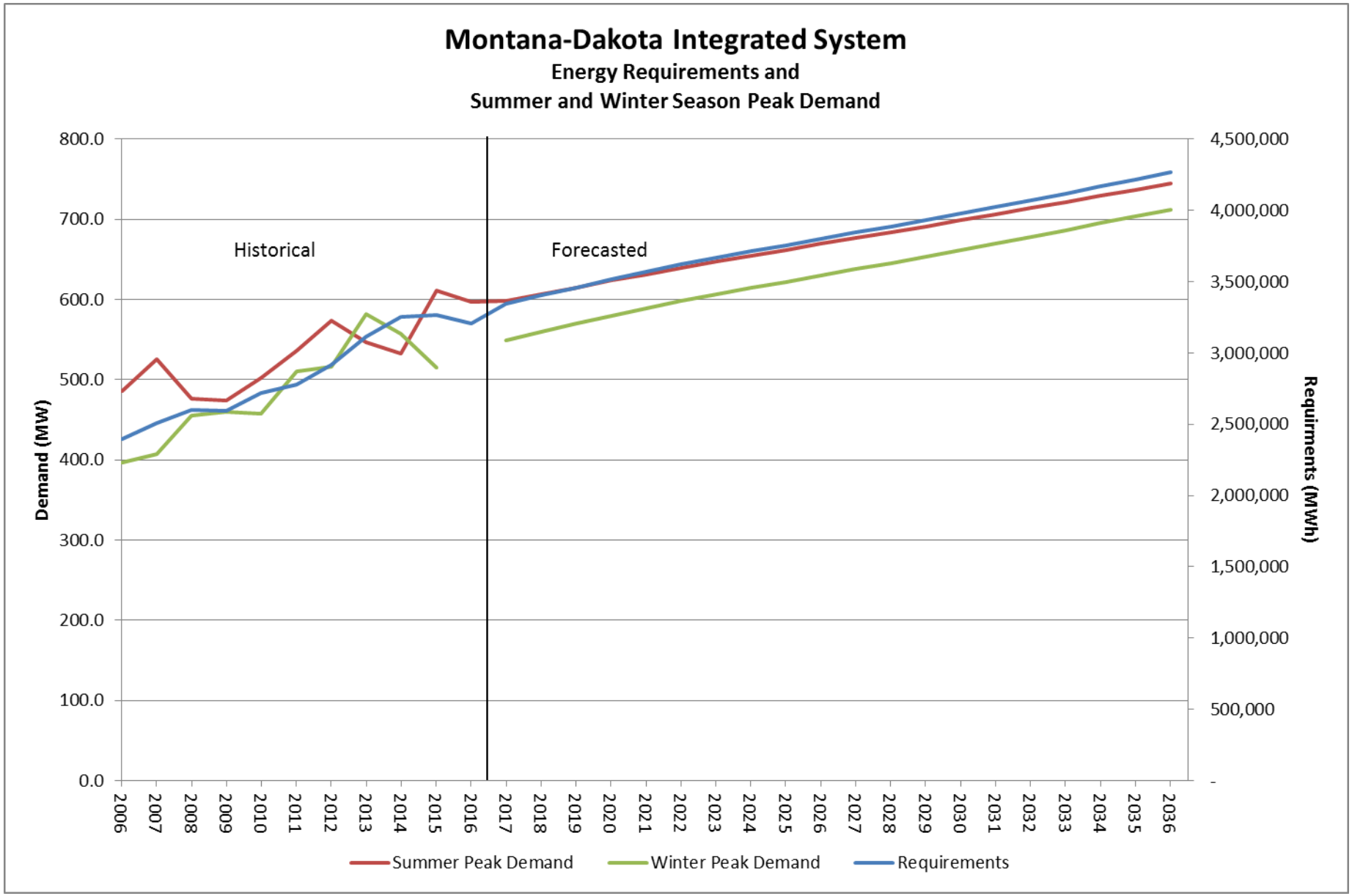
The final forecast results are presented on the following several pages. A table summarizing the Integrated System energy requirements and seasonal peak demand is given first, followed by a graph with historical and forecasted seasonal peak demand and energy requirements. A table summarizing historical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

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

Montana-Dakota Utilities Co.
Historical and Forecasted Energy and Demand
Integrated System
Reflecting Demand-Side Management Programs from 2015 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
2006	2,397,793				485.5				397.2				
2007	2,510,540	4.70%			525.6	8.26%			407.3	2.54%			
2008	2,596,990	3.44%			476.6	-9.32%			455.0	11.71%			
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%			not yet available				
2017	3,344,581	4.30%	598.5	0.6	597.9	0.18%	549.5	0.6	548.9		16.0	15.0	2.0
2018	3,401,299	1.70%	607.1	0.7	606.4	1.42%	559.5	0.6	558.9	1.82%	16.0	15.0	4.0
2019	3,458,081	1.67%	615.6	0.7	614.9	1.40%	569.6	0.7	568.9	1.79%	16.0	15.0	6.0
2020	3,515,837	1.67%	624.3	0.7	623.6	1.41%	579.8	0.7	579.1	1.79%	16.0	15.0	8.0
2021	3,567,809	1.48%	632.3	0.7	631.6	1.28%	589.0	0.7	588.3	1.59%	16.0	15.0	10.0
2022	3,619,625	1.45%	640.4	0.7	639.7	1.28%	598.1	0.7	597.4	1.55%	16.0	15.0	10.0
2023	3,665,050	1.25%	647.9	0.7	647.2	1.17%	606.2	0.7	605.5	1.36%	16.0	15.0	10.0
2024	3,713,246	1.32%	655.6	0.7	654.9	1.19%	614.7	0.7	614.0	1.40%	16.0	15.0	10.0
2025	3,755,533	1.14%	662.7	0.7	662.0	1.08%	622.2	0.7	621.5	1.22%	16.0	15.0	10.0
2026	3,800,005	1.18%	670.1	0.7	669.4	1.12%	630.0	0.7	629.3	1.26%	16.0	15.0	10.0
2027	3,843,862	1.15%	677.4	0.7	676.7	1.09%	637.8	0.8	637.0	1.22%	16.0	15.0	10.0
2028	3,888,305	1.16%	684.7	0.8	683.9	1.06%	645.6	0.8	644.8	1.22%	16.0	15.0	10.0
2029	3,933,368	1.16%	692.1	0.8	691.3	1.08%	653.6	0.8	652.8	1.24%	16.0	15.0	10.0
2030	3,978,987	1.16%	699.6	0.8	698.8	1.08%	661.7	0.8	660.9	1.24%	16.0	15.0	10.0
2031	4,025,257	1.16%	707.1	0.8	706.3	1.07%	669.8	0.8	669.0	1.23%	16.0	15.0	10.0
2032	4,072,137	1.16%	714.7	0.8	713.9	1.08%	678.1	0.8	677.3	1.24%	16.0	15.0	10.0
2033	4,119,650	1.17%	722.4	0.8	721.6	1.08%	686.5	0.8	685.7	1.24%	16.0	15.0	10.0
2034	4,167,820	1.17%	730.1	0.8	729.3	1.07%	695.0	0.8	694.2	1.24%	16.0	15.0	10.0
2035	4,216,657	1.17%	737.9	0.8	737.1	1.07%	703.7	0.8	702.9	1.25%	16.0	15.0	10.0
2036	4,266,394	1.18%	745.8	0.8	745.0	1.07%	712.5	0.8	711.7	1.25%	16.0	15.0	10.0

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


Montana-Dakota Integrated System
Energy Requirements and
Summer and Winter Season Peak Demand
Historical
Forecasted
Demand (MW)
Requirments (MWh)
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
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
Summer Peak Demand
Winter Peak Demand
Requirements

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

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2006	157,206		104,214		368,666		7,203		7,621		644,910	
2007	162,186	3.17%	109,101	4.69%	385,230	4.49%	7,187	-0.22%	7,456	-2.17%	671,160	4.07%
2008	162,182	0.00%	108,595	-0.46%	408,686	6.09%	7,244	0.79%	7,637	2.43%	694,344	3.45%
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	187,340	1.65%	134,871	2.42%	479,170	0.99%	7,103	0.01%	8,031	6.84%	816,515	1.42%
2018	188,625	0.69%	137,491	1.94%	481,543	0.50%	7,103	0.00%	8,051	0.25%	822,812	0.77%
2019	189,913	0.68%	140,006	1.83%	483,951	0.50%	7,103	0.00%	8,071	0.25%	829,044	0.76%
2020	191,207	0.68%	142,707	1.93%	485,912	0.41%	7,103	0.00%	8,091	0.25%	835,020	0.72%
2021	192,039	0.44%	144,977	1.59%	488,392	0.51%	7,103	0.00%	8,110	0.23%	840,621	0.67%
2022	192,505	0.24%	147,279	1.59%	490,914	0.52%	7,103	0.00%	8,130	0.25%	845,930	0.63%
2023	192,970	0.24%	149,444	1.47%	492,972	0.42%	7,103	0.00%	8,150	0.25%	850,639	0.56%
2024	193,436	0.24%	151,805	1.58%	495,567	0.53%	7,103	0.00%	8,170	0.25%	856,080	0.64%
2025	193,901	0.24%	154,192	1.57%	498,203	0.53%	7,103	0.00%	8,189	0.23%	861,588	0.64%
2026	194,367	0.24%	156,617	1.57%	500,881	0.54%	7,103	0.00%	8,209	0.24%	867,177	0.65%
2027	194,832	0.24%	159,075	1.57%	503,601	0.54%	7,103	0.00%	8,229	0.24%	872,840	0.65%
2028	195,298	0.24%	161,565	1.57%	506,365	0.55%	7,103	0.00%	8,249	0.24%	878,580	0.66%
2029	195,763	0.24%	164,093	1.56%	509,172	0.55%	7,103	0.00%	8,268	0.23%	884,399	0.66%
2030	196,229	0.24%	166,649	1.56%	512,023	0.56%	7,103	0.00%	8,288	0.24%	890,292	0.67%
2031	196,694	0.24%	169,240	1.55%	514,919	0.57%	7,103	0.00%	8,308	0.24%	896,264	0.67%
2032	197,160	0.24%	171,870	1.55%	517,861	0.57%	7,103	0.00%	8,328	0.24%	902,323	0.68%
2033	197,625	0.24%	174,533	1.55%	520,850	0.58%	7,103	0.00%	8,348	0.24%	908,458	0.68%
2034	198,091	0.24%	177,230	1.55%	523,886	0.58%	7,103	0.00%	8,367	0.23%	914,677	0.68%
2035	198,556	0.23%	179,974	1.55%	526,969	0.59%	7,103	0.00%	8,387	0.24%	920,990	0.69%
2036	199,022	0.23%	182,758	1.55%	530,119	0.60%	7,103	0.00%	8,407	0.24%	927,410	0.70%
2006-2016 Average Yearly Growth (10 Years History)		2.28%		2.98%		2.34%		-0.23%		0.36%		2.39%
2011-2016 Average Yearly Growth (5 Years History)		0.18%		1.76%		2.62%		0.05%		-0.60%		1.83%
2017-2022 Average Yearly Growth (5 Years)		0.56%		1.78%		0.48%		0.00%		0.24%		0.71%
2017-2027 Average Yearly Growth (10 Years)		0.37%		1.64%		0.49%		0.00%		0.24%		0.66%
2017-2036 Average Yearly Growth (19 Years)		0.28%		1.59%		0.53%		0.00%		0.24%		0.66%

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

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2006	550,071		274,728		564,963		20,772		43,337		1,453,871	
2007	568,710	3.39%	299,602	9.05%	570,170	0.92%	20,948	0.85%	43,819	1.11%	1,503,249	3.40%
2008	585,609	2.97%	320,093	6.84%	583,502	2.34%	21,201	1.21%	43,308	-1.17%	1,553,713	3.36%
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	787,442	5.50%	620,994	3.55%	639,921	3.56%	20,313	-0.36%	51,854	4.63%	2,120,524	4.26%
2018	799,109	1.48%	643,673	3.65%	649,685	1.53%	20,313	0.00%	52,415	1.08%	2,165,195	2.11%
2019	810,826	1.47%	666,552	3.55%	659,279	1.48%	20,313	0.00%	52,977	1.07%	2,209,947	2.07%
2020	822,594	1.45%	690,430	3.58%	669,390	1.53%	20,313	0.00%	53,538	1.06%	2,256,266	2.10%
2021	832,394	1.19%	711,435	3.04%	678,974	1.43%	20,313	0.00%	54,100	1.05%	2,297,216	1.81%
2022	840,462	0.97%	733,743	3.14%	689,444	1.54%	20,313	0.00%	54,662	1.04%	2,338,624	1.80%
2023	846,513	0.72%	752,903	2.61%	699,373	1.44%	20,313	0.00%	55,223	1.03%	2,374,325	1.53%
2024	852,564	0.71%	773,321	2.71%	710,213	1.55%	20,313	0.00%	55,785	1.02%	2,412,195	1.59%
2025	856,598	0.47%	790,307	2.20%	720,495	1.45%	20,313	0.00%	56,346	1.01%	2,444,058	1.32%
2026	860,632	0.47%	808,489	2.30%	731,712	1.56%	20,313	0.00%	56,908	1.00%	2,478,053	1.39%
2027	864,162	0.41%	826,201	2.19%	743,130	1.56%	20,313	0.00%	57,469	0.99%	2,511,275	1.34%
2028	867,691	0.41%	844,165	2.17%	754,753	1.56%	20,313	0.00%	58,031	0.98%	2,544,953	1.34%
2029	871,221	0.41%	862,387	2.16%	766,585	1.57%	20,313	0.00%	58,592	0.97%	2,579,098	1.34%
2030	874,751	0.41%	880,864	2.14%	778,628	1.57%	20,313	0.00%	59,154	0.96%	2,613,710	1.34%
2031	878,281	0.40%	899,603	2.13%	790,888	1.57%	20,313	0.00%	59,716	0.95%	2,648,801	1.34%
2032	881,810	0.40%	918,600	2.11%	803,367	1.58%	20,313	0.00%	60,277	0.94%	2,684,366	1.34%
2033	885,340	0.40%	937,863	2.10%	816,069	1.58%	20,313	0.00%	60,839	0.93%	2,720,424	1.34%
2034	888,870	0.40%	957,387	2.08%	829,000	1.58%	20,313	0.00%	61,400	0.92%	2,756,970	1.34%
2035	892,400	0.40%	977,179	2.07%	842,162	1.59%	20,313	0.00%	61,962	0.92%	2,794,016	1.34%
2036	895,929	0.40%	997,391	2.07%	855,625	1.60%	20,313	0.00%	62,523	0.91%	2,831,781	1.35%

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.

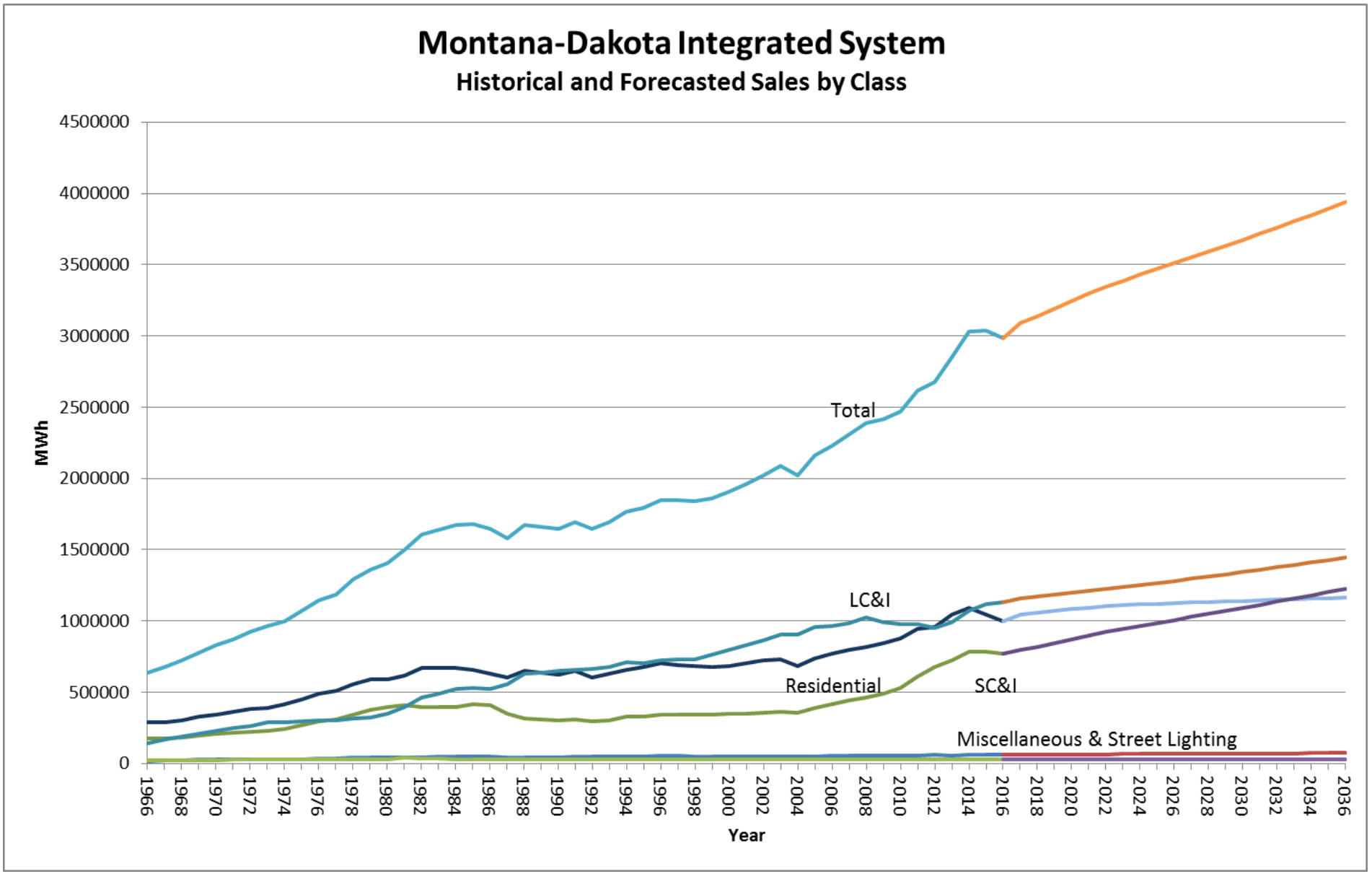
2006-2016 Average Yearly Growth (10 Years History)	4.06%	9.51%	0.41%	-0.43%	1.84%	4.02%
2011-2016 Average Yearly Growth (5 Years History)	2.31%	6.07%	4.80%	0.35%	1.57%	4.05%
2017-2022 Average Yearly Growth (5 Years)	1.33%	3.40%	1.50%	0.00%	1.06%	1.98%
2017-2027 Average Yearly Growth (10 Years)	0.93%	2.89%	1.50%	0.00%	1.03%	1.70%
2017-2036 Average Yearly Growth (19 Years)	0.61%	2.44%	1.54%	0.00%	0.99%	1.48%

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

	Residential		Small C&I		Large C&I		Street Lighting		Miscellaneous		Total Sales	
YEAR	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change	Sales (MWh)	% Change
2006	61,676		34,206		28,556		2,626		2,513		129,577	
2007	63,018	2.18%	35,211	2.94%	29,271	2.50%	2,638	0.46%	2,678	6.57%	132,816	2.50%
2008	67,104	6.48%	36,966	4.98%	30,891	5.53%	2,636	-0.08%	2,761	3.10%	140,358	5.68%
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	69,352	3.05%	37,924	5.94%	39,659	10.55%	2,568	2.03%	1,730	1.59%	151,233	5.61%
2018	69,358	0.01%	38,363	1.16%	40,664	2.53%	2,568	0.00%	1,730	0.00%	152,682	0.96%
2019	69,363	0.01%	38,767	1.05%	41,671	2.48%	2,568	0.00%	1,730	0.00%	154,099	0.93%
2020	69,358	-0.01%	39,215	1.16%	42,656	2.36%	2,568	0.00%	1,730	0.00%	155,527	0.93%
2021	69,352	-0.01%	39,669	1.16%	43,695	2.43%	2,568	0.00%	1,730	0.00%	157,014	0.96%
2022	69,363	0.02%	40,129	1.16%	44,755	2.43%	2,568	0.00%	1,730	0.00%	158,546	0.98%
2023	69,363	0.00%	40,551	1.05%	45,760	2.24%	2,568	0.00%	1,730	0.00%	159,972	0.90%
2024	69,363	0.00%	41,021	1.16%	46,866	2.42%	2,568	0.00%	1,730	0.00%	161,548	0.98%
2025	69,352	-0.02%	41,495	1.16%	47,991	2.40%	2,568	0.00%	1,730	0.00%	163,136	0.98%
2026	69,352	0.00%	41,975	1.16%	49,088	2.28%	2,568	0.00%	1,730	0.00%	164,713	0.97%
2027	69,342	-0.01%	42,462	1.16%	50,224	2.31%	2,568	0.00%	1,730	0.00%	166,326	0.98%
2028	69,332	-0.01%	42,953	1.16%	51,368	2.28%	2,568	0.00%	1,730	0.00%	167,951	0.98%
2029	69,321	-0.02%	43,450	1.16%	52,536	2.27%	2,568	0.00%	1,730	0.00%	169,606	0.99%
2030	69,300	-0.03%	43,953	1.16%	53,685	2.19%	2,568	0.00%	1,730	0.00%	171,235	0.96%
2031	69,280	-0.03%	44,462	1.16%	54,856	2.18%	2,568	0.00%	1,730	0.00%	172,897	0.97%
2032	69,259	-0.03%	44,976	1.16%	56,050	2.18%	2,568	0.00%	1,730	0.00%	174,584	0.98%
2033	69,238	-0.03%	45,497	1.16%	57,237	2.12%	2,568	0.00%	1,730	0.00%	176,270	0.97%
2034	69,207	-0.04%	46,024	1.16%	58,463	2.14%	2,568	0.00%	1,730	0.00%	177,991	0.98%
2035	69,176	-0.04%	46,556	1.16%	59,698	2.11%	2,568	0.00%	1,730	0.00%	179,728	0.98%
2036	69,155	-0.03%	47,097	1.16%	60,954	2.10%	2,568	0.00%	1,730	0.00%	181,504	0.99%
2006-2016 Average Yearly Growth												
(10 Years History)	1.19%		0.19%		2.67%		-0.24%		-4.51%		1.16%	
2011-2016 Average Yearly Growth												
(5 Years History)	-1.22%		0.04%		0.87%		-0.80%		-0.78%		-0.39%	
2017-2022 Average Yearly Growth												
(5 Years)	0.00%		1.13%		2.44%		0.00%		0.00%		0.95%	
2017-2027 Average Yearly Growth												
(10 Years)	0.00%		1.13%		2.38%		0.00%		0.00%		0.95%	
2017-2036 Average Yearly Growth												
(19 Years)	-0.01%		1.15%		2.29%		0.00%		0.00%		0.97%	

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

YEAR	Residential Sales (MWh)	% Change	Small C&I Sales (MWh)	% Change	Large C&I Sales (MWh)	% Change	Street Lighting Sales (MWh)	% Change	Miscellaneous Sales (MWh)	% Change	Total Sales Sales (MWh)	% Change	Total Energy Requirements MWh	% Change
2006	768,953		413,148		962,185		30,601		53,471		2,228,358		2,397,793	
2007	793,914	3.25%	443,914	7.45%	984,671	2.34%	30,773	0.56%	53,953	0.90%	2,307,225	3.54%	2,510,540	4.70%
2008	814,895	2.64%	465,654	4.90%	1,023,079	3.90%	31,081	1.00%	53,706	-0.46%	2,388,415	3.52%	2,596,990	3.44%
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	1,044,134	4.63%	793,789	3.47%	1,158,751	2.70%	29,984	-0.07%	61,615	4.82%	3,088,272	3.56%	3,341,449	4.20%
2018	1,057,092	1.24%	819,526	3.24%	1,171,891	1.13%	29,984	0.00%	62,196	0.94%	3,140,689	1.70%	3,398,163	1.70%
2019	1,070,102	1.23%	845,325	3.15%	1,184,901	1.11%	29,984	0.00%	62,778	0.94%	3,193,090	1.67%	3,454,860	1.67%
2020	1,083,159	1.22%	872,352	3.20%	1,197,959	1.10%	29,984	0.00%	63,359	0.93%	3,246,813	1.68%	3,512,986	1.68%
2021	1,093,785	0.98%	896,082	2.72%	1,211,061	1.09%	29,984	0.00%	63,940	0.92%	3,294,851	1.48%	3,564,963	1.48%
2022	1,102,330	0.78%	921,151	2.80%	1,225,113	1.16%	29,984	0.00%	64,522	0.91%	3,343,100	1.46%	3,617,168	1.46%
2023	1,108,846	0.59%	942,899	2.36%	1,238,104	1.06%	29,984	0.00%	65,103	0.90%	3,384,937	1.25%	3,662,434	1.25%
2024	1,115,363	0.59%	966,146	2.47%	1,252,645	1.17%	29,984	0.00%	65,685	0.89%	3,429,823	1.33%	3,711,000	1.33%
2025	1,119,851	0.40%	985,994	2.05%	1,266,689	1.12%	29,984	0.00%	66,265	0.88%	3,468,783	1.14%	3,753,154	1.14%
2026	1,124,351	0.40%	1,007,081	2.14%	1,281,680	1.18%	29,984	0.00%	66,847	0.88%	3,509,943	1.19%	3,797,688	1.19%
2027	1,128,336	0.35%	1,027,738	2.05%	1,296,956	1.19%	29,984	0.00%	67,428	0.87%	3,550,442	1.15%	3,841,507	1.15%
2028	1,132,321	0.35%	1,048,683	2.04%	1,312,486	1.20%	29,984	0.00%	68,010	0.86%	3,591,484	1.16%	3,885,914	1.16%
2029	1,136,305	0.35%	1,069,931	2.03%	1,328,293	1.20%	29,984	0.00%	68,590	0.85%	3,633,103	1.16%	3,930,945	1.16%
2030	1,140,280	0.35%	1,091,466	2.01%	1,344,335	1.21%	29,984	0.00%	69,172	0.85%	3,675,237	1.16%	3,976,533	1.16%
2031	1,144,255	0.35%	1,113,305	2.00%	1,360,664	1.21%	29,984	0.00%	69,754	0.84%	3,717,962	1.16%	4,022,760	1.16%
2032	1,148,229	0.35%	1,135,446	1.99%	1,377,278	1.22%	29,984	0.00%	70,335	0.83%	3,761,273	1.16%	4,069,622	1.16%
2033	1,152,203	0.35%	1,157,892	1.98%	1,394,156	1.23%	29,984	0.00%	70,917	0.83%	3,805,152	1.17%	4,117,098	1.17%
2034	1,156,168	0.34%	1,180,641	1.96%	1,411,349	1.23%	29,984	0.00%	71,497	0.82%	3,849,638	1.17%	4,165,232	1.17%
2035	1,160,132	0.34%	1,203,709	1.95%	1,428,829	1.24%	29,984	0.00%	72,079	0.81%	3,894,734	1.17%	4,214,024	1.17%
2036	1,164,106	0.34%	1,227,246	1.96%	1,446,698	1.25%	29,984	0.00%	72,660	0.81%	3,940,695	1.18%	4,263,753	1.18%
2006-2016 Average Yearly Growth (10 Years History)		3.50%		7.52%		1.27%		-0.36%		1.39%		3.41%		3.34%
2011-2016 Average Yearly Growth (5 Years History)		1.65%		4.94%		3.72%		0.18%		1.21%		3.19%		3.19%
2017-2022 Average Yearly Growth (5 Years)		1.11%		3.03%		1.11%		0.00%		0.93%		1.60%		1.60%
2017-2027 Average Yearly Growth (10 Years)		0.77%		2.61%		1.13%		0.00%		0.91%		1.40%		1.40%
2017-2036 Average Yearly Growth (19 Years)		0.51%		2.25%		1.17%		0.00%		0.87%		1.25%		1.25%


