Spire Missouri, Inc.

Demand Forecast

November 19, 2024

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Spire Missouri Inc.

Demand Forecast

2024/2025 through 2043/2044

November 19, 2024

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I. INTRODUCTION

In the stipulation and agreement in Case No. GR-2021-0127 Spire agreed to file an Integrated Resource Plan every three years starting in 2024. This report presents the 2024 demand forecast for Spire Missouri Inc. (hereinafter referred to as "Spire" or the "Company"), for the planning years 2024/2025 through 2043/2044 (the "Forecast Period").[1] The purpose of this report is to provide the Company with an understanding of the forecast demand under Normal Year weather conditions and under Base, High Electrification, High Energy Efficiency, and High Economic Growth scenarios. The report also presents a regional demand forecast.[2]

A. Company Background

Spire provides natural gas distribution service to approximately 665,000 customers in its East service area and 540,000 customers in its West service area. The East service area is comprised of 11 counties, including St. Louis, and the West service area is comprised of 31 counties, including Kansas City.

B. Organization of the Demand Forecast Report

ScottMadden, Inc. ("ScottMadden") was retained to prepare the Company's 20-year demand forecast.

The remainder of this report is organized as follows:

- Section II – Provides an overview of the results of the demand forecast;
- Section III – Discusses the Company's econometric demand forecasting methodology and provides detailed results for each rate class. In addition, this section summarizes the adjustments for Company Use and unaccounted for gas;
- Section IV – Provides a summary of alternative demand forecast scenarios; and
- Section V – Provides a summary of the regional demand forecast.

Additional information to support the demand forecast is provided in the following Appendices:

Appendix 1. Econometric Analysis Modeling Process

Appendix 2. Dependent Variable Graphs

Appendix 3. Independent Variable Graphs

Appendix 4. Detailed Statistical Output

[1] A gas supply planning year or "split-year" is defined as the twelve-month period from November to October.

[2] This report presents the annual split-year demand forecast under Normal Year weather conditions. The Company separately forecasts its peak day demand.

II. OVERVIEW OF DEMAND FORECAST RESULTS

The Company's demand forecast in the East and West service areas includes demand from firm sales customers. In addition, ScottMadden has developed a forecast of transportation service customers. The demand requirements are derived from econometric demand forecast models developed for four rate classes: Residential; Small General Gas Service; Large General Gas Service; and Large Volume Service. All the Company's transportation customers are on the Transportation Service rate. The demand forecast also includes an adjustment for Company Use and unaccounted for gas.

The results of the East and West service area are illustrated in Table 1, below. Over the Forecast Period, the Company's demand is expected to decrease slightly in the East service area and to increase slightly in the West service area. The East service area forecast is driven primarily by a decrease in demand in the Large General Service rate class (at a negative CAGR of 0.8%). The West service area forecast is driven primarily by an increase in demand in the Large General Service (at a CAGR of 0.7%) and Large Volume Service (at a CAGR of 1.4%) rate classes.[3]

[3] CAGRs are calculated prior to adjustments for unaccounted for gas.

Table 1: Demand Forecast Results (Ccf)[4]

Split-Year	East	West
2024/25	712,251,065	551,725,749
2025/26	711,237,670	554,543,754
2026/27	710,964,516	557,349,230
2027/28	713,077,984	561,393,818
2028/29	710,076,907	560,803,471
2029/30	709,517,582	561,837,260
2030/31	708,803,247	562,398,581
2031/32	710,419,621	564,832,680
2032/33	706,825,311	562,825,558
2033/34	705,775,325	562,819,891
2034/35	704,695,111	562,830,626
2035/36	705,981,515	565,220,816
2036/37	702,174,389	563,243,854
2037/38	700,690,997	562,823,820
2038/39	699,234,676	562,797,469
2039/40	700,086,885	564,459,822
2040/41	695,896,483	561,764,619
2041/42	694,154,698	561,244,382
2042/43	692,401,111	560,904,928
2043/44	693,104,550	562,705,073
CAGR (2024/25-2043/44)	-0.1%	0.1%

[4] Demand forecast results include the effect of leap days.

III. DEMAND FORECAST

The Company's demand forecast for both the East and West service areas were developed using econometric analysis unless indicated otherwise.

Phase 1 – Econometric Models for Demand Forecast

The purpose of the econometric forecasts is to develop long-term projections of demand based on forecasted changes in economic and demographic conditions in the Company's service territories. The econometric models were developed for each rate class and region for number of customers and use per customer based on variables such as weather, natural gas prices, and other economic and demographic variables.[5] The forecasts of customers and use per customer were then combined to develop a total demand forecast for each rate class.[6] The forecasts were then adjusted to reflect unaccounted for gas and Company Use. The demand forecasts for the four sales rate classes and unaccounted for gas and Company Use were then aggregated to determine the demand forecast requirements in the East and West regions.

Causal drivers of demand were identified and tested in the development of each of the forecast models. Each potential causal variable was tested and reviewed to develop models, which were robust, accurate and consistent with economic theory. In addition, each of the econometric models was tested for autocorrelation, heteroskedasticity, goodness of fit, significant values of the 't' statistics, and multicollinearity. Supporting detail for the demand forecast results and methodology is provided in Appendices 1 through 4.

1. Description of Variables

a. Rate Class Data

The Company provided monthly billing data by customer class (volumes, customers, and revenue) for the period from January 2014 through April 2024 for the East service area and January 2016 through April 2024 for the West service area. The monthly customer data served as the dependent variable for the customer models. The volume data was calendarized and the monthly use per customer (i.e., calendarized volumes divided by number of customers) served as the dependent variable for the use per customer models.

b. Weather Variable

Heating degree days ("HDDs") were used in the rate class models to account for the effect of weather on customers' usage. Spire provided daily HDD data for four weather locations: (1) Joplin Regional Airport; (2) Kansas City International Airport; and (3) St. Joseph Rosecrans Airport weather locations are located in the West service area; and (4) Lambert International Airport weather location is located in the East

[5] The East and West regions each include five rate classes: (1) Residential; (2) Small General Gas Service; (3) Large General Gas Service; (4) Large Volume Service; and (5) Transportation Service. Demand associated with Transportation Service customers was not included in the total demand forecast, because the Company does not procure natural gas supply for those customers.

[6] The total demand by customer segment for each month in the Forecast Period is calculated by multiplying the forecasted number of customers by the forecasted use per customer in the respective forecast month.

service area. The daily HDD data includes the period from January 1, 1960, through April 30, 2024. The HDD data represents daily temperatures below 65 degrees Fahrenheit.

To establish the Normal Year HDD data, the average annual number of HDDs was calculated for the Lambert International Airport in the East and Kansas City International Airport in the West for the 30 years spanning May 1995 through April 2024.[7] The Normal Year HDDs are summarized by month in Table 2, below.

Table 2: Normal Year HDD

Month	East	West
January	1,003	1,098
February[8]	789	875
March	557	628
April	254	318
May	73	105
June	4	6
July	0	0
August	0	1
September	25	46
October	224	284
November	543	617
December	863	970
Total	4,334	4,948

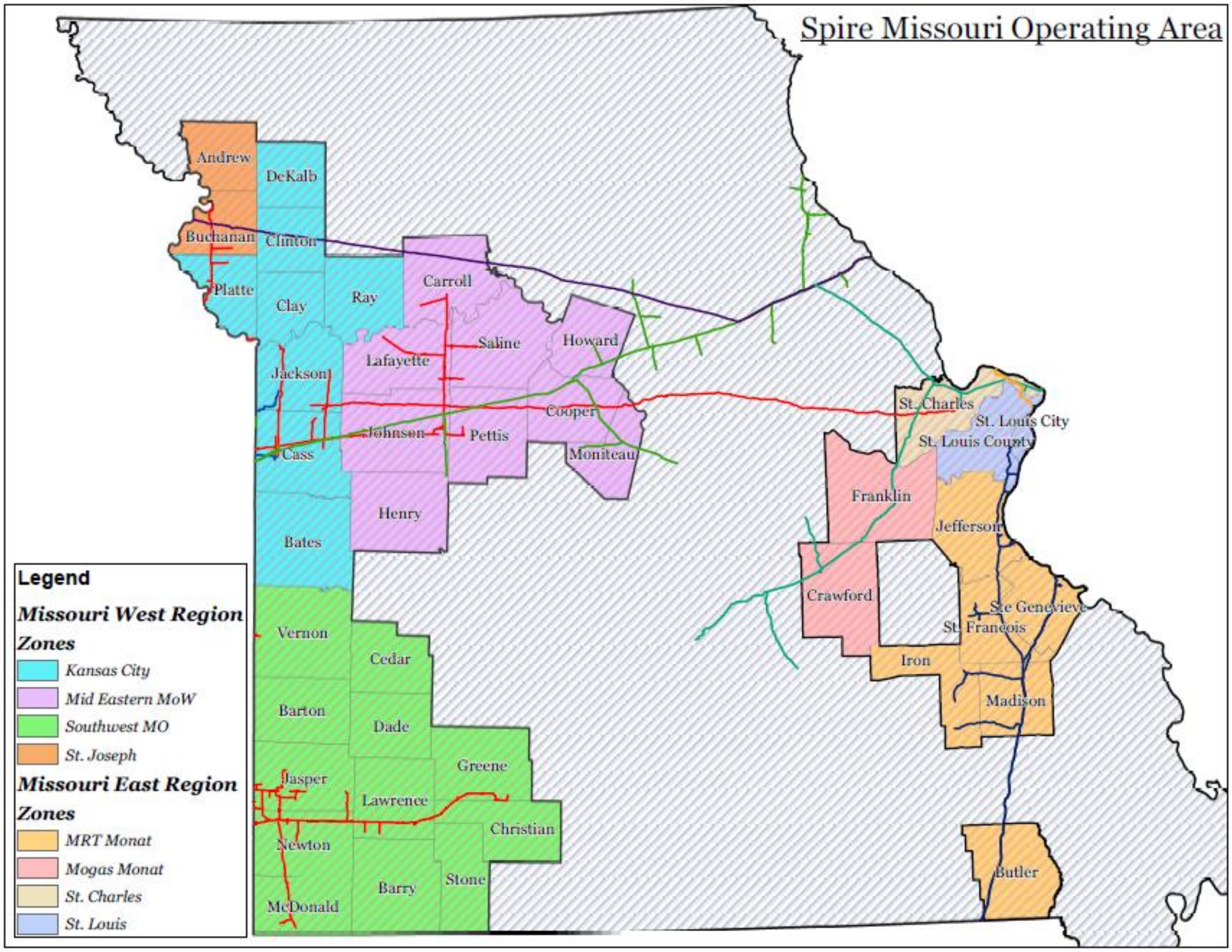
c. Economic and Demographic Variables

Economic and demographic data was purchased from Moody's Analytics to represent the market conditions in the East and West service areas. A regional map of the Company's East and West service areas is provided in Figure 1, below.

[7] A 30-year historical average is often used in integrated resource planning to determine the Normal Year weather. It represents a relatively stable estimate of weather over time, which is reasonable for the purposes of developing the Company's demand forecast and supply plan. A 30-year period is also consistent with the historical period used by Ameren Missouri in its 2023 electric IRP. Although a 30-year period is appropriate in developing the Company's demand forecast, a shorter averaging period may be reasonable if used for different purposes in other filings.

[8] HDDs in a leap year are 808 in the East service area and 897 in the West service area.

Figure 1: Spire Missouri Service Area by Region



As shown in Table 3, data for the Buchanan, Jefferson, St. Charles, and St. Louis counties were aggregated for the East service area level; data for the Franklin, Jackson, Jasper, and Johnson counties were aggregated for the West service area level.

Table 3: Region and Representative County

Service Area	Region	Representative County
East	MRT Monat	Jefferson
East	Mogas Monat	Franklin
East	St. Charles	St. Charles
East	St. Louis	St. Louis
West	Kansas City	Jackson
West	Mid Eastern MoW	Johnson
West	Southwest MO	Jasper
West	St. Joseph	Buchanan

Lag variables of between one and six months were developed for each of the economic and demographic variables listed in Table 4, below. Table 4 includes variables developed and tested in the modeling process.

Table 4: Independent Variables

Variable Name	Data Source	Description of Variable
HH	Moody's Analytics	Number of Households: Total, (Ths.)
POP	Moody's Analytics	Total Population, (Ths.)
MEDHHINC	Moody's Analytics	Income: Median Household, ($)
DISPINC	Moody's Analytics	Income: Disposable Personal, (Mil. $)
PERINC	Moody's Analytics	Income: Total Personal, (Mil. $)
EMP	Moody's Analytics	Employment, (Ths.)
NONFARMEMP	Moody's Analytics	Employment: Total Nonfarm Payroll, (Ths.)
UNEMPRATE	Moody's Analytics	Unemployment Rate, (%)
HSTARTS	Moody's Analytics	Housing Starts: Total Units, (#)
RETAILSALES	Moody's Analytics	Total Retail Sales, (Mil $)
GDP	Moody's Analytics	Gross Domestic Product: Total, (Mil. Chained 2017 $)
HHSIZE[9]	Calculated	Household Size
TREND	Calculated	Monthly Trend
HDD	Calculated	Heating Degree Days
RES.PRICE	Calculated	Missouri Residential Natural Gas Price ($/Mcf)
COM.PRICE	Calculated	Missouri Commercial Natural Gas Price ($/Mcf)
IND.PRICE	Calculated	Missouri Industrial Natural Gas Price ($/Mcf)

The historical and forecast data for the number of households, population, and employment in the East and West service areas are shown in Charts 1 through 3, below. These variables are presented here to give context to the economic and demographic trends associated with the East and West service areas as forecast by Moody's Analytics. Similar charts for all the potential independent variables are provided in Appendix 3.

The number of households and population in the East service area are generally forecast to increase until late in the Forecast Period when the growth levels off. However, the number of households and population in West service area is forecast to increase in the near-term, followed by a decreasing trend, which results in both variables experiencing levels below those currently observed. Turning to the forecast of employment, Moody's Analytics expects an increasing trend for the East service area, which is contrasted with the decreasing trend in the West service area.

[9] The Household Size variable was calculated using Moody's Analytics data by dividing the monthly values of total population by the number of households.

Chart 1: Number of Households

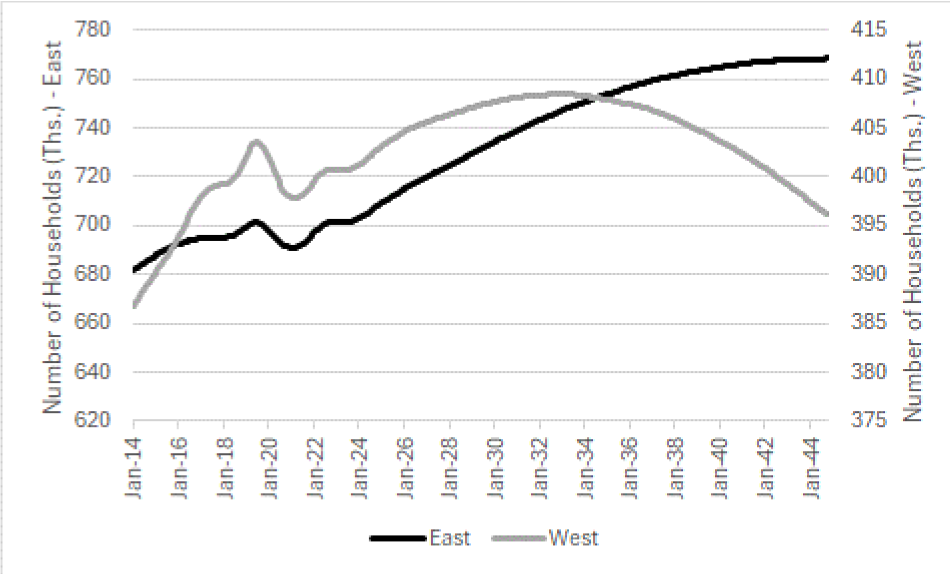


Chart 2: Population

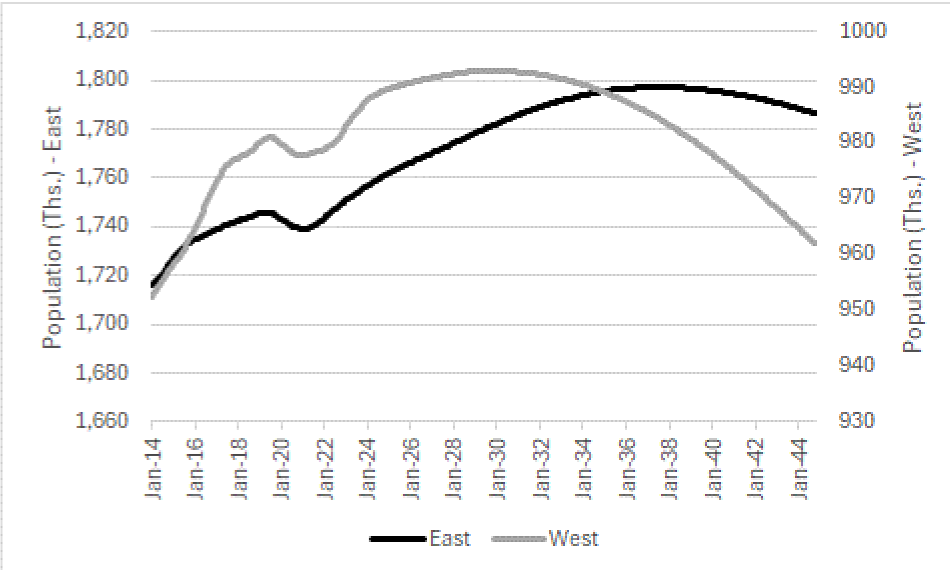
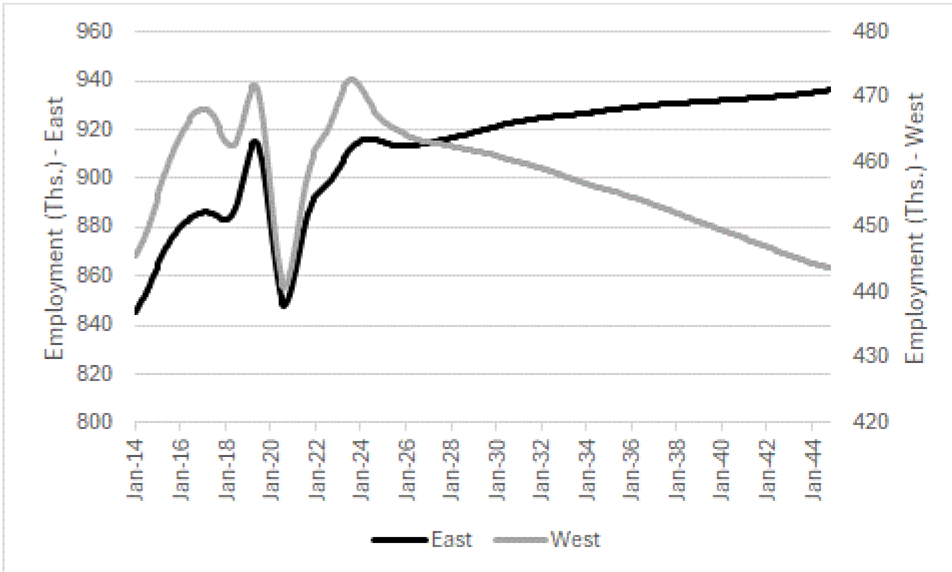


Chart 3: Employment



d. Natural Gas Price Variable

Historical residential, commercial, and industrial natural gas prices for Missouri were obtained from the U.S. Department of Energy/Energy Information Administration ("EIA").

Forecast natural gas prices were developed using EIA‟s Short Term Energy Outlook ("STEO")[10] and Annual Energy Outlook ("AEO").[11] The STEO forecasts natural gas prices for the West North Central region (which includes Missouri) on a monthly basis through December 2025. To develop the forecast of natural gas prices from March 2024 through December 2025, the year-over-year monthly percentage changes in the natural gas price forecast for the residential, commercial, and industrial customers were applied to the historical prices. For example, to develop the forecast of residential natural gas price in January 2025, the growth rate from the STEO for the period from January 2024 to January 2025 (i.e., the year-over-year growth rate) was applied to the historical residential natural gas price for Missouri in January 2025.

The AEO forecasts natural gas prices for residential, commercial, and industrial customers for the West North Central region. The annual percentage changes in the forecast for residential natural gas prices were used to develop the residential natural gas prices for Missouri starting in January 2026. Similarly, the percentage changes for commercial natural gas prices were applied to the commercial natural gas prices for Missouri, and the percentage changes in industrial natural gas prices were applied to industrial natural gas prices for Missouri. Those annual growth rates were applied to the previous year's natural gas prices in each month. For example, the natural gas price in January 2026 is equal to the January 2025 natural gas price adjusted by the annual growth rate between 2025 and 2026 from the AEO. Similarly, the natural gas price in February 2026 is equal to the February 2025 natural gas price adjusted

[10] Energy Information Administration, Short-Term Energy Outlook, Table 5b, as of May 23, 2024.