Montana-Dakota Integrated System
Historical and Forecasted Sales by Class
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
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
2006	550,071		61,026		9,014	
2007	568,710	3.39%	61,451	425	9,255	2.67%
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	787,442	5.50%	78,894	341	9,985	5.09%
2018	799,109	1.48%	79,894	1,000	10,010	0.25%
2019	810,826	1.47%	80,894	1,000	10,035	0.25%
2020	822,594	1.45%	81,894	1,000	10,060	0.25%
2021	832,394	1.19%	82,694	800	10,085	0.25%
2022	840,462	0.97%	83,494	800	10,085	0.00%
2023	846,513	0.72%	84,094	600	10,085	0.00%
2024	852,564	0.71%	84,694	600	10,085	0.00%
2025	856,598	0.47%	85,094	400	10,085	0.00%
2026	860,632	0.47%	85,494	400	10,085	0.00%
2027	864,162	0.41%	85,844	350	10,085	0.00%
2028	867,691	0.41%	86,194	350	10,085	0.00%
2029	871,221	0.41%	86,544	350	10,085	0.00%
2030	874,751	0.41%	86,894	350	10,085	0.00%
2031	878,281	0.40%	87,244	350	10,085	0.00%
2032	881,810	0.40%	87,594	350	10,085	0.00%
2033	885,340	0.40%	87,944	350	10,085	0.00%
2034	888,870	0.40%	88,294	350	10,085	0.00%
2035	892,400	0.40%	88,644	350	10,085	0.00%
2036	895,929	0.40%	88,994	350	10,085	0.00%

	Sales	Custs	Use/Cust
2006-2016 Average Yearly Growth (10 Years History)	4.06%	2.76%	1.27%
2011-2016 Average Yearly Growth (5 Years History)	2.31%	3.92%	-1.55%
2017-2022 Average Yearly Growth (5 Years)	1.33%	1.15%	0.21%
2017-2026 Average Yearly Growth (10 Years)	0.93%	0.85%	0.09%
2017-2036 Average Yearly Growth (19 Years)	0.61%	0.58%	0.03%

South Dakota

Year	Sales (MWh)	% Change	Avg Custs	Cust No Inc/(Dec)	Avg Use Per Cust (kWh/Yr)	% Change
2006	61,676		6,620		9,317	
2007	63,018	2.18%	6,593	(27)	9,558	2.59%
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	69,352	3.05%	6,671	125	10,400	1.16%
2018	69,358	0.01%	6,674	3	10,400	0.00%
2019	69,363	0.01%	6,677	3	10,400	0.00%
2020	69,358	-0.01%	6,679	2	10,400	0.00%
2021	69,352	-0.01%	6,681	2	10,400	0.00%
2022	69,363	0.02%	6,682	1	10,400	0.00%
2023	69,363	0.00%	6,682	-	10,400	0.00%
2024	69,363	0.00%	6,682	-	10,400	0.00%
2025	69,352	-0.02%	6,681	(1)	10,400	0.00%
2026	69,352	0.00%	6,681	-	10,400	0.00%
2027	69,342	-0.01%	6,680	(1)	10,400	0.00%
2028	69,332	-0.01%	6,679	(1)	10,400	0.00%
2029	69,321	-0.02%	6,678	(1)	10,400	0.00%
2030	69,300	-0.03%	6,676	(2)	10,400	0.00%
2031	69,280	-0.03%	6,674	(2)	10,400	0.00%
2032	69,259	-0.03%	6,672	(2)	10,400	0.00%
2033	69,238	-0.03%	6,670	(2)	10,400	0.00%
2034	69,207	-0.04%	6,667	(3)	10,400	0.00%
2035	69,176	-0.04%	6,664	(3)	10,400	0.00%
2036	69,155	-0.03%	6,662	(2)	10,400	0.00%

	Sales	Custs	Use/Cust
2006-2016 Average Yearly Growth (10 Years History)	1.19%	-0.03%	1.22%
2011-2016 Average Yearly Growth (5 Years History)	-1.22%	-0.07%	-1.15%
2017-2022 Average Yearly Growth (5 Years)	0.00%	0.03%	0.00%
2017-2026 Average Yearly Growth (10 Years)	0.00%	0.01%	0.00%
2017-2036 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
2006	157,206		18,505		8,495	
2007	162,186	3.17%	18,531	26	8,752	3.02%
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	187,340	1.65%	20,335	207	9,218	0.67%
2018	188,625	0.69%	20,435	100	9,241	0.25%
2019	189,913	0.68%	20,535	100	9,264	0.25%
2020	191,207	0.68%	20,635	100	9,287	0.25%
2021	192,039	0.44%	20,685	50	9,310	0.25%
2022	192,505	0.24%	20,735	50	9,310	0.00%
2023	192,970	0.24%	20,785	50	9,310	0.00%
2024	193,436	0.24%	20,835	50	9,310	0.00%
2025	193,901	0.24%	20,885	50	9,310	0.00%
2026	194,367	0.24%	20,935	50	9,310	0.00%
2027	194,832	0.24%	20,985	50	9,310	0.00%
2028	195,298	0.24%	21,035	50	9,310	0.00%
2029	195,763	0.24%	21,085	50	9,310	0.00%
2030	196,229	0.24%	21,135	50	9,310	0.00%
2031	196,694	0.24%	21,185	50	9,310	0.00%
2032	197,160	0.24%	21,235	50	9,310	0.00%
2033	197,625	0.24%	21,285	50	9,310	0.00%
2034	198,091	0.24%	21,335	50	9,310	0.00%
2035	198,556	0.23%	21,385	50	9,310	0.00%
2036	199,022	0.23%	21,435	50	9,310	0.00%

	Sales	Custs	Use/Cust
2006-2016 Average Yearly Growth (10 Years History)	2.28%	0.99%	1.27%
2011-2016 Average Yearly Growth (5 Years History)	0.18%	1.38%	-1.18%
2017-2022 Average Yearly Growth (5 Years)	0.56%	0.40%	0.21%
2017-2026 Average Yearly Growth (10 Years)	0.37%	0.30%	0.09%
2017-2036 Average Yearly Growth (19 Years)	0.28%	0.26%	0.03%

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
2006	768,952		86,150		8,926	
2007	793,914	3.25%	86,575	425	9,170	2.74%
2008	814,895	2.64%	87,262	687	9,338	1.83%
2009	846,289	3.85%	87,887	625	9,629	3.11%
2010	874,598	3.35%	88,944	1,057	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%	100,406	3,251	10,838	0.85%
2015	1,046,139	-3.87%	103,691	3,285	10,089	-6.91%
2016	997,971	-4.60%	105,227	1,536	9,484	-6.00%
2017	1,044,134	4.63%	105,900	673	9,860	3.96%
2018	1,057,092	1.24%	107,003	1,103	9,879	0.20%
2019	1,070,102	1.23%	108,106	1,103	9,899	0.20%
2020	1,083,159	1.22%	109,208	1,102	9,918	0.20%
2021	1,093,785	0.98%	110,060	852	9,938	0.20%
2022	1,102,330	0.78%	110,911	851	9,939	0.01%
2023	1,108,846	0.59%	111,561	650	9,939	0.01%
2024	1,115,363	0.59%	112,211	650	9,940	0.01%
2025	1,119,851	0.40%	112,660	449	9,940	0.00%
2026	1,124,351	0.40%	113,110	450	9,940	0.00%
2027	1,128,336	0.35%	113,509	399	9,940	0.00%
2028	1,132,321	0.35%	113,908	399	9,941	0.00%
2029	1,136,305	0.35%	114,307	399	9,941	0.00%
2030	1,140,280	0.35%	114,705	398	9,941	0.00%
2031	1,144,255	0.35%	115,103	398	9,941	0.00%
2032	1,148,229	0.35%	115,501	398	9,941	0.00%
2033	1,152,203	0.35%	115,899	398	9,941	0.00%
2034	1,156,168	0.34%	116,296	397	9,942	0.00%
2035	1,160,132	0.34%	116,693	397	9,942	0.00%
2036	1,164,106	0.34%	117,091	398	9,942	0.00%

	Sales	**Custs**	**Use/Cust**
2006-2016 Average Yearly Growth (10 Years History)	3.50%	2.20%	1.27%
2011-2016 Average Yearly Growth (5 Years History)	1.65%	3.14%	-1.44%
2017-2022 Average Yearly Growth (5 Years)	1.11%	0.94%	0.17%
2017-2027 Average Yearly Growth (10 Years)	0.77%	0.69%	0.08%
2017-2036 Average Yearly Growth (19 Years)	0.51%	0.49%	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 July and August demands and corresponding temperatures at times when the temperatures equaled or exceeded 85°F on Mondays through Thursdays are analyzed. The 2016 study results indicated that each one degree increase in temperature at the time of summer peak would result in an increase of approximately 6.7 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 1984 through 2015 (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	20.1
80%	100.6	25.5
85%	101.5	31.5
90%	102.6	38.9
95%	104.2	49.6
97%	105.2	56.3

As the table shows, there is a 90% probability that actual temperatures at the time of the system peak will not exceed 102.6°F. At this temperature, 38.9 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 probability of 90% 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 2017 90/10 forecasted demand is calculated to be the 2017 50/50 forecasted demand plus 38.9 MW as shown in the table above. From that point, the growth rate for the 90/10 forecast scenario is assumed to be the same as that of the 50/50 forecast scenario.

Alternate Summer Peak Demand Forecast Comparison

Year	Base Forecast (96.8 degrees F) 50/50 Forecast (MW)	Growth Rate	Alternate Forecast (102.6 degrees F) 90/10 Forecast (MW) */
2017	597.9		636.8
2018	606.4	1.42%	645.9
2019	614.9	1.40%	655.0
2020	623.6	1.41%	664.3
2021	631.6	1.28%	672.8
2022	639.7	1.28%	681.4
2023	647.2	1.17%	689.4
2024	654.9	1.19%	697.6
2025	662.0	1.08%	705.2
2026	669.4	1.12%	713.1
2027	676.7	1.09%	720.9
2028	683.9	1.06%	728.6
2029	691.3	1.08%	736.5
2030	698.8	1.08%	744.5
2031	706.3	1.07%	752.5
2032	713.9	1.08%	760.6
2033	721.6	1.08%	768.8
2034	729.3	1.07%	777.0
2035	737.1	1.07%	785.3
2036	745.0	1.07%	793.7

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

4.2. High-Growth and Low-Growth Scenario Forecasts

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

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

occurred from 1985 to 1993 (0.5%) was used as the low growth rate. Both periods consist of eight years of history.

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

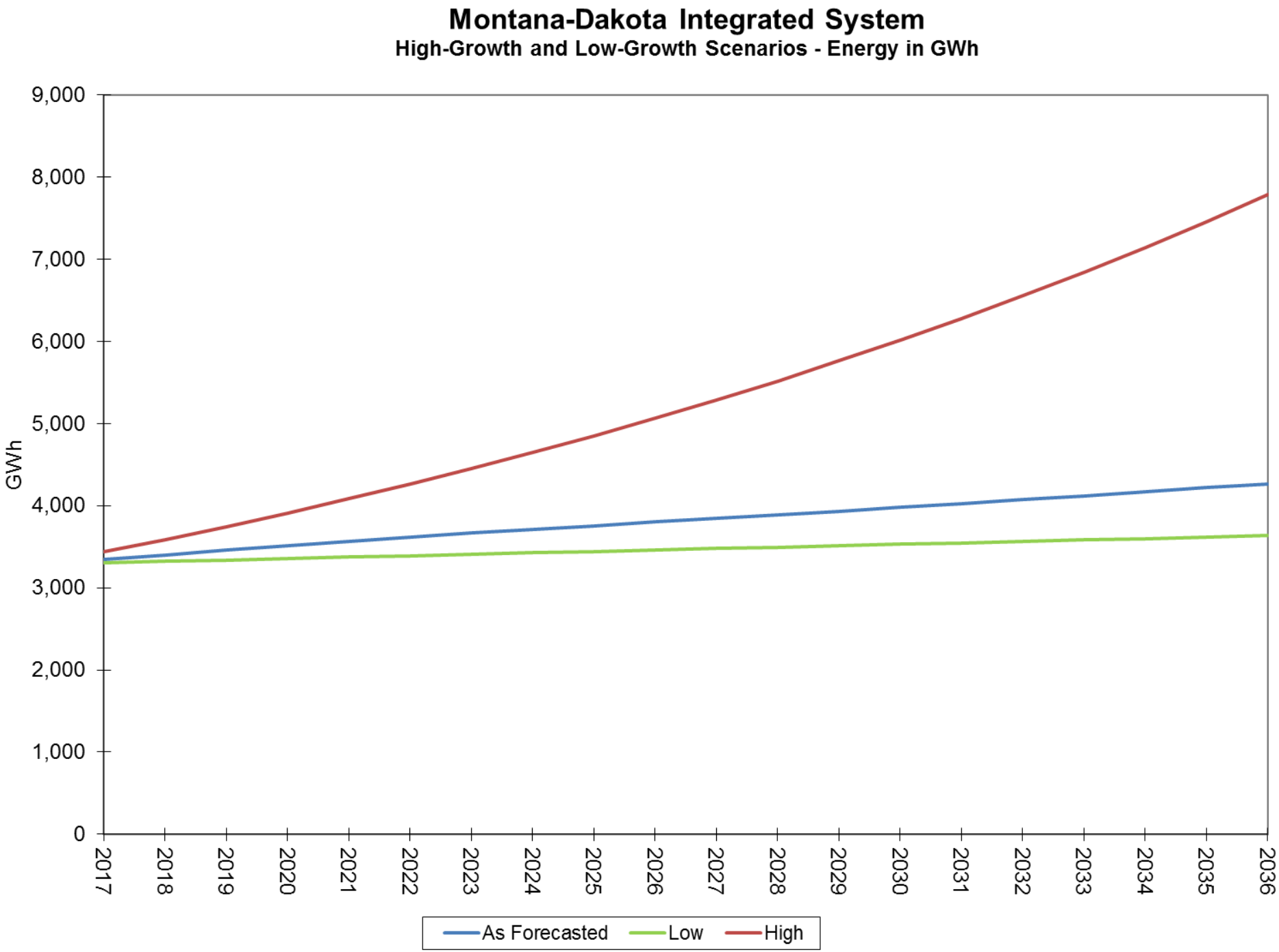
Demand for each scenario was derived by applying the load factors calculated from the base forecast to the high-growth and low-growth scenario forecasted energy.

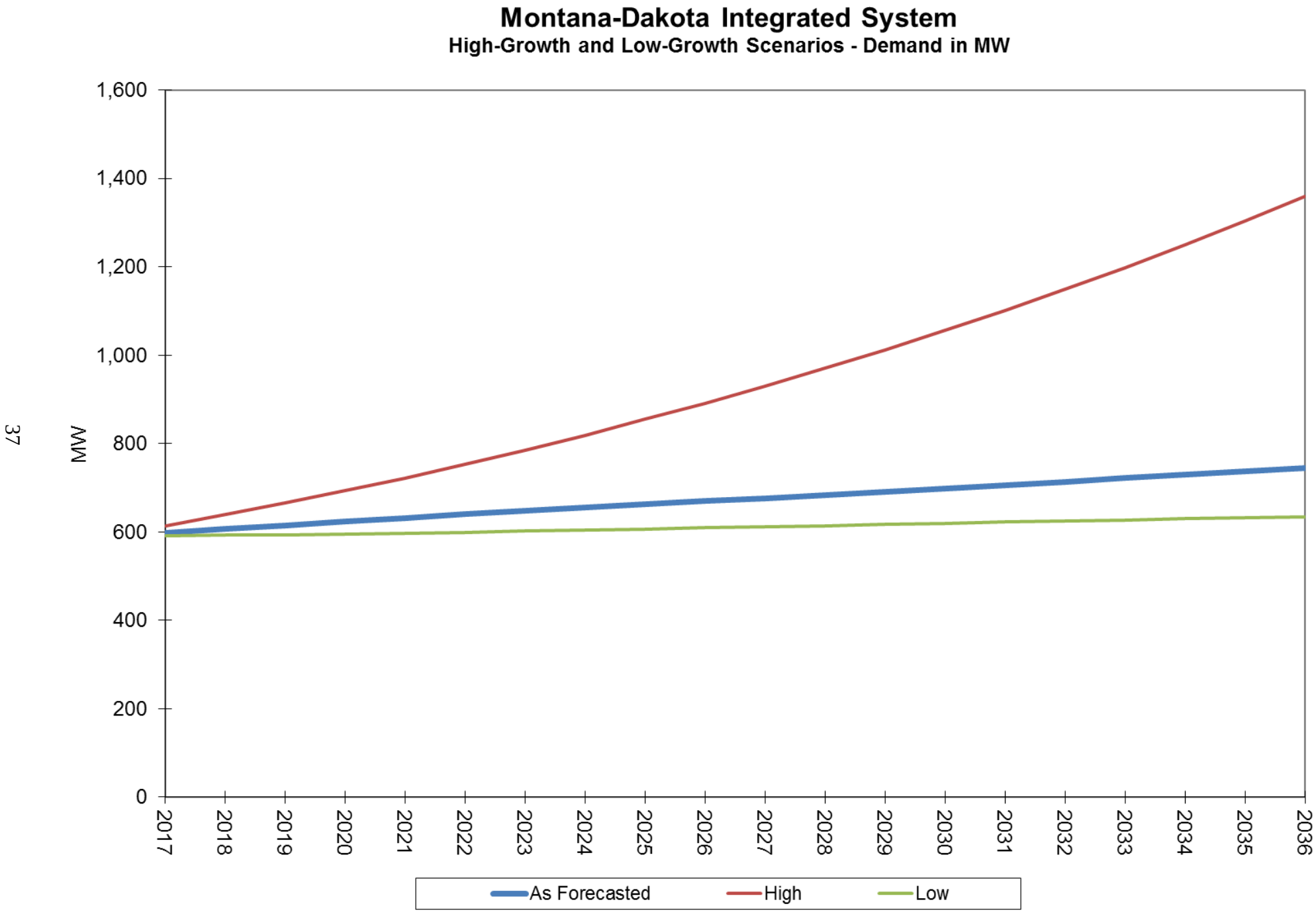
The results of the high-growth and low-growth scenarios for energy and demand are given below. The following two pages present the graphs of the numeric results.

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

	ENERGY			DEMAND		
	Forecast	HIGH 1/	LOW 2/	Forecast	HIGH	LOW
2017	3,344.6	3,434.6	3,306.2	597.9	614.0	591.0
2018	3,401.3	3,585.7	3,322.7	606.4	639.3	592.4
2019	3,458.1	3,743.5	3,339.3	614.9	665.6	593.8
2020	3,515.8	3,908.2	3,356.0	623.6	693.2	595.3
2021	3,567.8	4,080.2	3,372.8	631.6	722.3	597.1
2022	3,619.6	4,259.7	3,389.7	639.7	752.8	599.1
2023	3,665.1	4,447.1	3,406.6	647.2	785.3	601.6
2024	3,713.2	4,642.8	3,423.6	654.9	818.9	603.8
2025	3,755.5	4,847.1	3,440.7	662.0	854.4	606.5
2026	3,800.0	5,060.4	3,457.9	669.4	891.4	609.1
2027	3,843.9	5,283.1	3,475.2	676.7	930.1	611.8
2028	3,888.3	5,515.6	3,492.6	683.9	970.1	614.3
2029	3,933.4	5,758.3	3,510.1	691.3	1012.0	616.9
2030	3,979.0	6,011.7	3,527.7	698.8	1055.8	619.5
2031	4,025.3	6,276.2	3,545.3	706.3	1101.3	622.1
2032	4,072.1	6,552.4	3,563.0	713.9	1148.7	624.6
2033	4,119.7	6,840.7	3,580.8	721.6	1198.2	627.2
2034	4,167.8	7,141.7	3,598.7	729.3	1249.7	629.7
2035	4,216.7	7,455.9	3,616.7	737.1	1303.3	632.2
2036	4,266.4	7,784.0	3,634.8	745.0	1359.2	634.7

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


Montana-Dakota Integrated System
High-Growth and Low-Growth Scenarios - Energy in GWh
GWh
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
As Forecasted
Low
High


Montana-Dakota Integrated System
High-Growth and Low-Growth Scenarios - Demand in MW
MW
1,600
1,400
1,200
1,000
800
600
400
200
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
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 2011-2015 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 2001 through April 2016. (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) 0.6915	(6) 0.6234	(6) 0.6859
June	(3) 0.8867	(3) 0.8671	(3) 0.8834
July	(1) 0.9698	(1) 0.9527	(1) 0.9852
August	(2) 0.9574	(2) 0.9417	(2) 0.9482
September	(4) 0.8470	(4) 0.8127	(4) 0.8571
October	(5) 0.6930	(5) 0.7142	(5) 0.7021

Winter Season

	ND	SD	MT
November	(4) 0.8793	(3) 0.9005	(4) 0.9207
December	(2) 0.9515	(1) 0.9457	(1) 0.9690
January	(1) 0.9872	(2) 0.9186	(2) 0.9414
February	(3) 0.9234	(4) 0.8997	(3) 0.9226
March	(5) 0.8690	(5) 0.8912	(5) 0.8605
April	(6) 0.7805	(6) 0.7623	(6) 0.7524

3. For each season, the monthly ratios determined in Step 1 for the May 2011 through April 2016 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.

5-Year Average Monthly Ratios of Seasonal Peaks For North Dakota

January	0.9300 */	July	1.0000
February	0.8907	August	0.9412
March	0.8422	September	0.8396
April	0.7605	October	0.7571
May	0.7024	November	0.8675
June	0.9243	December	1.0000 */

5-Year Average Monthly Ratios of Seasonal Peaks For South Dakota

January	0.9682	July	1.0000
February	0.8862	August	0.9511
March	0.8596	September	0.8300
April	0.7388	October	0.7428
May	0.6293	November	0.9285
June	0.8968	December	1.0000

5-Year Average Monthly Ratios of Seasonal Peaks For Montana

January	0.9380	July	1.0000
February	0.9184	August	0.9460
March	0.8368	September	0.8034
April	0.7031	October	0.6651
May	0.6437	November	0.8905
June	0.8977	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 2036 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 2017-2026, 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

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

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

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

Montana-Dakota Utilities Co.
Integrated System Seasonal Peaks and Peak Month Load Factors 1/
1960 through 2016

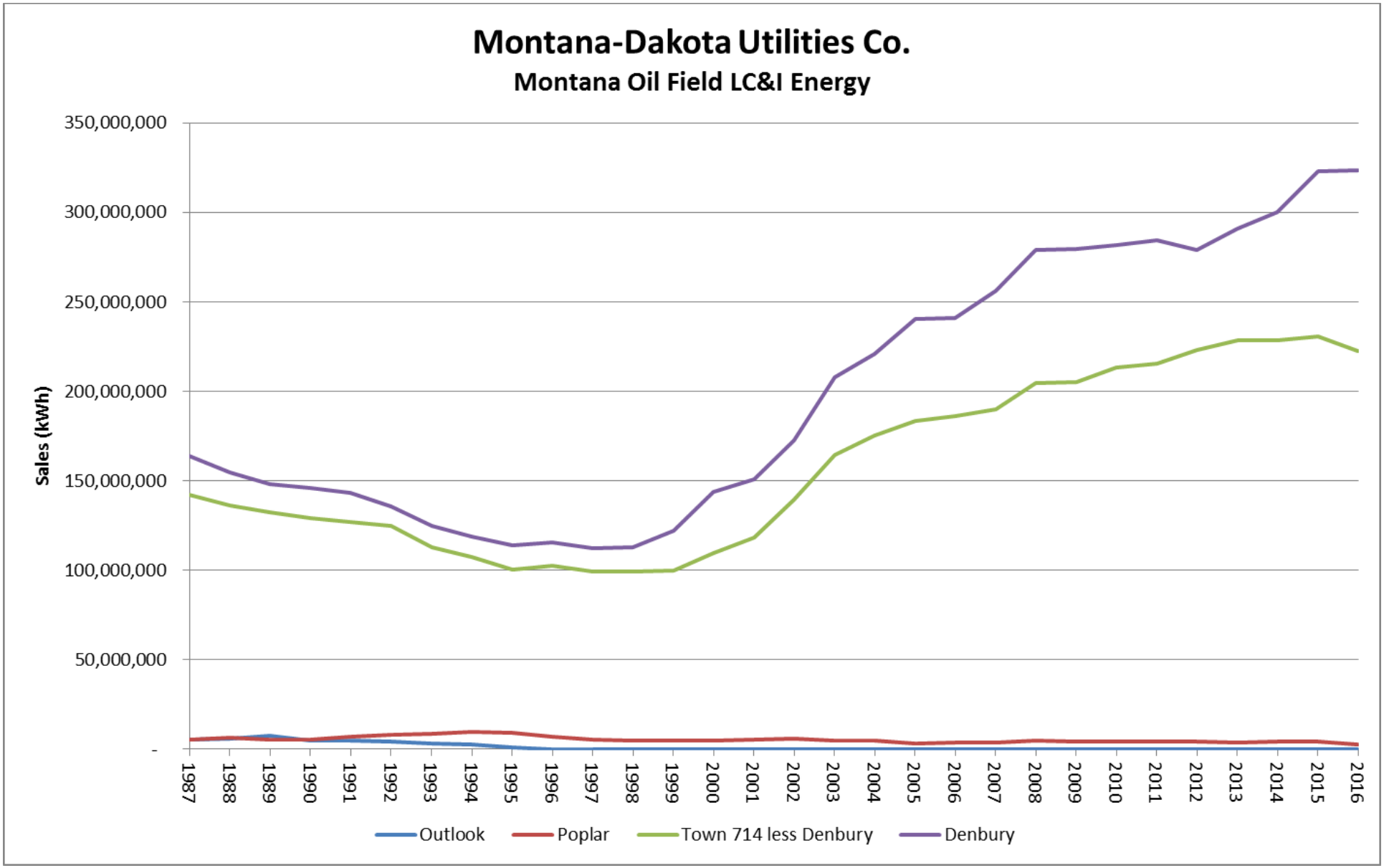
	SUMMER			WINTER			Annual
Year	MW	Month	Load Factor	MW	Month	Load Factor	load Factor
1960	76.7	AUG	70.7	109.3	DEC	58.8	50.9
1961	82.8	AUG	73.7	113.7	JAN	62.0	52.5
1962	83.8	AUG	76 4	123.2	JAN	65.4	53.7
1963	95.9	JUL	68.9	127.6	DEC	63.3	52.5
1964	101.8	AUG	68.2	138.2	DEC	64.2	51.8
1965	108.4	AUG	68.7	138.0	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				

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.
3/ Ratio of winter peak to preceding summer peak.

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	409.1	29.6	118.6	557.3	*
2015	438.2	30.2	143.2	611.6	382.0	25.5	107.4	514.9	*
2016	416.2	37.6	143.0	596.8					

* Winter peak is in the following year.


Montana-Dakota Utilities Co.
Montana Oil Field LC&I Energy
Sales (kWh)
350,000,000
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
-
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
Outlook
Poplar
Town 714 less Denbury
Denbury

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	0.114620	0.097287	0.100954	0.080129	0.065794	0.064065	0.079496	0.087134	0.075929	0.066339	0.066790	0.101463
Small C&I	0.099466	0.087110	0.093113	0.078888	0.071766	0.072896	0.079863	0.083662	0.080453	0.080231	0.074647	0.097904
Large C&I	0.090647	0.079370	0.085278	0.081367	0.075896	0.078885	0.084669	0.091460	0.085209	0.085662	0.073377	0.088181
Street Lighting	0.100702	0.084122	0.088015	0.082574	0.075552	0.074676	0.074800	0.074690	0.078278	0.086590	0.082797	0.097205
Other Public Sales	0.085256	0.074662	0.082326	0.077533	0.076447	0.081937	0.094849	0.098895	0.090188	0.086314	0.068919	0.082673
Interdepartmental	0.110270	0.096436	0.097810	0.089088	0.094719	0.073395	0.069133	0.071392	0.068065	0.072419	0.067382	0.089891
Company Use	0.098866	0.081210	0.088046	0.078796	0.077354	0.081046	0.088111	0.087187	0.083656	0.082083	0.070704	0.082941
Tesoro Refinery	0.084982	0.068458	0.085500	0.083813	0.077767	0.086268	0.084101	0.091894	0.087564	0.089746	0.078392	0.081515
Westmoreland Coal	0.102600	0.094990	0.093768	0.089496	0.073280	0.072807	0.071253	0.073919	0.072047	0.079636	0.080238	0.095964
Customers												
Residential	0.982780	0.986641	0.989936	0.991968	0.992523	0.996807	1.000347	1.002509	1.007154	1.011979	1.016378	1.020975
Small C&I	0.983337	0.984315	0.987141	0.990732	0.994820	0.998428	1.000188	1.004223	1.018976	1.018941	1.008258	1.010640
Large C&I	0.972447	0.977963	0.983768	0.987252	0.989864	1.006120	1.017731	0.985510	1.023537	1.027311	1.007281	1.021215
Street Lighting	1.040284	0.987268	0.985598	0.986850	0.987268	0.988103	0.989772	0.994364	1.004801	1.008975	1.010228	1.016489
Other Public Sales	1.000075	0.999776	1.000671	1.004547	1.005740	1.002758	1.001267	1.000075	1.012598	1.007231	0.985464	0.979799
Peak Demand	0.9300	0.8907	0.8422	0.7605	0.7024	0.9243	1.0000	0.9412	0.8396	0.7571	0.8675	1.0000

South Dakota

Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.119618	0.101831	0.105926	0.082188	0.067223	0.061072	0.075150	0.086411	0.071880	0.063553	0.065454	0.099694
Small C&I	0.108657	0.096005	0.101885	0.081802	0.069873	0.066933	0.077189	0.086102	0.076108	0.070889	0.067125	0.097434
Large C&I	0.088510	0.078746	0.083626	0.077687	0.073597	0.072773	0.074613	0.088198	0.086574	0.090287	0.084454	0.100936
Street Lighting	0.086681	0.080307	0.084317	0.084166	0.081134	0.081671	0.083646	0.080929	0.081204	0.086042	0.078559	0.091344
Other Public Sales	0.089919	0.082271	0.086582	0.082857	0.076885	0.086954	0.085717	0.090784	0.079404	0.078269	0.073002	0.087357
Interdepartmental	0.200637	0.161063	0.136802	0.077533	0.041050	0.038744	0.038697	0.039851	0.040911	0.029796	0.048937	0.145980
Company Use	0.174750	0.157089	0.162303	0.116886	0.059067	0.035394	0.035557	0.040337	0.034384	0.030879	0.042651	0.110703
Customers												
Residential	0.996265	0.996023	0.996235	0.997234	0.997507	0.998930	1.000959	1.000323	1.012012	1.010468	0.998203	0.995841
Small C&I	0.981811	0.981484	0.982901	0.990638	1.002297	1.011560	1.011451	1.009271	1.026707	1.017989	0.991836	0.992054
Large C&I	0.999516	0.999516	0.995642	0.997579	1.001453	0.989831	0.997579	0.997579	1.009201	1.011138	0.999516	1.001453
Street Lighting	1.250704	0.963380	0.963380	0.963380	0.963380	0.954930	0.954930	0.971831	0.980282	0.997183	1.005634	1.030986
Other Public Sales	0.981383	0.965426	0.957447	0.977394	1.025266	1.029255	1.033245	1.025266	1.041223	1.013298	0.977394	0.973404
Peak Demand	0.9682	0.8862	0.8596	0.7388	0.6293	0.8968	1.0000	0.9511	0.8300	0.7428	0.9285	1.0000

Montana

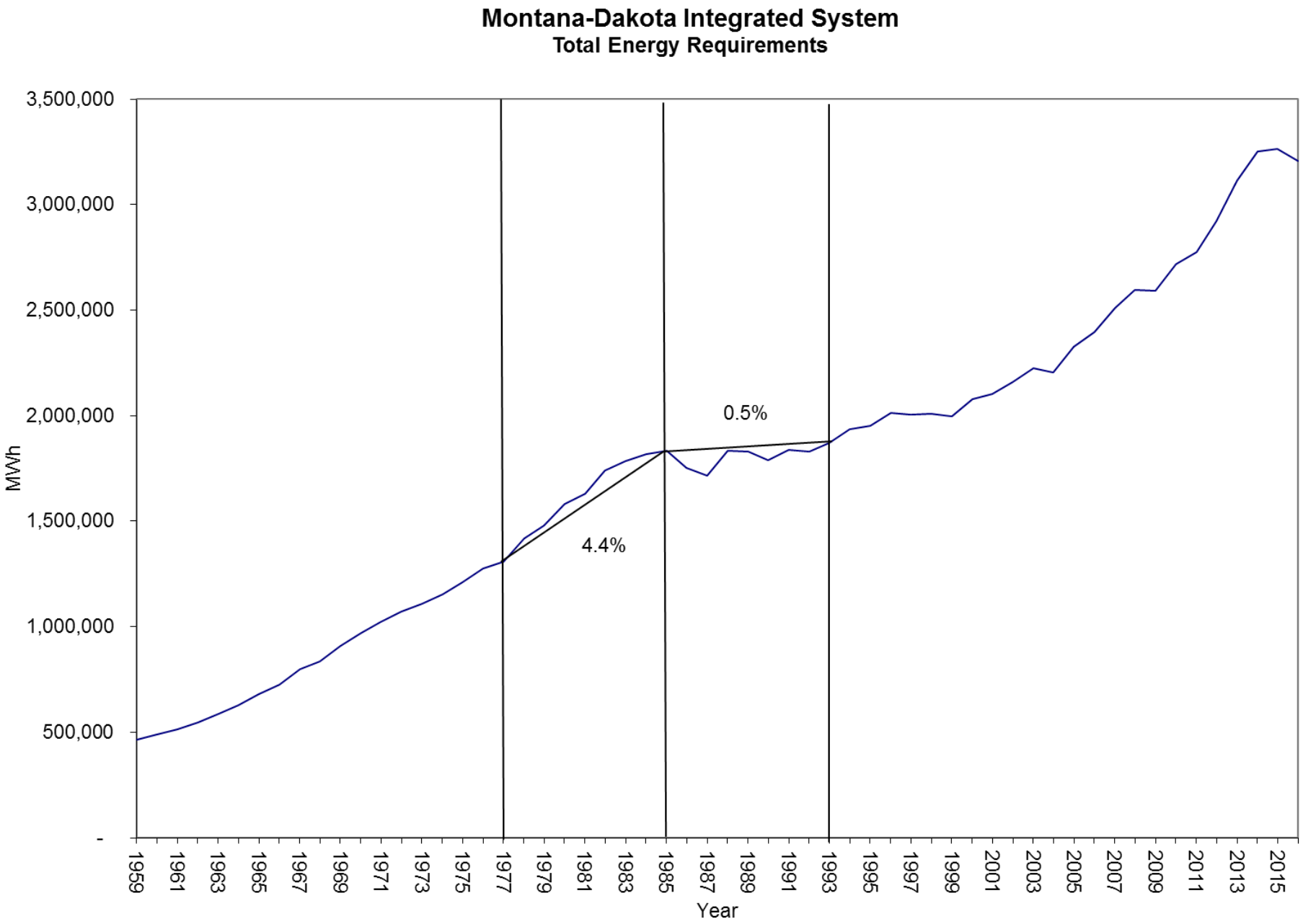
Sales	January	February	March	April	May	June	July	August	September	October	November	December
Residential	0.111691	0.093026	0.096375	0.077245	0.064799	0.064342	0.082063	0.099016	0.082299	0.068363	0.064559	0.096222
Small C&I	0.097038	0.086293	0.088642	0.079421	0.070858	0.073015	0.084201	0.098228	0.085376	0.078537	0.068862	0.089528
Large C&I	0.095564	0.082305	0.082110	0.081482	0.078019	0.080332	0.079645	0.083616	0.079731	0.087498	0.077776	0.091922
Street Lighting	0.091194	0.079017	0.082967	0.084513	0.081112	0.082215	0.084063	0.081616	0.081477	0.085563	0.078199	0.088064
Other Public Sales	0.082107	0.071479	0.080872	0.072760	0.072708	0.083884	0.103648	0.115770	0.096319	0.085219	0.059498	0.075735
Interdepartmental	0.110644	0.093498	0.096625	0.081099	0.071760	0.072016	0.074522	0.080328	0.074614	0.077850	0.071602	0.095440
Company Use	0.107114	0.093099	0.097879	0.081631	0.068905	0.067137	0.080855	0.092265	0.083399	0.070173	0.066079	0.091465
Oil Fields	0.091226	0.077041	0.083332	0.083017	0.079233	0.081784	0.083135	0.082121	0.082674	0.086827	0.081059	0.088551
Westmoreland Coal	0.124146	0.108483	0.107580	0.090048	0.073933	0.061428	0.061042	0.057883	0.055949	0.069550	0.080250	0.109707
Customers												
Residential	0.993994	0.995283	0.997626	0.997493	0.997145	0.998435	0.999335	1.000133	1.002282	1.003837	1.005934	1.008502
Small C&I	0.986439	0.984985	0.985928	0.993791	0.998902	1.005743	1.008338	1.010737	1.015651	1.009832	1.000239	0.999414
Large C&I	0.996547	0.985644	0.993640	0.998001	1.005270	0.988552	0.995094	0.995094	1.029257	1.029257	0.992913	0.990732
Street Lighting	1.189030	0.976703	0.994397	0.994397	0.976703	0.976703	0.976703	0.976703	0.983781	0.983781	0.980242	0.990858
Other Public Sales	0.995141	0.993197	0.991254	1.004859	1.006803	1.008746	1.006803	1.008746	1.012634	1.002915	0.983479	0.985423
Peak Demand	0.9380	0.9184	0.8368	0.7031	0.6437	0.8977	1.0000	0.9460	0.8034	0.6651	0.8905	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	55.5%	56.4%	58.6%	56.8%	56.2%	58.5%	52.5%	56.6%	55.8%	55.4%	55.2%	58.1%
South Dakota	60.3%	62.1%	64.5%	60.9%	59.9%	64.2%	57.2%	62.4%	58.4%	60.6%	61.3%	62.9%
Montana	58.1%	58.6%	64.9%	60.5%	59.7%	62.8%	56.6%	64.1%	58.9%	60.5%	56.9%	60.5%
Small Commercial & Industrial												
North Dakota	55.3%	56.4%	56.5%	55.6%	56.2%	58.4%	52.3%	54.2%	54.0%	53.7%	56.0%	57.7%
South Dakota	60.4%	60.9%	65.3%	59.3%	58.8%	62.7%	55.9%	62.4%	55.9%	60.3%	59.1%	63.0%
Montana	53.7%	55.4%	58.3%	53.5%	53.4%	56.0%	51.0%	57.4%	52.9%	53.9%	52.9%	55.2%
Large Commercial & Industrial												
North Dakota	55.4%	57.5%	57.8%	57.1%	56.7%	59.8%	54.1%	57.1%	56.0%	56.8%	59.6%	59.9%
South Dakota	65.4%	59.1%	70.3%	64.8%	60.4%	65.0%	62.2%	70.7%	59.0%	66.2%	63.4%	68.0%
Montana	38.0%	37.3%	36.0%	33.6%	33.1%	37.9%	33.5%	37.2%	31.8%	33.8%	36.4%	37.8%
Street Lighting												
North Dakota	51.2%	54.0%	50.8%	49.7%	49.9%	52.0%	47.8%	48.6%	48.9%	48.1%	52.7%	53.8%
South Dakota	57.7%	63.2%	58.8%	58.3%	59.2%	60.0%	57.8%	58.1%	56.8%	57.4%	61.9%	61.9%
Montana	56.2%	59.3%	55.8%	55.6%	53.4%	57.8%	54.1%	52.1%	55.3%	54.3%	58.1%	57.9%
Other Public Sales												
North Dakota	56.4%	59.8%	55.7%	55.6%	55.5%	57.5%	53.9%	54.2%	55.4%	54.1%	58.9%	59.4%
South Dakota	63.3%	60.2%	78.2%	62.0%	64.6%	64.5%	58.2%	71.6%	62.6%	74.0%	66.3%	67.2%
Montana	55.0%	50.8%	59.8%	56.0%	54.3%	54.6%	49.2%	58.4%	51.1%	58.6%	48.5%	56.1%
Interdepartmental												
North Dakota	61.7%	63.0%	63.4%	63.4%	61.5%	65.2%	59.6%	64.2%	60.3%	63.8%	61.2%	63.0%
South Dakota	24.2%	23.0%	20.7%	20.3%	18.0%	25.0%	19.6%	19.4%	19.7%	19.0%	24.0%	25.0%
Montana	50.8%	50.3%	61.6%	54.5%	54.7%	60.9%	54.0%	65.0%	52.7%	60.1%	51.3%	53.1%
Company Use												
North Dakota	48.1%	51.2%	47.4%	46.7%	47.3%	49.2%	44.0%	43.8%	45.0%	43.6%	49.2%	50.3%
South Dakota	75.5%	82.8%	74.2%	75.5%	77.4%	77.6%	73.4%	73.4%	75.4%	73.6%	83.0%	79.8%
Montana	64.7%	71.3%	67.5%	64.6%	66.6%	67.2%	61.8%	64.3%	63.1%	63.9%	69.0%	69.4%

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%


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

SOURCE:
1991-2015: 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

SOURCE:
1991-2015: CSBEPFL 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
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	1,436,821	4,530,212	665,390
1992	1,509,959	4,916,225	725,899
1993	1,544,265	5,020,518	736,994
1994	1,498,771	5,084,690	671,661
1995	1,479,541	5,037,292	685,282
1996	1,488,274	5,467,394	769,209
1997	1,486,735	5,248,980	739,173
1998	1,561,226	5,720,703	816,430
1999	1,583,266	5,717,237	848,020
2000	1,578,545	6,111,689	909,896
2001	1,638,738	6,251,028	916,289
2002	1,587,612	6,108,846	774,299
2003	1,712,902	6,632,909	933,994
2004	1,731,631	6,676,069	931,997
2005	1,757,492	6,980,504	929,576
2006	1,745,266	7,181,624	724,069
2007	1,906,093	7,770,069	932,479
2008	2,017,001	8,664,999	1,066,848
2009	1,981,042	8,753,092	932,126
2010	2,142,555	9,780,302	946,415
2011	2,261,934	11,545,983	1,158,873
2012	2,541,538	14,106,013	1,168,388
2013	2,580,212	14,678,061	1,111,720
2014	2,591,076	15,841,646	1,188,151
2015	2,540,161	16,110,097	1,176,435

SOURCES:
1991-2014: U.S. Dept. of Commerce
2015: 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	3.7%
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%

SOURCES:
1991-2014 U.S. Department of Commerce
2015-2036 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	25,352	18,883	95,816	65,196	11,012	6,602
2012	25,402	19,191	96,736	67,888	10,989	6,616
2013	25,496	19,616	97,816	70,949	10,982	6,590
2014	25,534	19,918	99,095	73,909	10,989	6,580
2015	25,763	20,135	101,162	76,894	11,061	6,662
2016	25,970	20,235	103,143	77,894	11,121	6,667
2017	26,153	20,335	105,059	78,894	11,173	6,671
2018	26,306	20,435	106,902	79,894	11,212	6,674
2019	26,442	20,535	108,705	80,894	11,245	6,677
2020	26,573	20,635	110,497	81,894	11,272	6,679
2021	26,690	20,685	112,279	82,694	11,295	6,681
2022	26,779	20,735	113,956	83,494	11,306	6,682
2023	26,850	20,785	115,581	84,094	11,309	6,682
2024	26,910	20,835	117,184	84,694	11,307	6,682
2025	26,963	20,885	118,771	85,094	11,301	6,681
2026	27,006	20,935	120,350	85,494	11,294	6,681
2027	27,046	20,985	121,931	85,844	11,285	6,680
2028	27,081	21,035	123,507	86,194	11,272	6,679
2029	27,105	21,085	125,059	86,544	11,257	6,678
2030	27,122	21,135	126,587	86,894	11,237	6,676
2031	27,129	21,185	128,106	87,244	11,213	6,674
2032	27,126	21,235	129,592	87,594	11,185	6,672
2033	27,119	21,285	131,069	87,944	11,155	6,670
2034	27,102	21,335	132,531	88,294	11,124	6,667
2035	27,089	21,385	134,010	88,644	11,091	6,664
2036	27,083	21,435	135,553	88,994	11,065	6,662

*/ 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
1991-2015: Actuals from Montana-Dakota Utilities Co. Customer Information System Active Customers Report
2016-2036: 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	28,937				99,960				11,329	
1992	28,628	-1.07%			101,182	1.22%			11,320	-0.08%
1993	29,144	1.80%			104,024	2.81%			11,380	0.53%
1994	30,485	4.60%			108,815	4.61%			12,271	7.83%
1995	30,210	-0.90%			109,416	0.55%			12,018	-2.06%
1996	30,125	-0.28%			111,670	2.06%			12,244	1.88%
1997	30,477	1.17%			113,466	1.61%			12,135	-0.89%
1998	30,939	1.52%			116,114	2.33%			12,229	0.77%
1999	30,698	-0.78%			117,324	1.04%			12,180	-0.40%
2000	30,733	0.11%			119,260	1.65%			12,276	0.79%
2001	30,250	-1.57%			119,645	0.32%			12,485	1.70%
2002	30,268	0.06%			121,189	1.29%			12,339	-1.17%
2003	30,672	1.33%			122,741	1.28%			12,142	-1.60%
2004	30,699	0.09%			125,378	2.15%			12,299	1.29%
2005	30,669	-0.10%			128,194	2.25%			12,456	1.28%
2006	30,962	0.96%			132,103	3.05%			12,548	0.74%
2007	31,745	2.53%			135,004	2.20%			12,578	0.24%
2008	32,517	2.43%			138,424	2.53%			12,846	2.13%
2009	32,815	0.92%			140,892	1.78%			13,008	1.26%
2010	33,355	1.65%			145,049	2.95%			13,354	2.66%
2011	34,880	4.57%			156,647	8.00%			13,497	1.07%
2012	35,883	2.88%			172,610	10.19%			13,592	0.70%
2013	36,431	1.53%			183,032	6.04%			13,537	-0.40%
2014	36,591	0.44%			192,475	5.16%			13,667	0.96%
2015	37,200	1.66%			197,269	2.49%			13,821	1.13%
2016	37,810	1.64%	36,650	-1.48%	202,070	2.43%	194,246	-1.53%	13,969	1.07%
2017	38,394	1.54%	37,014	0.99%	206,800	2.34%	198,935	2.41%	14,120	1.08%
2018	38,972	1.51%	37,379	0.99%	211,577	2.31%	203,680	2.39%	14,253	0.94%
2019	39,554	1.49%	37,747	0.98%	216,409	2.28%	208,480	2.36%	14,378	0.88%
2020	40,123	1.44%	38,116	0.98%	221,312	2.27%	213,336	2.33%	14,503	0.87%
2021	40,698	1.43%	38,394	0.73%	226,317	2.26%	217,721	2.06%	14,623	0.83%
2022	41,278	1.43%	38,673	0.73%	231,389	2.24%	222,151	2.03%	14,743	0.82%
2023	41,852	1.39%	38,954	0.73%	236,511	2.21%	226,087	1.77%	14,851	0.73%
2024	42,422	1.36%	39,235	0.72%	241,684	2.19%	230,057	1.76%	14,971	0.81%
2025	42,977	1.31%	39,516	0.72%	246,902	2.16%	233,511	1.50%	15,089	0.79%
2026	43,537	1.30%	39,799	0.72%	252,170	2.13%	236,988	1.49%	15,188	0.66%
2027	44,089	1.27%	40,083	0.71%	257,475	2.10%	240,347	1.42%	15,293	0.69%
2028	44,635	1.24%	40,367	0.71%	262,825	2.08%	243,725	1.41%	15,392	0.65%
2029	45,177	1.21%	40,653	0.71%	268,210	2.05%	247,123	1.39%	15,491	0.64%
2030	45,705	1.17%	40,939	0.70%	273,634	2.02%	250,540	1.38%	15,575	0.54%
2031	46,239	1.17%	41,226	0.70%	279,108	2.00%	253,977	1.37%	15,659	0.54%
2032	46,748	1.10%	41,515	0.70%	284,619	1.97%	257,433	1.36%	15,742	0.53%
2033	47,264	1.10%	41,804	0.70%	290,168	1.95%	260,909	1.35%	15,815	0.46%
2034	47,769	1.07%	42,094	0.69%	295,778	1.93%	264,404	1.34%	15,893	0.49%
2035	48,268	1.04%	42,385	0.69%	301,445	1.92%	267,919	1.33%	15,966	0.46%
2036	48,770	1.04%	42,676	0.69%	307,174	1.90%	271,453	1.32%	16,036	0.44%

SOURCES:

Number of Employees:

1991-2014: U.S. Department of Commerce

2015-2036: Woods & Poole Economics Inc.