[11] Energy Information Administration, Annual Energy Outlook 2023, Supplemental Table 3.4, March 16, 2023.

by the same growth rate. That methodology was applied to develop the forecast between January 2026 and the end of the Forecast Period.

e. Historical Data Periods Used in Econometric Models

Based on the availability of historical data, the historical period January 2014 through April 2024 was used in the econometric analyses for each rate class in the East service area. Data was available for the period January 2016 through April 2024 for the West service area. All rate class models relied on those analytical periods, with two exceptions. To reflect current trends in the historical data, the Large Volume Service econometric models are based on the historical period April 2022 through April 2024, and the Small General Gas Service econometric models are based on the historical period October 2018 through April 2024.

2. Summary of Rate Class Forecasts

The majority of Spire's customers in the East service area are residential customers (i.e., approximately 94%). On a volumetric basis in the 2022/23 split-year, the residential rate class comprised approximately 67% of firm sendout.[12] The Small General Gas Service, Large General Gas Service, and Large Volume Service rate class volumes represented approximately 12%, 21%, and 1% of firm sendout in the East service area, respectively.

In the West service area, the majority of Spire's customers are residential customers (i.e., approximately 94%). On a volumetric basis in the 2022/23 split-year, the residential rate class comprised approximately 70% of firm sendout. The Small General Gas Service, Large General Gas Service, and Large Volume Service rate class volumes represented approximately 12%, 13%, and 5% of firm sendout in the West service area, respectively.

All number of customers, use per customer, and volumes results discussed in the following sections are based on the twelve months from November to October.

3. Residential Service – East

a. Number of Customers

Based on the econometric model developed, the number of customers for the residential customer segment is forecasted to increase slightly over the Forecast Period. The forecast equation for the number of residential customers includes autoregressive ("AR") terms and population, as well as monthly variables. Appendix 4.1 contains the detailed results of the regression analysis. The adjusted R^2 of the model is 0.984 and the independent variables are significant at the 95% level. The model results in the following forecast of residential customers.

[12] Calculated as the volumes associated with sales and excluding transportation customers.

Table 5: Residential Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	622,851
2025/26	624,009
2026/27	625,218
2027/28	626,531
2028/29	627,862
2029/30	629,143
2030/31	630,322
2031/32	631,340
2032/33	632,182
2033/34	632,886
2034/35	633,403
2035/36	633,694
2036/37	633,815
2037/38	633,767
2038/39	633,551
2039/40	633,183
2040/41	632,685
2041/42	632,069
2042/43	631,315
2043/44	630,467
CAGR (2024/25-2043/44)	0.1%

b. Use Per Customer

Over the Forecast Period, the residential use per customer is forecasted to decrease slightly. The forecast equation for residential use per customer includes an AR term, variables for the price of natural gas lagged one month, household size, and weather, as well as monthly variables. Appendix 4.2 contains the results of the regression analysis. The adjusted R^2 of the model is 0.999 and the independent variables are significant at the 95% level. The model results in the following forecast of residential use per customer.

Table 6: Residential Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	762.3
2025/26	762.3
2026/27	762.1
2027/28	764.2
2028/29	760.6
2029/30	759.7
2030/31	758.6
2031/32	760.4
2032/33	756.6
2033/34	755.7
2034/35	754.8
2035/36	756.8
2036/37	753.4
2037/38	752.7
2038/39	752.2
2039/40	754.3
2040/41	751.0
2041/42	750.6
2042/43	750.3
2043/44	752.8
CAGR (2024/25-2043/44)	-0.1%

c. Total Rate Class

The residential customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results, adjusted for the split-year, are shown in Table 7, below. Specifically, residential demand is expected to remain relatively flat, increasing by approximately 163,000 Ccf over the Forecast Period.

Table 7: Residential Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	475,930,800
2025/26	476,826,994
2026/27	477,599,387
2027/28	479,955,649
2028/29	478,718,596
2029/30	479,086,792
2030/31	479,345,536
2031/32	481,253,867
2032/33	479,515,436
2033/34	479,479,337
2034/35	479,370,295
2035/36	480,886,406
2036/37	478,825,300
2037/38	478,364,706
2038/39	477,914,076
2039/40	479,019,557
2040/41	476,553,370
2041/42	475,836,853
2042/43	475,106,343
2043/44	476,093,957
CAGR (2024/25-2043/44)	0.0%

4. Small General Gas Service – East

a. Number of Customers

The number of Small General Gas Service customers is forecasted to increase slightly over the Forecast Period. The forecast equation for the number of Small General Gas Service customers includes an AR term, a variable for nonfarm employment, as well as monthly variables. Appendix 4.3 contains the results of the regression analysis. The adjusted R^2 of the model is 0.966 and the independent variables are significant at the 95% level. The model results in the following forecast of Small General Gas Service customers.

Table 8: Small General Gas Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	36,499
2025/26	36,499
2026/27	36,515
2027/28	36,530
2028/29	36,544
2029/30	36,557
2030/31	36,569
2031/32	36,581
2032/33	36,592
2033/34	36,602
2034/35	36,613
2035/36	36,622
2036/37	36,628
2037/38	36,632
2038/39	36,635
2039/40	36,639
2040/41	36,643
2041/42	36,646
2042/43	36,648
2043/44	36,648
CAGR (2024/25-2043/44)	0.0%

b. Use Per Customer

Small General Gas Service use per customer is forecasted to decrease slightly over the Forecast Period. The forecast equation for Small General Gas Service use per customer includes an AR term and variables for employment and weather, as well as monthly variables. Appendix 4.4 contains the results of the regression analysis. The adjusted R^2 of the model is 0.996 and the independent variables are significant at the 95% level. The model results in the following forecast of Small General Gas Service use per customer.

Table 9: Small General Gas Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	2,208.5
2025/26	2,208.2
2026/27	2,209.2
2027/28	2,218.5
2028/29	2,211.7
2029/30	2,213.1
2030/31	2,214.2
2031/32	2,223.1
2032/33	2,215.5
2033/34	2,216.2
2034/35	2,216.9
2035/36	2,225.6
2036/37	2,218.0
2037/38	2,218.4
2038/39	2,218.7
2039/40	2,227.2
2040/41	2,219.5
2041/42	2,219.9
2042/43	2,220.4
2043/44	2,229.2
CAGR (2024/25-2043/44)	0.0%

c. Total Rate Class

The Small General Gas Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results adjusted for the split-year are shown in Table 10, below. Specifically, Small General Gas Service demand is expected to increase by almost 1,100,000 Ccf over the Forecast Period.

Table 10: Small General Gas Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	81,377,396
2025/26	81,349,756
2026/27	81,420,965
2027/28	81,800,161
2028/29	81,579,215
2029/30	81,659,658
2030/31	81,727,030
2031/32	82,082,849
2032/33	81,825,095
2033/34	81,872,553
2034/35	81,922,872
2035/36	82,267,574
2036/37	82,000,263
2037/38	82,022,184
2038/39	82,042,570
2039/40	82,366,017
2040/41	82,088,027
2041/42	82,110,793
2042/43	82,132,912
2043/44	82,461,961
CAGR (2024/25-2043/44)	0.1%

5. Large General Gas Service – East

a. Number of Customers

The number of Large General Gas Service customers is forecasted to decrease slightly over the Forecast Period. The forecast equation for the number of Large General Gas Service customers includes a constant, AR terms, unemployment rate, and monthly variables. Appendix 4.5 contains the results of the regression analysis. The adjusted R^2 of the model is 0.978 and the independent variables are significant at the 95% level. The model results in the following forecast of Large General Gas Service customers.

Table 11: Large General Gas Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	4,293
2025/26	4,255
2026/27	4,221
2027/28	4,188
2028/29	4,154
2029/30	4,121
2030/31	4,087
2031/32	4,054
2032/33	4,020
2033/34	3,986
2034/35	3,953
2035/36	3,920
2036/37	3,887
2037/38	3,853
2038/39	3,820
2039/40	3,787
2040/41	3,754
2041/42	3,721
2042/43	3,687
2043/44	3,654
CAGR (2024/25-2043/44)	-0.8%

b. Use Per Customer

The Large General Gas Service use per customer is forecasted to increase slightly over the Forecast Period. The forecast equation for Large General Gas Service use per customer includes an AR term, variables for the unemployment rate lagged two months, as well as monthly weather variables. Appendix 4.6 contains the results of the regression analysis. The adjusted R^2 of the model is 0.991 and the independent variables are significant at the 95% level. The model results in the following forecast of Large General Gas Service use per customer.

Table 12: Large General Gas Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	31,628.6
2025/26	31,482.2
2026/27	31,470.5
2027/28	31,561.3
2028/29	31,459.1
2029/30	31,469.0
2030/31	31,473.3
2031/32	31,563.6
2032/33	31,450.6
2033/34	31,452.3
2034/35	31,462.6
2035/36	31,573.1
2036/37	31,483.7
2037/38	31,491.6
2038/39	31,503.8
2039/40	31,619.4
2040/41	31,536.8
2041/42	31,545.8
2042/43	31,555.5
2043/44	31,666.9
CAGR (2024/25-2043/44)	0.0%

c. Total Rate Class

The Large General Gas Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results are shown in Table 13, below. Specifically, Large General Gas Service demand is expected to decrease by approximately 20,100,000 Ccf over the Forecast Period, or at a CAGR of negative 0.8%.

Table 13: Large General Gas Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	136,418,701
2025/26	134,558,902
2026/27	133,441,169
2027/28	132,764,778
2028/29	131,277,193
2029/30	130,271,369
2030/31	129,238,044
2031/32	128,548,393
2032/33	127,022,657
2033/34	125,977,899
2034/35	124,972,719
2035/36	124,364,185
2036/37	122,962,114
2037/38	121,944,127
2038/39	120,944,367
2039/40	120,343,484
2040/41	118,982,056
2041/42	117,965,507
2042/43	116,951,715
2043/44	116,314,991
CAGR (2024/25-2043/44)	-0.8%

6. Large Volume Service – East

a. Number of Customers

The number of Large Volume Service customers has remained relatively stable over the historical period, with a minimum of 22 and a maximum of 28 customers in the rate class since January 2014. Given the relatively small number of customers and the lack of variability in the data, the forecast for the number of Large Volume Service customers was based on the average number of customers over the most recent 12-month period. As shown in Table 14, below, the forecast of the number of Large Volume Service customers is the same in each year of the Forecast Period.

Table 14: Large Volume Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	26
2025/26	26
2026/27	26
2027/28	26
2028/29	26
2029/30	26
2030/31	26
2031/32	26
2032/33	26
2033/34	26
2034/35	26
2035/36	26
2036/37	26
2037/38	26
2038/39	26
2039/40	26
2040/41	26
2041/42	26
2042/43	26
2043/44	26
CAGR (2024/25-2043/44)	0.0%

b. Use Per Customer

Over the Forecast Period, use per customer by the Large Volume Service segment is forecasted to increase slightly. The forecast equation for Large Volume Service use per customer includes an AR term, variables for employment and weather, as well as monthly and dummy variables. Appendix 4.8 contains the results of the regression analysis. The adjusted R^2 of the model is 0.881 and the independent variables are significant at the 95% level. The model results in the following forecast of Large Volume Service use per customer.

Table 15: Large Volume Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	177,602.4
2025/26	177,513.6
2026/27	177,760.3
2027/28	178,265.2
2028/29	178,395.8
2029/30	178,739.8
2030/31	179,007.8
2031/32	179,404.5
2032/33	179,330.0
2033/34	179,485.9
2034/35	179,675.6
2035/36	180,022.4
2036/37	179,945.0
2037/38	180,036.6
2038/39	180,123.9
2039/40	180,414.3
2040/41	180,311.7
2041/42	180,415.6
2042/43	180,531.8
2043/44	180,909.9
CAGR (2024/25-2043/44)	0.1%

c. Total Rate Class

The Large Volume Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results adjusted for the split-year are shown in Table 16, below. Specifically, Large Volume Service demand is expected to increase by approximately 85,000 Ccf over the Forecast Period, or at a CAGR of 0.1%.

Table 16: Large Volume Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	4,558,461
2025/26	4,556,182
2026/27	4,562,514
2027/28	4,575,474
2028/29	4,578,826
2029/30	4,587,654
2030/31	4,594,534
2031/32	4,604,715
2032/33	4,602,804
2033/34	4,606,805
2034/35	4,611,673
2035/36	4,620,575
2036/37	4,618,587
2037/38	4,620,940
2038/39	4,623,179
2039/40	4,630,632
2040/41	4,628,001
2041/42	4,630,668
2042/43	4,633,649
2043/44	4,643,354
CAGR (2024/25-2043/44)	0.1%

7. Transportation Service – East

a. Number of Customers

The number of Transportation Service customers is forecasted to increase over the Forecast Period. The forecast equation for the number of Transportation Service customers includes a constant, an AR term, a variable for Gross Domestic Product lagged six months, as well as dummy variables. Appendix 4.9 contains the results of the regression analysis. The adjusted R^2 of the model is 0.988 and the independent variables are significant at the 95% level. The model results in the following forecast of Transportation Service customers.

Table 17: Transportation Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	147
2025/26	148
2026/27	149
2027/28	150
2028/29	151
2029/30	152
2030/31	153
2031/32	154
2032/33	155
2033/34	156
2034/35	157
2035/36	159
2036/37	160
2037/38	161
2038/39	162
2039/40	163
2040/41	164
2041/42	165
2042/43	166
2043/44	167
CAGR (2024/25-2043/44)	0.7%

b. Use Per Customer

Over the Forecast Period, use per customer by the Transportation Service segment is forecasted to increase. The forecast equation for Transportation Service use per customer includes AR terms, variables for the price of natural gas and employment, as well as monthly weather variables. Appendix 4.10 contains the results of the regression analysis. The adjusted R^2 of the model is 0.934 and the independent variables are significant at the 95% level. The model results in the following forecast of Transportation Service use per customer.

Table 18: Transportation Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	1,799,926.7
2025/26	1,828,202.6
2026/27	1,853,338.0
2027/28	1,871,127.5
2028/29	1,880,729.5
2029/30	1,888,420.9
2030/31	1,892,243.0
2031/32	1,895,622.3
2032/33	1,892,792.7
2033/34	1,891,648.1
2034/35	1,891,371.6
2035/36	1,893,659.3
2036/37	1,892,249.5
2037/38	1,890,490.3
2038/39	1,891,651.9
2039/40	1,892,134.3
2040/41	1,889,261.0
2041/42	1,889,828.3
2042/43	1,891,933.9
2043/44	1,896,754.8
CAGR (2024/25-2043/44)	0.3%

c. Total Rate Class

The Transportation Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results adjusted for the split-year are shown in Table 19, below. Specifically, Transportation Service demand is expected to increase by approximately 52,000,000 Ccf over the Forecast Period, or at a CAGR of 1.0%.

Table 19: Transportation Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	265,230,774
2025/26	270,314,947
2026/27	275,544,544
2027/28	280,078,989
2028/29	283,614,545
2029/30	286,842,473
2030/31	289,412,469
2031/32	291,875,220
2032/33	293,488,786
2033/34	295,456,547
2034/35	297,611,659
2035/36	300,145,420
2036/37	302,102,805
2037/38	303,945,182
2038/39	306,226,393
2039/40	308,423,019
2040/41	310,037,606
2041/42	312,210,485
2042/43	314,653,254
2043/44	317,582,231
CAGR (2024/25-2043/44)	1.0%

8. Residential Service – West

a. Number of Customers

Based on the econometric model developed, the number of customers for the residential customer segment is forecasted to decrease slightly over the Forecast Period. The forecast equation for the number of residential customers includes AR terms and variables for total households, as well as monthly and dummy variables. Appendix 4.11 contains the detailed results of the regression analysis. The adjusted R^2 of the model is 0.970 and the independent variables are significant at the 95% level. The model results in the following forecast of residential customers.

Table 20: Residential Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	505,660
2025/26	506,441
2026/27	506,711
2027/28	506,857
2028/29	506,978
2029/30	506,946
2030/31	506,781
2031/32	506,407
2032/33	505,866
2033/34	505,007
2034/35	504,014
2035/36	502,966
2036/37	501,641
2037/38	500,065
2038/39	498,335
2039/40	496,505
2040/41	494,532
2041/42	492,347
2042/43	490,021
2043/44	487,625
CAGR (2024/25-2043/44)	-0.2%

b. Use Per Customer

Over the Forecast Period, the residential use per customer is forecasted to increase slightly. The forecast equation for residential use per customer includes a constant, AR terms, variables for the price of natural gas and weather, as well as a monthly and dummy variables. Appendix 4.12 contains the results of the regression analysis. The adjusted R^2 of the model is 0.998 and the independent variables are significant at the 95% level. The model results in the following forecast of residential use per customer.

Table 21: Residential Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	746.5
2025/26	750.5
2026/27	752.7
2027/28	756.5
2028/29	753.4
2029/30	752.8
2030/31	751.8
2031/32	753.9
2032/33	749.7
2033/34	748.5
2034/35	747.6
2035/36	750.1
2036/37	746.6
2037/38	745.9
2038/39	745.8
2039/40	748.3
2040/41	744.7
2041/42	744.6
2042/43	744.8
2043/44	748.2
CAGR (2024/25-2043/44)	0.0%

c. Total Rate Class

The residential customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results, adjusted for the split-year, are shown in Table 22, below. Specifically, residential demand is expected to decrease by approximately 12,000,000 Ccf over the Forecast Period, or at a negative CAGR of 0.2%.

Table 22: Residential Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	379,040,424
2025/26	381,699,738
2026/27	383,060,145
2027/28	385,111,825
2028/29	383,625,610
2029/30	383,341,672
2030/31	382,752,265
2031/32	383,551,024
2032/33	381,047,710
2033/34	379,860,300
2034/35	378,619,445
2035/36	379,136,674
2036/37	376,448,091
2037/38	374,913,720
2038/39	373,624,847
2039/40	373,528,042
2040/41	370,286,899
2041/42	368,608,673
2042/43	367,017,868
2043/44	366,905,054
CAGR (2024/25-2043/44)	-0.2%

9. Small General Gas Service – West

a. Number of Customers

The number of Small General Gas Service customers is forecasted to increase slightly over the Forecast Period. The forecast equation for the number of Small General Gas Service customers includes a constant, an AR term, and a variable for Gross Domestic Product, as well as monthly variables. Appendix 4.13 contains the results of the regression analysis. The adjusted R^2 of the model is 0.859 and the independent variables are significant at the 95% level. The model results in the following forecast of Small General Gas Service customers.

Table 23: Small General Gas Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	30,863
2025/26	30,967
2026/27	31,105
2027/28	31,261
2028/29	31,418
2029/30	31,567
2030/31	31,708
2031/32	31,851
2032/33	32,000
2033/34	32,154
2034/35	32,305
2035/36	32,454
2036/37	32,601
2037/38	32,740
2038/39	32,879
2039/40	33,015
2040/41	33,148
2041/42	33,280
2042/43	33,412
2043/44	33,546
CAGR (2024/25-2043/44)	0.4%

b. Use Per Customer

Small General Gas Service use per customer is forecasted to decline slightly over the Forecast Period. The forecast equation for Small General Gas Service use per customer includes a constant and variables for the price of natural gas, weather and unemployment rate, as well as monthly variables. Appendix 4.14 contains the results of the regression analysis. The adjusted R^2 of the model is 0.992 and the independent variables are significant at the 95% level. The model results in the following forecast of Small General Gas Service use per customer.

Table 24: Small General Gas Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	2,087.3
2025/26	2,080.8
2026/27	2,087.5
2027/28	2,096.4
2028/29	2,085.4
2029/30	2,081.2
2030/31	2,075.6
2031/32	2,078.3
2032/33	2,061.8
2033/34	2,055.7
2034/35	2,051.2
2035/36	2,058.1
2036/37	2,048.0
2037/38	2,044.2
2038/39	2,044.9
2039/40	2,052.2
2040/41	2,041.5
2041/42	2,041.1
2042/43	2,043.3
2043/44	2,054.8
CAGR (2024/25-2043/44)	-0.1%

c. Total Rate Class

The Small General Gas Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results adjusted for the split-year are shown in Table 25, below. Specifically, Small General Gas Service demand is expected to increase by approximately 4,500,000 Ccf over the Forecast Period, or at a CAGR of 0.4%.