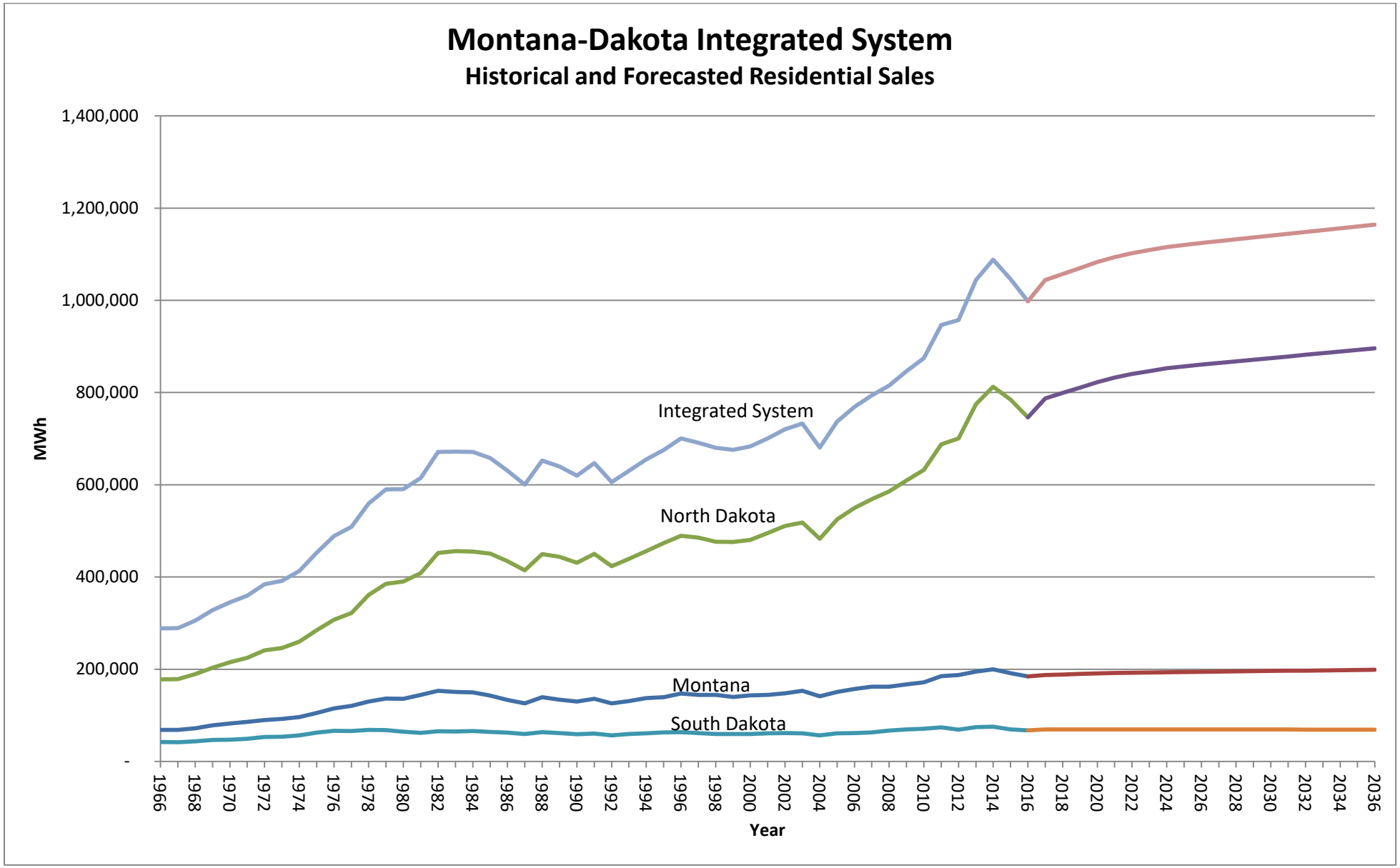
Adjusted Employment:

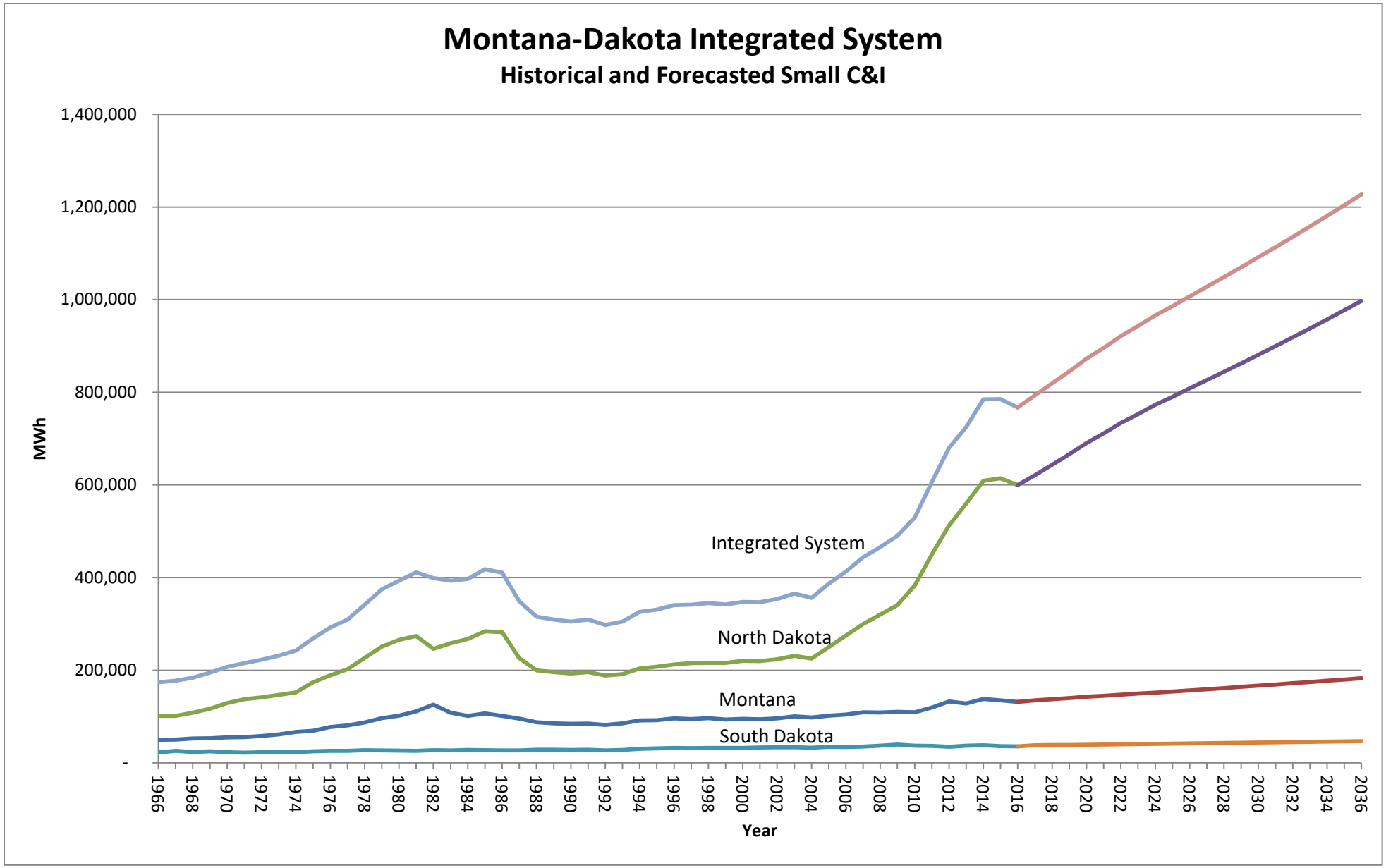
2016-2036: For Montana and North Dakota, employment was tied to the growth in residential customers by running a regression on the historical (1981-2015) ratio of actual residential customer numbers to employees. Those regression results were then applied on a forecasted basis to the adjusted forecast of residential customer numbers to arrive an adjusted forecast of number of employees.
No adjustment was made to South Dakota employment.

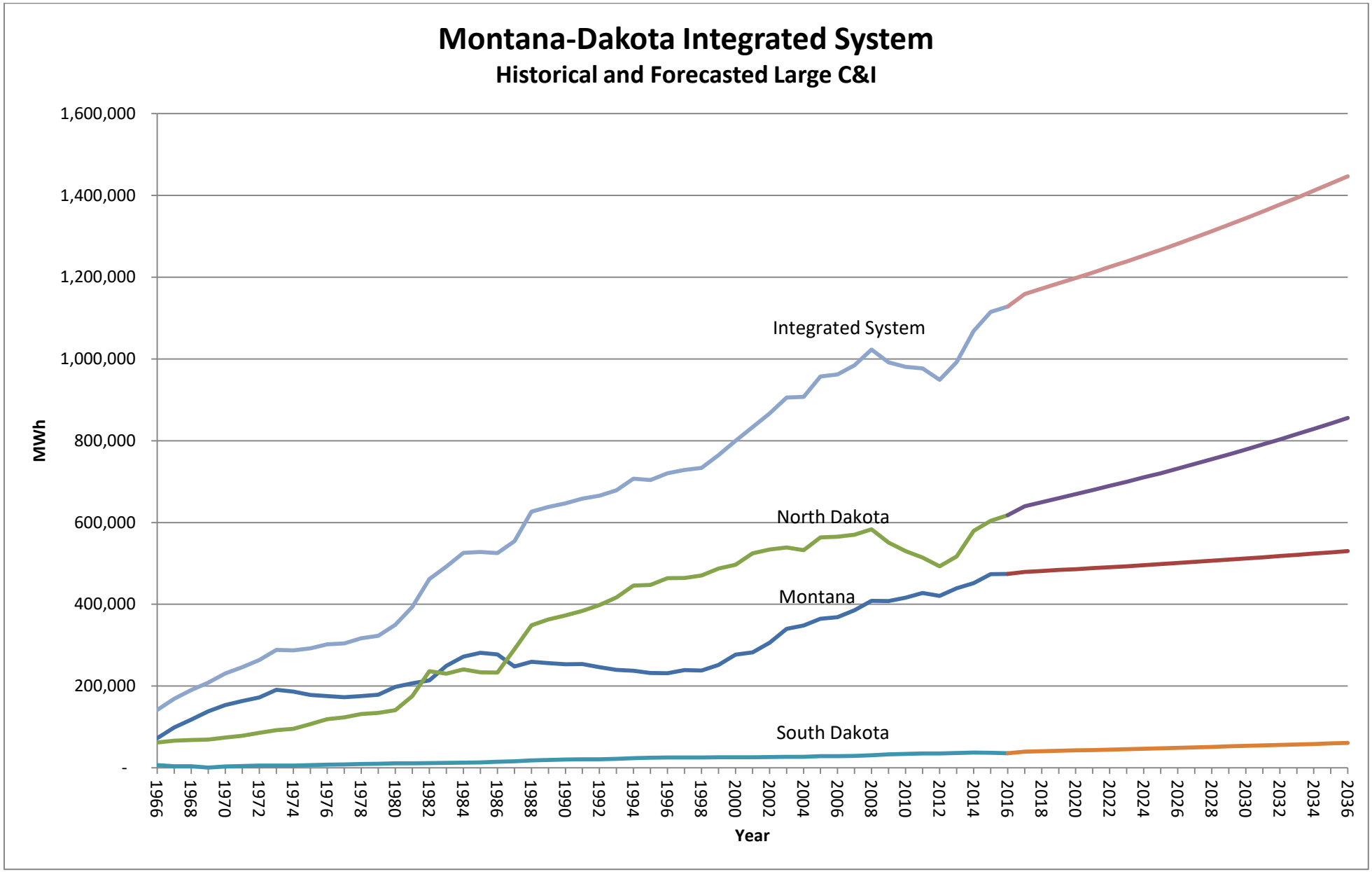
NOTE: The number of employees used for the forecast is total employment less farming and mining employment (most farms are not served by Montana-Dakota and the mining sector (oil fields and coal mining) is forecasted separately).

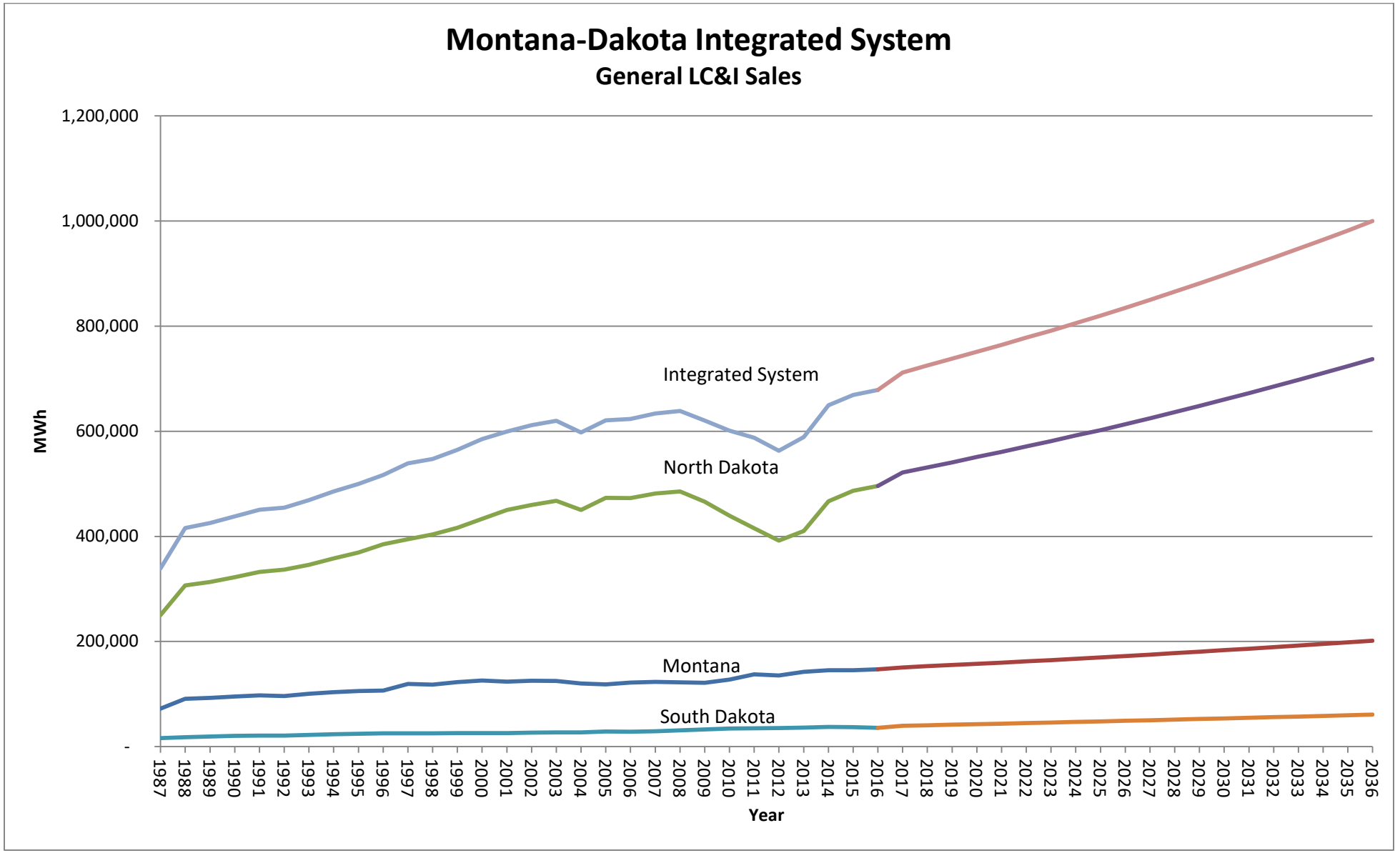
APPENDIX C

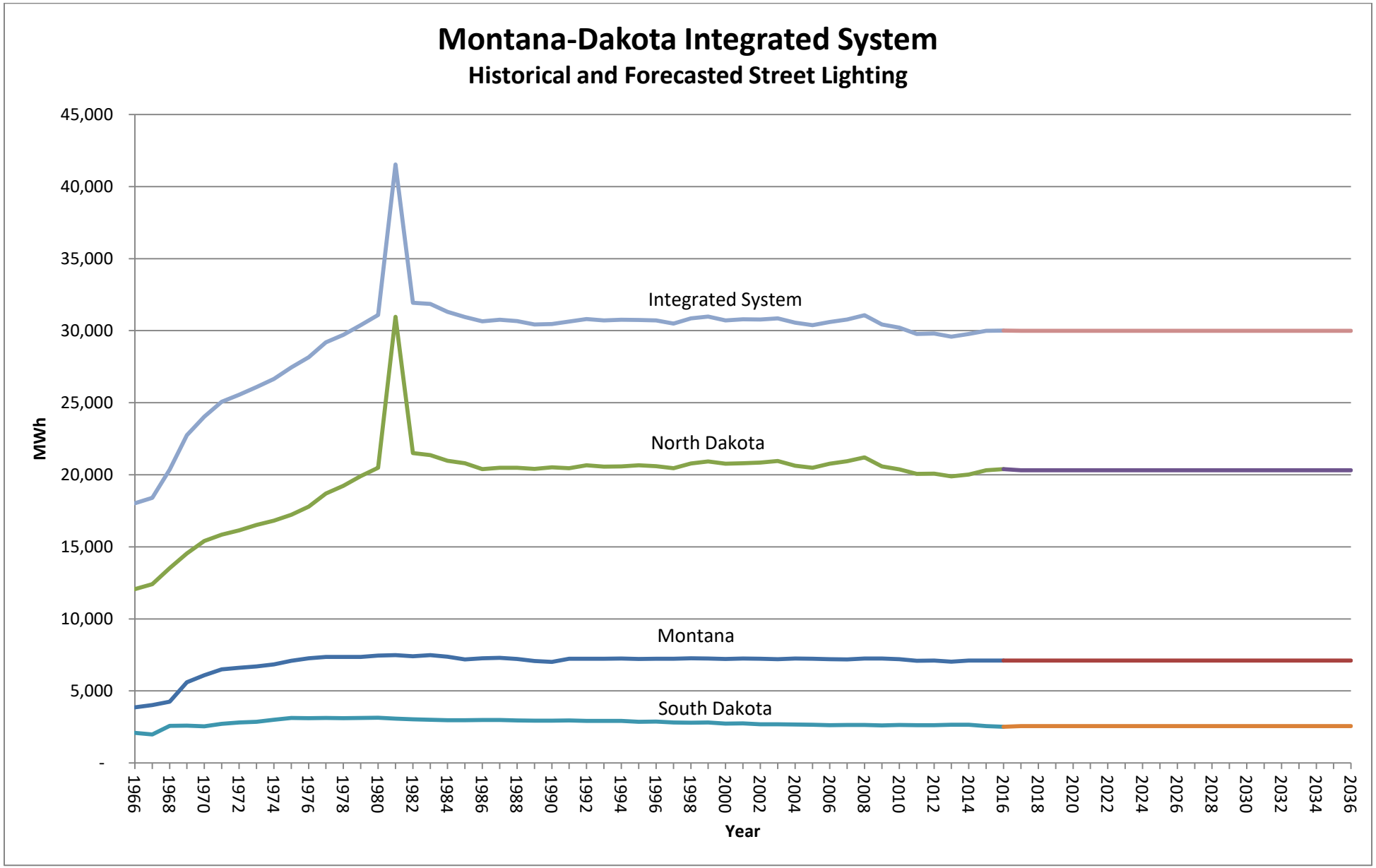
Integrated System Forecast Results

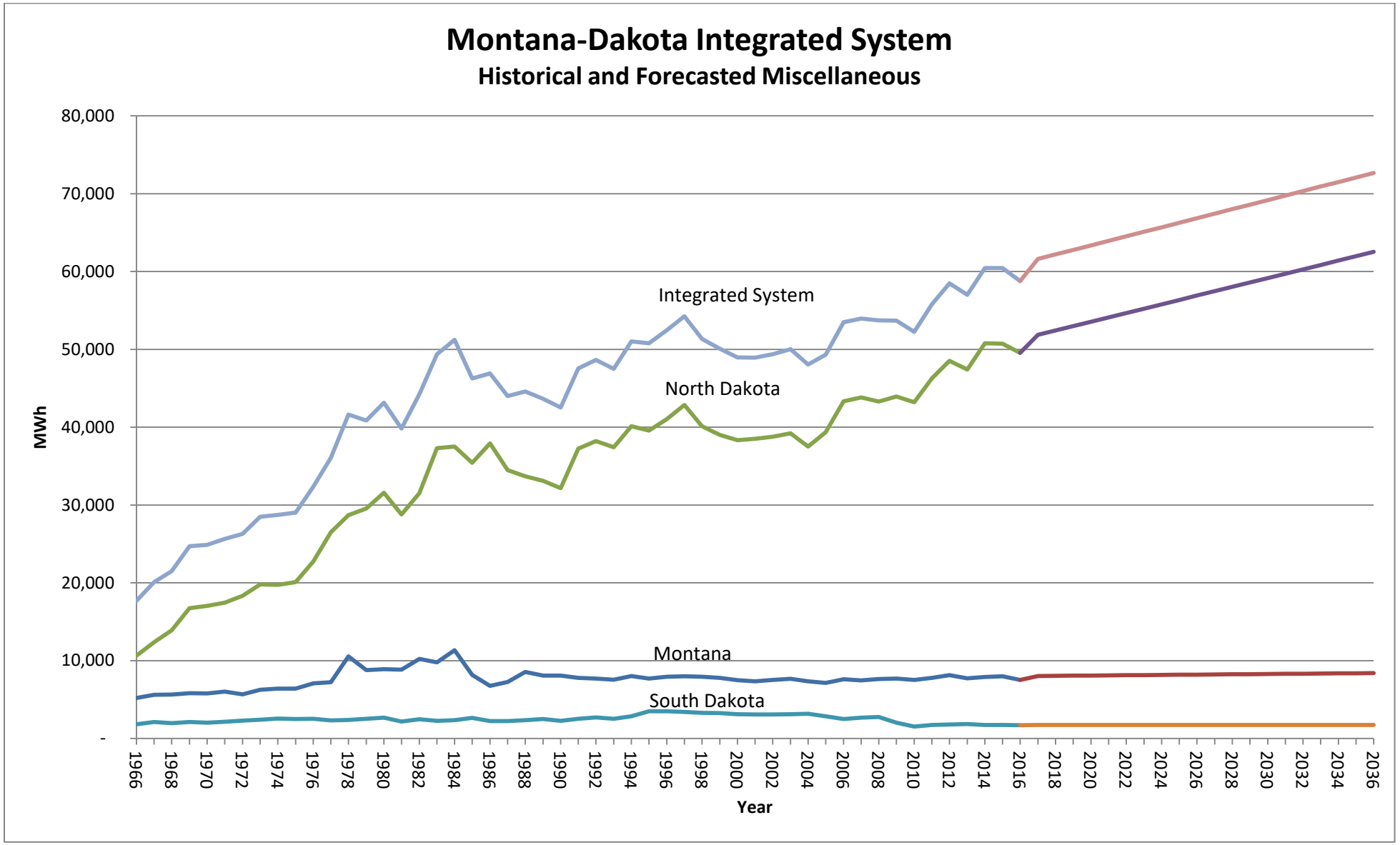

Montana-Dakota Integrated System
Historical and Forecasted Residential Sales
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
MWh
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006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

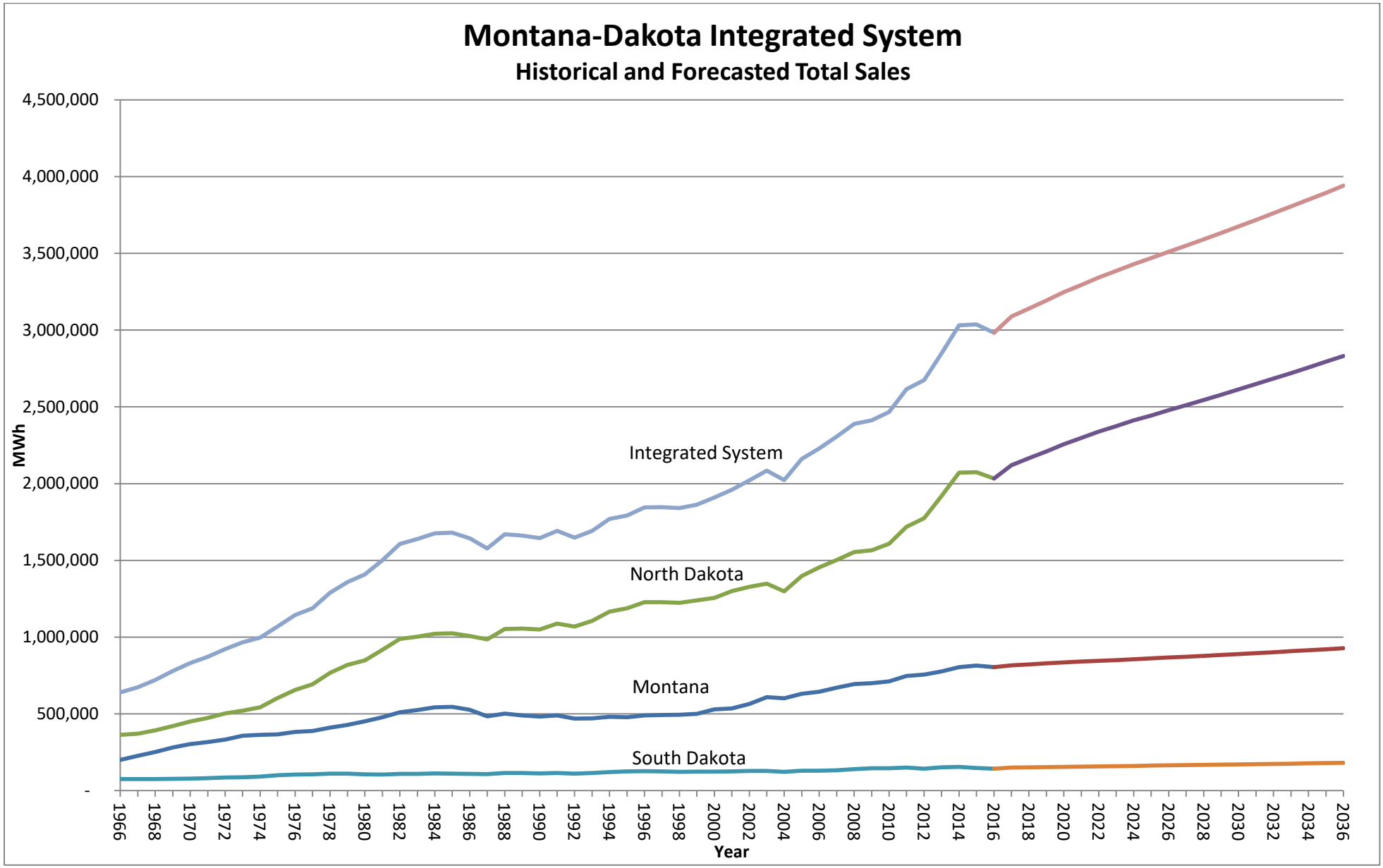

Montana-Dakota Integrated System
Historical and Forecasted Small C&I
MWh
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
Integrated System
North Dakota
Montana
South Dakota
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010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


Montana-Dakota Integrated System
Historical and Forecasted Large C&I
MWh
1,600,000
1,400,000
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
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
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
Year


Montana-Dakota Integrated System
Historical and Forecasted Street Lighting
MWh
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Integrated System
North Dakota
Montana
South Dakota
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 Miscellaneous
MWh
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
-
Integrated System
North Dakota
Montana
South Dakota
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
MWh
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
-
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 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 (%)
2017	158.0		145.0		883.8		63.87%
2018	158.8	0.50%	146.3	0.90%	890.6	0.77%	64.04%
2019	159.6	0.51%	147.6	0.89%	897.3	0.75%	64.19%
2020	160.3	0.48%	148.9	0.85%	903.8	0.72%	64.35%
2021	161.1	0.46%	150.0	0.76%	909.8	0.66%	64.49%
2022	161.8	0.45%	151.1	0.71%	915.5	0.63%	64.60%
2023	162.6	0.49%	152.1	0.67%	920.6	0.56%	64.64%
2024	163.4	0.50%	153.2	0.72%	926.5	0.64%	64.73%
2025	164.4	0.60%	154.3	0.73%	932.5	0.65%	64.76%
2026	165.3	0.59%	155.4	0.72%	938.5	0.64%	64.80%
2027	166.3	0.60%	156.6	0.73%	944.7	0.66%	64.84%
2028	167.3	0.57%	157.7	0.73%	950.9	0.66%	64.89%
2029	168.3	0.59%	158.9	0.74%	957.2	0.66%	64.94%
2030	169.2	0.59%	160.1	0.74%	963.6	0.67%	64.99%
2031	170.2	0.57%	161.2	0.72%	970.0	0.66%	65.05%
2032	171.2	0.57%	162.4	0.74%	976.6	0.68%	65.12%
2033	172.2	0.61%	163.7	0.78%	983.2	0.68%	65.16%
2034	173.2	0.56%	164.9	0.73%	990.0	0.69%	65.25%
2035	174.3	0.60%	166.2	0.78%	996.8	0.69%	65.30%
2036	175.3	0.60%	167.5	0.78%	1,003.7	0.69%	65.36%

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 (%)
2017	410.6		377.0		2,297.1		63.86%
2018	418.2	1.85%	385.4	2.23%	2,345.4	2.10%	64.02%
2019	425.7	1.79%	393.8	2.18%	2,393.9	2.07%	64.19%
2020	433.5	1.83%	402.5	2.21%	2,443.7	2.08%	64.35%
2021	440.5	1.61%	410.3	1.94%	2,488.0	1.81%	64.48%
2022	447.6	1.61%	418.0	1.88%	2,532.5	1.79%	64.59%
2023	454.1	1.45%	424.8	1.63%	2,571.2	1.53%	64.64%
2024	460.7	1.45%	431.9	1.67%	2,611.8	1.58%	64.72%
2025	466.5	1.26%	438.0	1.41%	2,646.4	1.32%	64.76%
2026	472.7	1.33%	444.3	1.44%	2,683.1	1.39%	64.80%
2027	478.7	1.27%	450.6	1.42%	2,719.1	1.34%	64.84%
2028	484.7	1.25%	457.0	1.42%	2,755.6	1.34%	64.90%
2029	490.8	1.26%	463.5	1.42%	2,792.6	1.34%	64.95%
2030	497.0	1.26%	470.0	1.40%	2,830.0	1.34%	65.00%
2031	503.2	1.25%	476.7	1.43%	2,868.0	1.34%	65.06%
2032	509.6	1.27%	483.5	1.43%	2,906.5	1.34%	65.11%
2033	515.9	1.24%	490.3	1.41%	2,945.6	1.35%	65.18%
2034	522.3	1.24%	497.2	1.41%	2,985.2	1.34%	65.25%
2035	528.9	1.26%	504.3	1.43%	3,025.3	1.34%	65.30%
2036	535.4	1.23%	511.5	1.43%	3,066.2	1.35%	65.38%

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

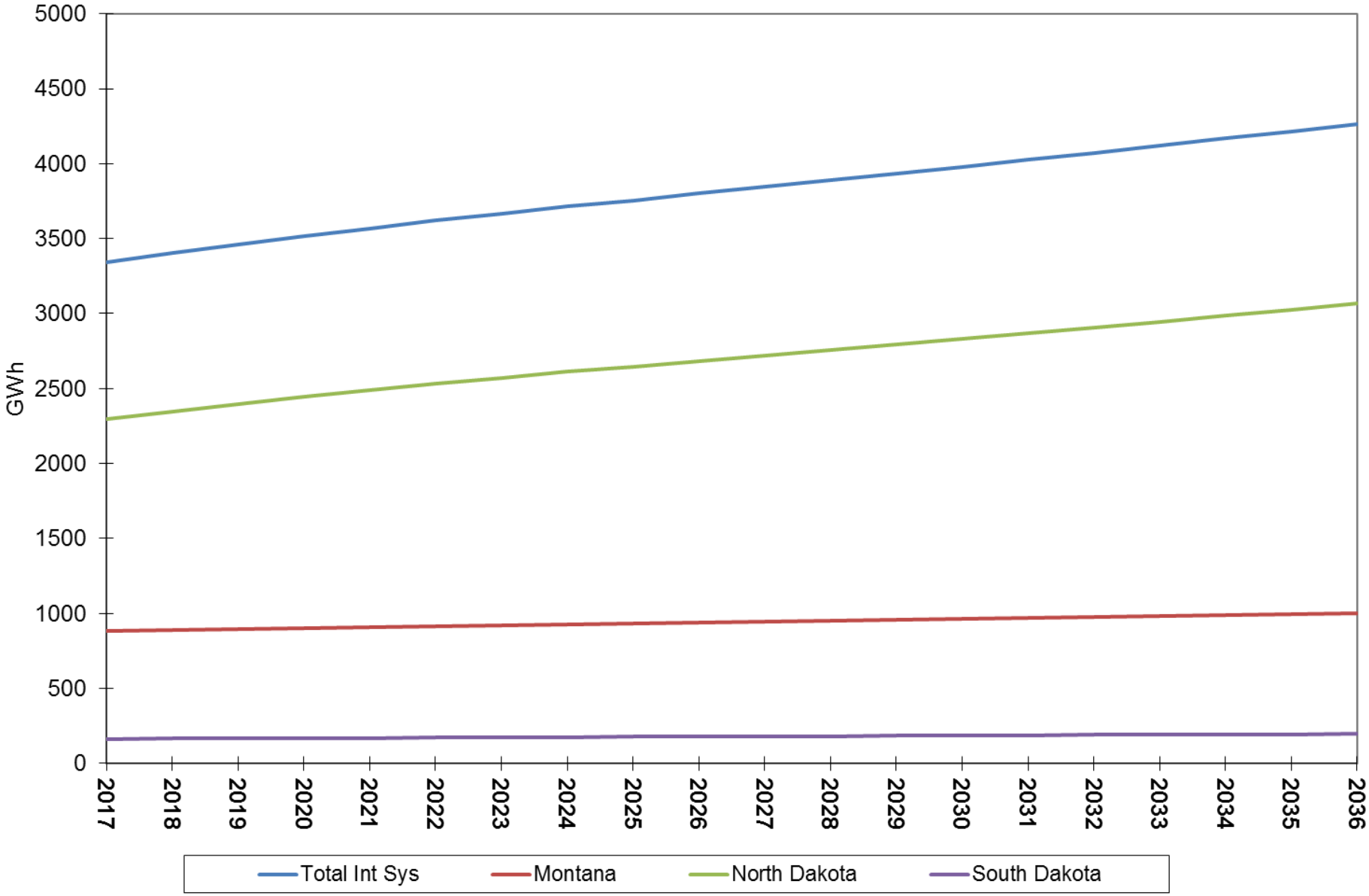
Year	Summer Peak net of Energy Efficiency Programs (MW)	% Chg	Winter Peak net of Energy Efficiency Programs (MW)	% Chg	Annual Energy Requirments (GWh)	% Chg	Load Factor (%)
2017	29.3		26.9		163.7		63.78%
2018	29.5	0.68%	27.2	1.12%	165.3	0.98%	63.97%
2019	29.6	0.34%	27.4	0.74%	166.8	0.91%	64.33%
2020	29.9	1.01%	27.7	1.09%	168.4	0.96%	64.29%
2021	30.1	0.67%	28.0	1.08%	170.0	0.95%	64.47%
2022	30.3	0.66%	28.3	1.07%	171.6	0.94%	64.65%
2023	30.6	0.99%	28.6	1.06%	173.2	0.93%	64.61%
2024	30.8	0.65%	28.9	1.05%	174.9	0.98%	64.82%
2025	31.1	0.97%	29.2	1.04%	176.6	0.97%	64.82%
2026	31.4	0.96%	29.5	1.03%	178.3	0.96%	64.82%
2027	31.7	0.96%	29.8	1.02%	180.1	1.01%	64.86%
2028	32.0	0.95%	30.2	1.34%	181.8	0.94%	64.85%
2029	32.3	0.94%	30.5	0.99%	183.6	0.99%	64.89%
2030	32.6	0.93%	30.8	0.98%	185.4	0.98%	64.92%
2031	32.8	0.61%	31.1	0.97%	187.2	0.97%	65.15%
2032	33.1	0.91%	31.4	0.96%	189.0	0.96%	65.18%
2033	33.4	0.91%	31.7	0.96%	190.8	0.95%	65.21%
2034	33.7	0.90%	32.1	1.26%	192.7	1.00%	65.28%
2035	34.0	0.89%	32.4	0.93%	194.6	0.99%	65.34%
2036	34.3	0.88%	32.8	1.23%	196.5	0.98%	65.40%

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 (%)
2017	597.9		548.9		3,344.6		63.86%
2018	606.5	1.44%	558.9	1.82%	3,401.3	1.70%	64.02%
2019	614.9	1.39%	568.8	1.77%	3,458.0	1.67%	64.20%
2020	623.7	1.44%	579.1	1.80%	3,515.9	1.67%	64.35%
2021	631.7	1.27%	588.3	1.59%	3,567.8	1.48%	64.48%
2022	639.7	1.27%	597.4	1.54%	3,619.6	1.45%	64.59%
2023	647.3	1.19%	605.5	1.36%	3,665.0	1.25%	64.64%
2024	654.9	1.18%	614.0	1.40%	3,713.2	1.32%	64.72%
2025	662.0	1.08%	621.5	1.23%	3,755.5	1.14%	64.76%
2026	669.4	1.13%	629.2	1.24%	3,799.9	1.18%	64.80%
2027	676.7	1.09%	637.0	1.23%	3,843.9	1.16%	64.84%
2028	684.0	1.07%	644.9	1.25%	3,888.3	1.16%	64.89%
2029	691.4	1.08%	652.9	1.24%	3,933.4	1.16%	64.95%
2030	698.8	1.08%	660.9	1.22%	3,979.0	1.16%	65.00%
2031	706.2	1.05%	669.0	1.23%	4,025.2	1.16%	65.06%
2032	713.9	1.09%	677.3	1.24%	4,072.1	1.17%	65.12%
2033	721.5	1.07%	685.7	1.23%	4,119.6	1.17%	65.18%
2034	729.2	1.06%	694.2	1.24%	4,167.9	1.17%	65.25%
2035	737.2	1.09%	702.9	1.25%	4,216.7	1.17%	65.30%
2036	745.0	1.06%	711.8	1.27%	4,266.4	1.18%	65.37%

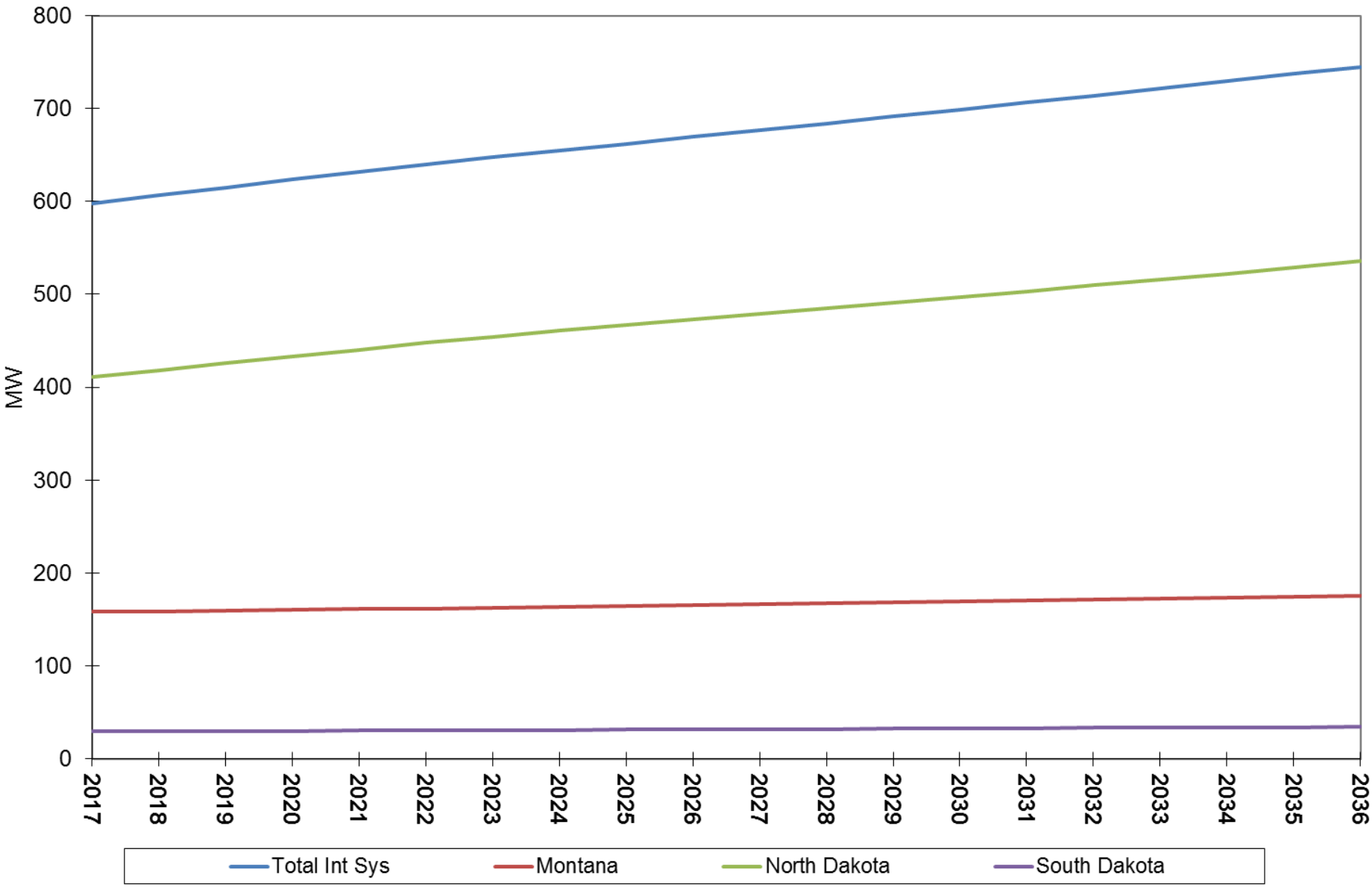
Montana-Dakota Integrated System

Forecast of Annual Energy by State



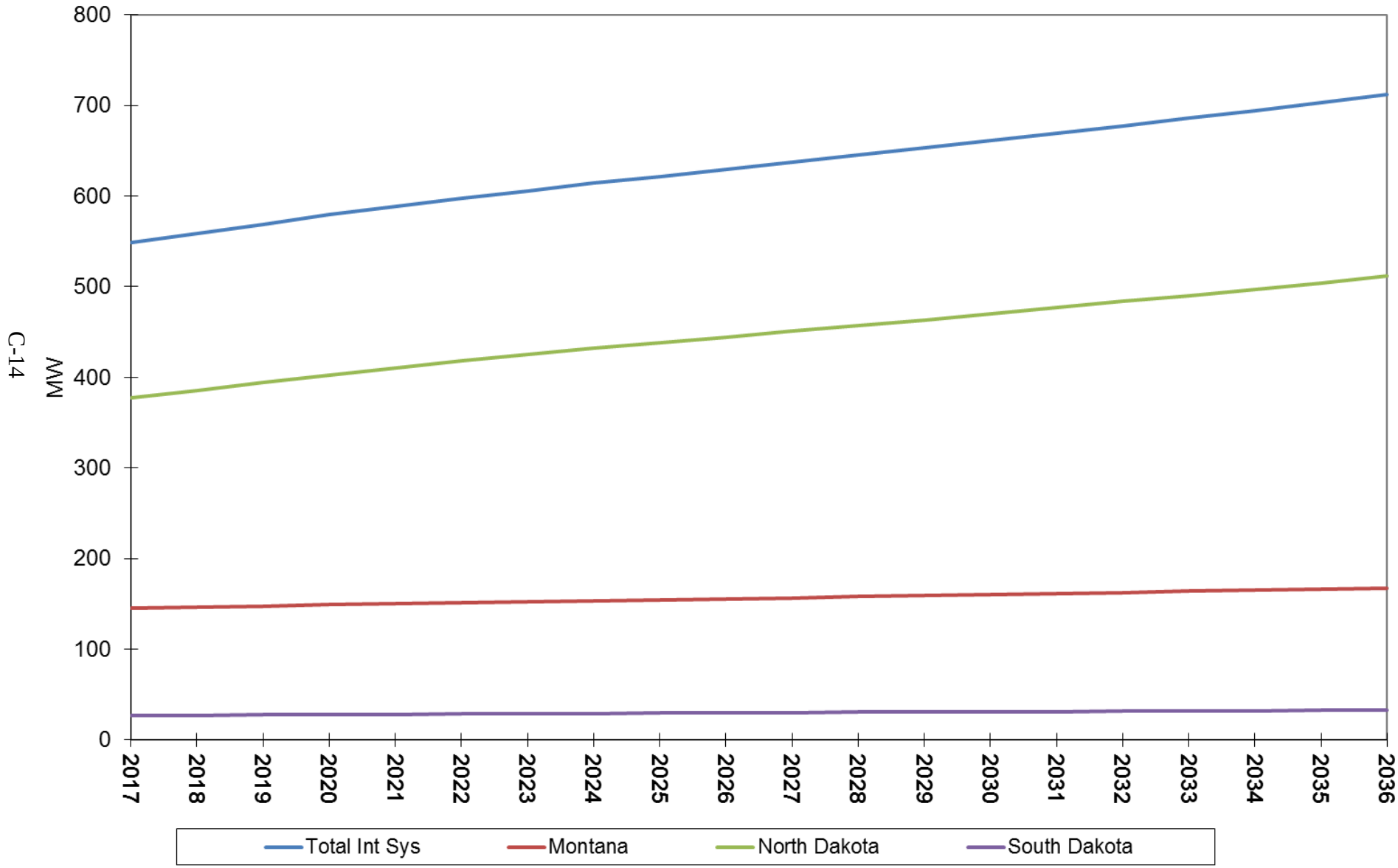
Montana-Dakota Integrated System

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



Montana-Dakota Integrated System

Forecast of Winter Peak Demand by State



APPENDIX D

Monthly Forecasts - Montana
(2017-2026)

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

MONTANA YEAR 2017

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	939.0	935.4	743.9	639.1	614.6	649.5	913.5	774.0	691.1	584.9	787.9	944.1	9,216.7
# of Residential Customers	20,213	20,239	20,287	20,284	20,277	20,303	20,321	20,338	20,381	20,413	20,456	20,508	20,335
Total Residential Sales - MWh	18,979	18,932	15,092	12,963	12,462	13,186	18,563	15,741	14,085	11,940	16,118	19,361	187,422
Use per Small Comm & Ind Customer - kWh	2,430.0	2,365.8	2,082.8	1,944.7	1,912.5	1,929.3	2,502.7	2,225.1	2,100.6	1,859.2	2,115.3	2,411.1	25,873.1
# of Small Comm & Ind Customers	5,147	5,140	5,145	5,186	5,212	5,248	5,262	5,274	5,300	5,269	5,219	5,215	5,218
Total Small Comm & Ind Sales - MWh	12,507	12,160	10,716	10,085	9,968	10,125	13,169	11,735	11,133	9,796	11,040	12,574	135,008
Large Comm & Ind Sales	42,071	38,271	38,629	38,633	39,897	37,138	40,656	37,273	40,604	41,477	40,553	44,054	479,256
Total Sales (Residential, SC&I and LC&I)	73,557	69,363	64,437	61,681	62,327	60,449	72,388	64,749	65,822	63,213	67,711	75,989	801,686
Other Public Sales	551	628	551	538	595	670	905	733	730	483	550	591	7,525
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	74,741	70,566	65,596	62,806	63,541	61,700	73,884	66,092	67,155	64,307	68,871	77,226	816,485
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	74,776	70,597	65,624	62,831	63,563	61,724	73,914	66,121	67,181	64,331	68,899	77,259	816,820
Total Requirements (Energy + Losses)	80,906	76,385	71,004	67,982	68,774	66,784	79,973	71,542	72,688	69,605	74,547	83,593	883,783
# of Large Comm & Ind Customers	260	257	259	260	262	258	260	260	269	269	259	259	261
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	134.9	132.1	120.3	101.1	101.7	141.8	158.0	149.4	126.9	105.1	129.1	145.0	158.0

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

MONTANA YEAR 2018

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	940.8	937.3	745.4	640.3	615.8	650.7	915.2	775.5	692.4	586.1	789.5	945.8	9,234.6
# of Residential Customers	20,312	20,339	20,386	20,384	20,377	20,403	20,421	20,438	20,482	20,513	20,556	20,609	20,435
Total Residential Sales - MWh	19,110	19,063	15,196	13,052	12,548	13,276	18,690	15,849	14,182	12,022	16,229	19,493	188,710
Use per Small Comm & Ind Customer - kWh	2,452.9	2,388.4	2,102.8	1,963.3	1,930.8	1,947.7	2,526.8	2,246.2	2,120.9	1,876.7	2,135.5	2,432.6	26,118.8
# of Small Comm & Ind Customers	5,198	5,190	5,195	5,236	5,263	5,299	5,313	5,326	5,351	5,321	5,270	5,266	5,269
Total Small Comm & Ind Sales - MWh	12,750	12,396	10,924	10,280	10,162	10,321	13,425	11,963	11,349	9,986	11,254	12,810	137,620
Large Comm & Ind Sales	42,285	38,464	38,818	38,822	40,093	37,319	40,856	37,458	40,803	41,682	40,752	44,277	481,629
Total Sales (Residential, SC&I and LC&I)	74,145	69,923	64,938	62,154	62,803	60,916	72,971	65,270	66,334	63,690	68,235	76,580	807,959
Other Public Sales	552	630	553	539	596	672	907	735	732	484	552	592	7,544
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	75,330	71,128	66,099	63,280	64,018	62,169	74,469	66,615	67,669	64,785	69,397	77,818	822,777
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	75,365	71,159	66,127	63,305	64,040	62,193	74,499	66,644	67,695	64,809	69,425	77,851	823,112
Total Requirements (Energy + Losses)	81,543	76,993	71,548	68,495	69,290	67,292	80,606	72,107	73,245	70,122	75,116	84,233	890,590
# of Large Comm & Ind Customers	263	260	262	263	265	261	263	263	272	272	262	262	264
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	136.0	133.2	121.4	102.0	102.2	142.5	158.8	150.2	127.5	105.6	130.3	146.3	158.8

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	942.6	939.1	746.9	641.5	617.0	652.0	917.0	777.0	693.8	587.2	791.0	947.7	9,252.4
# of Residential Customers	20,412	20,438	20,486	20,484	20,476	20,503	20,521	20,538	20,582	20,614	20,657	20,710	20,535
Total Residential Sales - MWh	19,241	19,193	15,300	13,141	12,633	13,367	18,817	15,957	14,279	12,105	16,340	19,626	189,999
Use per Small Comm & Ind Customer - kWh	2,473.6	2,408.7	2,120.5	1,979.6	1,946.9	1,963.9	2,548.2	2,265.2	2,138.6	1,892.6	2,153.3	2,454.3	26,339.4
# of Small Comm & Ind Customers	5,249	5,241	5,246	5,288	5,315	5,352	5,365	5,378	5,404	5,373	5,322	5,318	5,321
Total Small Comm & Ind Sales - MWh	12,984	12,624	11,124	10,468	10,348	10,511	13,671	12,182	11,557	10,169	11,460	13,052	140,150
Large Comm & Ind Sales	42,501	38,659	39,011	39,015	40,292	37,504	41,058	37,646	41,005	41,889	40,955	44,486	484,021
Total Sales (Residential, SC&I and LC&I)	74,726	70,476	65,435	62,624	63,273	61,382	73,546	65,785	66,841	64,163	68,755	77,164	814,170
Other Public Sales	554	632	554	541	598	674	910	736	734	485	553	594	7,565
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	75,913	71,683	66,597	63,752	64,490	62,637	75,047	67,131	68,178	65,259	69,918	78,404	829,009
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	75,948	71,714	66,625	63,777	64,512	62,661	75,077	67,160	68,204	65,283	69,946	78,437	829,344
Total Requirements (Energy + Losses)	82,174	77,593	72,087	69,005	69,801	67,798	81,232	72,666	73,795	70,635	75,680	84,867	897,333
# of Large Comm & Ind Customers	265	262	264	265	267	263	265	265	274	274	264	264	266
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	137.2	134.4	122.4	102.9	102.7	143.2	159.6	150.9	128.2	106.1	131.5	147.6	159.6

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	944.4	940.9	748.3	642.8	618.1	653.2	918.8	778.4	695.0	588.3	792.6	948.1	9,268.8
# of Residential Customers	20,511	20,538	20,586	20,583	20,576	20,603	20,621	20,638	20,682	20,714	20,757	20,810	20,635
Total Residential Sales - MWh	19,371	19,324	15,404	13,231	12,719	13,458	18,946	16,065	14,375	12,187	16,451	19,729	191,260
Use per Small Comm & Ind Customer - kWh	2,497.0	2,431.4	2,140.6	1,998.1	1,965.2	1,982.4	2,571.8	2,286.3	2,158.7	1,910.2	2,173.6	2,472.6	26,582.0
# of Small Comm & Ind Customers	5,300	5,292	5,297	5,340	5,367	5,404	5,418	5,431	5,457	5,426	5,374	5,370	5,373
Total Small Comm & Ind Sales - MWh	13,234	12,867	11,339	10,670	10,547	10,713	13,934	12,417	11,780	10,365	11,681	13,278	142,825
Large Comm & Ind Sales	42,677	38,818	39,168	39,172	40,454	37,654	41,223	37,799	41,170	42,058	41,120	44,688	486,001
Total Sales (Residential, SC&I and LC&I)	75,282	71,009	65,911	63,073	63,720	61,825	74,103	66,281	67,325	64,610	69,252	77,695	820,086
Other Public Sales	556	633	556	542	599	675	912	738	736	486	554	595	7,582
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	76,471	72,217	67,075	64,202	64,938	63,081	75,606	67,629	68,664	65,707	70,416	78,936	834,942
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	76,506	72,248	67,103	64,227	64,960	63,105	75,636	67,658	68,690	65,731	70,444	78,969	835,277
Total Requirements (Energy + Losses)	82,778	78,171	72,604	69,492	70,285	68,278	81,837	73,205	74,321	71,120	76,219	85,443	903,753
# of Large Comm & Ind Customers	268	265	267	268	270	266	268	268	277	277	267	267	269
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	138.5	135.6	123.5	103.8	103.2	143.9	160.3	151.7	128.8	106.6	132.6	148.9	160.3