Table 25: Small General Gas Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	64,886,384
2025/26	64,880,862
2026/27	65,366,151
2027/28	65,969,375
2028/29	65,952,417
2029/30	66,134,579
2030/31	66,253,368
2031/32	66,636,237
2032/33	66,413,835
2033/34	66,531,942
2034/35	66,701,294
2035/36	67,235,564
2036/37	67,205,786
2037/38	67,370,502
2038/39	67,676,232
2039/40	68,200,694
2040/41	68,116,147
2041/42	68,372,301
2042/43	68,715,651
2043/44	69,378,525
CAGR (2024/25-2043/44)	0.4%

10. Large General Gas Service – West

a. Number of Customers

The number of Large General Gas Service customers is forecasted to increase slightly over the Forecast Period. The forecast equation for the number of Large General Gas Service customers includes an AR term, variables for employment and Gross Domestic Product, as well as monthly variables. Appendix 4.15 contains the results of the regression analysis. The adjusted R^2 of the model is 0.879 and the independent variables are significant at the 95% level. The model results in the following forecast of Large General Gas Service customers.

Table 26: Large General Gas Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	3,149
2025/26	3,166
2026/27	3,196
2027/28	3,230
2028/29	3,264
2029/30	3,299
2030/31	3,330
2031/32	3,362
2032/33	3,394
2033/34	3,427
2034/35	3,460
2035/36	3,493
2036/37	3,525
2037/38	3,555
2038/39	3,586
2039/40	3,617
2040/41	3,647
2041/42	3,678
2042/43	3,708
2043/44	3,740
CAGR (2024/25-2043/44)	0.9%

b. Use Per Customer

The Large General Gas Service use per customer is forecasted to decrease slightly over the Forecast Period. The forecast equation for Large General Gas Service use per customer includes AR terms and variables for weather and unemployment rate. Appendix 4.16 contains the results of the regression analysis. The adjusted R^2 of the model is 0.976 and the independent variables are significant at the 95% level. The model results in the following forecast of Large General Gas Service use per customer.

Table 27: Large General Gas Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	21,946.7
2025/26	21,852.6
2026/27	21,809.6
2027/28	21,821.2
2028/29	21,728.4
2029/30	21,698.0
2030/31	21,662.2
2031/32	21,674.0
2032/33	21,575.9
2033/34	21,542.3
2034/35	21,511.3
2035/36	21,535.3
2036/37	21,449.7
2037/38	21,417.9
2038/39	21,388.8
2039/40	21,416.2
2040/41	21,335.0
2041/42	21,303.5
2042/43	21,273.7
2043/44	21,299.0
CAGR (2024/25-2043/44)	-0.2%

c. Total Rate Class

The Large General Gas Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results, adjusted for the split-year, are shown in Table 28, below. Specifically, Large General Gas Service demand is expected to increase by approximately 10,400,000 Ccf over the Forecast Period, or at a CAGR of 0.7%.

Table 28: Large General Gas Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	69,571,416
2025/26	69,568,994
2026/27	70,057,366
2027/28	70,820,867
2028/29	71,272,619
2029/30	71,912,593
2030/31	72,487,146
2031/32	73,204,153
2032/33	73,551,521
2033/34	74,141,422
2034/35	74,751,366
2035/36	75,537,420
2036/37	75,922,016
2037/38	76,468,626
2038/39	77,018,914
2039/40	77,773,088
2040/41	78,122,192
2041/42	78,653,604
2042/43	79,193,534
2043/44	79,963,146
CAGR (2024/25-2043/44)	0.7%

11. Large Volume Service – West

a. Number of Customers

The number of Large Volume Service customers is forecasted to increase over the Forecast Period. The forecast equation for the number of Large Volume Service customers includes an AR term, a variable for Gross Domestic Product, as well as a monthly variable and a dummy variable. Appendix 4.17 contains the results of the regression analysis. The adjusted R^2 of the model is 0.722 and the independent variables are significant at the 95% level. The model results in the following forecast of Large Volume Service customers.

Table 29: Large Volume Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	29
2025/26	29
2026/27	30
2027/28	30
2028/29	31
2029/30	32
2030/31	32
2031/32	33
2032/33	33
2033/34	34
2034/35	34
2035/36	35
2036/37	35
2037/38	36
2038/39	36
2039/40	37
2040/41	37
2041/42	38
2042/43	38
2043/44	39
CAGR (2024/25-2043/44)	1.5%

b. Use Per Customer

Over the Forecast Period, use per customer by the Large Volume Service segment is forecasted to decline slightly. The forecast equation for Large Volume Service use per customer includes variables for weather and employment, as well as dummy variables. Appendix 4.18 contains the results of the regression analysis. The adjusted R^2 of the model is 0.880 and the independent variables are significant at the 95% level. The model results in the following forecast of Large Volume Service use per customer.

Table 30: Large Volume Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	943,414.9
2025/26	940,934.7
2026/27	939,765.5
2027/28	940,224.3
2028/29	937,938.8
2029/30	936,736.4
2030/31	935,476.6
2031/32	935,422.8
2032/33	932,366.6
2033/34	930,858.1
2034/35	929,530.5
2035/36	929,387.0
2036/37	926,402.2
2037/38	924,593.8
2038/39	922,843.2
2039/40	922,464.6
2040/41	919,360.6
2041/42	917,572.9
2042/43	915,812.2
2043/44	915,676.5
CAGR (2024/25-2043/44)	-0.2%

c. Total Customer Segment

The Large Volume Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results adjusted for the split-year are shown in Table 31, below. Specifically, Large Volume Service demand is expected to increase by approximately 8,000,000 Ccf over the Forecast Period, or at a CAGR of 1.4%.

Table 31: Large Volume Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	27,409,373
2025/26	27,520,753
2026/27	27,937,152
2027/28	28,484,028
2028/29	28,956,679
2029/30	29,431,999
2030/31	29,878,379
2031/32	30,366,115
2032/33	30,776,696
2033/34	31,250,543
2034/35	31,722,627
2035/36	32,228,396
2036/37	32,623,965
2037/38	33,035,210
2038/39	33,442,232
2039/40	33,890,159
2040/41	34,224,388
2041/42	34,605,012
2042/43	34,979,740
2043/44	35,424,916
CAGR (2024/25-2043/44)	1.4%

12. Transportation Service – West

a. Number of Customers

The number of Transportation Service customers is forecasted to increase over the Forecast Period. The forecast equation for the number of Transportation Service customers includes AR terms, a variable for Gross Domestic Product, as well as a dummy variable. Appendix 4.19 contains the results of the regression analysis. The adjusted R^2 of the model is 0.985 and the independent variables are significant at the 95% level. The model results in the following forecast of Transportation Service customers.

Table 32: Transportation Service Customers Forecast

Split-Year	Avg. # of Customers
2024/25	589
2025/26	590
2026/27	594
2027/28	600
2028/29	606
2029/30	612
2030/31	619
2031/32	626
2032/33	634
2033/34	642
2034/35	651
2035/36	659
2036/37	668
2037/38	676
2038/39	685
2039/40	693
2040/41	702
2041/42	710
2042/43	718
2043/44	727
CAGR (2024/25-2043/44)	1.1%

b. Use Per Customer

Over the Forecast Period, use per customer by the Transportation Service segment is forecasted to decrease slightly. The forecast equation for Transportation Service use per customer includes AR terms, variables for weather and employment, as well as dummy variables. Appendix 4.20 contains the results of the regression analysis. The adjusted R^2 of the model is 0.924 and the independent variables are significant at the 95% level. The model results in the following forecast of Transportation Service use per customer.

Table 33: Transportation Service Use Per Customer Forecast (Ccf/Customer)

Split-Year	Use Per Customer
2024/25	896,634.5
2025/26	892,680.1
2026/27	890,406.7
2027/28	890,132.8
2028/29	888,120.4
2029/30	886,611.4
2030/31	885,022.1
2031/32	884,112.6
2032/33	881,100.4
2033/34	879,198.6
2034/35	877,524.9
2035/36	876,503.1
2036/37	873,580.8
2037/38	871,300.9
2038/39	869,093.8
2039/40	867,775.8
2040/41	864,703.1
2041/42	862,449.3
2042/43	860,229.6
2043/44	859,217.7
CAGR (2024/25-2043/44)	-0.2%

c. Total Rate Class

The Transportation Service customer forecast was multiplied by the use per customer forecast on a monthly basis to determine the annual demand forecast for each year. Those results adjusted for the split-year are shown in Table 34, below. Specifically, Transportation Service demand is expected to increase by almost 95,700,000 Ccf over the Forecast Period, or at a CAGR of 0.9%.

Table 34: Transportation Service Demand Forecast (Ccf)

Split-Year	Demand
2024/25	528,604,611
2025/26	526,641,701
2026/27	528,505,600
2027/28	533,370,493
2028/29	537,878,856
2029/30	542,697,440
2030/31	547,403,429
2031/32	553,006,822
2032/33	557,967,072
2033/34	564,137,728
2034/35	570,547,201
2035/36	577,462,456
2036/37	583,111,356
2037/38	588,898,847
2038/39	594,747,524
2039/40	601,168,502
2040/41	606,246,544
2041/42	611,880,623
2042/43	617,560,494
2043/44	624,259,744
CAGR (2024/25-2043/44)	0.9%

13. Unaccounted For Gas and Company Use

Unaccounted for gas is the difference between the total system sendout as measured at the gate-station and the volumes recorded at customer meters in the Company's billing system.[13] Company Use is the amount of gas utilized by Spire for its own purposes.

To calculate unaccounted for gas and Company Use, an annual percentage of 2% was applied to each year over the Forecast Period. The 2% assumption is consistent with the rate defined in Spire's tariff.[14]

14. Energy Efficiency

Energy efficiency programs have been active during the entirety of the historical data period used in this demand forecast (i.e., January 2016 through April 2024 in the West service area and January 2014 through April 2024 in the East service area). As such, the historical data used to develop the econometric

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[13] There are a variety of factors that contribute to lost and unaccounted for gas. Those factors include:% system leakage; metering variances; theft of service; purging during construction activities; and third-party damages.

[14] Spire Missouri West Tariff, Date effective: December 23, 2021, Sheet No. 7.1.

model includes demand savings associated with those programs. Because the Company does not have plans to materially change the current programs in place, it was assumed that the historical data reflects the impact of energy efficiency savings associated with the Company's energy efficiency program. However, as described in Section IV, an alternative demand forecast scenario was developed assuming higher levels of energy efficiency and conservation over the Forecast Period.

15. Total Demand Forecast Results

The results of the Company's demand forecast are provided in Tables 35 (East) and 36 (West), below. Total demand is forecasted to slightly increase in the West service area, and slightly decrease in the East service area over the Forecast Period.

Table 35: Demand Forecast by Rate Class – East (Ccf)

Split-Year	Res.	Small Gen. Service	Large Gen. Service	Large Volume Service	Unaccounted For Gas and Company Use	Total Demand Forecast
	A	B	C	D	E	F = Sum of A through E
2024/25	475,930,800	81,377,396	136,418,701	4,558,461	13,965,707	712,251,065
2025/26	476,826,994	81,349,756	134,558,902	4,556,182	13,945,837	711,237,670
2026/27	477,599,387	81,420,965	133,441,169	4,562,514	13,940,481	710,964,516
2027/28	479,955,649	81,800,161	132,764,778	4,575,474	13,981,921	713,077,984
2028/29	478,718,596	81,579,215	131,277,193	4,578,826	13,923,077	710,076,907
2029/30	479,086,792	81,659,658	130,271,369	4,587,654	13,912,109	709,517,582
2030/31	479,345,536	81,727,030	129,238,044	4,594,534	13,898,103	708,803,247
2031/32	481,253,867	82,082,849	128,548,393	4,604,715	13,929,796	710,419,621
2032/33	479,515,436	81,825,095	127,022,657	4,602,804	13,859,320	706,825,311
2033/34	479,479,337	81,872,553	125,977,899	4,606,805	13,838,732	705,775,325
2034/35	479,370,295	81,922,872	124,972,719	4,611,673	13,817,551	704,695,111
2035/36	480,886,406	82,267,574	124,364,185	4,620,575	13,842,775	705,981,515
2036/37	478,825,300	82,000,263	122,962,114	4,618,587	13,768,125	702,174,389
2037/38	478,364,706	82,022,184	121,944,127	4,620,940	13,739,039	700,690,997
2038/39	477,914,076	82,042,570	120,944,367	4,623,179	13,710,484	699,234,676
2039/40	479,019,557	82,366,017	120,343,484	4,630,632	13,727,194	700,086,885
2040/41	476,553,370	82,088,027	118,982,056	4,628,001	13,645,029	695,896,483
2041/42	475,836,853	82,110,793	117,965,507	4,630,668	13,610,876	694,154,698
2042/43	475,106,343	82,132,912	116,951,715	4,633,649	13,576,492	692,401,111
2043/44	476,093,957	82,461,961	116,314,991	4,643,354	13,590,285	693,104,550
CAGR (2024/25-2043/44)	0.0%	0.1%	-0.8%	0.1%	-0.1%	-0.1%

Table 36: Demand Forecast by Rate Class – West (Ccf)

Split-Year	Res.	Small Gen. Service	Large Gen. Service	Large Volume Service	Unaccounted For Gas and Company Use	Total Demand Forecast
	A	B	C	D	E	F = Sum of A through E
2024/25	379,040,424	64,886,384	69,571,416	27,409,373	10,818,152	551,725,749
2025/26	381,699,738	64,880,862	69,568,994	27,520,753	10,873,407	554,543,754
2026/27	383,060,145	65,366,151	70,057,366	27,937,152	10,928,416	557,349,230
2027/28	385,111,825	65,969,375	70,820,867	28,484,028	11,007,722	561,393,818
2028/29	383,625,610	65,952,417	71,272,619	28,956,679	10,996,146	560,803,471
2029/30	383,341,672	66,134,579	71,912,593	29,431,999	11,016,417	561,837,260
2030/31	382,752,265	66,253,368	72,487,146	29,878,379	11,027,423	562,398,581
2031/32	383,551,024	66,636,237	73,204,153	30,366,115	11,075,151	564,832,680
2032/33	381,047,710	66,413,835	73,551,521	30,776,696	11,035,795	562,825,558
2033/34	379,860,300	66,531,942	74,141,422	31,250,543	11,035,684	562,819,891
2034/35	378,619,445	66,701,294	74,751,366	31,722,627	11,035,895	562,830,626
2035/36	379,136,674	67,235,564	75,537,420	32,228,396	11,082,761	565,220,816
2036/37	376,448,091	67,205,786	75,922,016	32,623,965	11,043,997	563,243,854
2037/38	374,913,720	67,370,502	76,468,626	33,035,210	11,035,761	562,823,820
2038/39	373,624,847	67,676,232	77,018,914	33,442,232	11,035,244	562,797,469
2039/40	373,528,042	68,200,694	77,773,088	33,890,159	11,067,840	564,459,822
2040/41	370,286,899	68,116,147	78,122,192	34,224,388	11,014,993	561,764,619
2041/42	368,608,673	68,372,301	78,653,604	34,605,012	11,004,792	561,244,382
2042/43	367,017,868	68,715,651	79,193,534	34,979,740	10,998,136	560,904,928
2043/44	366,905,054	69,378,525	79,963,146	35,424,916	11,033,433	562,705,073
CAGR (2024/25-2043/44)	-0.2%	0.4%	0.7%	1.4%	0.1%	0.1%

IV. ALTERNATIVE DEMAND FORECAST SCENARIOS

In addition to the Base demand forecast, three alternative demand scenarios were developed: (1) High Electrification; (2) High Energy Efficiency; and (3) High Economic Growth. The assumptions underlying each of the alternative demand scenarios are discussed in turn below.

1. High Electrification

The High Electrification scenario assumes a higher level of electrification than is present in the historical dataset. Electrification includes new potential customers or existing customers installing electric heat pumps, water heaters, stoves, or other electric technologies instead of the natural gas equivalents. Industry research was reviewed to help develop the assumptions that serve as the basis for the High Electrification scenario. In addition, because Ameren Missouri's electric service territory significantly overlaps with Spire's, Ameren Missouri's most recent electric Integrated Resource Plan ("IRP") was reviewed to understand the underlying forecasts related to electrification.

Based on the research summarized below, there are two main themes as it relates to the effect of electrification on natural gas and electric utilities. First, there is a wide range of potential outcomes. There is no consensus on the effect of electrification on natural gas demand. It may have a limited impact or be a significant driver of future demand. Second, there are barriers to existing customers electrifying buildings that has the potential to slow the rate of adoption of electric technologies.

There are several reports that attempt to project the level of electrification. Much of the research is within the context of the effect on the electric grid. For example, in May 2024 The Brattle Group released a report which shows a CAGR in electric demand of 0% to 4% as a result of building electrification in the United States.[15] In addition, the National Renewable Energy Laboratory's ("NREL") Electrification Futures Study determined three electrification scenarios: (1) Reference; (2) Medium; and (3) High. NREL notes regarding its reference case, "[W]e estimate electric technologies will grow to provide 18% and 15% of 2050 space heating needs in residential and commercial buildings, respectively."[16] NREL further states that, "Despite the measurable degree of buildings electrification in the Reference scenario, we assume significant expansion of electric buildings technologies in the Medium and High electrification scenarios, particularly with respect to heat pumps for both space and water heating."[17] The consequence of high electrification scenarios would be lower gas demand. As shown in Chart 4, below, under the Reference case, the percentage of natural gas demand as compared to other fuels slightly increases, whereas there is a noticeable decline in the Medium and High cases.

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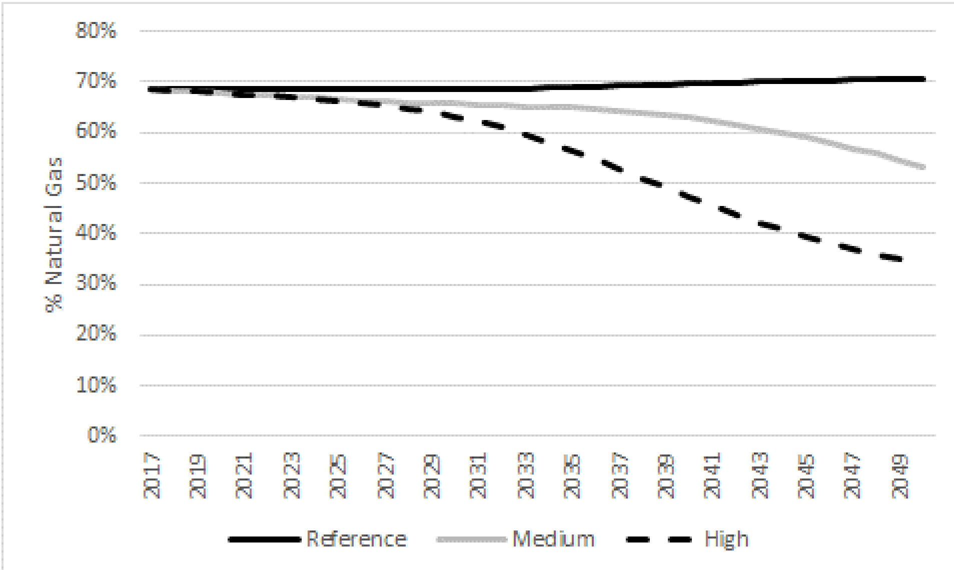
[15] The Brattle Group, *Electricity Demand Growth and Forecasting in a Time of Change*, May 2024, at vi.

[16] National Renewable Energy Laboratory, *Electrification Futures Study: Scenarios of Electric Technology Adoption and Power Consumption for the United States*, 2018, at 50.

[17] *Ibid*.

Chart 4: Percentage of Residential and Commercial Building Space Heating, Water Heating, and Cooking Demand from Natural Gas[18]



NREL also discussed challenges in converting customers to electric technologies, such as heat pumps:

> Despite the substantial growth in electric technologies, reliance on non-electric technologies, particularly natural gas-based technologies, remains sizeable in the Medium and Reference scenarios due to incumbency and economic advantages. For example, residential furnaces have typical lifetimes on the order of 15 to 20 years. Given that residential heating systems are typically only replaced following system failure, only two opportunities (two life-cycles) exist for new electric-technologies (e.g., heat pumps) to replace incumbent technologies over the present day to 2050. Furthermore, in cold-climate regions, the lower efficiencies of conventional heat pumps and higher upfront capital costs of cold-climate optimized heat pumps (relative to conventional technologies) decrease the economic competitiveness of heat pumps in those regions, and they challenge the potential for widespread adoption in colder climates. Finally, challenges associated with building retrofits (including the potential need for new ducting and upgraded electric service), installer or contractor experience (and level of comfort with heat pump technologies), access to capital, and consumer preferences may also hinder the spread of electric technologies in the buildings sector.[19]

Similarly, EIA forecasts heat pumps to gain market share, but notes that growth is limited:

> Federal and non-federal subsidies both encourage homes and businesses to adopt high-efficiency natural gas and electric equipment, including heat pumps. Electric heat pumps, including ground-source heat pumps, gain market share over

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[18] Source: National Renewable Energy Laboratory, *Electrification Futures Study: Scenarios of Electric Technology Adoption and Power Consumption for the United States*, 2018, data supporting Table 6.5.