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	946.3	942.7	749.7	644.0	619.4	654.4	920.5	780.0	696.4	589.5	794.1	948.7	9,285.5
# of Residential Customers	20,561	20,587	20,636	20,633	20,626	20,653	20,671	20,688	20,732	20,764	20,808	20,861	20,685
Total Residential Sales - MWh	19,456	19,408	15,471	13,288	12,775	13,516	19,028	16,136	14,438	12,240	16,523	19,791	192,070
Use per Small Comm & Ind Customer - kWh	2,518.3	2,452.1	2,158.7	2,015.6	1,982.1	1,999.4	2,594.1	2,306.2	2,177.0	1,926.8	2,192.3	2,494.0	26,810.6
# of Small Comm & Ind Customers	5,339	5,331	5,336	5,378	5,406	5,443	5,457	5,470	5,497	5,465	5,413	5,409	5,412
Total Small Comm & Ind Sales - MWh	13,445	13,072	11,519	10,840	10,715	10,883	14,156	12,615	11,967	10,530	11,867	13,490	145,099
Large Comm & Ind Sales	42,901	39,020	39,366	39,370	40,659	37,844	41,432	37,992	41,378	42,272	41,329	44,921	488,484
Total Sales (Residential, SC&I and LC&I)	75,802	71,500	66,356	63,498	64,149	62,243	74,616	66,743	67,783	65,042	69,719	78,202	825,653
Other Public Sales	557	635	557	544	601	677	914	740	738	487	556	597	7,603
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	76,992	72,710	67,521	64,629	65,369	63,501	76,121	68,093	69,124	66,140	70,885	79,445	840,530
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	77,027	72,741	67,549	64,654	65,391	63,525	76,151	68,122	69,150	66,164	70,913	79,478	840,865
Total Requirements (Energy + Losses)	83,342	78,704	73,087	69,954	70,752	68,733	82,394	73,707	74,819	71,588	76,726	85,994	909,800
# of Large Comm & Ind Customers	270	267	269	270	272	268	270	270	279	279	269	268	271
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	139.7	136.7	124.6	104.7	103.7	144.6	161.1	152.4	129.4	107.1	133.6	150.0	161.1

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	946.3	942.7	749.7	644.1	619.3	654.4	920.5	779.9	696.4	589.5	794.1	948.7	9,285.5
# of Residential Customers	20,610	20,637	20,686	20,683	20,676	20,703	20,721	20,738	20,782	20,815	20,858	20,911	20,735
Total Residential Sales - MWh	19,503	19,455	15,508	13,321	12,805	13,549	19,074	16,174	14,473	12,270	16,563	19,839	192,534
Use per Small Comm & Ind Customer - kWh	2,540.1	2,473.3	2,177.5	2,032.9	1,999.1	2,016.8	2,616.6	2,325.8	2,196.0	1,943.3	2,211.3	2,513.8	27,040.2
# of Small Comm & Ind Customers	5,377	5,369	5,374	5,417	5,445	5,482	5,496	5,510	5,536	5,505	5,452	5,448	5,451
Total Small Comm & Ind Sales - MWh	13,658	13,279	11,702	11,012	10,885	11,056	14,381	12,815	12,157	10,698	12,056	13,695	147,394
Large Comm & Ind Sales	43,128	39,225	39,568	39,572	40,868	38,037	41,644	38,188	41,590	42,490	41,541	45,140	490,991
Total Sales (Residential, SC&I and LC&I)	76,289	71,959	66,778	63,905	64,558	62,642	75,099	67,177	68,220	65,458	70,160	78,674	830,919
Other Public Sales	559	637	558	545	602	679	916	742	740	489	557	598	7,622
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	77,481	73,171	67,944	65,037	65,779	63,902	76,606	68,529	69,563	66,558	71,327	79,918	845,815
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	77,516	73,202	67,972	65,062	65,801	63,926	76,636	68,558	69,589	66,582	71,355	79,951	846,150
Total Requirements (Energy + Losses)	83,871	79,203	73,544	70,396	71,195	69,167	82,919	74,178	75,294	72,040	77,205	86,505	915,517
# of Large Comm & Ind Customers	272	269	271	272	274	270	272	272	281	281	271	270	273
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	140.7	137.8	125.5	105.5	104.1	145.2	161.8	153.0	130.0	107.6	134.5	151.1	161.8

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	946.3	942.7	749.7	644.0	619.3	654.5	920.5	779.9	696.4	589.5	794.1	948.7	9,285.4
# of Residential Customers	20,660	20,687	20,736	20,733	20,726	20,752	20,771	20,788	20,832	20,865	20,908	20,962	20,785
Total Residential Sales - MWh	19,550	19,501	15,546	13,353	12,836	13,582	19,120	16,213	14,508	12,299	16,603	19,887	192,998
Use per Small Comm & Ind Customer - kWh	2,558.4	2,491.2	2,193.2	2,047.6	2,013.7	2,031.3	2,635.4	2,342.9	2,211.9	1,957.6	2,227.2	2,533.5	27,237.9
# of Small Comm & Ind Customers	5,417	5,409	5,414	5,457	5,485	5,523	5,537	5,550	5,577	5,545	5,492	5,488	5,491
Total Small Comm & Ind Sales - MWh	13,859	13,475	11,874	11,174	11,045	11,219	14,592	13,003	12,336	10,855	12,232	13,904	149,568
Large Comm & Ind Sales	43,313	39,392	39,732	39,737	41,037	38,194	41,817	38,348	41,763	42,667	41,714	45,352	493,066
Total Sales (Residential, SC&I and LC&I)	76,722	72,368	67,152	64,264	64,918	62,995	75,529	67,564	68,607	65,821	70,549	79,143	835,632
Other Public Sales	560	638	560	547	604	681	919	744	741	490	559	600	7,643
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	77,915	73,581	68,320	65,398	66,141	64,257	77,039	68,918	69,951	66,922	71,718	80,389	850,549
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	77,950	73,612	68,348	65,423	66,163	64,281	77,069	68,947	69,977	66,946	71,746	80,422	850,884
Total Requirements (Energy + Losses)	84,340	79,647	73,951	70,786	71,587	69,551	83,387	74,599	75,714	72,434	77,628	87,015	920,639
# of Large Comm & Ind Customers	274	271	273	274	276	272	274	274	283	283	273	272	275
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	141.7	138.8	126.4	106.2	104.7	145.9	162.6	153.8	130.6	108.1	135.4	152.1	162.6

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	946.3	942.7	749.7	644.0	619.3	654.5	920.5	780.0	696.5	589.5	794.1	948.7	9,285.6
# of Residential Customers	20,710	20,737	20,786	20,783	20,776	20,802	20,821	20,838	20,883	20,915	20,959	21,012	20,835
Total Residential Sales - MWh	19,598	19,549	15,583	13,385	12,867	13,615	19,166	16,253	14,544	12,329	16,643	19,935	193,467
Use per Small Comm & Ind Customer - kWh	2,580.3	2,512.3	2,211.8	2,064.8	2,030.8	2,048.5	2,657.7	2,362.8	2,230.3	1,974.2	2,246.2	2,554.8	27,468.3
# of Small Comm & Ind Customers	5,456	5,448	5,453	5,497	5,525	5,563	5,577	5,590	5,618	5,585	5,532	5,528	5,531
Total Small Comm & Ind Sales - MWh	14,078	13,687	12,061	11,350	11,220	11,396	14,822	13,208	12,530	11,026	12,426	14,123	151,927
Large Comm & Ind Sales	43,546	39,602	39,939	39,944	41,252	38,393	42,034	38,550	41,981	42,891	41,933	45,597	495,662
Total Sales (Residential, SC&I and LC&I)	77,222	72,838	67,583	64,679	65,339	63,404	76,022	68,011	69,055	66,246	71,002	79,655	841,056
Other Public Sales	561	640	561	548	606	683	921	746	744	492	560	602	7,664
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	78,416	74,053	68,752	65,814	66,564	64,668	77,534	69,367	70,402	67,349	72,172	80,903	855,994
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	78,451	74,084	68,780	65,839	66,586	64,692	77,564	69,396	70,428	67,373	72,200	80,936	856,329
Total Requirements (Energy + Losses)	84,882	80,157	74,419	71,236	72,045	69,995	83,923	75,085	76,202	72,896	78,119	87,571	926,530
# of Large Comm & Ind Customers	276	273	275	276	278	274	276	276	285	285	275	274	277
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	142.7	139.7	127.3	106.9	105.2	146.7	163.4	154.6	131.3	108.7	136.4	153.2	163.4

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	946.3	942.7	749.7	644.1	619.4	654.5	920.5	780.0	696.5	589.5	794.1	948.7	9,285.8
# of Residential Customers	20,760	20,786	20,835	20,833	20,825	20,852	20,871	20,888	20,933	20,965	21,009	21,063	20,885
Total Residential Sales - MWh	19,645	19,596	15,621	13,418	12,899	13,647	19,212	16,292	14,579	12,359	16,683	19,983	193,934
Use per Small Comm & Ind Customer - kWh	2,602.7	2,534.3	2,230.7	2,082.9	2,048.2	2,066.2	2,680.7	2,382.9	2,250.0	1,991.1	2,265.5	2,577.0	27,705.8
# of Small Comm & Ind Customers	5,494	5,486	5,492	5,535	5,564	5,602	5,616	5,630	5,657	5,625	5,571	5,567	5,570
Total Small Comm & Ind Sales - MWh	14,299	13,903	12,251	11,529	11,396	11,575	15,055	13,416	12,728	11,200	12,621	14,346	154,319
Large Comm & Ind Sales	43,783	39,816	40,150	40,154	41,470	38,595	42,256	38,756	42,202	43,119	42,155	45,844	498,300
Total Sales (Residential, SC&I and LC&I)	77,727	73,315	68,022	65,101	65,765	63,817	76,523	68,464	69,509	66,678	71,459	80,173	846,553
Other Public Sales	563	641	563	549	607	684	924	748	746	493	562	603	7,683
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	78,923	74,531	69,193	66,237	66,991	65,082	78,038	69,822	70,858	67,782	72,631	81,422	861,510
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	78,958	74,562	69,221	66,262	67,013	65,106	78,068	69,851	70,884	67,806	72,659	81,455	861,845
Total Requirements (Energy + Losses)	85,431	80,675	74,896	71,694	72,507	70,443	84,468	75,577	76,695	73,365	78,616	88,133	932,500
# of Large Comm & Ind Customers	278	275	277	278	280	276	278	278	287	287	277	276	279
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	143.7	140.7	128.2	107.7	105.8	147.6	164.4	155.5	132.1	109.3	137.4	154.3	164.4

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	946.3	942.7	749.7	644.1	619.4	654.5	920.5	780.0	696.5	589.5	794.1	948.7	9,285.8
# of Residential Customers	20,809	20,836	20,885	20,883	20,875	20,902	20,921	20,938	20,983	21,015	21,059	21,113	20,935
Total Residential Sales - MWh	19,692	19,643	15,658	13,450	12,930	13,680	19,258	16,331	14,614	12,389	16,723	20,030	194,398
Use per Small Comm & Ind Customer - kWh	2,624.5	2,555.4	2,249.9	2,100.4	2,065.5	2,083.8	2,703.2	2,403.4	2,268.7	2,008.1	2,284.8	2,598.7	27,940.1
# of Small Comm & Ind Customers	5,534	5,526	5,531	5,575	5,604	5,642	5,657	5,670	5,698	5,665	5,611	5,607	5,610
Total Small Comm & Ind Sales - MWh	14,524	14,121	12,444	11,710	11,575	11,757	15,292	13,627	12,927	11,376	12,820	14,571	156,744
Large Comm & Ind Sales	44,024	40,033	40,364	40,368	41,691	38,800	42,481	38,964	42,426	43,349	42,380	46,096	500,976
Total Sales (Residential, SC&I and LC&I)	78,240	73,797	68,466	65,528	66,196	64,237	77,031	68,922	69,967	67,114	71,923	80,697	852,118
Other Public Sales	564	643	564	550	609	686	926	750	747	494	563	605	7,701
Street & Highway Lighting Sales	616	557	594	574	606	569	576	598	589	600	595	628	7,102
Interdepartmental Sales	17	18	14	13	13	12	15	12	14	11	15	18	172
Total Billed Sales - MWh	79,437	75,015	69,638	66,665	67,424	65,504	78,548	70,282	71,317	68,219	73,096	81,948	867,093
Company Use	35	31	28	25	22	24	30	29	26	24	28	33	335
Total Energy	79,472	75,046	69,666	66,690	67,446	65,528	78,578	70,311	71,343	68,243	73,124	81,981	867,428
Total Requirements (Energy + Losses)	85,987	81,198	75,377	72,157	72,975	70,900	85,020	76,075	77,192	73,838	79,119	88,702	938,540
# of Large Comm & Ind Customers	280	277	279	280	282	278	280	280	289	289	279	278	281
# of Other Public Customers	100	99	99	100	101	101	101	101	101	100	98	99	100
# of Street & Highway Lighting Customers	35	35	35	35	35	35	35	35	35	35	35	35	35
Peak Demand Net of Energy Efficiency Progs	144.8	141.7	129.1	108.5	106.4	148.4	165.3	156.4	132.8	110.0	138.4	155.4	165.3

APPENDIX E

Monthly Forecasts - North Dakota
(2017-2026)

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

NORTH DAKOTA YEAR 2017

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,075.3	1,027.6	880.3	720.4	666.7	684.1	868.8	798.3	696.8	655.4	872.7	1,046.7	9,990.4
# of Residential Customers	77,535	77,840	78,100	78,260	78,304	78,642	78,921	79,092	79,458	79,839	80,186	80,549	78,894
Total Residential Sales - MWh	83,371	79,985	68,750	56,375	52,204	53,799	68,569	63,141	55,367	52,329	69,981	84,311	788,182
Use per Small Comm & Ind Customer - kWh	4,842.9	4,682.8	4,348.9	3,870.4	3,785.2	3,674.1	4,245.0	4,142.8	3,999.4	3,942.7	4,508.5	4,955.7	50,985.9
# of Small Comm & Ind Customers	12,001	12,013	12,047	12,091	12,141	12,185	12,206	12,256	12,436	12,435	12,305	12,334	12,204
Total Small Comm & Ind Sales - MWh	58,120	56,255	52,391	46,797	45,956	44,769	51,815	50,774	49,737	49,027	55,477	61,123	622,241
Large Comm & Ind Sales	54,597	52,795	53,067	50,181	51,671	49,783	57,873	55,472	55,135	52,163	52,729	54,945	640,411
Total Sales (Residential, SC&I and LC&I)	196,088	189,035	174,208	153,353	149,831	148,351	178,257	169,387	160,239	153,519	178,187	200,379	2,050,834
Other Public Sales	3,800	3,524	3,696	3,570	3,769	3,992	4,520	4,424	4,037	3,726	3,597	3,820	46,475
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	201,827	194,270	179,633	158,547	155,173	153,809	184,320	175,380	165,948	159,056	183,657	206,177	2,117,797
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	202,313	194,696	180,068	158,958	155,595	154,227	184,778	175,833	166,376	159,481	184,063	206,641	2,123,029
Total Requirements (Energy + Losses)	218,899	210,657	194,830	171,989	168,351	166,871	199,926	190,248	180,016	172,555	199,152	223,581	2,297,075
# of Large Comm & Ind Customers	927	932	938	941	943	959	970	939	975	979	960	973	953
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	343.0	328.5	310.6	280.5	288.4	379.5	410.6	386.5	344.7	310.9	327.0	377.0	410.6

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

NORTH DAKOTA YEAR 2018

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,077.5	1,029.7	882.1	721.9	668.1	685.6	870.7	800.0	698.3	656.8	874.6	1,048.8	10,011.4
# of Residential Customers	78,518	78,827	79,090	79,252	79,297	79,639	79,922	80,094	80,466	80,851	81,203	81,570	79,894
Total Residential Sales - MWh	84,606	81,170	69,769	57,210	52,978	54,597	69,585	64,077	56,187	53,105	71,018	85,553	799,855
Use per Small Comm & Ind Customer - kWh	4,964.3	4,800.3	4,457.7	3,967.1	3,880.0	3,765.9	4,351.3	4,246.6	4,099.6	4,041.2	4,621.3	5,077.0	52,259.5
# of Small Comm & Ind Customers	12,135	12,147	12,182	12,227	12,277	12,322	12,343	12,393	12,575	12,575	12,443	12,472	12,341
Total Small Comm & Ind Sales - MWh	60,242	58,309	54,304	48,506	47,635	46,404	53,708	52,628	51,553	50,818	57,503	63,320	644,930
Large Comm & Ind Sales	55,438	53,606	53,872	50,942	52,453	50,539	58,762	56,321	55,976	52,952	53,534	55,772	650,167
Total Sales (Residential, SC&I and LC&I)	200,286	193,085	177,945	156,658	153,066	151,540	182,055	173,026	163,716	156,875	182,055	204,645	2,094,952
Other Public Sales	3,846	3,567	3,741	3,613	3,814	4,041	4,575	4,478	4,086	3,771	3,640	3,865	47,037
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	206,071	198,363	183,415	161,895	158,453	157,047	188,173	179,073	169,474	162,457	187,568	210,488	2,162,477
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	206,557	198,789	183,850	162,306	158,875	157,465	188,631	179,526	169,902	162,882	187,974	210,952	2,167,709
Total Requirements (Energy + Losses)	223,491	215,086	198,922	175,612	171,900	170,374	204,095	194,244	183,831	176,235	203,384	228,246	2,345,420
# of Large Comm & Ind Customers	932	937	942	946	948	964	975	944	981	984	965	978	958
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	350.6	335.8	317.5	286.7	293.7	386.5	418.2	393.6	351.1	316.6	334.3	385.4	418.2

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	1,079.8	1,031.9	884.0	723.4	669.5	687.0	872.5	801.7	699.8	658.2	876.4	1,050.9	10,032.6
# of Residential Customers	79,501	79,813	80,080	80,244	80,289	80,636	80,922	81,097	81,473	81,863	82,219	82,591	80,894
Total Residential Sales - MWh	85,847	82,361	70,792	58,048	53,754	55,398	70,606	65,016	57,011	53,883	72,060	86,799	811,575
Use per Small Comm & Ind Customer - kWh	5,084.2	4,916.3	4,565.2	4,063.3	3,973.9	3,857.3	4,456.5	4,349.1	4,198.7	4,139.1	4,733.1	5,200.3	53,523.8
# of Small Comm & Ind Customers	12,270	12,282	12,318	12,362	12,413	12,458	12,480	12,531	12,715	12,714	12,581	12,611	12,478
Total Small Comm & Ind Sales - MWh	62,383	60,382	56,234	50,231	49,328	48,054	55,617	54,498	53,386	52,624	59,547	65,581	667,865
Large Comm & Ind Sales	56,263	54,402	54,663	51,689	53,221	51,284	59,636	57,155	56,803	53,727	54,325	56,620	659,788
Total Sales (Residential, SC&I and LC&I)	204,493	197,145	181,689	159,968	156,303	154,736	185,859	176,669	167,200	160,234	185,932	209,000	2,139,228
Other Public Sales	3,893	3,609	3,785	3,656	3,860	4,089	4,630	4,531	4,135	3,815	3,683	3,911	47,597
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	210,325	202,465	187,203	165,248	161,736	160,291	192,032	182,769	173,007	165,860	191,488	214,889	2,207,313
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	210,811	202,891	187,638	165,659	162,158	160,709	192,490	183,222	173,435	166,285	191,894	215,353	2,212,545
Total Requirements (Energy + Losses)	228,093	219,524	203,021	179,240	175,452	173,884	208,270	198,243	187,653	179,917	207,625	233,008	2,393,930
# of Large Comm & Ind Customers	935	941	946	950	952	968	979	948	985	988	969	982	962
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	358.4	343.3	324.6	293.1	299.0	393.5	425.7	400.7	357.4	322.3	341.6	393.8	425.7

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	1,082.1	1,034.1	885.9	724.9	670.9	688.5	874.4	803.4	701.2	659.6	878.3	1,051.6	10,052.2
# of Residential Customers	80,484	80,800	81,070	81,236	81,282	81,633	81,922	82,099	82,480	82,875	83,235	83,612	81,894
Total Residential Sales - MWh	87,093	83,556	71,819	58,891	54,534	56,201	71,630	65,960	57,839	54,666	73,106	87,923	823,218
Use per Small Comm & Ind Customer - kWh	5,209.0	5,037.0	4,677.5	4,163.1	4,071.3	3,952.0	4,566.0	4,456.2	4,302.0	4,240.6	4,849.4	5,312.3	54,822.9
# of Small Comm & Ind Customers	12,405	12,417	12,453	12,498	12,550	12,595	12,617	12,668	12,854	12,854	12,719	12,749	12,615
Total Small Comm & Ind Sales - MWh	64,618	62,545	58,249	52,030	51,095	49,776	57,609	56,451	55,298	54,509	61,680	67,726	691,586
Large Comm & Ind Sales	57,134	55,242	55,497	52,478	54,030	52,067	60,557	58,034	57,674	54,543	55,159	57,458	669,873
Total Sales (Residential, SC&I and LC&I)	208,845	201,343	185,565	163,399	159,659	158,044	189,796	180,445	170,811	163,718	189,945	213,107	2,184,677
Other Public Sales	3,938	3,652	3,830	3,699	3,905	4,137	4,684	4,585	4,183	3,860	3,727	3,957	48,157
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	214,722	206,706	191,124	168,722	165,137	163,647	196,023	186,599	176,666	169,389	195,545	219,042	2,253,322
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	215,208	207,132	191,559	169,133	165,559	164,065	196,481	187,052	177,094	169,814	195,951	219,506	2,258,554
Total Requirements (Energy + Losses)	232,851	224,113	207,263	182,999	179,132	177,515	212,589	202,387	191,612	183,735	212,015	237,501	2,443,712
# of Large Comm & Ind Customers	940	946	951	955	957	973	984	953	990	993	974	988	967
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	366.2	350.8	331.7	299.5	304.5	400.7	433.5	408.0	364.0	328.2	349.2	402.5	433.5

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	1,084.4	1,036.3	887.8	726.5	672.4	689.9	876.2	805.1	702.7	661.0	880.2	1,052.4	10,072.2
# of Residential Customers	81,270	81,589	81,862	82,030	82,076	82,430	82,723	82,901	83,286	83,685	84,048	84,429	82,694
Total Residential Sales - MWh	88,130	84,552	72,675	59,593	55,184	56,871	72,484	66,745	58,528	55,317	73,977	88,853	832,909
Use per Small Comm & Ind Customer - kWh	5,322.9	5,147.2	4,779.9	4,254.0	4,160.4	4,038.2	4,665.7	4,553.3	4,395.9	4,333.2	4,955.2	5,431.1	56,023.1
# of Small Comm & Ind Customers	12,509	12,521	12,557	12,603	12,655	12,701	12,723	12,775	12,962	12,962	12,826	12,856	12,721
Total Small Comm & Ind Sales - MWh	66,584	64,448	60,021	53,613	52,650	51,289	59,362	58,168	56,980	56,167	63,556	69,822	712,660
Large Comm & Ind Sales	57,958	56,037	56,287	53,225	54,797	52,810	61,430	58,868	58,499	55,317	55,950	58,323	679,501
Total Sales (Residential, SC&I and LC&I)	212,672	205,037	188,983	166,431	162,631	160,970	193,276	183,781	174,007	166,801	193,483	216,998	2,225,070
Other Public Sales	3,984	3,695	3,875	3,742	3,951	4,185	4,739	4,638	4,233	3,906	3,771	4,003	48,722
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	218,595	210,443	194,587	171,797	168,155	166,621	199,558	189,988	179,912	172,518	199,127	222,979	2,294,280
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	219,081	210,869	195,022	172,208	168,577	167,039	200,016	190,441	180,340	172,943	199,533	223,443	2,299,512
Total Requirements (Energy + Losses)	237,041	228,156	211,010	186,326	182,397	180,733	216,413	206,053	195,124	187,121	215,891	241,761	2,488,026
# of Large Comm & Ind Customers	942	948	953	957	959	975	986	955	992	995	976	990	969
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	374.3	358.5	339.0	306.1	309.4	407.2	440.5	414.6	369.8	333.5	355.9	410.3	440.5

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	1,084.4	1,036.3	887.8	726.5	672.4	689.9	876.2	805.1	702.8	661.0	880.2	1,050.9	10,070.8
# of Residential Customers	82,056	82,379	82,654	82,823	82,870	83,227	83,523	83,703	84,091	84,494	84,861	85,245	83,494
Total Residential Sales - MWh	88,985	85,371	73,379	60,170	55,719	57,422	73,186	67,392	59,095	55,853	74,693	89,581	840,846
Use per Small Comm & Ind Customer - kWh	5,444.1	5,264.0	4,888.5	4,350.8	4,254.9	4,130.1	4,771.9	4,657.0	4,496.0	4,431.9	5,068.0	5,538.4	57,281.1
# of Small Comm & Ind Customers	12,614	12,627	12,663	12,709	12,762	12,808	12,830	12,882	13,071	13,071	12,934	12,964	12,828
Total Small Comm & Ind Sales - MWh	68,672	66,469	61,903	55,294	54,301	52,898	61,223	59,992	58,767	57,929	65,549	71,800	734,797
Large Comm & Ind Sales	58,860	56,906	57,150	54,041	55,635	53,622	62,384	59,778	59,401	56,162	56,813	59,192	689,944
Total Sales (Residential, SC&I and LC&I)	216,517	208,746	192,432	169,505	165,655	163,942	196,793	187,162	177,263	169,944	197,055	220,573	2,265,587
Other Public Sales	4,030	3,737	3,920	3,785	3,996	4,234	4,794	4,692	4,281	3,951	3,814	4,049	49,283
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	222,486	214,194	198,081	174,914	171,224	169,642	203,130	193,423	183,216	175,706	202,742	226,600	2,335,358
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	222,972	214,620	198,516	175,325	171,646	170,060	203,588	193,876	183,644	176,131	203,148	227,064	2,340,590
Total Requirements (Energy + Losses)	241,251	232,215	214,790	189,698	185,718	184,002	220,278	209,770	198,699	190,570	219,802	245,679	2,532,472
# of Large Comm & Ind Customers	945	951	956	960	962	978	989	958	995	999	979	993	972
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	365.5	345.6	312.0	314.4	413.7	447.6	421.3	375.8	338.9	362.6	418.0	447.6