[19] *Ibid*., at 50-51.

the projection period, increasing from 11% of households in 2022 to between 14% and 15% of households in 2050 across all cases; however, their growth is limited by:

> • A large existing market share for non-heat pump equipment that lasts a long time
>
> • The high cost of purchasing and switching technologies, including electrical upgrades to accommodate electric heating and cooling and new ductwork when replacing boilers
>
> • The higher price of electricity versus natural gas per million British thermal units, despite heat pump efficiency that may be multiple times higher than fossil fuel-fired equipment
>
> • Reduced overall demand for space heating as building efficiency improves and heating degree days decrease[20]

Regarding Ameren Missouri's most recent IRP, the company developed three electrification scenarios: (1) Low, (2) Base, and (3) High. The scenarios were based on varying inputs such as natural gas prices, carbon prices, and electric vehicle adoption. The resulting electric demand associated with electrification ranged from approximately 1,000 GWh in the Low case to over 8,000 GWh in the High case, with Base case demand of approximately 5,000 GWh in 2043. On a total demand basis, the Low and High cases range from approximately 31,000 GWh to over 39,000 GWh, with Base case demand of over 35,000 GWh in 2043.[21] Similar to the research noted above, those forecasts reflect a wide range of potential future outcomes.

The High Electrification scenario in this demand forecast assumes that over the Forecast Period the number of customers is lower relative to the Base case. The adjustments to the number of customers were performed by rate class, because converting to electric technologies is likely easier for residential and small commercial customers who are using natural gas for space heating, water heating, or cooking, as compared to large commercial and industrial customers that use natural gas for processes. Consistent with Ameren Missouri's 2023 IRP, the effects of increased electrification were forecast to begin in 2027. The downward adjustment to the number of customers was estimated by assuming a percentage decrease in 2044 (i.e., the last year of the Forecast Period) and applying a downward adjustment in each calendar year based on an increasing percentage change. For example, for the Residential rate class it was assumed that in 2044 the number of customers would be approximately 21% lower than the base case. Because there are 18 years between 2027 and 2044, inclusive, the 21% was divided by 18, which is approximately 1.2%. The downward adjustment to the number of residential customers was increased by approximately 1.2% in each year between 2027 and 2044.[22] The Small General Gas Service number of customers adjustment was approximately 13% lower in 2044 relative to the base case. The Large General Gas Service, Large Volume Service, and Transportation Service rate classes were not adjusted. The Residential and Small General Gas Service adjustments were derived from NREL data representing

[20] Energy Information Administration, 2023 Annual Energy Outlook, March 16, 2023, at 17.

[21] Ameren Missouri, *2023 Integrated Resource Plan*, *Section 3. Load Analysis and Forecasting*, 2023, at 31.

[22] That is, the downward adjustment in 2027 was 1.2%, in 2028 was 2.3%, in 2029 was 3.5%, etc.

the percentage difference between its Reference and Medium cases for the number of residential and commercial buildings that are projected to rely on natural gas for space heating in 2044.[23]

2. High Energy Efficiency

Although the historical dataset on which the econometric models were developed reflects a trend in energy efficiency savings, the potential for additional energy efficiency and conservation savings associated with new factors (e.g., changes in federal standards, emerging technologies, changes in local building codes, etc.) remains a possibility. Between late 2023 and early 2024 the Department of Energy finalized several efficiency standards which go into effect in 2028 and 2029 for natural gas furnaces and boilers, water heaters, washers and dryers, and stoves. For example, starting in 2028, newly installed natural gas furnaces and boilers must have an efficiency rating of at least 95 AFUE, which is an increase from the current standard of 80 AFUE.

The High Energy Efficiency scenario assumes that additional policies, technologies, and customer activities will lead to incremental demand reductions over the Forecast Period. For example, currently high efficiency natural gas heat pumps, which can reach efficiency ratings of over 100%, have generally been deployed in commercial buildings. Under the High Energy Efficiency scenario such technologies become more viable for residential customers, resulting in decreased demand.

To reflect those changes, an adjustment was made to the residential use per customer forecasts in each month. Specifically, it was assumed that every twelve months the residential use per customer would be an additional 0.5% lower than the Base forecast. Each intervening month was lowered by 0.04%, or 0.5% divided by 12. The results of the residential use per customer forecast under the High Energy Efficiency scenario are summarized in Table 37, below.

[23] Source: National Renewable Energy Laboratory, *Electrification Futures Study: Scenarios of Electric Technology Adoption and Power Consumption for the United States*, 2018, data supporting Table 6.4.

**Table 37: Residential Use Per Customer Forecast (Ccf/Customer)
Base and High Energy Efficiency Scenarios**

Split-Year	East - Base	East – High EE	West - Base	West – High EE
2024/25	762.3	759.0	746.5	743.3
2025/26	762.3	755.2	750.5	743.5
2026/27	762.1	751.2	752.7	741.9
2027/28	764.2	749.5	756.5	741.9
2028/29	760.6	742.2	753.4	735.1
2029/30	759.7	737.4	752.8	730.8
2030/31	758.6	732.6	751.8	726.1
2031/32	760.4	730.5	753.9	724.3
2032/33	756.6	723.1	749.7	716.5
2033/34	755.7	718.4	748.5	711.7
2034/35	754.8	713.8	747.6	707.0
2035/36	756.8	711.9	750.1	705.6
2036/37	753.4	705.0	746.6	698.6
2037/38	752.7	700.5	745.9	694.2
2038/39	752.2	696.3	745.8	690.4
2039/40	754.3	694.5	748.3	689.0
2040/41	751.0	687.7	744.7	682.0
2041/42	750.6	683.6	744.6	678.1
2042/43	750.3	679.6	744.8	674.6
2043/44	752.8	678.1	748.2	673.9
CAGR (2024/25-2043/44)	-0.1%	-0.6%	0.0%	-0.5%

3. High Economic Growth

The High Economic Growth scenario assumes that the rate of electrification is similar to the historical data period and the Base case, with additional growth over the Forecast Period associated with higher economic growth, driving higher demand. To develop this scenario, it was assumed that in each year of the Forecast Period growth was 0.5% higher than the year over year growth rate of the Base case. That is, if the Base case assumed 0% growth in a given year, the High Economic Growth scenario would reflect 0.5% growth.

The results of the alternative demand forecast scenarios are provided in Charts 5 and 6, and Tables 38 and 39, below.

Chart 5: Alternative Demand Forecast Results – East

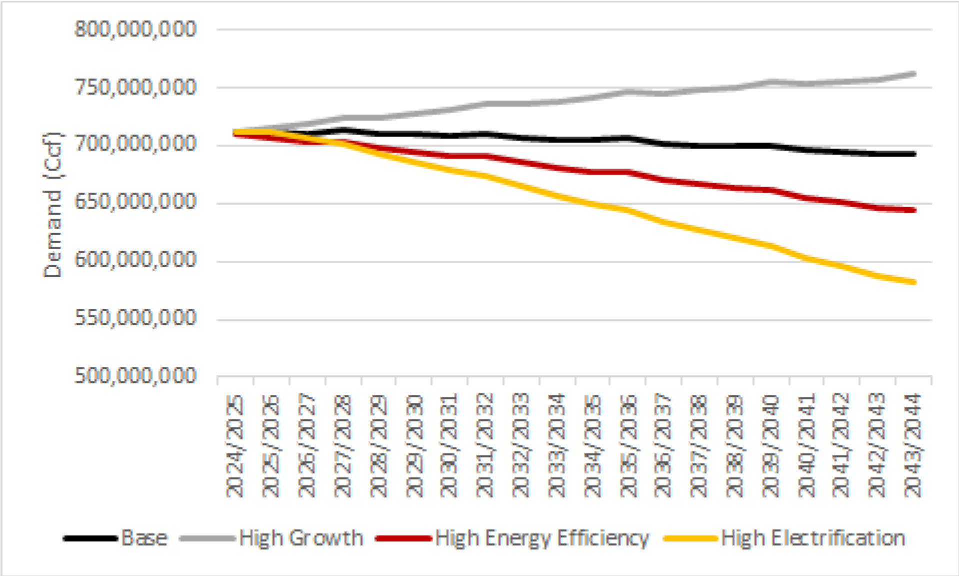


Chart 6: Alternative Demand Forecast Results – West

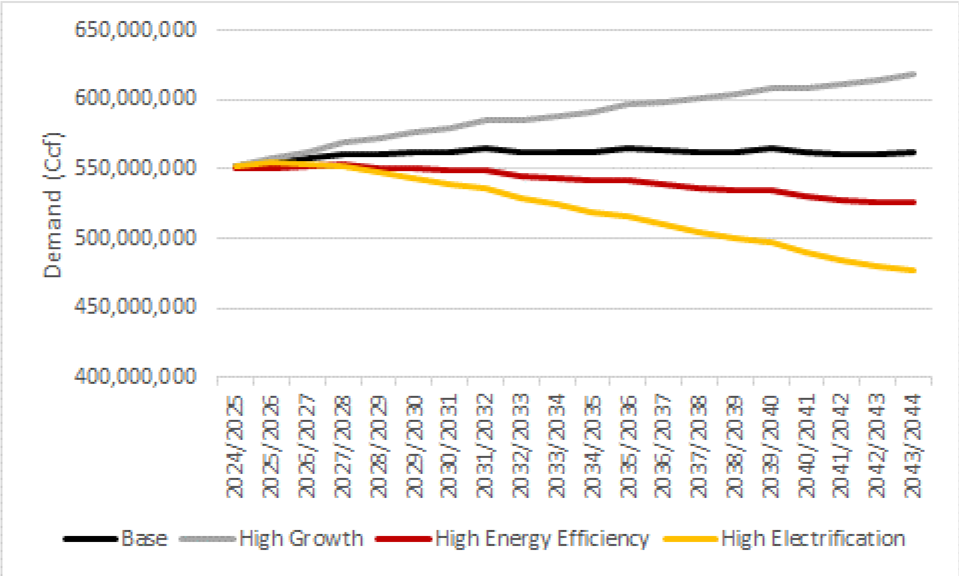


Table 38: Alternative Demand Forecast Results – East (Ccf)

Split-Year	Base	High Economic Growth	High Energy Efficiency	High Electrification
2024/2025	712,251,065	712,251,065	710,171,913	712,251,065
2025/2026	711,237,670	714,798,925	706,722,596	711,237,670
2026/2027	710,964,516	718,098,398	704,006,488	706,455,209
2027/2028	713,077,984	723,823,565	703,638,469	702,241,296
2028/2029	710,076,907	724,396,382	698,220,643	692,992,104
2029/2030	709,517,582	727,447,759	695,209,528	686,131,937
2030/2031	708,803,247	730,352,611	692,043,509	679,113,363
2031/2032	710,419,621	735,669,890	691,139,607	674,287,738
2032/2033	706,825,311	735,626,177	685,169,961	664,535,042
2033/2034	705,775,325	738,211,539	681,676,869	657,191,682
2034/2035	704,695,111	740,772,738	678,157,931	649,825,598
2035/2036	705,981,515	745,828,864	676,908,521	644,612,839
2036/2037	702,174,389	745,535,999	670,784,271	634,781,764
2037/2038	700,690,997	747,688,682	666,891,949	627,073,367
2038/2039	699,234,676	749,873,125	663,030,332	619,400,711
2039/2040	700,086,885	754,536,416	661,356,464	613,757,033
2040/2041	695,896,483	753,792,786	654,935,256	603,741,515
2041/2042	694,154,698	755,675,054	650,828,503	595,869,174
2042/2043	692,401,111	757,544,428	646,718,561	588,004,541
2043/2044	693,104,550	762,101,771	644,899,214	582,205,937
CAGR (2024/25-2043/44)	-0.1%	0.4%	-0.5%	-1.1%

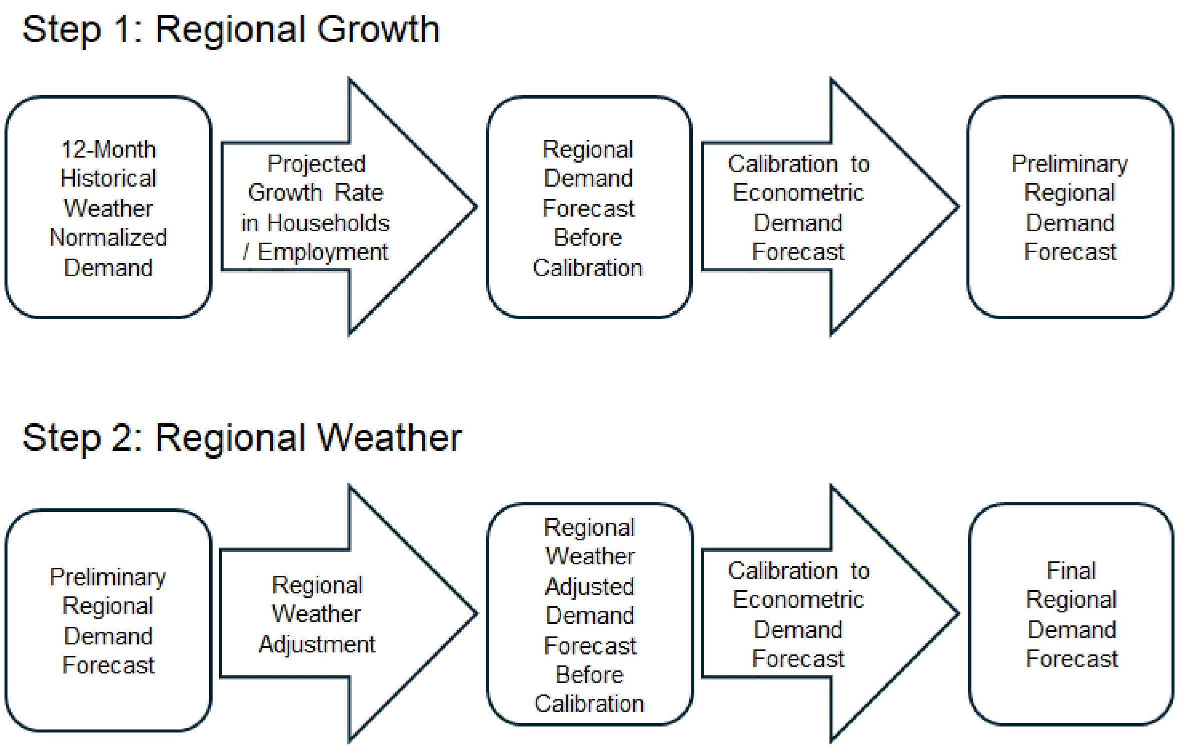
Table 39: Alternative Demand Forecast Results – West (Ccf)

Split-Year	Base	High Economic Growth	High Energy Efficiency	High Electrification
2024/2025	551,725,749	551,725,749	550,073,770	551,725,749
2025/2026	554,543,754	557,302,382	550,931,890	554,543,754
2026/2027	557,349,230	562,908,327	551,769,997	553,752,886
2027/2028	561,393,818	569,807,798	553,820,621	552,714,480
2028/2029	560,803,471	572,057,642	551,303,219	547,121,717
2029/2030	561,837,260	575,972,465	550,389,449	543,124,142
2030/2031	562,398,581	579,427,770	549,017,044	538,677,812
2031/2032	564,832,680	584,832,711	549,467,821	536,005,066
2032/2033	562,825,558	585,678,684	545,618,443	529,171,809
2033/2034	562,819,891	588,601,180	543,729,821	524,256,217
2034/2035	562,830,626	591,555,413	541,872,528	519,385,405
2035/2036	565,220,816	597,025,366	542,300,742	516,685,423
2036/2037	563,243,854	597,922,289	538,566,745	510,062,743
2037/2038	562,823,820	600,466,005	536,335,828	504,878,419
2038/2039	562,797,469	603,440,222	534,494,830	500,069,266
2039/2040	564,459,822	608,239,824	534,260,186	496,755,247
2040/2041	561,764,619	608,376,778	529,938,875	489,704,001
2041/2042	561,244,382	610,855,258	527,682,943	484,568,086
2042/2043	560,904,928	613,540,075	525,616,325	479,620,616
2043/2044	562,705,073	618,576,845	525,555,940	476,487,232
CAGR (2024/25-2043/44)	0.1%	0.6%	-0.2%	-0.8%

V. REGIONAL DEMAND FORECAST

After determining the East and West service area level demand forecasts, the forecasts were allocated to a regional basis. Doing so allows Spire to better understand where it may experience growth within its system. A summary of the process used to allocate the East and West service area level demand forecasts is provided in Figure 2, below.

Figure 2: Regional Demand Forecast Allocation Process



The first step to allocate the East and West service area level demand forecasts to the regional basis was to calculate the growth rates of certain economic and demographic variables and apply those growth rates to the regional historical weather normalized demand for the most recent 12-month period. Specifically, the number of households and employment variables were chosen to be applied to the residential and commercial and industrial demand, respectively. For example, the historical weather normalized demand for the 12-month period ending April 2024 was calculated for the residential rate class in the Kansas City region. The year-over-year growth rates were then calculated for the number of households in Jackson County, which is within the Kansas City region. The normalized demand for the Kansas City region was increased/decreased based on those growth rates in each year of the Forecast Period. The same process was used for each region and rate class. The regional demand forecasts were then calibrated up or down to ensure that the total of the regional demand in each year aligned with the East or West service area level forecasts (i.e., the demand forecasts described in Section III, based on the econometric analysis).

The second step to allocate the East and West service area level demand forecasts to the regional basis was to reflect the variance of weather between the regions. Spire provided daily weather data for seven weather locations: (1) Joplin Regional Airport; (2) Kansas City International Airport; (3) St. Joseph Rosecrans Airport; (4) Whiteman Air Force Base; (5) Lambert International Airport; (6) Farmington Regional Airport; and (7) Washington Regional Airport. Weather locations (1) through (4) are located in the West service area and remaining three are in the East service area. As noted in Section III.A.1.b, to establish the Normal Year HDD data, the average annual number of HDDs was calculated for the Lambert International Airport in the East and Kansas City International Airport in the West.

To adjust the regional demand for differences in weather, the percentage difference in HDDs was calculated between the Lambert International Airport and the other two weather locations in the East and Kansas City International Airport and the other three weather locations in the West. That percentage was then multiplied by the Normal Year HDDs to calculate the difference between the Normal Year HDDs used in the econometric models and the HDDs associated with the other weather locations. That is, the relative difference in weather between regions. That value was then multiplied by the heatload slope value for each rate class in each region to estimate the increase/decrease in demand in each year.[24] The resulting demand was added to the regional forecasts and the total values were calibrated again to ensure that the total of each rate class within the regional demand forecast equaled the East and West level demand forecast for that rate class. The regional demand forecasts are provided in Tables 40 and 41, below.

[24] The heatload slope value was calculated by subtracting the July and August volumes of each rate class and region from the most recent year of historical weather normalized demand and dividing the resulting volume by the Normal Year HDDs.