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	1,084.4	1,036.3	887.8	726.5	672.4	690.0	876.3	805.1	702.8	661.0	880.2	1,050.8	10,070.9
# of Residential Customers	82,646	82,971	83,248	83,419	83,465	83,825	84,123	84,305	84,696	85,101	85,471	85,858	84,094
Total Residential Sales - MWh	89,625	85,986	73,907	60,603	56,120	57,836	73,713	67,877	59,521	56,256	75,232	90,223	846,899
Use per Small Comm & Ind Customer - kWh	5,553.2	5,369.5	4,986.6	4,438.2	4,340.5	4,212.9	4,867.7	4,750.6	4,586.1	4,520.9	5,169.5	5,652.6	58,433.7
# of Small Comm & Ind Customers	12,689	12,702	12,738	12,784	12,837	12,884	12,906	12,958	13,149	13,148	13,011	13,041	12,904
Total Small Comm & Ind Sales - MWh	70,465	68,204	63,519	56,738	55,719	54,279	62,822	61,558	60,302	59,441	67,261	73,716	754,024
Large Comm & Ind Sales	59,715	57,731	57,969	54,814	56,430	54,391	63,288	60,642	60,256	56,964	57,632	60,087	699,919
Total Sales (Residential, SC&I and LC&I)	219,805	211,921	195,395	172,155	168,269	166,506	199,823	190,077	180,079	172,661	200,125	224,026	2,300,842
Other Public Sales	4,076	3,779	3,964	3,828	4,042	4,282	4,849	4,746	4,330	3,996	3,857	4,094	49,843
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	225,820	217,411	201,088	177,607	173,884	172,254	206,215	196,392	186,081	178,468	205,855	230,098	2,371,173
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	226,306	217,837	201,523	178,018	174,306	172,672	206,673	196,845	186,509	178,893	206,261	230,562	2,376,405
Total Requirements (Energy + Losses)	244,859	235,695	218,044	192,612	188,596	186,828	223,616	212,982	201,799	193,559	223,170	249,463	2,571,223
# of Large Comm & Ind Customers	946	952	957	961	963	979	990	959	996	1,000	980	994	973
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	388.7	372.3	352.0	317.9	319.0	419.7	454.1	427.4	381.3	343.8	368.5	424.8	454.1

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	1,084.5	1,036.3	887.8	726.5	672.4	690.0	876.3	805.1	702.8	661.0	880.2	1,049.3	10,069.4
# of Residential Customers	83,236	83,563	83,842	84,014	84,061	84,424	84,723	84,906	85,300	85,709	86,081	86,470	84,694
Total Residential Sales - MWh	90,266	86,600	74,436	61,037	56,522	58,249	74,240	68,362	59,946	56,657	75,769	90,737	852,821
Use per Small Comm & Ind Customer - kWh	5,670.3	5,483.2	5,091.9	4,531.6	4,431.9	4,301.8	4,970.4	4,850.6	4,683.0	4,616.1	5,278.9	5,755.2	59,649.8
# of Small Comm & Ind Customers	12,764	12,776	12,813	12,860	12,913	12,960	12,982	13,035	13,226	13,226	13,087	13,118	12,980
Total Small Comm & Ind Sales - MWh	72,376	70,054	65,242	58,277	57,229	55,751	64,526	63,228	61,937	61,053	69,085	75,497	774,255
Large Comm & Ind Sales	60,647	58,631	58,863	55,659	57,297	55,232	64,275	61,584	61,191	57,839	58,526	60,987	710,731
Total Sales (Residential, SC&I and LC&I)	223,289	215,285	198,541	174,973	171,048	169,232	203,041	193,174	183,074	175,549	203,380	227,221	2,337,807
Other Public Sales	4,122	3,822	4,009	3,872	4,087	4,330	4,903	4,799	4,378	4,041	3,901	4,140	50,404
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	229,350	220,818	204,279	180,469	176,708	175,028	209,487	199,542	189,124	181,401	209,154	233,339	2,408,699
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	229,836	221,244	204,714	180,880	177,130	175,446	209,945	199,995	189,552	181,826	209,560	233,803	2,413,931
Total Requirements (Energy + Losses)	248,678	239,382	221,496	195,709	191,651	189,829	227,156	216,391	205,091	196,732	226,740	252,970	2,611,825
# of Large Comm & Ind Customers	947	953	958	962	964	980	991	960	997	1,001	981	995	974
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	395.1	378.4	357.8	323.1	323.6	425.8	460.7	433.6	386.8	348.8	374.7	431.9	460.7

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	1,084.5	1,036.4	887.8	726.5	672.4	690.0	876.3	805.2	702.8	661.1	880.2	1,049.3	10,069.5
# of Residential Customers	83,629	83,957	84,238	84,411	84,458	84,822	85,124	85,308	85,703	86,113	86,488	86,879	85,094
Total Residential Sales - MWh	90,693	87,010	74,788	61,325	56,789	58,525	74,591	68,686	60,230	56,925	76,127	91,165	856,854
Use per Small Comm & Ind Customer - kWh	5,774.5	5,583.6	5,185.5	4,615.0	4,513.2	4,380.7	5,061.6	4,939.8	4,768.9	4,700.8	5,375.5	5,864.0	60,747.8
# of Small Comm & Ind Customers	12,809	12,822	12,858	12,905	12,959	13,006	13,028	13,081	13,273	13,273	13,134	13,165	13,026
Total Small Comm & Ind Sales - MWh	73,966	71,593	66,675	59,557	58,486	56,975	65,943	64,617	63,298	62,394	70,602	77,200	791,306
Large Comm & Ind Sales	61,532	59,484	59,710	56,460	58,120	56,029	65,212	62,478	62,077	58,669	59,373	61,914	721,058
Total Sales (Residential, SC&I and LC&I)	226,191	218,087	201,173	177,342	173,395	171,529	205,746	195,781	185,605	177,988	206,102	230,279	2,369,218
Other Public Sales	4,168	3,865	4,054	3,915	4,133	4,378	4,958	4,852	4,428	4,086	3,944	4,186	50,967
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	232,298	223,663	206,956	182,881	179,101	177,373	212,247	202,202	191,705	183,885	211,919	236,443	2,440,673
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	232,784	224,089	207,391	183,292	179,523	177,791	212,705	202,655	192,133	184,310	212,325	236,907	2,445,905
Total Requirements (Energy + Losses)	251,868	242,460	224,393	198,318	194,240	192,366	230,143	219,269	207,884	199,420	229,731	256,329	2,646,421
# of Large Comm & Ind Customers	946	952	957	961	963	979	990	959	996	1,000	980	994	973
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	401.7	384.7	363.7	328.5	327.7	431.2	466.5	439.1	391.7	353.2	380.0	438.0	466.5

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	1,084.5	1,036.4	887.8	726.5	672.4	690.0	876.3	805.2	702.8	661.1	880.2	1,049.0	10,069.2
# of Residential Customers	84,022	84,352	84,634	84,807	84,855	85,221	85,524	85,709	86,106	86,518	86,894	87,287	85,494
Total Residential Sales - MWh	91,120	87,419	75,140	61,614	57,056	58,800	74,942	69,009	60,513	57,194	76,486	91,561	860,854
Use per Small Comm & Ind Customer - kWh	5,886.2	5,691.6	5,285.5	4,704.1	4,600.7	4,465.7	5,159.5	5,035.3	4,861.0	4,791.7	5,479.6	5,973.9	61,918.9
# of Small Comm & Ind Customers	12,855	12,868	12,905	12,952	13,005	13,052	13,075	13,128	13,321	13,321	13,181	13,212	13,073
Total Small Comm & Ind Sales - MWh	75,667	73,240	68,209	60,927	59,832	58,286	67,460	66,103	64,754	63,830	72,226	78,927	809,461
Large Comm & Ind Sales	62,497	60,416	60,635	57,335	59,018	56,898	66,234	63,454	63,042	59,574	60,298	62,884	732,285
Total Sales (Residential, SC&I and LC&I)	229,284	221,075	203,984	179,876	175,906	173,984	208,636	198,566	188,309	180,598	209,010	233,372	2,402,600
Other Public Sales	4,214	3,907	4,098	3,958	4,178	4,427	5,012	4,906	4,476	4,131	3,988	4,232	51,527
Street & Highway Lighting Sales	1,921	1,694	1,713	1,609	1,558	1,454	1,530	1,557	1,659	1,799	1,858	1,960	20,312
Interdepartmental Sales	18	17	16	15	15	12	13	12	13	12	15	18	176
Total Billed Sales - MWh	235,437	226,693	209,811	185,458	181,657	179,877	215,191	205,041	194,457	186,540	214,871	239,582	2,474,615
Company Use	486	426	435	411	422	418	458	453	428	425	406	464	5,232
Total Energy	235,923	227,119	210,246	185,869	182,079	180,295	215,649	205,494	194,885	186,965	215,277	240,046	2,479,847
Total Requirements (Energy + Losses)	255,264	245,738	227,482	201,107	197,006	195,076	233,328	222,340	210,862	202,292	232,925	259,725	2,683,145
# of Large Comm & Ind Customers	945	951	956	960	962	978	989	958	995	999	979	993	972
# of Other Public Customers	621	621	621	624	625	623	622	621	629	625	612	608	621
# 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	407.3	390.1	368.9	333.1	332.0	436.9	472.7	444.9	396.9	357.9	385.4	444.3	472.7

APPENDIX F

Monthly Forecasts – South Dakota
(2017-2026)

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

SOUTH DAKOTA YEAR 2017

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,155.4	1,116.0	914.7	754.7	689.5	674.8	894.1	774.0	702.9	670.4	916.8	1,139.2	10,396.0
# of Residential Customers	6,646	6,644	6,646	6,653	6,654	6,664	6,677	6,673	6,751	6,741	6,659	6,643	6,671
Total Residential Sales - MWh	7,679	7,415	6,079	5,021	4,588	4,497	5,970	5,165	4,745	4,519	6,105	7,568	69,351
Use per Small Comm & Ind Customer - kWh	2,068.2	2,122.0	1,706.9	1,502.9	1,412.8	1,347.4	1,736.0	1,485.1	1,487.2	1,333.3	1,792.0	2,066.5	20,025.7
# of Small Comm & Ind Customers	1,861	1,860	1,863	1,877	1,899	1,917	1,917	1,913	1,946	1,929	1,880	1,880	1,895
Total Small Comm & Ind Sales - MWh	3,849	3,947	3,180	2,821	2,683	2,583	3,328	2,841	2,894	2,572	3,369	3,885	37,952
Large Comm & Ind Sales	3,060	3,609	2,982	2,848	3,032	2,851	3,592	3,050	3,778	3,334	3,948	3,635	39,719
Total Sales (Residential, SC&I and LC&I)	14,588	14,971	12,241	10,690	10,303	9,931	12,890	11,056	11,417	10,425	13,422	15,088	147,022
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	14,937	15,324	12,561	11,024	10,639	10,260	13,253	11,375	11,765	10,747	13,768	15,433	151,086
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	14,978	15,359	12,591	11,041	10,648	10,268	13,262	11,383	11,772	10,757	13,790	15,469	151,318
Total Requirements (Energy + Losses)	16,206	16,618	13,623	11,946	11,521	11,110	14,349	12,316	12,737	11,639	14,921	16,737	163,723
# of Large Comm & Ind Customers	106	106	106	106	106	105	106	106	107	107	106	106	106
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	25.8	23.6	22.9	19.7	18.4	26.3	29.3	27.9	24.3	21.8	25.0	26.9	29.3

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

SOUTH DAKOTA YEAR 2018

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,155.1	1,115.7	914.3	754.4	689.3	674.7	893.7	773.7	702.5	670.2	916.7	1,138.9	10,392.5
# of Residential Customers	6,649	6,647	6,649	6,656	6,657	6,667	6,680	6,676	6,754	6,744	6,662	6,646	6,674
Total Residential Sales - MWh	7,680	7,416	6,079	5,021	4,589	4,498	5,970	5,165	4,745	4,520	6,107	7,569	69,359
Use per Small Comm & Ind Customer - kWh	2,088.5	2,142.2	1,723.1	1,517.3	1,426.7	1,360.2	1,752.7	1,499.2	1,501.0	1,345.6	1,809.9	2,084.4	20,215.4
# of Small Comm & Ind Customers	1,864	1,864	1,867	1,881	1,903	1,921	1,921	1,917	1,950	1,933	1,883	1,884	1,899
Total Small Comm & Ind Sales - MWh	3,893	3,993	3,217	2,854	2,715	2,613	3,367	2,874	2,927	2,601	3,408	3,927	38,389
Large Comm & Ind Sales	3,138	3,701	3,057	2,920	3,109	2,923	3,682	3,127	3,873	3,418	4,048	3,725	40,721
Total Sales (Residential, SC&I and LC&I)	14,711	15,110	12,353	10,795	10,413	10,034	13,019	11,166	11,545	10,539	13,563	15,221	148,469
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,060	15,463	12,673	11,129	10,749	10,363	13,382	11,485	11,893	10,861	13,909	15,566	152,533
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,101	15,498	12,703	11,146	10,758	10,371	13,391	11,493	11,900	10,871	13,931	15,602	152,765
Total Requirements (Energy + Losses)	16,339	16,769	13,744	12,060	11,640	11,221	14,489	12,435	12,876	11,762	15,073	16,881	165,289
# of Large Comm & Ind Customers	107	107	107	107	107	106	107	107	108	108	107	107	107
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	26.0	23.8	23.1	19.9	18.6	26.5	29.5	28.1	24.5	21.9	25.3	27.2	29.5

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	1,154.5	1,115.2	914.0	754.2	689.0	674.4	893.5	773.5	702.2	669.9	916.3	1,138.2	10,388.3
# of Residential Customers	6,652	6,650	6,652	6,659	6,660	6,670	6,683	6,679	6,757	6,747	6,665	6,649	6,677
Total Residential Sales - MWh	7,680	7,416	6,080	5,022	4,589	4,498	5,971	5,166	4,745	4,520	6,107	7,568	69,362
Use per Small Comm & Ind Customer - kWh	2,108.8	2,162.4	1,740.4	1,531.1	1,439.9	1,372.9	1,769.1	1,513.3	1,515.4	1,358.7	1,827.1	2,105.5	20,408.6
# of Small Comm & Ind Customers	1,866	1,866	1,868	1,883	1,905	1,923	1,923	1,919	1,952	1,935	1,885	1,886	1,901
Total Small Comm & Ind Sales - MWh	3,935	4,035	3,251	2,883	2,743	2,640	3,402	2,904	2,958	2,629	3,444	3,971	38,795
Large Comm & Ind Sales	3,215	3,792	3,133	2,992	3,186	2,995	3,773	3,205	3,970	3,503	4,148	3,815	41,727
Total Sales (Residential, SC&I and LC&I)	14,830	15,243	12,464	10,897	10,518	10,133	13,146	11,275	11,673	10,652	13,699	15,354	149,884
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,179	15,596	12,784	11,231	10,854	10,462	13,509	11,594	12,021	10,974	14,045	15,699	153,948
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,220	15,631	12,814	11,248	10,863	10,470	13,518	11,602	12,028	10,984	14,067	15,735	154,180
Total Requirements (Energy + Losses)	16,468	16,912	13,864	12,170	11,754	11,328	14,626	12,553	13,014	11,884	15,220	17,025	166,818
# of Large Comm & Ind Customers	108	108	108	108	108	107	108	108	109	109	108	108	108
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	26.3	24.1	23.4	20.1	18.6	26.5	29.6	28.2	24.6	22.0	25.4	27.4	29.6

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	1,154.2	1,114.9	913.6	753.8	688.8	674.2	893.0	773.1	702.0	669.7	916.0	1,137.9	10,384.6
# of Residential Customers	6,654	6,652	6,654	6,661	6,662	6,672	6,685	6,681	6,759	6,749	6,667	6,651	6,679
Total Residential Sales - MWh	7,680	7,416	6,079	5,021	4,589	4,498	5,970	5,165	4,745	4,520	6,107	7,568	69,358
Use per Small Comm & Ind Customer - kWh	2,129.5	2,183.5	1,757.9	1,546.7	1,454.4	1,386.8	1,787.1	1,528.6	1,530.9	1,372.0	1,845.3	2,126.5	20,613.3
# of Small Comm & Ind Customers	1,869	1,869	1,871	1,886	1,908	1,926	1,926	1,922	1,955	1,938	1,888	1,889	1,904
Total Small Comm & Ind Sales - MWh	3,980	4,081	3,289	2,917	2,775	2,671	3,442	2,938	2,993	2,659	3,484	4,017	39,246
Large Comm & Ind Sales	3,291	3,881	3,207	3,062	3,261	3,066	3,863	3,281	4,063	3,585	4,246	3,907	42,713
Total Sales (Residential, SC&I and LC&I)	14,951	15,378	12,575	11,000	10,625	10,235	13,275	11,384	11,801	10,764	13,837	15,492	151,317
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,300	15,731	12,895	11,334	10,961	10,564	13,638	11,703	12,149	11,086	14,183	15,837	155,381
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,341	15,766	12,925	11,351	10,970	10,572	13,647	11,711	12,156	11,096	14,205	15,873	155,613
Total Requirements (Energy + Losses)	16,599	17,058	13,985	12,282	11,869	11,439	14,766	12,671	13,153	12,006	15,370	17,174	168,372
# of Large Comm & Ind Customers	109	109	109	109	109	108	109	109	110	110	109	109	109
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	26.5	24.3	23.6	20.2	18.8	26.8	29.9	28.4	24.8	22.2	25.7	27.7	29.9

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	1,153.7	1,114.4	913.3	753.6	688.5	673.8	892.8	772.9	701.8	669.4	915.4	1,137.5	10,380.5
# of Residential Customers	6,656	6,654	6,656	6,663	6,664	6,674	6,687	6,683	6,761	6,751	6,669	6,653	6,681
Total Residential Sales - MWh	7,679	7,415	6,079	5,021	4,588	4,497	5,970	5,165	4,745	4,519	6,105	7,568	69,351
Use per Small Comm & Ind Customer - kWh	2,151.8	2,206.3	1,776.3	1,563.0	1,469.6	1,401.5	1,806.0	1,544.7	1,546.8	1,386.6	1,864.6	2,148.6	20,829.3
# of Small Comm & Ind Customers	1,871	1,871	1,873	1,888	1,910	1,928	1,928	1,924	1,957	1,940	1,890	1,891	1,906
Total Small Comm & Ind Sales - MWh	4,026	4,128	3,327	2,951	2,807	2,702	3,482	2,972	3,027	2,690	3,524	4,063	39,699
Large Comm & Ind Sales	3,372	3,976	3,285	3,138	3,341	3,141	3,957	3,361	4,163	3,673	4,349	4,002	43,758
Total Sales (Residential, SC&I and LC&I)	15,077	15,519	12,691	11,110	10,736	10,340	13,409	11,498	11,935	10,882	13,978	15,633	152,808
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,426	15,872	13,011	11,444	11,072	10,669	13,772	11,817	12,283	11,204	14,324	15,978	156,872
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,467	15,907	13,041	11,461	11,081	10,677	13,781	11,825	12,290	11,214	14,346	16,014	157,104
Total Requirements (Energy + Losses)	16,735	17,211	14,110	12,401	11,989	11,552	14,911	12,794	13,298	12,133	15,522	17,327	169,983
# of Large Comm & Ind Customers	110	110	110	110	110	109	110	110	111	111	110	110	110
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	26.8	24.5	23.8	20.5	18.9	27.0	30.1	28.6	25.0	22.4	26.0	28.0	30.1

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	1,153.7	1,114.4	913.3	753.6	688.5	673.9	892.8	772.9	701.7	669.4	915.6	1,137.5	10,380.7
# of Residential Customers	6,657	6,655	6,657	6,664	6,665	6,675	6,688	6,684	6,762	6,752	6,670	6,654	6,682
Total Residential Sales - MWh	7,680	7,416	6,080	5,022	4,589	4,498	5,971	5,166	4,745	4,520	6,107	7,569	69,363
Use per Small Comm & Ind Customer - kWh	2,174.6	2,230.1	1,795.2	1,579.4	1,484.8	1,416.6	1,824.9	1,560.7	1,563.0	1,401.6	1,884.2	2,170.1	21,048.6
# of Small Comm & Ind Customers	1,873	1,873	1,875	1,890	1,912	1,930	1,930	1,926	1,959	1,942	1,892	1,893	1,908
Total Small Comm & Ind Sales - MWh	4,073	4,177	3,366	2,985	2,839	2,734	3,522	3,006	3,062	2,722	3,565	4,108	40,159
Large Comm & Ind Sales	3,453	4,073	3,365	3,213	3,421	3,217	4,053	3,443	4,264	3,762	4,455	4,094	44,813
Total Sales (Residential, SC&I and LC&I)	15,206	15,666	12,811	11,220	10,849	10,449	13,546	11,615	12,071	11,004	14,127	15,771	154,335
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,555	16,019	13,131	11,554	11,185	10,778	13,909	11,934	12,419	11,326	14,473	16,116	158,399
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,596	16,054	13,161	11,571	11,194	10,786	13,918	11,942	12,426	11,336	14,495	16,152	158,631
Total Requirements (Energy + Losses)	16,875	17,370	14,240	12,520	12,112	11,670	15,059	12,921	13,445	12,265	15,683	17,476	171,636
# of Large Comm & Ind Customers	111	111	111	111	111	110	111	111	112	112	111	111	111
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	27.1	24.8	24.1	20.7	19.1	27.2	30.3	28.8	25.1	22.5	26.3	28.3	30.3

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	1,153.7	1,114.4	913.3	753.6	688.5	673.9	892.8	772.9	701.7	669.4	915.6	1,137.5	10,380.7
# of Residential Customers	6,657	6,655	6,657	6,664	6,665	6,675	6,688	6,684	6,762	6,752	6,670	6,654	6,682
Total Residential Sales - MWh	7,680	7,416	6,080	5,022	4,589	4,498	5,971	5,166	4,745	4,520	6,107	7,569	69,363
Use per Small Comm & Ind Customer - kWh	2,197.5	2,253.1	1,813.9	1,595.8	1,500.5	1,431.1	1,844.0	1,577.4	1,579.9	1,416.1	1,903.8	2,194.4	21,270.3
# of Small Comm & Ind Customers	1,873	1,873	1,875	1,890	1,912	1,930	1,930	1,926	1,959	1,942	1,892	1,893	1,908
Total Small Comm & Ind Sales - MWh	4,116	4,220	3,401	3,016	2,869	2,762	3,559	3,038	3,095	2,750	3,602	4,154	40,582
Large Comm & Ind Sales	3,531	4,164	3,440	3,286	3,498	3,289	4,144	3,520	4,360	3,847	4,556	4,191	45,826
Total Sales (Residential, SC&I and LC&I)	15,327	15,800	12,921	11,324	10,956	10,549	13,674	11,724	12,200	11,117	14,265	15,914	155,771
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,676	16,153	13,241	11,658	11,292	10,878	14,037	12,043	12,548	11,439	14,611	16,259	159,835
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,717	16,188	13,271	11,675	11,301	10,886	14,046	12,051	12,555	11,449	14,633	16,295	160,067
Total Requirements (Energy + Losses)	17,005	17,515	14,359	12,632	12,227	11,778	15,197	13,039	13,584	12,388	15,833	17,631	173,188
# of Large Comm & Ind Customers	112	112	112	112	112	111	112	112	113	113	112	112	112
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	27.4	25.1	24.3	20.9	19.3	27.4	30.6	29.1	25.4	22.7	26.6	28.6	30.6

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

SOUTH DAKOTA YEAR 2024

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,153.7	1,114.4	913.3	753.6	688.5	673.9	892.8	772.9	701.7	669.4	915.6	1,137.4	10,380.6
# of Residential Customers	6,657	6,655	6,657	6,664	6,665	6,675	6,688	6,684	6,762	6,752	6,670	6,654	6,682
Total Residential Sales - MWh	7,680	7,416	6,080	5,022	4,589	4,498	5,971	5,166	4,745	4,520	6,107	7,568	69,362
Use per Small Comm & Ind Customer - kWh	2,220.3	2,276.8	1,832.7	1,612.6	1,516.7	1,446.2	1,863.4	1,593.9	1,596.1	1,431.1	1,924.0	2,217.4	21,493.6
# of Small Comm & Ind Customers	1,875	1,875	1,877	1,892	1,914	1,932	1,932	1,928	1,961	1,944	1,894	1,895	1,910
Total Small Comm & Ind Sales - MWh	4,163	4,269	3,440	3,051	2,903	2,794	3,600	3,073	3,130	2,782	3,644	4,202	41,051
Large Comm & Ind Sales	3,617	4,265	3,523	3,365	3,583	3,369	4,244	3,605	4,464	3,939	4,665	4,292	46,931
Total Sales (Residential, SC&I and LC&I)	15,460	15,950	13,043	11,438	11,075	10,661	13,815	11,844	12,339	11,241	14,416	16,062	157,344
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,809	16,303	13,363	11,772	11,411	10,990	14,178	12,163	12,687	11,563	14,762	16,407	161,408
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,850	16,338	13,393	11,789	11,420	10,998	14,187	12,171	12,694	11,573	14,784	16,443	161,640
Total Requirements (Energy + Losses)	17,149	17,677	14,491	12,755	12,356	11,900	15,350	13,169	13,735	12,522	15,996	17,791	174,891
# of Large Comm & Ind Customers	113	113	113	113	113	112	113	113	114	114	113	113	113
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	27.7	25.3	24.6	21.1	19.4	27.6	30.8	29.3	25.6	22.9	26.8	28.9	30.8

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	1,153.7	1,114.4	913.3	753.6	688.5	673.8	892.8	772.9	701.8	669.4	915.4	1,137.5	10,380.5
# of Residential Customers	6,656	6,654	6,656	6,663	6,664	6,674	6,687	6,683	6,761	6,751	6,669	6,653	6,681
Total Residential Sales - MWh	7,679	7,415	6,079	5,021	4,588	4,497	5,970	5,165	4,745	4,519	6,105	7,568	69,351
Use per Small Comm & Ind Customer - kWh	2,245.2	2,302.2	1,853.0	1,630.2	1,533.2	1,462.0	1,884.1	1,611.7	1,614.2	1,446.8	1,945.1	2,242.1	21,732.0
# of Small Comm & Ind Customers	1,876	1,876	1,878	1,893	1,915	1,933	1,933	1,929	1,962	1,945	1,895	1,896	1,911
Total Small Comm & Ind Sales - MWh	4,212	4,319	3,480	3,086	2,936	2,826	3,642	3,109	3,167	2,814	3,686	4,251	41,528
Large Comm & Ind Sales	3,703	4,367	3,608	3,446	3,668	3,450	4,346	3,692	4,572	4,034	4,777	4,392	48,055
Total Sales (Residential, SC&I and LC&I)	15,594	16,101	13,167	11,553	11,192	10,773	13,958	11,966	12,484	11,367	14,568	16,211	158,934
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	15,943	16,454	13,487	11,887	11,528	11,102	14,321	12,285	12,832	11,689	14,914	16,556	162,998
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	15,984	16,489	13,517	11,904	11,537	11,110	14,330	12,293	12,839	11,699	14,936	16,592	163,230
Total Requirements (Energy + Losses)	17,294	17,841	14,625	12,880	12,483	12,021	15,505	13,301	13,892	12,658	16,160	17,952	176,612
# of Large Comm & Ind Customers	114	114	114	114	114	113	114	114	115	115	114	114	114
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	28.0	25.6	24.8	21.4	19.6	27.9	31.1	29.6	25.8	23.1	27.1	29.2	31.1

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	1,153.7	1,114.4	913.3	753.6	688.5	673.8	892.8	772.9	701.8	669.4	915.4	1,137.4	10,380.3
# of Residential Customers	6,656	6,654	6,656	6,663	6,664	6,674	6,687	6,683	6,761	6,751	6,669	6,653	6,681
Total Residential Sales - MWh	7,679	7,415	6,079	5,021	4,588	4,497	5,970	5,165	4,745	4,519	6,105	7,567	69,350
Use per Small Comm & Ind Customer - kWh	2,272.0	2,330.1	1,875.3	1,650.1	1,551.7	1,479.8	1,906.8	1,631.2	1,633.9	1,464.5	1,968.8	2,269.1	21,995.2
# of Small Comm & Ind Customers	1,875	1,875	1,877	1,892	1,914	1,932	1,932	1,928	1,961	1,944	1,894	1,895	1,910
Total Small Comm & Ind Sales - MWh	4,260	4,369	3,520	3,122	2,970	2,859	3,684	3,145	3,204	2,847	3,729	4,300	42,009
Large Comm & Ind Sales	3,788	4,467	3,690	3,524	3,753	3,529	4,445	3,776	4,676	4,127	4,887	4,493	49,155
Total Sales (Residential, SC&I and LC&I)	15,727	16,251	13,289	11,667	11,311	10,885	14,099	12,086	12,625	11,493	14,721	16,360	160,514
Other Public Sales	123	150	105	121	125	121	151	113	131	103	124	127	1,494
Street & Highway Lighting Sales	225	203	215	213	211	208	212	206	217	219	222	218	2,569
Interdepartmental Sales	1	-	-	-	-	-	-	-	-	-	-	-	1
Total Billed Sales - MWh	16,076	16,604	13,609	12,001	11,647	11,214	14,462	12,405	12,973	11,815	15,067	16,705	164,578
Company Use	41	35	30	17	9	8	9	8	7	10	22	36	232
Total Energy	16,117	16,639	13,639	12,018	11,656	11,222	14,471	12,413	12,980	11,825	15,089	16,741	164,810
Total Requirements (Energy + Losses)	17,438	18,003	14,757	13,003	12,612	12,142	15,657	13,431	14,044	12,794	16,326	18,113	178,320
# of Large Comm & Ind Customers	114	114	114	114	114	113	114	114	115	115	114	114	114
# of Other Public Customers	47	46	46	47	49	49	50	49	50	49	47	47	48
# of Street & Highway Lighting Customers	12	13	13	13	13	13	13	14	14	14	14	14	13
Peak Demand Net of Energy Efficiency Progs	28.3	25.9	25.1	21.6	19.8	28.2	31.4	29.9	26.1	23.3	27.4	29.5	31.4

APPENDIX G

Monthly Forecasts – Integrated System (2017-2026)

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

INTEGRATED SYSTEM YEAR 2017

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,054.0	1,015.4	856.1	706.9	658.1	676.9	879.0	792.1	696.1	642.9	859.3	1,032.9	9,867.4
# of Residential Customers	104,394	104,723	105,033	105,197	105,235	105,609	105,919	106,103	106,590	106,993	107,301	107,700	105,900
Total Residential Sales - MWh	110,029	106,332	89,921	74,359	69,254	71,482	93,102	84,047	74,197	68,788	92,204	111,240	1,044,955
Use per Small Comm & Ind Customer - kWh	3,917.9	3,805.9	3,478.7	3,117.0	3,044.2	2,970.4	3,524.0	3,361.1	3,239.7	3,127.1	3,601.6	3,993.1	41,165.0
# of Small Comm & Ind Customers	19,009	19,013	19,055	19,154	19,252	19,350	19,385	19,443	19,682	19,633	19,404	19,429	19,317
Total Small Comm & Ind Sales - MWh	74,476	72,362	66,287	59,703	58,607	57,477	68,312	65,350	63,764	61,395	69,886	77,582	795,201
Large Comm & Ind Sales	99,728	94,675	94,678	91,662	94,600	89,772	102,121	95,795	99,517	96,974	97,230	102,634	1,159,386
Total Sales (Residential, SC&I and LC&I)	284,233	273,369	250,886	225,724	222,461	218,731	263,535	245,192	237,478	227,157	259,320	291,456	2,999,542
Other Public Sales	4,474	4,302	4,352	4,229	4,489	4,783	5,576	5,270	4,898	4,312	4,271	4,538	55,494
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	291,505	280,160	257,790	232,377	229,353	225,769	271,457	252,847	244,868	234,110	266,296	298,836	3,085,368
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	292,067	280,652	258,283	232,830	229,806	226,219	271,954	253,337	245,329	234,569	266,752	299,369	3,091,167
Total Requirements (Energy + Losses)	316,011	303,660	279,457	251,917	248,646	244,765	294,248	274,106	265,441	253,799	288,620	323,911	3,344,581
# of Large Comm & Ind Customers	1,293	1,295	1,303	1,307	1,311	1,322	1,336	1,305	1,351	1,355	1,325	1,338	1,320
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	503.7	484.2	453.8	401.3	408.5	547.6	597.9	563.8	495.9	437.8	481.1	548.9	597.9

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

INTEGRATED SYSTEM YEAR 2018

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Use per Residential Customer - kWh	1,056.1	1,017.4	857.9	708.3	659.4	678.2	880.6	793.7	697.4	644.2	861.0	1,034.8	9,886.9
# of Residential Customers	105,479	105,813	106,125	106,292	106,331	106,709	107,023	107,208	107,702	108,108	108,421	108,825	107,003
Total Residential Sales - MWh	111,396	107,649	91,044	75,283	70,115	72,371	94,245	85,091	75,114	69,647	93,354	112,615	1,057,924
Use per Small Comm & Ind Customer - kWh	4,005.1	3,890.3	3,556.7	3,186.5	3,112.3	3,036.4	3,601.2	3,435.8	3,312.0	3,197.6	3,682.6	4,080.0	42,080.2
# of Small Comm & Ind Customers	19,197	19,201	19,244	19,344	19,443	19,542	19,577	19,636	19,876	19,829	19,596	19,622	19,509
Total Small Comm & Ind Sales - MWh	76,885	74,698	68,445	61,640	60,512	59,338	70,500	67,465	65,829	63,405	72,165	80,057	820,939
Large Comm & Ind Sales	100,861	95,771	95,747	92,684	95,655	90,781	103,300	96,906	100,652	98,052	98,334	103,774	1,172,517
Total Sales (Residential, SC&I and LC&I)	289,142	278,118	255,236	229,607	226,282	222,490	268,045	249,462	241,595	231,104	263,853	296,446	3,051,380
Other Public Sales	4,521	4,347	4,399	4,273	4,535	4,834	5,633	5,326	4,949	4,358	4,316	4,584	56,075
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	296,461	284,954	262,187	236,304	233,220	229,579	276,024	257,173	249,036	238,103	270,874	303,872	3,137,787
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	297,023	285,446	262,680	236,757	233,673	230,029	276,521	257,663	249,497	238,562	271,330	304,405	3,143,586
Total Requirements (Energy + Losses)	321,373	308,848	284,214	256,167	252,830	248,887	299,190	278,786	269,952	258,119	293,573	329,360	3,401,299
# of Large Comm & Ind Customers	1,302	1,304	1,311	1,316	1,320	1,331	1,345	1,314	1,361	1,364	1,334	1,347	1,329
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	512.6	492.8	462.0	408.6	414.5	555.5	606.5	571.9	503.1	444.1	489.9	558.9	606.5

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	1,058.2	1,019.4	859.7	709.7	660.7	679.6	882.2	795.3	698.8	645.5	862.8	1,036.8	9,906.4
# of Residential Customers	106,565	106,901	107,218	107,387	107,425	107,809	108,126	108,314	108,812	109,224	109,541	109,950	108,106
Total Residential Sales - MWh	112,768	108,970	92,172	76,211	70,976	73,263	95,394	86,139	76,035	70,508	94,507	113,993	1,070,936
Use per Small Comm & Ind Customer - kWh	4,090.9	3,973.4	3,633.6	3,255.1	3,179.3	3,101.7	3,677.2	3,509.4	3,383.0	3,267.5	3,762.4	4,168.8	42,985.8
# of Small Comm & Ind Customers	19,385	19,389	19,432	19,533	19,633	19,733	19,768	19,828	20,071	20,022	19,788	19,815	19,700
Total Small Comm & Ind Sales - MWh	79,302	77,041	70,609	63,582	62,419	61,205	72,690	69,584	67,901	65,422	74,451	82,604	846,810
Large Comm & Ind Sales	101,979	96,853	96,807	93,696	96,699	91,783	104,467	98,006	101,778	99,119	99,428	104,921	1,185,536
Total Sales (Residential, SC&I and LC&I)	294,049	282,864	259,588	233,489	230,094	226,251	272,551	253,729	245,714	235,049	268,386	301,518	3,103,282
Other Public Sales	4,570	4,391	4,444	4,318	4,583	4,884	5,691	5,380	5,000	4,403	4,360	4,632	56,656
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	301,417	289,744	266,584	240,231	237,080	233,390	280,588	261,494	253,206	242,093	275,451	308,992	3,190,270
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	301,979	290,236	267,077	240,684	237,533	233,840	281,085	261,984	253,667	242,552	275,907	309,525	3,196,069
Total Requirements (Energy + Losses)	326,735	314,029	288,972	260,415	257,007	253,010	304,128	283,462	274,462	262,436	298,525	334,900	3,458,081
# of Large Comm & Ind Customers	1,308	1,311	1,318	1,323	1,327	1,338	1,352	1,321	1,368	1,371	1,341	1,354	1,336
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	521.9	501.8	470.4	416.1	420.3	563.2	614.9	579.8	510.2	450.4	498.5	568.8	614.9

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	1,060.3	1,021.4	861.4	711.1	662.0	680.9	883.9	796.9	700.1	646.9	864.5	1,037.3	9,924.5
# of Residential Customers	107,649	107,990	108,310	108,480	108,520	108,908	109,228	109,418	109,921	110,338	110,659	111,073	109,208
Total Residential Sales - MWh	114,144	110,296	93,302	77,143	71,842	74,157	96,546	87,190	76,959	71,373	95,664	115,220	1,083,836
Use per Small Comm & Ind Customer - kWh	4,180.6	4,060.3	3,714.2	3,326.8	3,249.3	3,169.9	3,756.6	3,586.5	3,457.6	3,340.2	3,845.9	4,249.4	43,920.4
# of Small Comm & Ind Customers	19,574	19,578	19,621	19,724	19,825	19,925	19,961	20,021	20,266	20,218	19,981	20,008	19,892
Total Small Comm & Ind Sales - MWh	81,832	79,493	72,877	65,617	64,417	63,160	74,985	71,806	70,071	67,533	76,845	85,021	873,657
Large Comm & Ind Sales	103,102	97,941	97,872	94,712	97,745	92,787	105,643	99,114	102,907	100,186	100,525	106,053	1,198,587
Total Sales (Residential, SC&I and LC&I)	299,078	287,730	264,051	237,472	234,004	230,104	277,174	258,110	249,937	239,092	273,034	306,294	3,156,080
Other Public Sales	4,617	4,435	4,491	4,362	4,629	4,933	5,747	5,436	5,050	4,449	4,405	4,679	57,233
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	306,493	294,654	271,094	244,258	241,036	237,292	285,267	265,931	257,479	246,182	280,144	313,815	3,243,645
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	307,055	295,146	271,587	244,711	241,489	237,742	285,764	266,421	257,940	246,641	280,600	314,348	3,249,444
Total Requirements (Energy + Losses)	332,228	319,342	293,852	264,773	261,286	257,232	309,192	288,263	279,086	266,861	303,604	340,118	3,515,837
# of Large Comm & Ind Customers	1,317	1,320	1,327	1,332	1,336	1,347	1,361	1,330	1,377	1,380	1,350	1,364	1,345
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	531.2	510.7	478.8	423.5	426.5	571.4	623.7	588.1	517.6	457.0	507.5	579.1	623.7

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	1,062.5	1,023.4	863.2	712.6	663.3	682.3	885.5	798.4	701.5	648.2	866.2	1,038.1	9,943.0
# of Residential Customers	108,487	108,830	109,154	109,326	109,366	109,757	110,081	110,272	110,779	111,200	111,525	111,943	110,060
Total Residential Sales - MWh	115,265	111,375	94,225	77,902	72,547	74,884	97,482	88,046	77,711	72,076	96,605	116,212	1,094,330
Use per Small Comm & Ind Customer - kWh	4,262.6	4,139.7	3,787.7	3,392.4	3,313.4	3,232.1	3,829.3	3,656.8	3,525.4	3,406.8	3,922.1	4,334.9	44,786.1
# of Small Comm & Ind Customers	19,719	19,723	19,766	19,869	19,971	20,072	20,108	20,169	20,416	20,367	20,129	20,156	20,039
Total Small Comm & Ind Sales - MWh	84,055	81,648	74,867	67,404	66,172	64,874	77,000	73,755	71,974	69,387	78,947	87,375	897,458
Large Comm & Ind Sales	104,231	99,033	98,938	95,733	98,797	93,795	106,819	100,221	104,040	101,262	101,628	107,246	1,211,743
Total Sales (Residential, SC&I and LC&I)	303,551	292,056	268,030	241,039	237,516	233,553	281,301	262,022	253,725	242,725	277,180	310,833	3,203,531
Other Public Sales	4,664	4,480	4,537	4,407	4,677	4,983	5,804	5,491	5,102	4,496	4,451	4,727	57,819
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	311,013	299,025	275,119	247,870	244,596	240,791	289,451	269,898	261,319	249,862	284,336	318,402	3,291,682
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	311,575	299,517	275,612	248,323	245,049	241,241	289,948	270,388	261,780	250,321	284,792	318,935	3,297,481
Total Requirements (Energy + Losses)	337,118	324,071	298,207	268,681	265,138	261,018	313,718	292,554	283,241	270,842	308,139	345,082	3,567,809
# of Large Comm & Ind Customers	1,322	1,325	1,332	1,337	1,341	1,352	1,366	1,335	1,382	1,385	1,355	1,368	1,350
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	540.8	519.7	487.4	431.3	432.0	578.8	631.7	595.6	524.2	463.0	515.5	588.3	631.7

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	1,062.6	1,023.4	863.4	712.7	663.4	682.3	885.5	798.5	701.5	648.2	866.3	1,037.0	9,942.6
# of Residential Customers	109,323	109,671	109,997	110,170	110,211	110,605	110,932	111,125	111,635	112,061	112,389	112,810	110,911
Total Residential Sales - MWh	116,168	112,242	94,967	78,513	73,113	75,469	98,231	88,732	78,313	72,643	97,363	116,989	1,102,743
Use per Small Comm & Ind Customer - kWh	4,349.7	4,223.9	3,865.6	3,461.8	3,381.1	3,298.1	3,906.3	3,731.3	3,597.5	3,477.4	4,002.9	4,412.9	45,690.9
# of Small Comm & Ind Customers	19,864	19,869	19,912	20,016	20,119	20,220	20,256	20,318	20,566	20,518	20,278	20,305	20,187
Total Small Comm & Ind Sales - MWh	86,403	83,925	76,971	69,291	68,025	66,688	79,126	75,813	73,986	71,349	81,170	89,603	922,350
Large Comm & Ind Sales	105,441	100,204	100,083	96,826	99,924	94,876	108,081	101,409	105,255	102,414	102,809	108,426	1,225,748
Total Sales (Residential, SC&I and LC&I)	308,012	296,371	272,021	244,630	241,062	237,033	285,438	265,954	257,554	246,406	281,342	315,018	3,250,841
Other Public Sales	4,712	4,524	4,583	4,451	4,723	5,034	5,861	5,547	5,152	4,543	4,495	4,774	58,399
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	315,522	303,384	279,156	251,505	248,188	244,322	293,645	273,886	265,198	253,590	288,542	322,634	3,339,572
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	316,084	303,876	279,649	251,958	248,641	244,772	294,142	274,376	265,659	254,049	288,998	323,167	3,345,371
Total Requirements (Energy + Losses)	341,997	328,788	302,574	272,614	269,025	264,839	318,256	296,869	287,438	274,875	312,690	349,660	3,619,625
# of Large Comm & Ind Customers	1,328	1,331	1,338	1,343	1,347	1,358	1,372	1,341	1,388	1,392	1,361	1,374	1,356
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	549.4	528.1	495.2	438.2	437.6	586.1	639.7	603.1	530.9	469.0	523.4	597.4	639.7

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	1,062.7	1,023.5	863.5	712.7	663.4	682.4	885.5	798.5	701.5	648.3	866.4	1,037.1	9,943.1
# of Residential Customers	109,963	110,313	110,641	110,816	110,856	111,252	111,582	111,777	112,290	112,718	113,049	113,474	111,561
Total Residential Sales - MWh	116,855	112,903	95,533	78,978	73,545	75,916	98,804	89,256	78,774	73,075	97,942	117,679	1,109,260
Use per Small Comm & Ind Customer - kWh	4,426.6	4,298.4	3,934.4	3,523.3	3,441.4	3,356.4	3,974.5	3,797.5	3,661.3	3,539.9	4,074.3	4,493.9	46,504.2
# of Small Comm & Ind Customers	19,979	19,984	20,027	20,131	20,234	20,337	20,373	20,434	20,685	20,635	20,395	20,422	20,303
Total Small Comm & Ind Sales - MWh	88,440	85,899	78,794	70,928	69,633	68,260	80,973	77,599	75,733	73,046	83,095	91,774	944,174
Large Comm & Ind Sales	106,559	101,287	101,141	97,837	100,965	95,874	109,249	102,510	106,379	103,478	103,902	109,630	1,238,811
Total Sales (Residential, SC&I and LC&I)	311,854	300,089	275,468	247,743	244,143	240,050	289,026	269,365	260,886	249,599	284,939	319,083	3,292,245
Other Public Sales	4,759	4,567	4,629	4,496	4,771	5,084	5,919	5,603	5,202	4,589	4,540	4,821	58,980
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	319,411	307,145	282,649	254,663	251,317	247,389	297,291	277,353	268,580	256,829	292,184	326,746	3,381,557
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	319,973	307,637	283,142	255,116	251,770	247,839	297,788	277,843	269,041	257,288	292,640	327,279	3,387,356
Total Requirements (Energy + Losses)	346,204	332,857	306,354	276,030	272,410	268,157	322,200	300,620	291,097	278,381	316,631	354,109	3,665,050
# of Large Comm & Ind Customers	1,332	1,335	1,342	1,347	1,351	1,362	1,376	1,345	1,392	1,396	1,365	1,378	1,360
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	557.8	536.2	502.7	445.0	443.0	593.0	647.3	610.3	537.3	474.6	530.5	605.5	647.3

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	1,062.8	1,023.5	863.5	712.8	663.5	682.4	885.5	798.6	701.5	648.3	866.4	1,036.0	9,942.4
# of Residential Customers	110,603	110,955	111,285	111,461	111,502	111,901	112,232	112,428	112,945	113,376	113,710	114,136	112,211
Total Residential Sales - MWh	117,544	113,565	96,099	79,444	73,978	76,362	99,377	89,781	79,235	73,506	98,519	118,240	1,115,650
Use per Small Comm & Ind Customer - kWh	4,509.4	4,378.8	4,008.5	3,589.2	3,505.9	3,419.3	4,048.0	3,868.5	3,729.7	3,606.9	4,151.3	4,567.5	47,364.8
# of Small Comm & Ind Customers	20,095	20,099	20,143	20,249	20,352	20,455	20,491	20,553	20,805	20,755	20,513	20,541	20,421
Total Small Comm & Ind Sales - MWh	90,617	88,010	80,743	72,678	71,352	69,941	82,948	79,509	77,597	74,861	85,155	93,822	967,233
Large Comm & Ind Sales	107,810	102,498	102,325	98,968	102,132	96,994	110,553	103,739	107,636	104,669	105,124	110,876	1,253,324
Total Sales (Residential, SC&I and LC&I)	315,971	304,073	279,167	251,090	247,462	243,297	292,878	273,029	264,468	253,036	288,798	322,938	3,336,207
Other Public Sales	4,806	4,612	4,675	4,541	4,818	5,134	5,975	5,658	5,253	4,636	4,585	4,869	59,562
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	323,575	311,174	286,394	258,055	254,683	250,686	301,199	281,072	272,213	260,313	296,088	330,649	3,426,101
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	324,137	311,666	286,887	258,508	255,136	251,136	301,696	281,562	272,674	260,772	296,544	331,182	3,431,900
Total Requirements (Energy + Losses)	350,709	337,216	310,406	279,700	276,052	271,724	326,429	304,645	295,028	282,150	320,855	358,332	3,713,246
# of Large Comm & Ind Customers	1,336	1,339	1,346	1,351	1,355	1,366	1,380	1,349	1,396	1,400	1,369	1,382	1,364
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	565.5	543.4	509.7	451.1	448.2	600.1	654.9	617.5	543.7	480.4	537.9	614.0	654.9

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	1,062.8	1,023.6	863.6	712.8	663.5	682.4	885.4	798.6	701.6	648.4	866.4	1,036.0	9,942.6
# of Residential Customers	111,045	111,397	111,729	111,907	111,947	112,348	112,682	112,879	113,397	113,829	114,166	114,595	112,660
Total Residential Sales - MWh	118,017	114,021	96,488	79,764	74,276	76,669	99,773	90,143	79,554	73,803	98,915	118,716	1,120,139
Use per Small Comm & Ind Customer - kWh	4,582.8	4,449.8	4,073.9	3,647.9	3,562.9	3,474.8	4,113.3	3,931.3	3,790.6	3,665.9	4,218.9	4,644.0	48,137.6
# of Small Comm & Ind Customers	20,179	20,184	20,228	20,333	20,438	20,541	20,577	20,640	20,892	20,843	20,600	20,628	20,507
Total Small Comm & Ind Sales - MWh	92,477	89,815	82,406	74,172	72,818	71,376	84,640	81,142	79,193	76,408	86,909	95,797	987,153
Large Comm & Ind Sales	109,018	103,667	103,468	100,060	103,258	98,074	111,814	104,926	108,851	105,822	106,305	112,150	1,267,413
Total Sales (Residential, SC&I and LC&I)	319,512	307,503	282,362	253,996	250,352	246,119	296,227	276,211	267,598	256,033	292,129	326,663	3,374,705
Other Public Sales	4,854	4,656	4,722	4,585	4,865	5,183	6,033	5,713	5,305	4,682	4,630	4,916	60,144
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	327,164	314,648	289,636	261,005	257,620	253,557	304,606	284,309	275,395	263,356	299,464	334,421	3,465,181
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	327,726	315,140	290,129	261,458	258,073	254,007	305,103	284,799	275,856	263,815	299,920	334,954	3,470,980
Total Requirements (Energy + Losses)	354,593	340,976	313,914	282,892	279,230	274,830	330,116	308,147	298,471	285,443	324,507	362,414	3,755,533
# of Large Comm & Ind Customers	1,338	1,341	1,348	1,353	1,357	1,368	1,382	1,351	1,398	1,402	1,371	1,384	1,366
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	573.4	551.0	516.7	457.6	453.1	606.7	662.0	624.2	549.6	485.6	544.5	621.5	662.0

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	1,062.8	1,023.6	863.6	712.8	663.5	682.4	885.4	798.6	701.6	648.4	866.4	1,035.7	9,942.6
# of Residential Customers	111,487	111,842	112,175	112,353	112,394	112,797	113,132	113,330	113,850	114,284	114,622	115,053	113,110
Total Residential Sales - MWh	118,491	114,477	96,877	80,085	74,574	76,977	100,170	90,505	79,872	74,102	99,314	119,158	1,124,602
Use per Small Comm & Ind Customer - kWh	4,661.0	4,525.6	4,143.8	3,710.2	3,624.1	3,534.5	4,182.9	3,998.6	3,855.3	3,729.2	4,291.5	4,721.3	48,959.5
# of Small Comm & Ind Customers	20,264	20,269	20,313	20,419	20,523	20,626	20,664	20,726	20,980	20,930	20,686	20,714	20,593
Total Small Comm & Ind Sales - MWh	94,451	91,730	84,173	75,759	74,377	72,902	86,436	82,875	80,885	78,053	88,775	97,798	1,008,214
Large Comm & Ind Sales	110,309	104,916	104,689	101,227	104,462	99,227	113,160	106,194	110,144	107,050	107,565	113,473	1,282,416
Total Sales (Residential, SC&I and LC&I)	323,251	311,123	285,739	257,071	253,413	249,106	299,766	279,574	270,901	259,205	295,654	330,429	3,415,232
Other Public Sales	4,901	4,700	4,767	4,629	4,912	5,234	6,089	5,769	5,354	4,728	4,675	4,964	60,722
Street & Highway Lighting Sales	2,762	2,454	2,522	2,396	2,375	2,231	2,318	2,361	2,465	2,618	2,675	2,806	29,983
Interdepartmental Sales	36	35	30	28	28	24	28	24	27	23	30	36	349
Total Billed Sales - MWh	330,950	318,312	293,058	264,124	260,728	256,595	308,201	287,728	278,747	266,574	303,034	338,235	3,506,286
Company Use	562	492	493	453	453	450	497	490	461	459	456	533	5,799
Total Energy	331,512	318,804	293,551	264,577	261,181	257,045	308,698	288,218	279,208	267,033	303,490	338,768	3,512,085
Total Requirements (Energy + Losses)	358,689	344,939	317,616	286,267	282,593	278,118	334,005	311,846	302,098	288,924	328,370	366,540	3,800,005
# of Large Comm & Ind Customers	1,339	1,342	1,349	1,354	1,358	1,369	1,383	1,352	1,399	1,403	1,372	1,385	1,367
# of Other Public Customers	768	766	766	771	775	773	773	771	780	774	757	754	769
# of Street & Highway Lighting Customers	480	481	481	481	481	481	481	482	482	482	482	482	481
Peak Demand Net of Energy Efficiency Progs	580.4	557.7	523.1	463.2	458.2	613.5	669.4	631.2	555.8	491.2	551.2	629.2	669.4