Table 40: East Service Area Regional Demand Forecast (Ccf)

Split-Year	Mogas Monat	MRT Monat	St. Charles	St. Louis	Total Demand Forecast
	A	B	C	D	E = Sum of A through D
2024/25	11,747,241	51,970,120	109,715,234	538,818,470	712,251,065
2025/26	11,721,300	52,002,719	110,567,362	536,946,290	711,237,670
2026/27	11,726,791	52,105,242	111,509,696	535,622,787	710,964,516
2027/28	11,768,321	52,358,279	112,805,074	536,146,310	713,077,984
2028/29	11,725,985	52,240,940	113,232,197	532,877,785	710,076,907
2029/30	11,721,556	52,276,036	114,026,658	531,493,333	709,517,582
2030/31	11,713,142	52,302,935	114,768,551	530,018,619	708,803,247
2031/32	11,739,149	52,487,873	115,882,998	530,309,601	710,419,621
2032/33	11,683,552	52,308,819	116,123,958	526,708,982	706,825,311
2033/34	11,666,931	52,285,223	116,768,237	525,054,934	705,775,325
2034/35	11,650,806	52,264,711	117,388,564	523,391,030	704,695,111
2035/36	11,671,390	52,407,358	118,391,930	523,510,836	705,981,515
2036/37	11,612,422	52,196,321	118,518,271	519,847,375	702,174,389
2037/38	11,588,046	52,128,632	119,028,790	517,945,528	700,690,997
2038/39	11,564,672	52,069,642	119,532,123	516,068,239	699,234,676
2039/40	11,578,924	52,174,120	120,424,248	515,909,593	700,086,885
2040/41	11,515,160	51,928,977	120,430,136	512,022,210	695,896,483
2041/42	11,486,740	51,836,475	120,857,507	509,973,976	694,154,698
2042/43	11,458,770	51,750,961	121,271,541	507,919,838	692,401,111
2043/44	11,469,521	51,839,730	122,114,427	507,680,872	693,104,550
CAGR (2024/25-2043/44)	-0.1%	0.0%	0.6%	-0.3%	-0.1%

Table 41: West Service Area Regional Demand Forecast (Ccf)

Split-Year	Kansas City	Mid Eastern MoW	Southwest MO	St. Joseph	Total Demand Forecast
	A	B	C	D	E = Sum of A through D
2024/25	390,946,267	41,007,544	95,527,877	24,244,061	551,725,749
2025/26	392,709,983	41,260,929	96,093,917	24,478,925	554,543,754
2026/27	394,181,670	41,732,575	96,743,346	24,691,639	557,349,230
2027/28	396,507,859	42,321,990	97,597,088	24,966,881	561,393,818
2028/29	395,241,147	42,691,815	97,855,954	25,014,555	560,803,471
2029/30	395,270,066	43,140,188	98,250,872	25,176,133	561,837,260
2030/31	394,922,107	43,552,804	98,627,987	25,295,682	562,398,581
2031/32	395,948,071	44,063,775	99,306,683	25,514,151	564,832,680
2032/33	393,618,267	44,350,501	99,361,112	25,495,678	562,825,558
2033/34	392,829,645	44,769,202	99,617,960	25,603,084	562,819,891
2034/35	391,992,123	45,174,340	99,958,828	25,705,335	562,830,626
2035/36	392,904,060	45,696,257	100,687,405	25,933,093	565,220,816
2036/37	390,554,399	45,966,954	100,794,657	25,927,844	563,243,854
2037/38	389,439,483	46,311,404	101,040,379	26,032,554	562,823,820
2038/39	388,563,810	46,665,301	101,419,808	26,148,549	562,797,469
2039/40	388,926,965	47,111,433	102,072,866	26,348,557	564,459,822
2040/41	386,076,429	47,299,670	102,086,397	26,302,124	561,764,619
2041/42	384,918,643	47,609,286	102,332,632	26,383,821	561,244,382
2042/43	383,869,299	47,913,601	102,660,782	26,461,245	560,904,928
2043/44	384,375,376	48,347,476	103,331,761	26,650,461	562,705,073
CAGR (2024/25-2043/44)	-0.1%	0.9%	0.4%	0.5%	0.1%

APPENDICES

Appendix 1. Econometric Analysis Modeling Process

Appendix 2. Dependent Variable Graphs

Appendix 3. Independent Variable Graphs

Appendix 4. Detailed Statistical Output

APPENDIX 1. ECONOMETRIC ANALYSIS MODELING PROCESS

Econometric models for the number of customers and use per customer were developed for the Company's five rate classes in the East and West service areas. These models provide the basis for the demand forecast for Spire. The modeling process included the following five steps:

- Gather the necessary internal and external data files for the relevant dependent and potential independent variables
- Determine appropriate independent variables that have a theoretical causal relationship with the relevant dependent variables
- Develop correlation matrix for all variables
- Perform regression analysis
    - Test models for:
        - Significance of independent variables using t-Statistics
        - Autocorrelation
        - Heteroskedasticity
    - Perform corrective measures to eliminate or reduce the impact of the above factors
- Re-specify and retest models if statistical tests illustrate potential concerns with the models/results

1. Gather Data

The first step in the modeling process was to obtain billing data from the Company and develop monthly rate class dependent variables. In addition, economic and demographic data was obtained from Moody's Analytics to serve as independent variables in the rate class models. Additional variables were created, including lagged variables, weather variables, and natural gas price variables.

2. Determine Appropriate Variables

An important aspect of econometrics and forecasting is that models are not only statistically sound but are also consistent with economic theory. It is therefore crucial, prior to developing any model, to consider the reasonableness of each independent variable in the context of the model. As such, each variable that was calculated or obtained from Moody's Analytics was considered for each model. After a review of the variables, only those that had a theoretical relationship with the dependent variable were included for further testing. For example, the price of natural gas may have an effect on the residential heating use per customer, because when the price of natural gas is higher customers may use less natural gas to heat their homes. However, changes in the number of residential heating customers are more likely to be influenced by changes in demographics, such as the number of households. For that reason, in the residential heating number of customers model, the price of natural gas was not considered and other variables were tested. A similar process was employed for each variable and each model until a list of reasonable variables was developed for the modeling process.

3. Develop Correlation Matrix

Multicollinearity occurs when two or more independent variables in a model are highly correlated. The characteristics of multicollinearity include increased standard errors, small t-Statistics, and estimates that vary widely with changes in the specification in the model. It is important to avoid multicollinearity, because if present, it can cause relevant independent variables to be excluded from the model and could affect the magnitude and sign of included variables.

To avoid multicollinearity, a correlation matrix was developed with all potential variables and lagged variables. Where the correlations between independent variables were above 0.9, the two variables were not included in the same model. In certain cases, it may be reasonable to include two variables that have a high correlation. Where this was the case, a Klein test was performed to assess the possibility of multicollinearity in the model. The Klein test involves creating auxiliary models using the independent variables as the dependent variable and regressing them on the other independent variables. Multicollinearity is likely present if the R^2 of the auxiliary-model is higher than the R^2 of the initial model.

4. Perform Regression Analysis

Once the potential variables were determined, each was tested, and models were developed based on the statistical tests described below.

t-Statistic

The first statistics that were reviewed for each model developed were the t-Statistic. The t-Statistic measures the likelihood that an independent variable is significant. The t-Statistics in each model were considered significant at the 95% level. As shown in Appendix 4, if the significance column was less than or equal to 0.05, the variable was considered to be significant.

Autocorrelation

Autocorrelation (or serial correlation) occurs when error terms in a regression are correlated with other error terms. The characteristics of autocorrelation are an increased variance of coefficient estimates and smaller standard errors, which can cause variables to be deemed significant when they are not because of increased t-Statistics.

The autocorrelation function (“ACF”) and partial autocorrelation function (“PACF”) were used to test for the presence of autocorrelation in the models. The results of the ACF and PACF tests show the presence of autocorrelation at different lags. Autocorrelation was tested for lags of between 1 and 12 periods. Where the ACF or PACF values fell outside of two standard errors, the model was first re-specified with different independent variables or included additional independent variables. If other variables were not significant, displayed the same level of autocorrelation or caused the model to fail other statistical tests, an autoregressive (“AR”) term was added to the model. An AR term corrects for autocorrelation at specific lag periods. Again, if the inclusion of an AR term caused variables to be no longer significant, the model was re-specified until all variables were significant.

Heteroskedasticity

Heteroskedasticity occurs when the error term observations do not have a constant variance. The characteristics of heteroskedasticity are an increased variance of coefficient estimates and smaller standard errors, which can cause variables to be deemed significant when they are not because of increased t-Statistics.

A form of the White's Test was employed to test for the presence of heteroskedasticity. The White's Test is calculated by regressing the squared residuals of the original model against the independent variables from the model, the squared independent variables and the cross product of the independent variables. The resulting R^2 of the model is multiplied by the number of observations and compared against a chi-squared distribution. If the nR^2 statistic was significant at the 99% level, heteroskedasticity was assumed to be present. Because the White's Test requires a large number of independent variables to be created, thereby decreasing the number of degrees of freedom, the special form of the White's Test was employed, where the squared residuals of the original model are regressed against the predicted values and the squared predicted values.[25] Where heteroskedasticity was present, the models were re-specified with either different independent variables or additional independent variables were included.

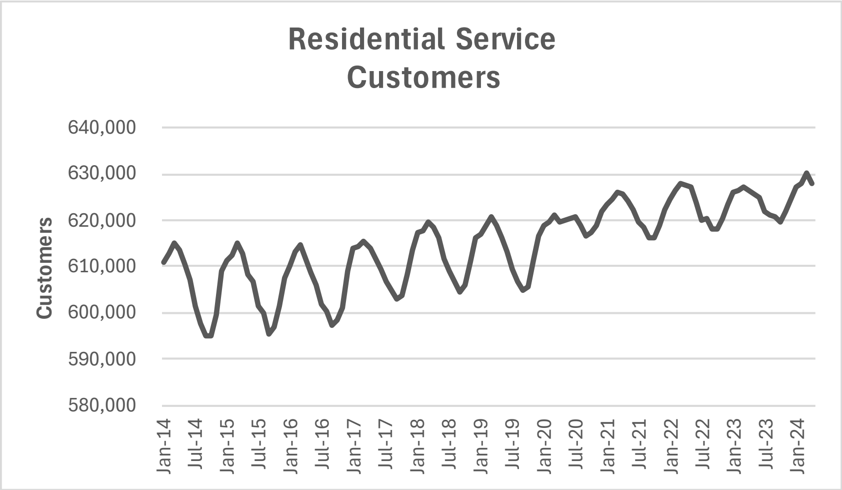
5. Re-Specify Models

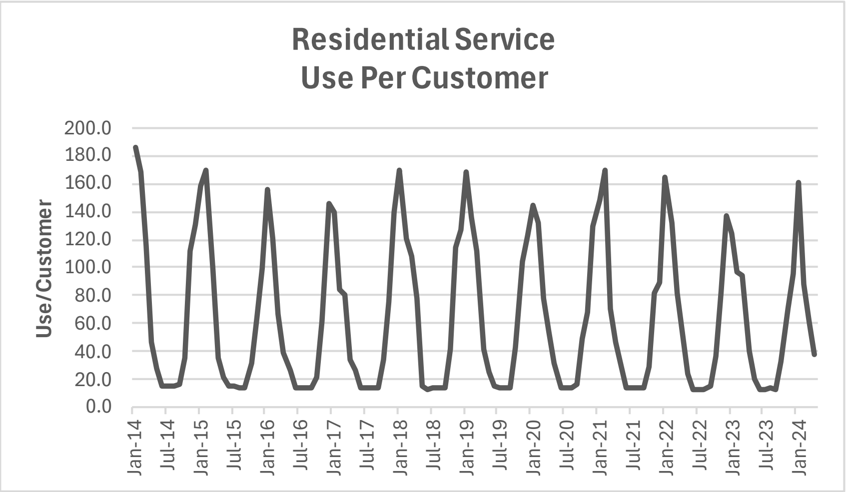
To the extent that the potential models failed any of the tests described above, the models were re-specified to include different or additional economic or demographic variables. Each variable or combination of variables was tested, including lagged variables. Dummy variables and interactive variables were only included where necessary. The model specification and results of the tests described above are presented in Appendix 4.

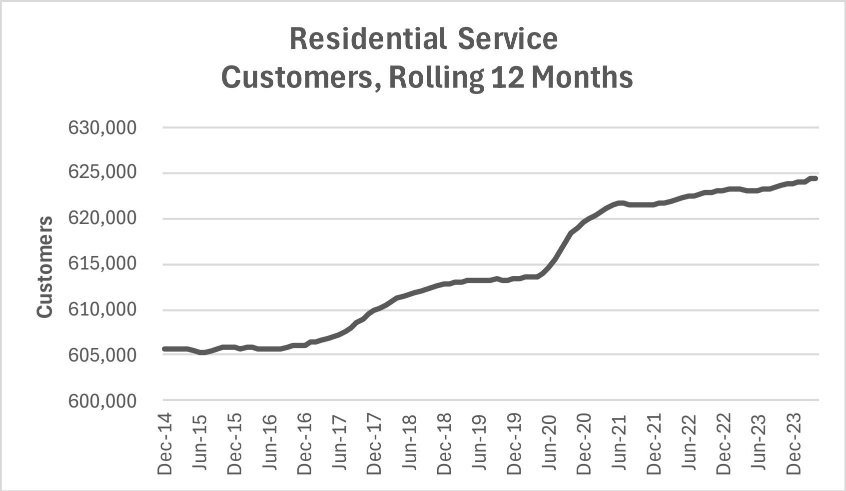
[25] See, Jeffery M. Wooldridge, Introductory Econometrics: A Modern Approach, Third Edition, at 283.

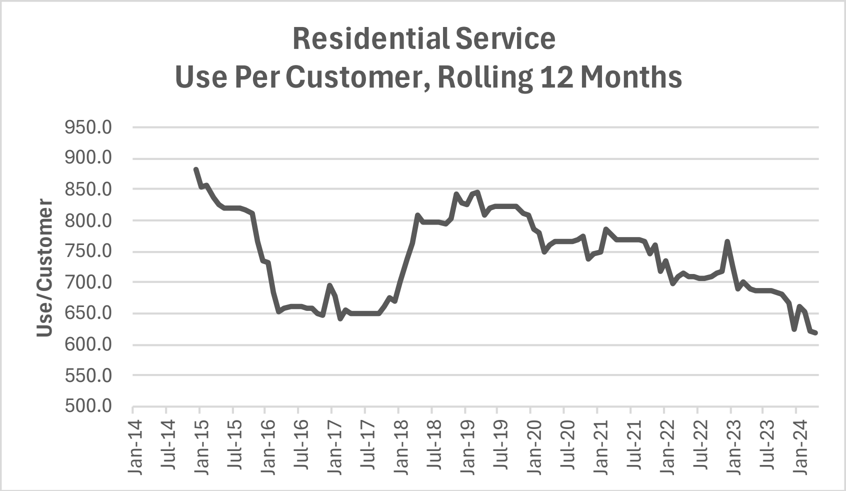
APPENDIX 2. DEPENDENT VARIABLE GRAPHS

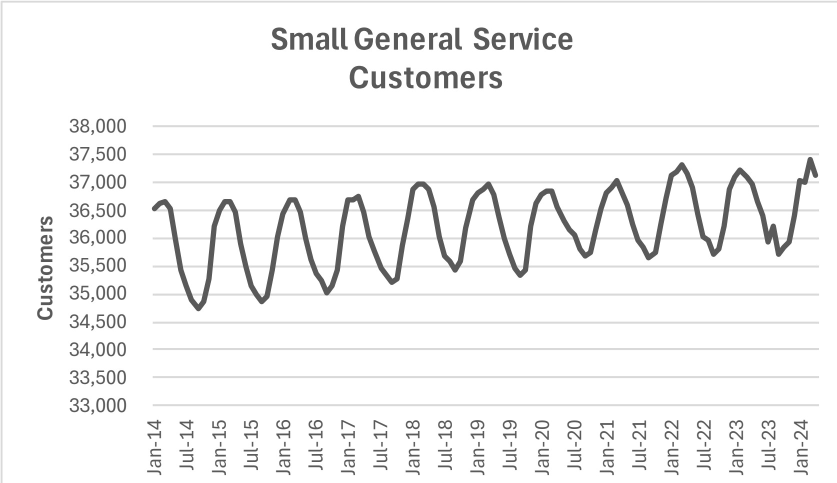
EAST SERVICE AREA










Small General Service
Customers
Customers
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37,500
37,000
36,500
36,000
35,500
35,000
34,500
34,000
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33,000
Jan-14
Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
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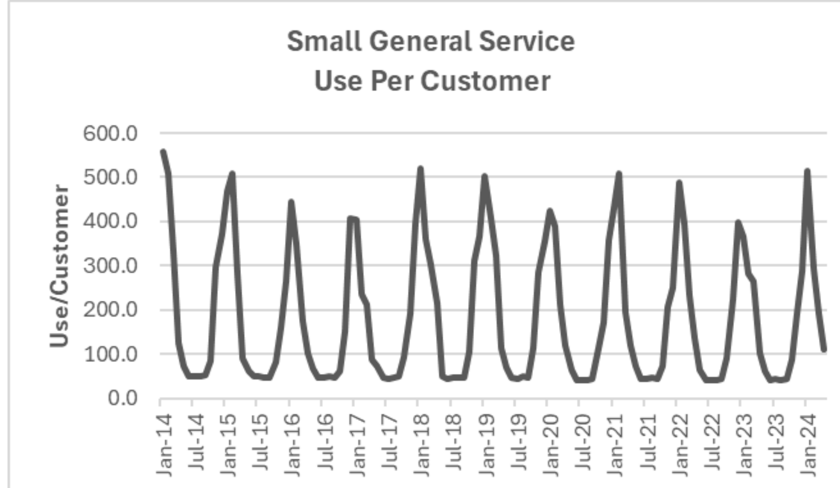
Jan-23
Jul-23
Jan-24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Use Per Customer
Use/Customer
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500.0
400.0
300.0
200.0
100.0
0.0
Jan-14
Jul-14
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Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
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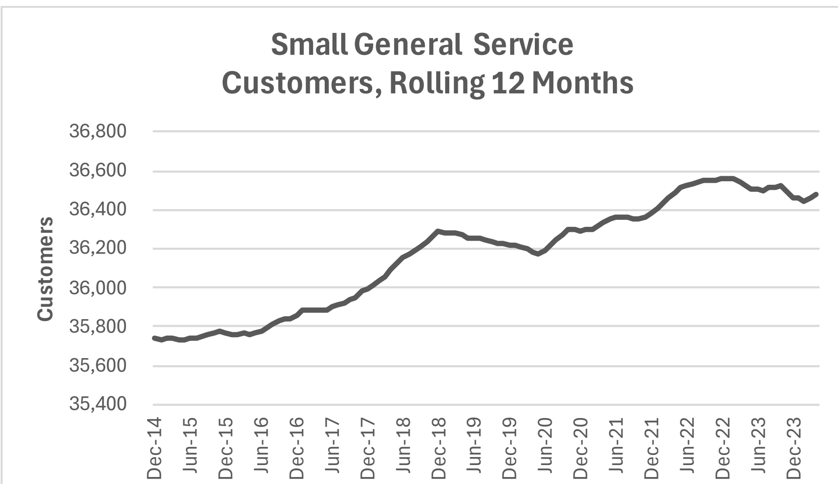
Jul-23
Jan-24


Small General Service
Customers, Rolling 12 Months
Customers
36,800
36,600
36,400
36,200
36,000
35,800
35,600
35,400
Dec-14
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
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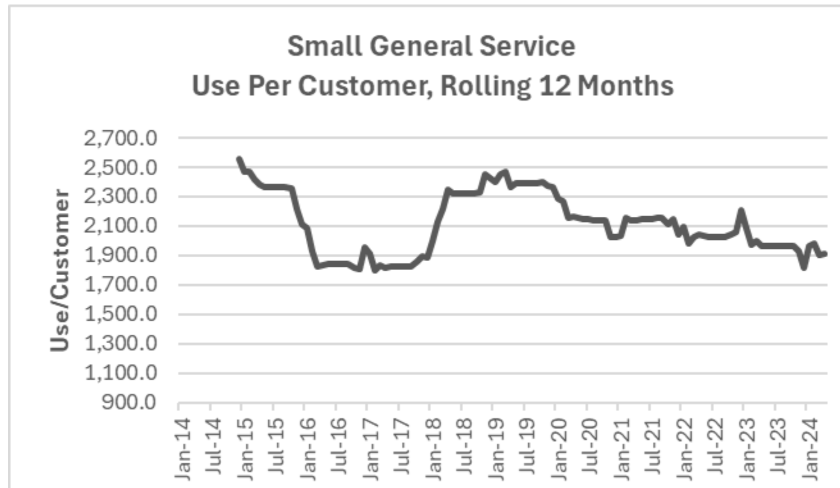
Dec-23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Use Per Customer, Rolling 12 Months
Use/Customer
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2,300.0
2,100.0
1,900.0
1,700.0
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1,300.0
1,100.0
900.0
Jan-14
Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
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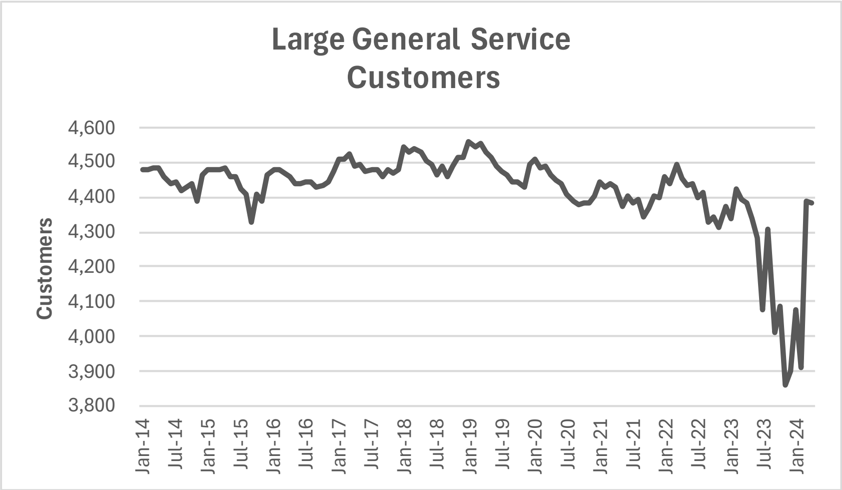
Jan-24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Customers
Customers
4,600
4,500
4,400
4,300
4,200
4,100
4,000
3,900
3,800
Jan-14
Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
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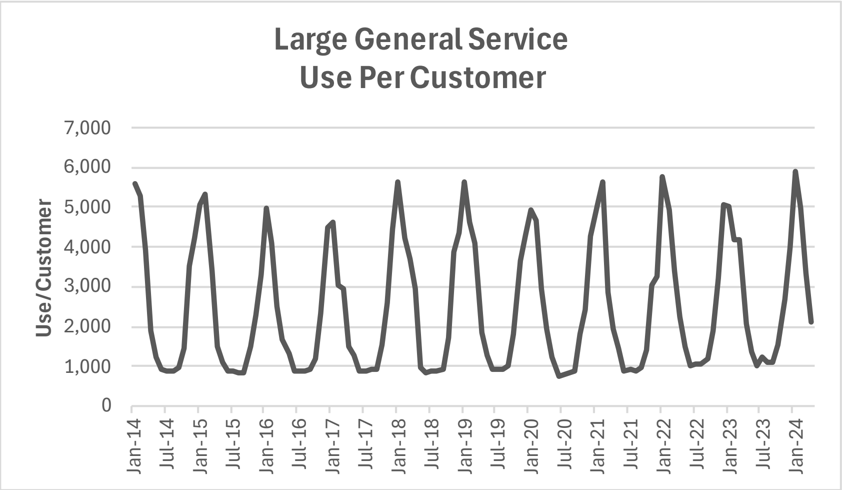
Jul-23
Jan-24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Use Per Customer
Use/Customer
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
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Jul-15
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Jan-17
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Jan-18
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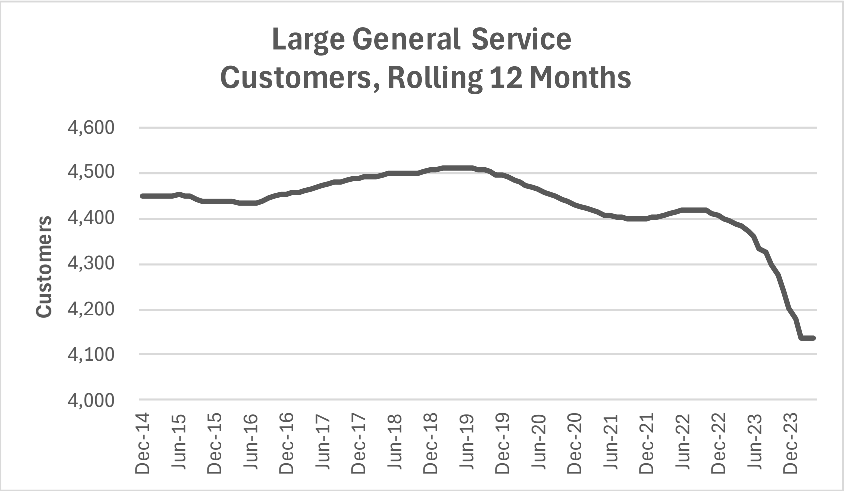
Large General Service
Customers, Rolling 12 Months
Customers
4,600
4,500
4,400
4,300
4,200
4,100
4,000
Dec-14
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Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
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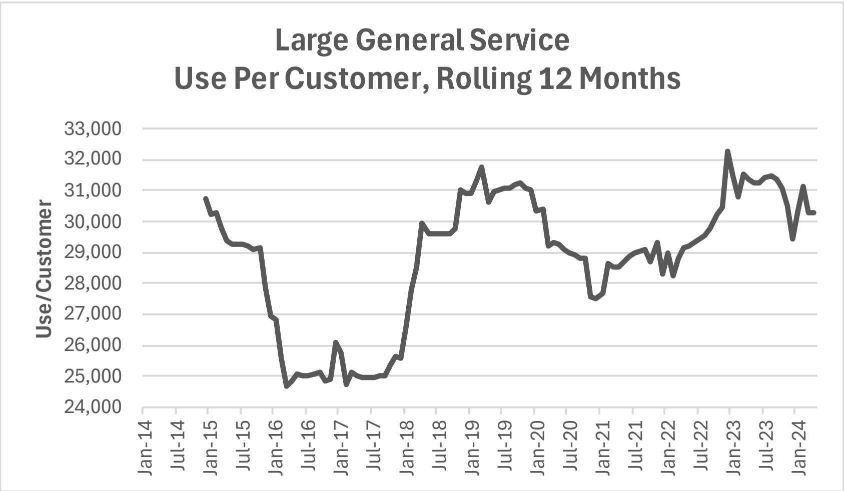
Dec-23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Use/Customer
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32,000
31,000
30,000
29,000
28,000
27,000
26,000
25,000
24,000
Jan-14
Jul-14
Jan-15
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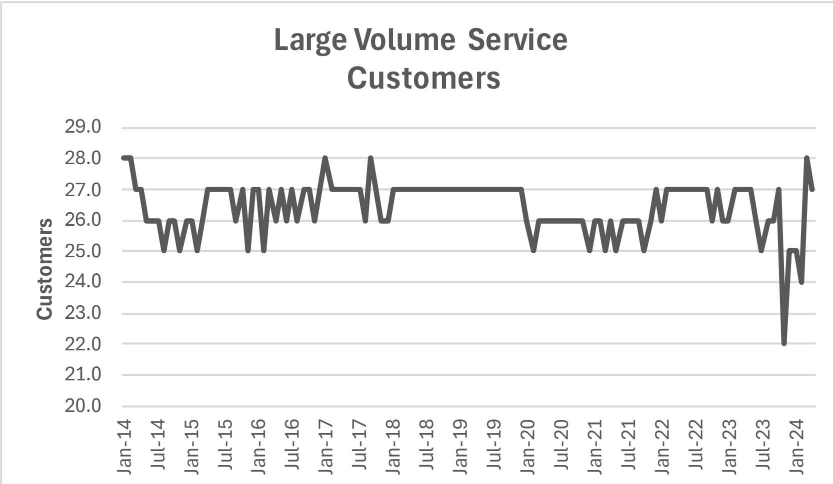
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Customers
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Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
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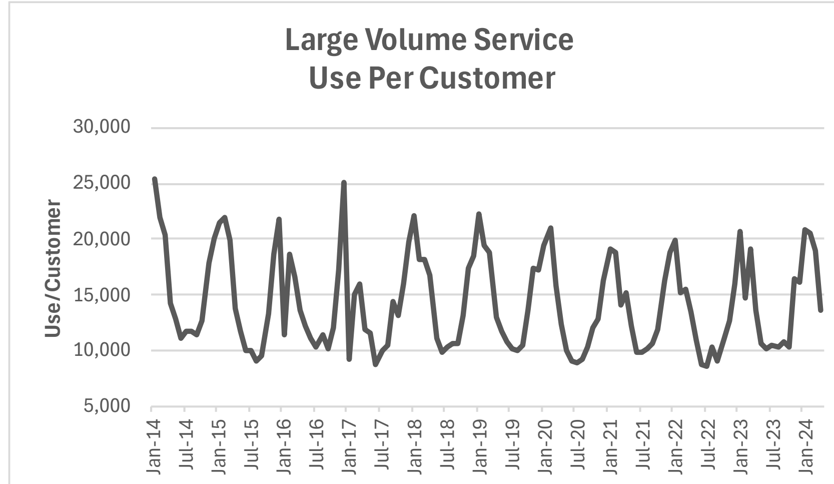
Large Volume Service
Use Per Customer
Use/Customer
30,000
25,000
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10,000
5,000
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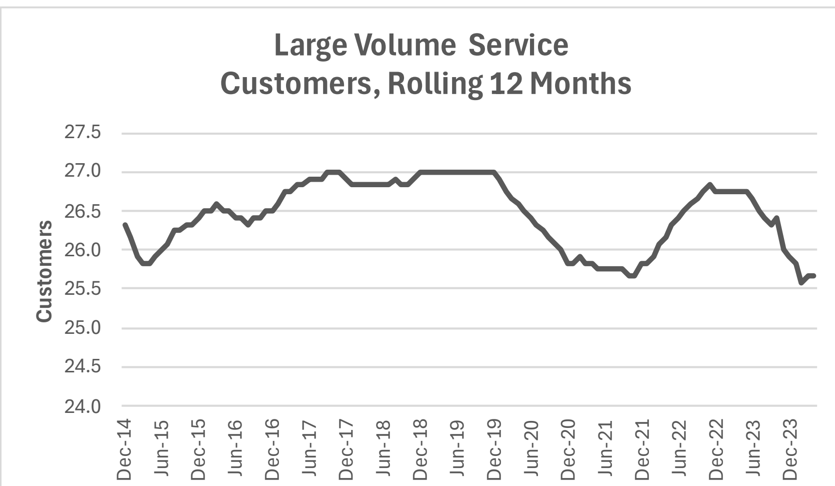
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Customers
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26.5
26.0
25.5
25.0
24.5
24.0
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Dec-15
Jun-16
Dec-16
Jun-17
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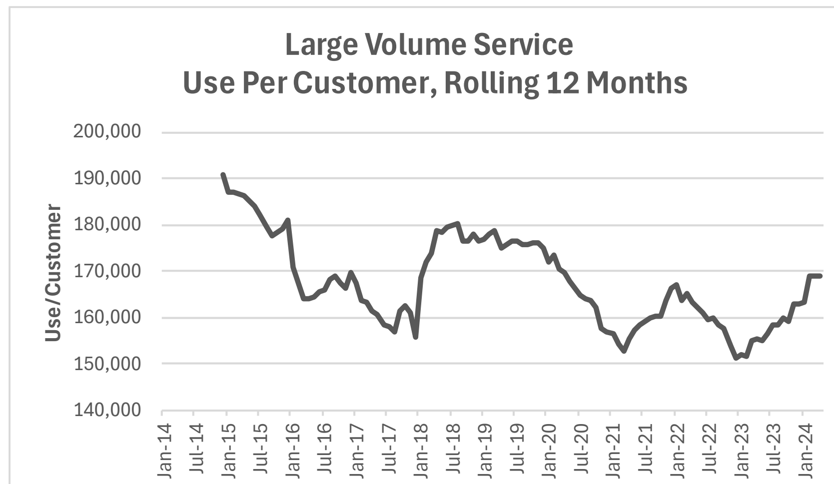
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Use Per Customer, Rolling 12 Months
Use/Customer
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190,000
180,000
170,000
160,000
150,000
140,000
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Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
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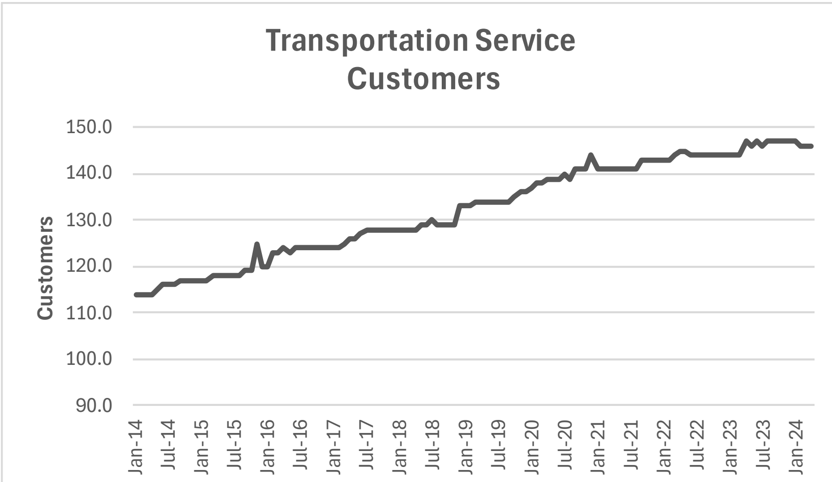
Transportation Service
Customers
150.0
140.0
130.0
120.0
110.0
100.0
90.0
Customers
Jan-14
Jul-14
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Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
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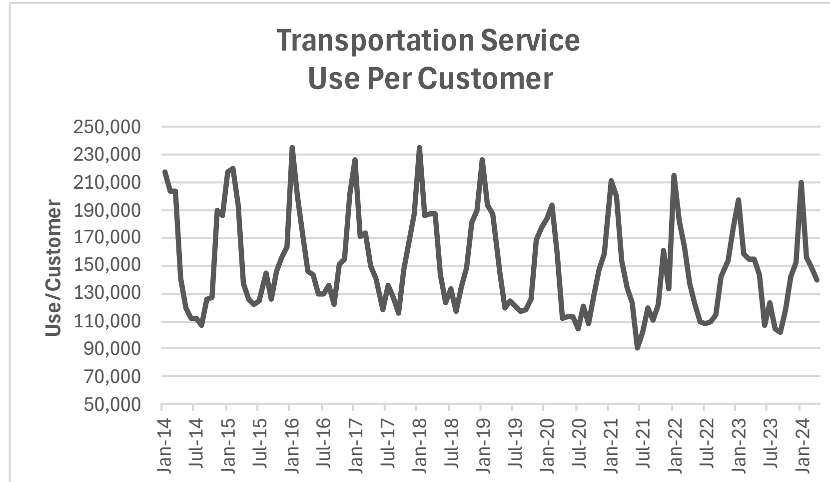
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Use Per Customer
250,000
230,000
210,000
190,000
170,000
150,000
130,000
110,000
90,000
70,000
50,000
Use/Customer
Jan-14
Jul-14
Jan-15
Jul-15
Jan-16
Jul-16
Jan-17
Jul-17
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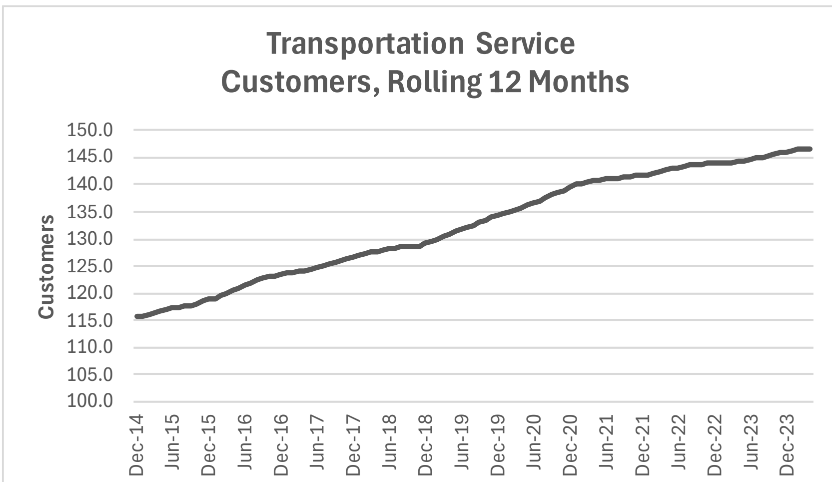
Jan-24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Customers, Rolling 12 Months
150.0
145.0
140.0
135.0
130.0
125.0
120.0
115.0
110.0
105.0
100.0
Customers
Dec-14
Jun-15
Dec-15
Jun-16
Dec-16
Jun-17
Dec-17
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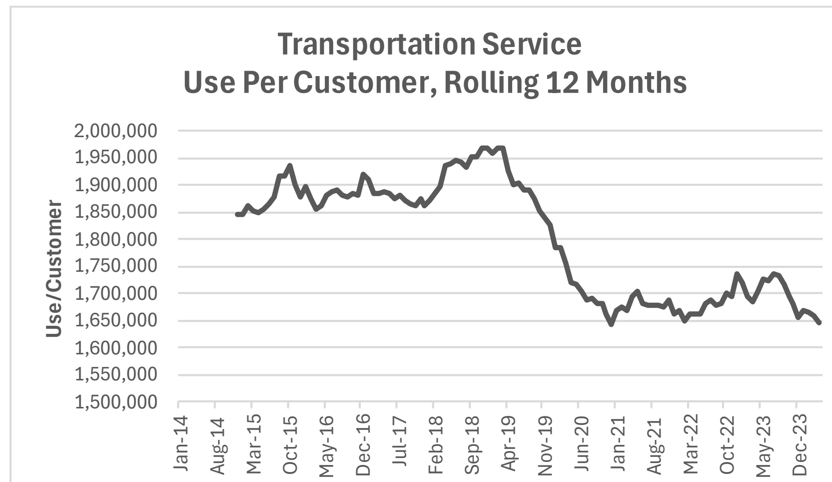
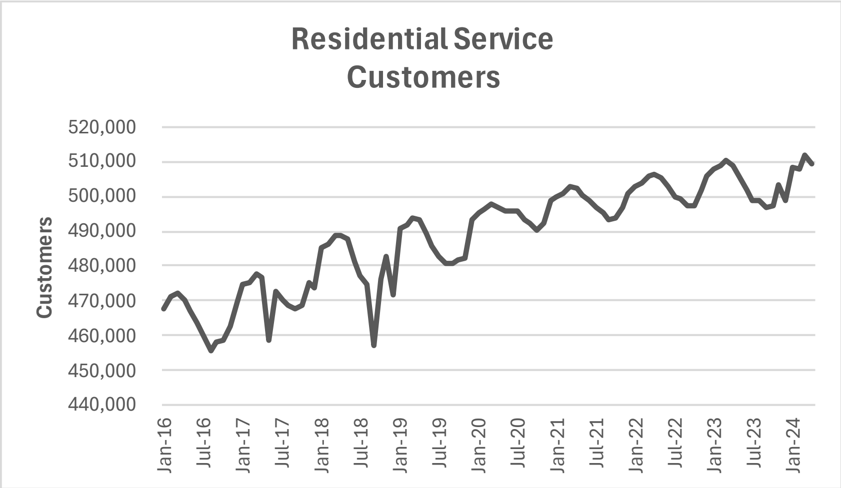
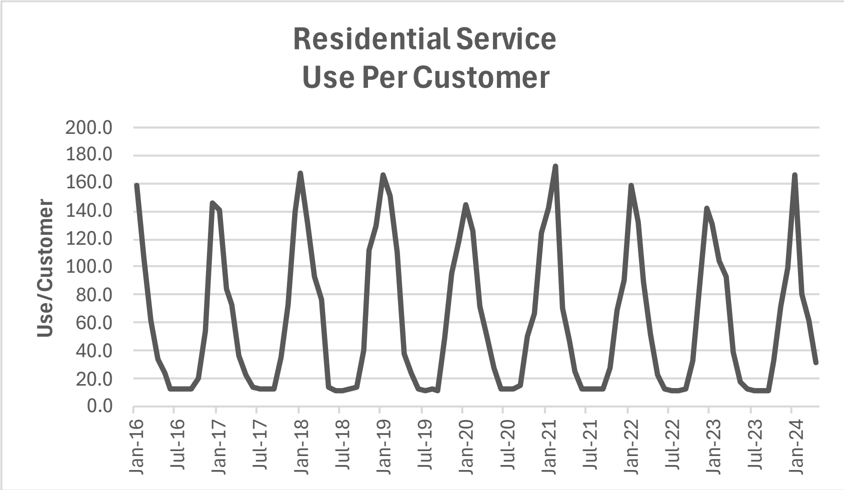
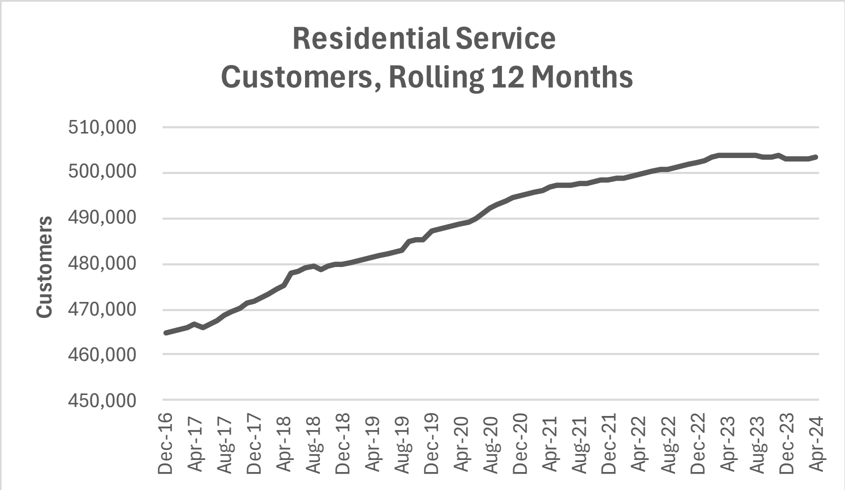
Jun-23
Dec-23

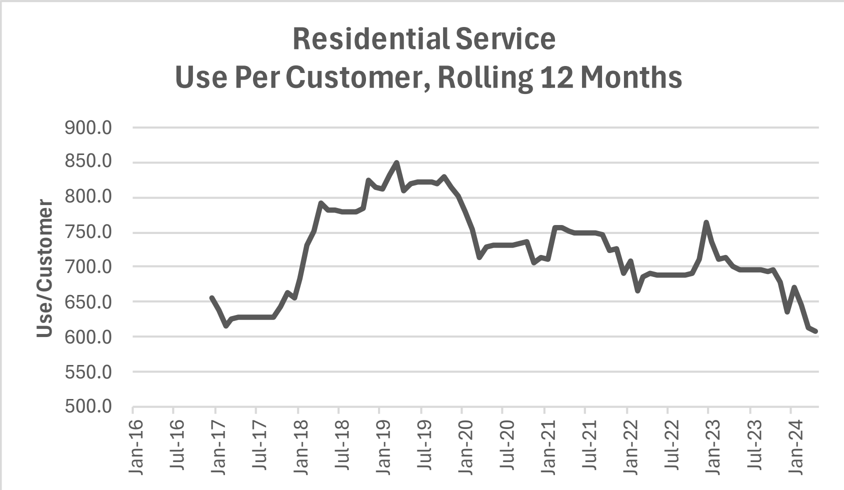

Transportation Service
Use Per Customer, Rolling 12 Months
2,000,000
1,950,000
1,900,000
1,850,000
1,800,000
1,750,000
1,700,000
1,650,000
1,600,000
1,550,000
1,500,000
Use/Customer
Jan-14
Aug-14
Mar-15
Oct-15
May-16
Dec-16
Jul-17
Feb-18
Sep-18
Apr-19
Nov-19
Jun-20
Jan-21
Aug-21
Mar-22
Oct-22
May-23
Dec-23

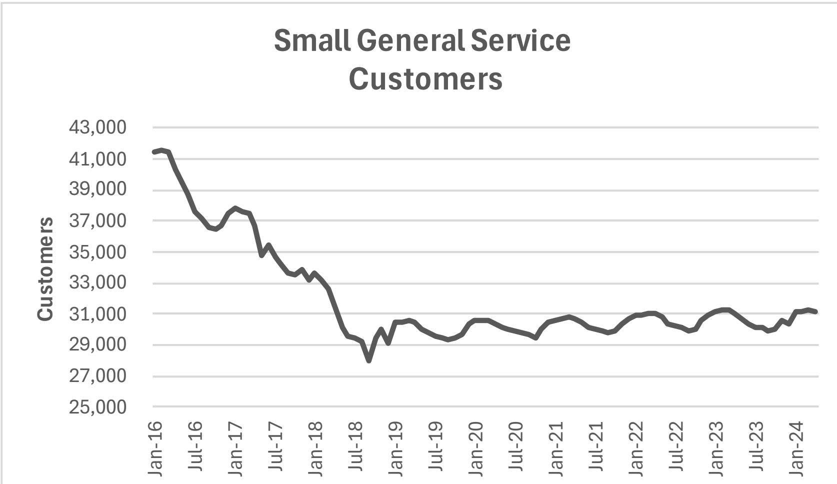
WEST SERVICE AREA










Small General Service
Customers
Customers
43,000
41,000
39,000
37,000
35,000
33,000
31,000
29,000
27,000
25,000
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
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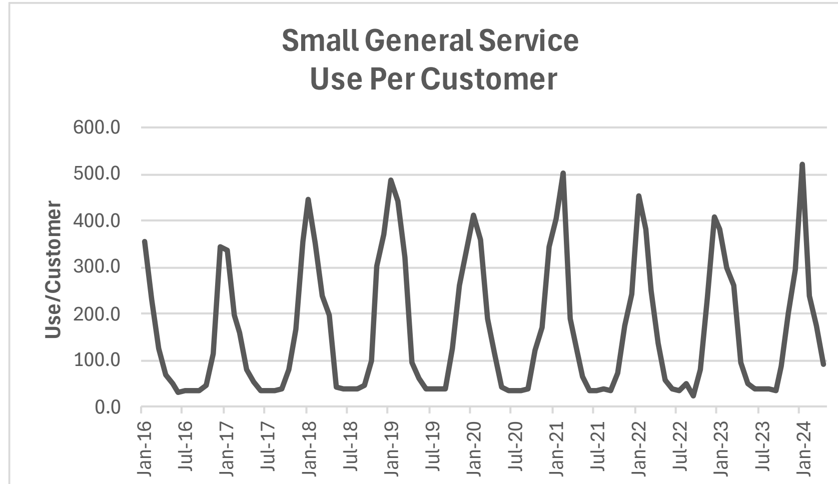
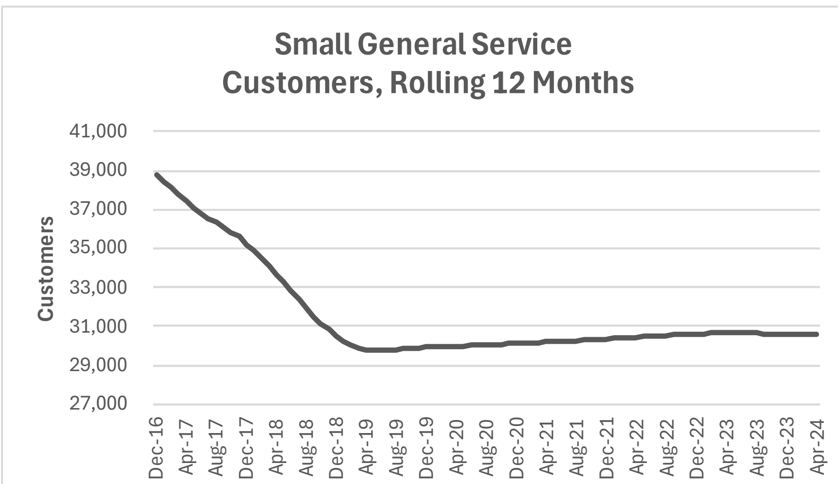
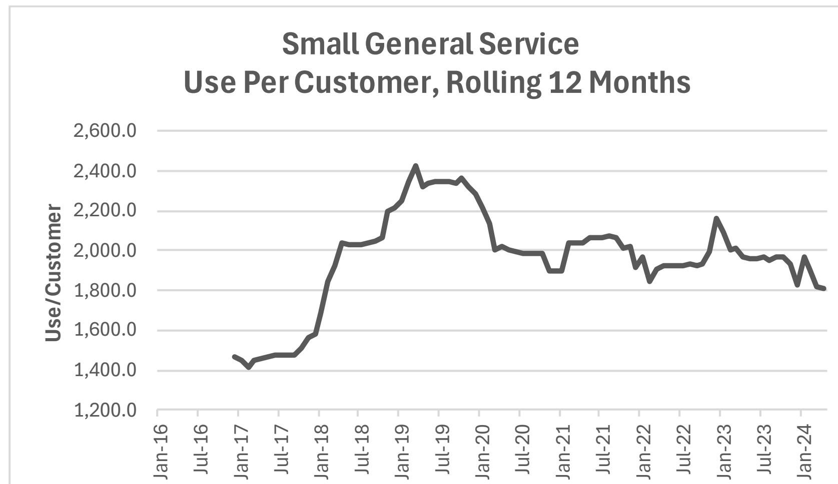
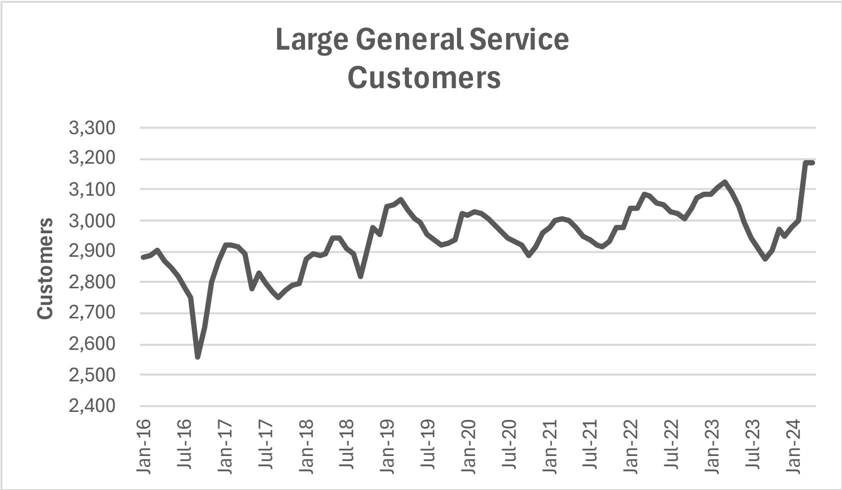
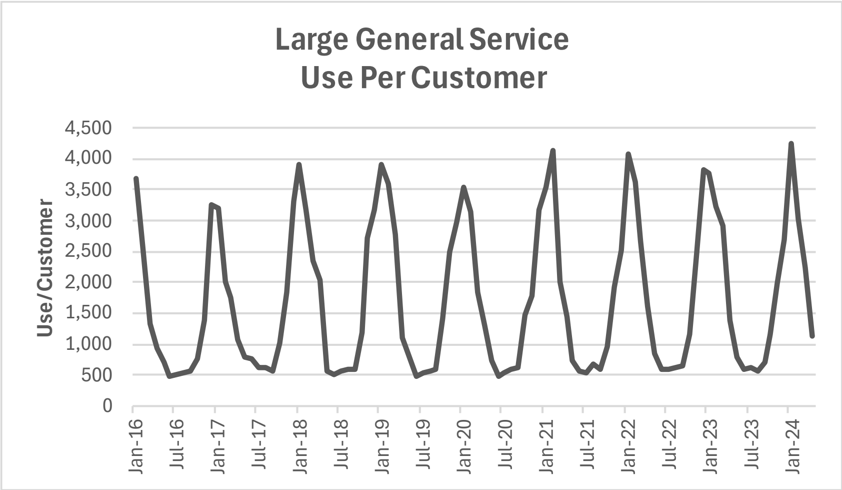
Jan-23
Jul-23
Jan-24

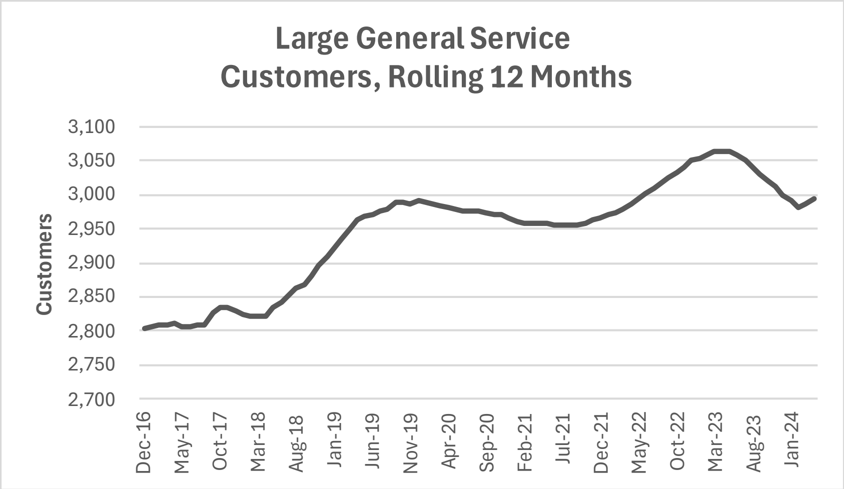

Small General Service
Use Per Customer
Use/Customer
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

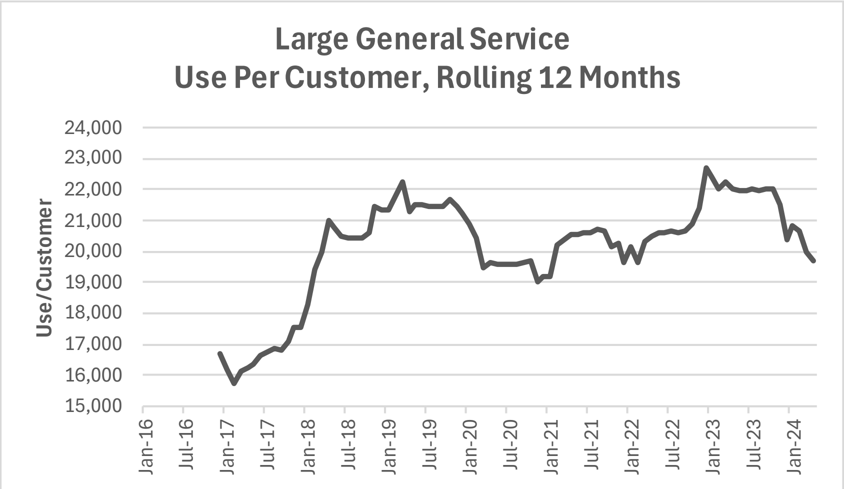

Small General Service
Customers, Rolling 12 Months
Customers
41,000
39,000
37,000
35,000
33,000
31,000
29,000
27,000
Dec-16
Apr-17
Aug-17
Dec-17
Apr-18
Aug-18
Dec-18
Apr-19
Aug-19
Dec-19
Apr-20
Aug-20
Dec-20
Apr-21
Aug-21
Dec-21
Apr-22
Aug-22
Dec-22
Apr-23
Aug-23
Dec-23
Apr-24

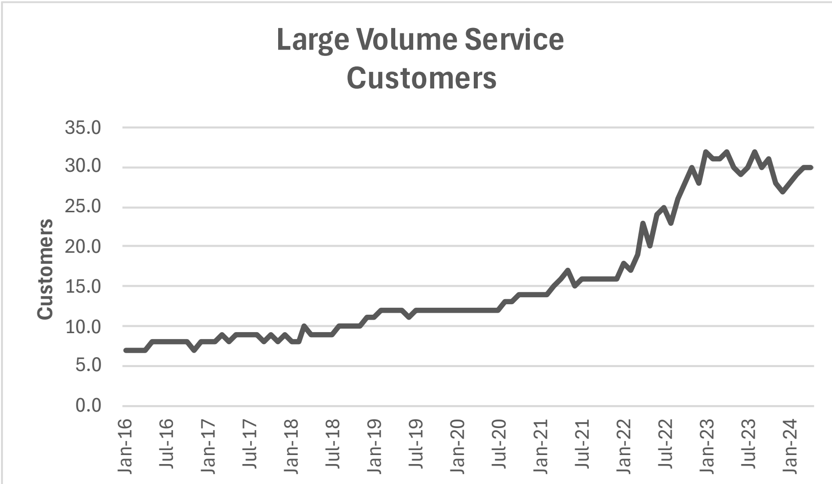

Small General Service
Use Per Customer, Rolling 12 Months
Use/Customer
2,600.0
2,400.0
2,200.0
2,000.0
1,800.0
1,600.0
1,400.0
1,200.0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

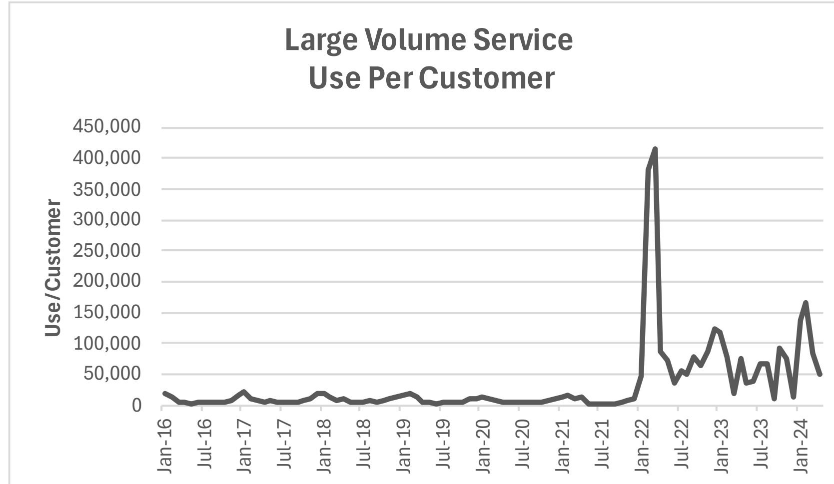

Large General Service
Customers
Customers
3,300
3,200
3,100
3,000
2,900
2,800
2,700
2,600
2,500
2,400
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

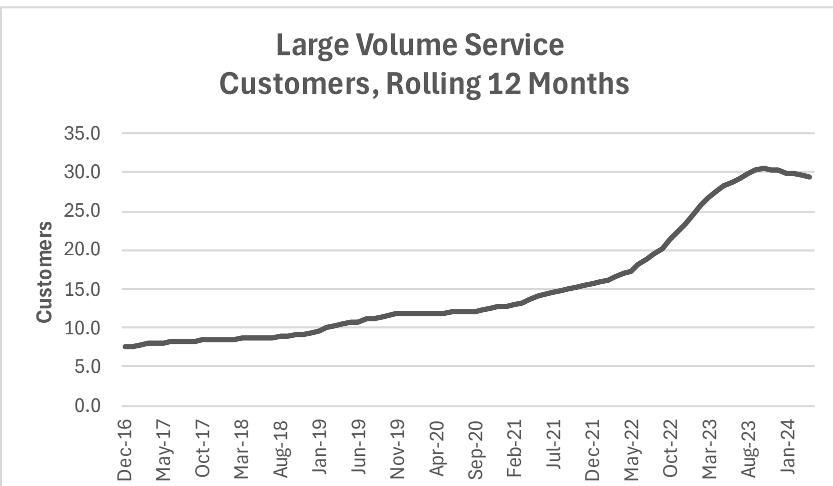

Large General Service
Use Per Customer
Use/Customer
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

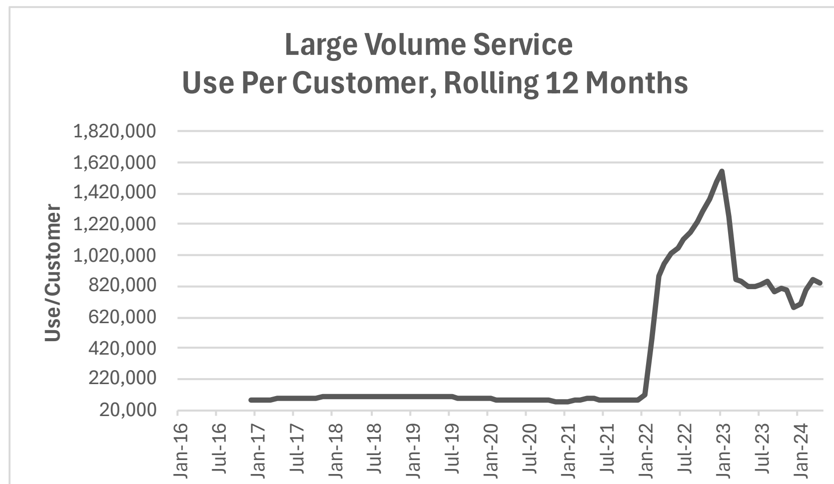

Large General Service
Customers, Rolling 12 Months
Customers
3,100
3,050
3,000
2,950
2,900
2,850
2,800
2,750
2,700
Dec-16
May-17
Oct-17
Mar-18
Aug-18
Jan-19
Jun-19
Nov-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21
May-22
Oct-22
Mar-23
Aug-23
Jan-24

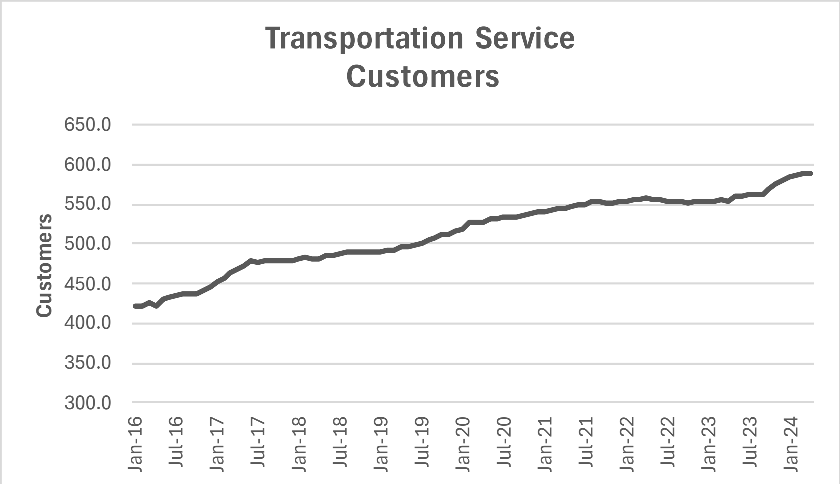

Large General Service
Use Per Customer, Rolling 12 Months
Use/Customer
24,000
23,000
22,000
21,000
20,000
19,000
18,000
17,000
16,000
15,000
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

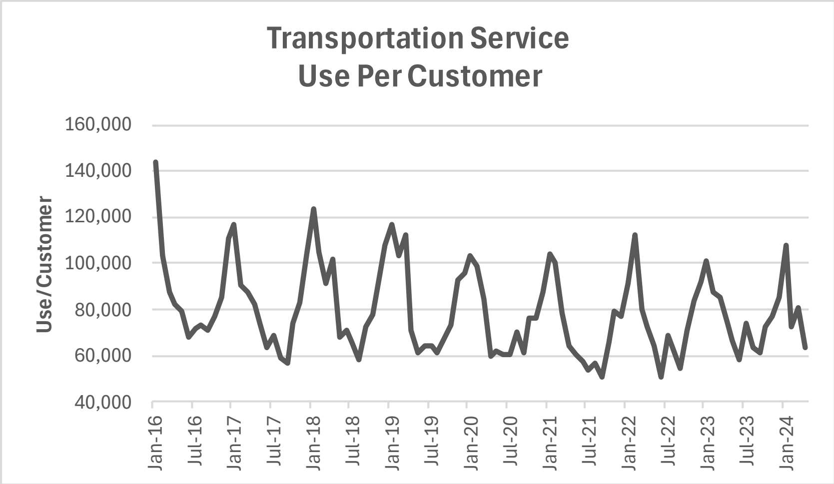

Large Volume Service
Customers
Customers
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

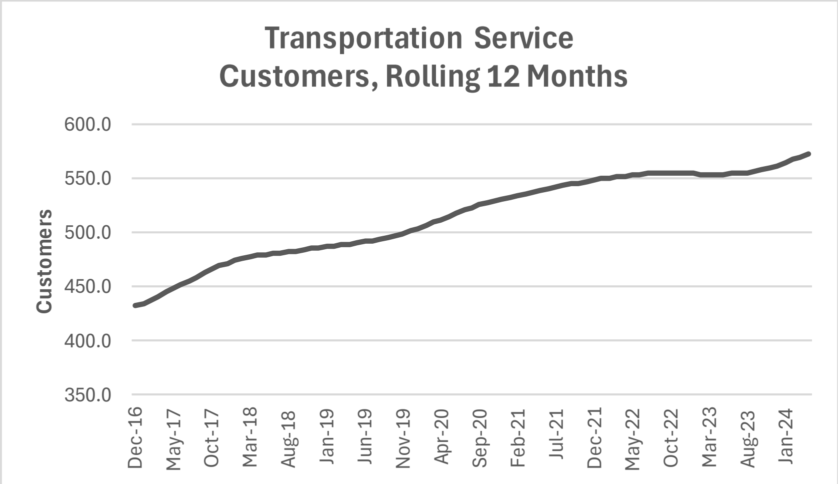

Large Volume Service
Use Per Customer
Use/Customer
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

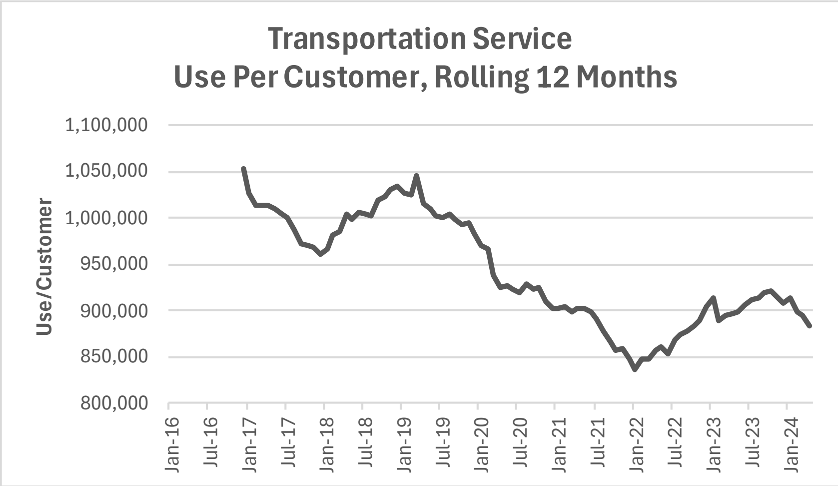

Large Volume Service
Customers, Rolling 12 Months
Customers
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Dec-16
May-17
Oct-17
Mar-18
Aug-18
Jan-19
Jun-19
Nov-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21
May-22
Oct-22
Mar-23
Aug-23
Jan-24


Large Volume Service
Use Per Customer, Rolling 12 Months
Use/Customer
1,820,000
1,620,000
1,420,000
1,220,000
1,020,000
820,000
620,000
420,000
220,000
20,000
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24


Transportation Service
Customers
Customers
650.0
600.0
550.0
500.0
450.0
400.0
350.0
300.0
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

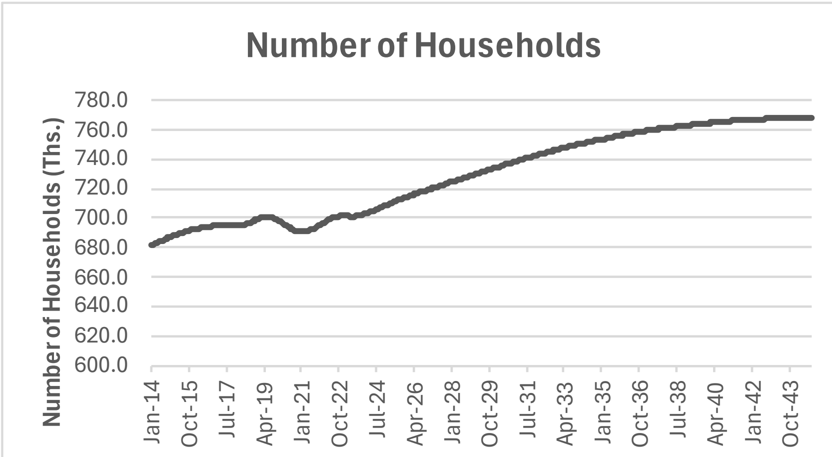

Transportation Service
Use Per Customer
Use/Customer
160,000
140,000
120,000
100,000
80,000
60,000
40,000
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

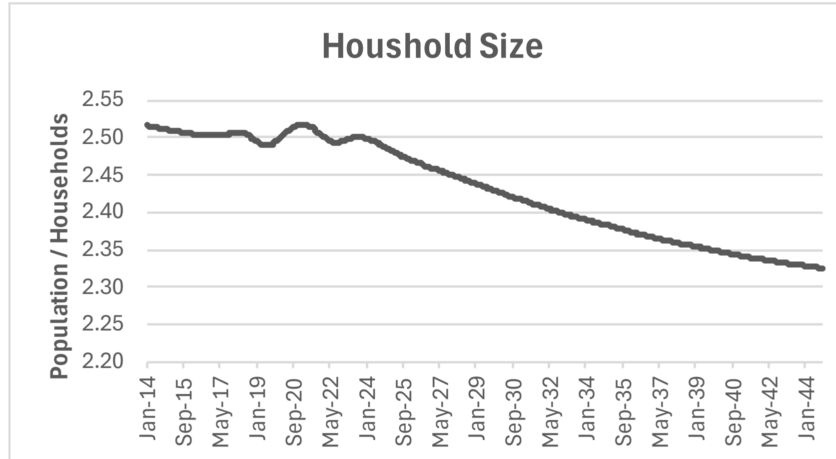

Transportation Service
Customers, Rolling 12 Months
Customers
600.0
550.0
500.0
450.0
400.0
350.0
Dec-16
May-17
Oct-17
Mar-18
Aug-18
Jan-19
Jun-19
Nov-19
Apr-20
Sep-20
Feb-21
Jul-21
Dec-21
May-22
Oct-22
Mar-23
Aug-23
Jan-24

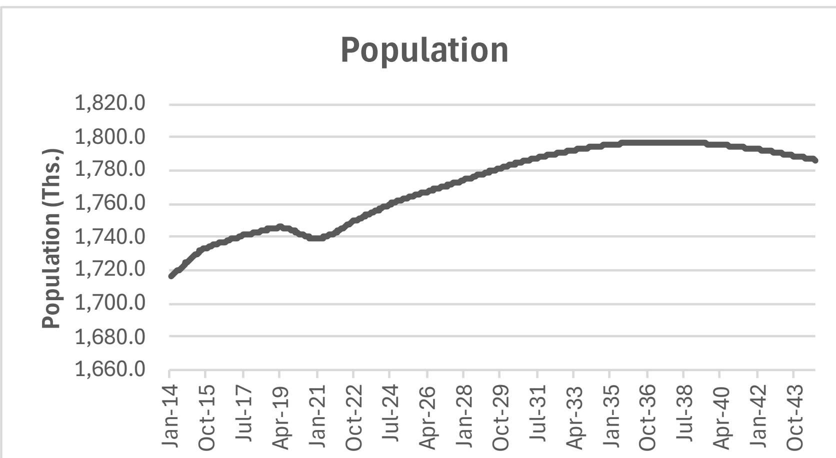

Transportation Service
Use Per Customer, Rolling 12 Months
Use/Customer
1,100,000
1,050,000
1,000,000
950,000
900,000
850,000
800,000
Jan-16
Jul-16
Jan-17
Jul-17
Jan-18
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
Jan-24

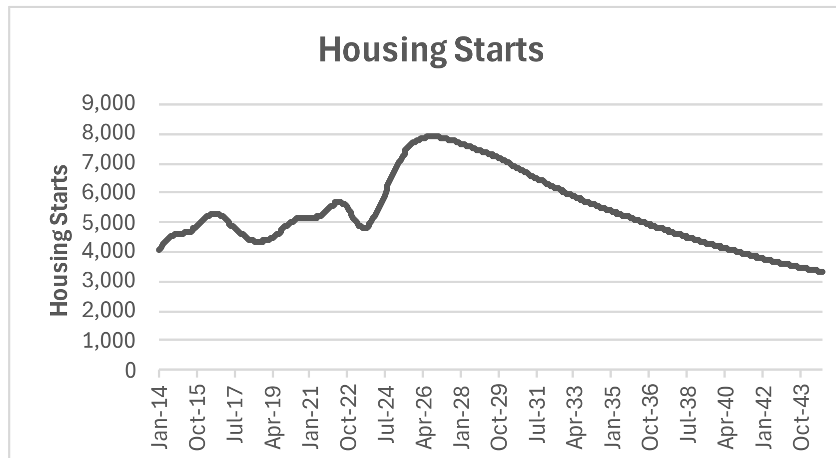
APPENDIX 3. INDEPENDENT VARIABLE GRAPHS

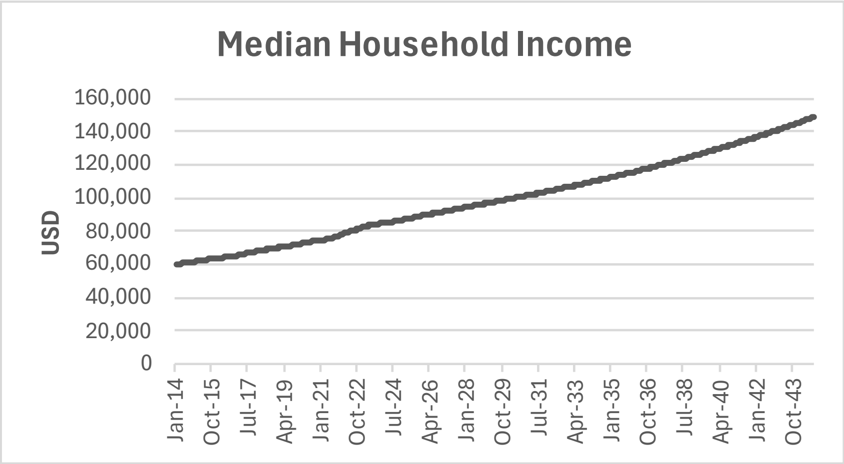
EAST SERVICE AREA

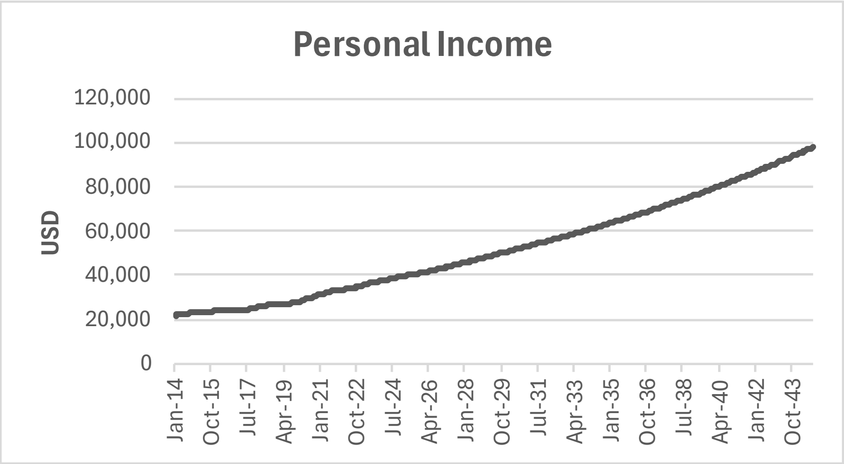


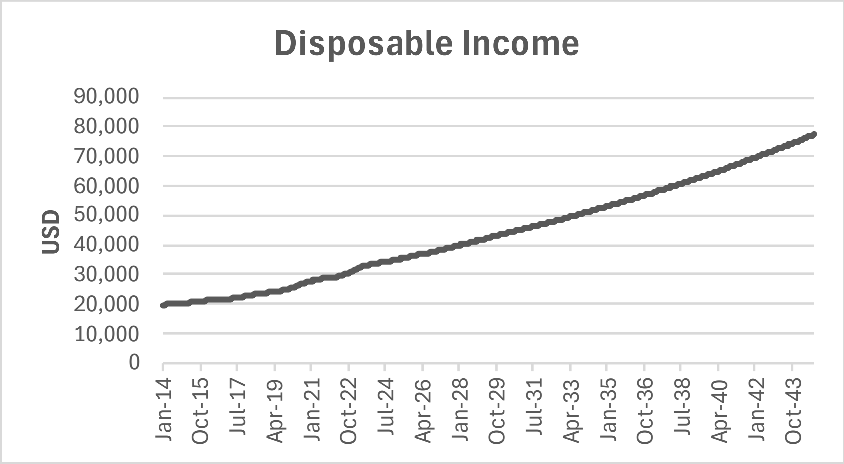


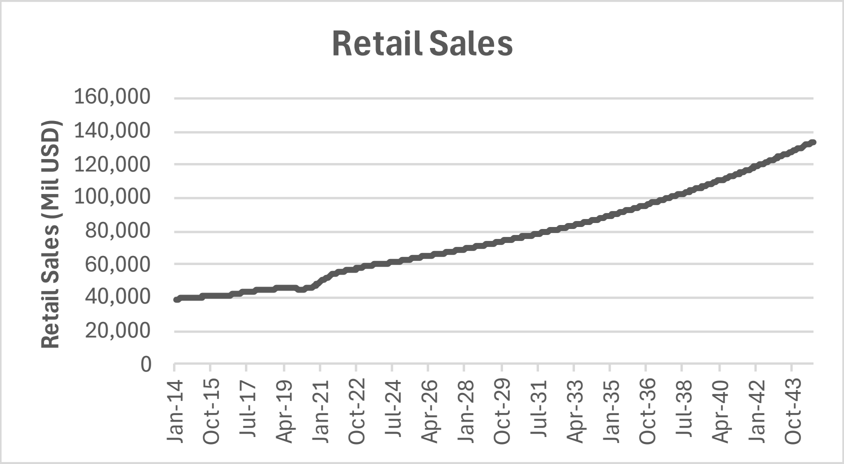


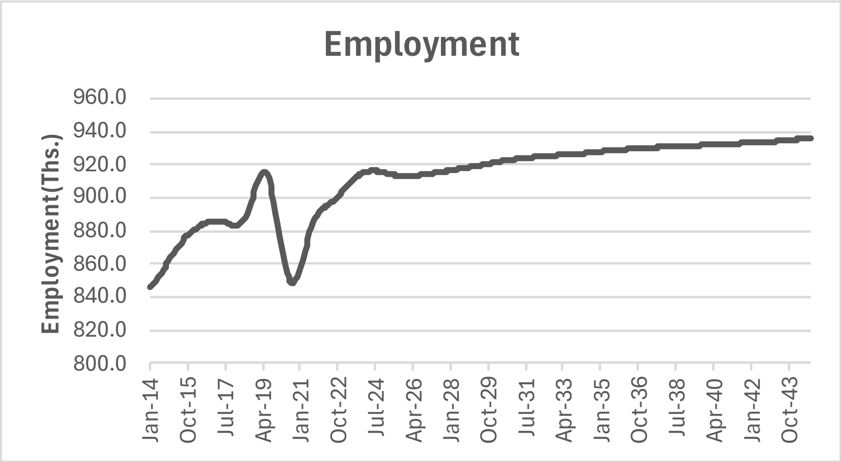


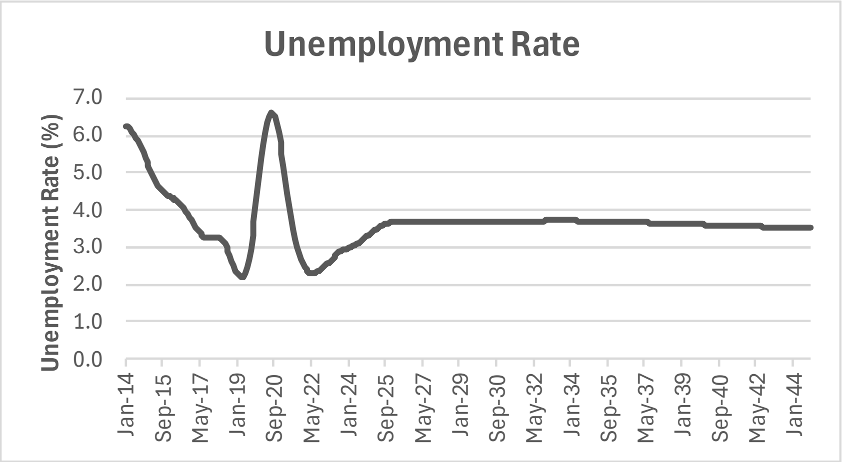

Median Household Income
USD
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-14
Oct-15
Jul-17
Apr-19
Jan-21
Oct-22
Jul-24
Apr-26
Jan-28
Oct-29
Jul-31
Apr-33
Jan-35
Oct-36
Jul-38
Apr-40
Jan-42
Oct-43

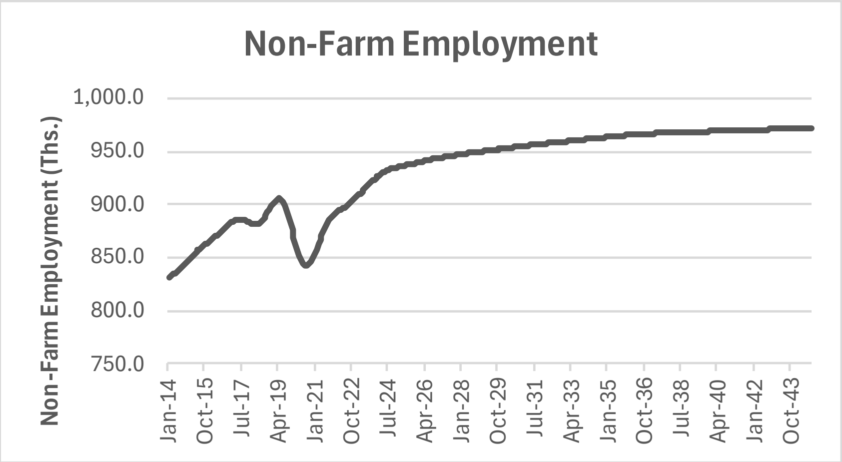

Personal Income
USD
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-14
Oct-15
Jul-17
Apr-19
Jan-21
Oct-22
Jul-24
Apr-26
Jan-28
Oct-29
Jul-31
Apr-33
Jan-35
Oct-36
Jul-38
Apr-40
Jan-42
Oct-43

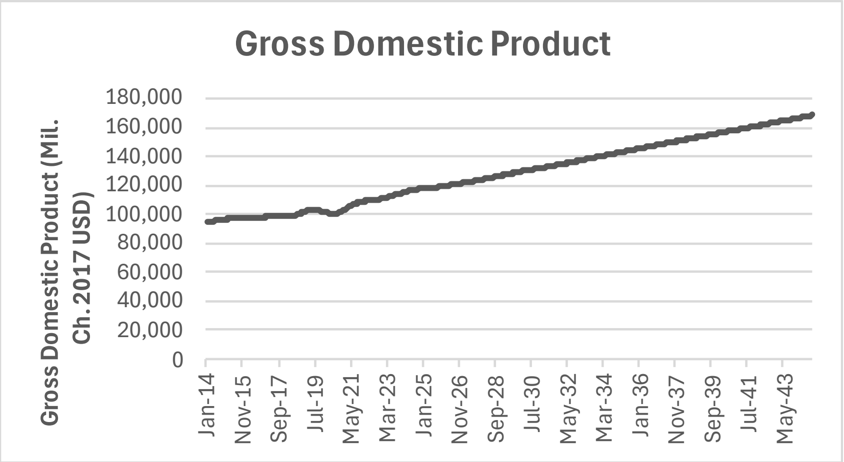

Disposable Income
USD
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Jan-14
Oct-15
Jul-17
Apr-19
Jan-21
Oct-22
Jul-24
Apr-26
Jan-28
Oct-29
Jul-31
Apr-33
Jan-35
Oct-36
Jul-38
Apr-40
Jan-42
Oct-43


Retail Sales
Retail Sales (Mil USD)
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-14
Oct-15
Jul-17
Apr-19
Jan-21
Oct-22
Jul-24
Apr-26
Jan-28
Oct-29
Jul-31
Apr-33
Jan-35
Oct-36
Jul-38
Apr-40
Jan-42
Oct-43

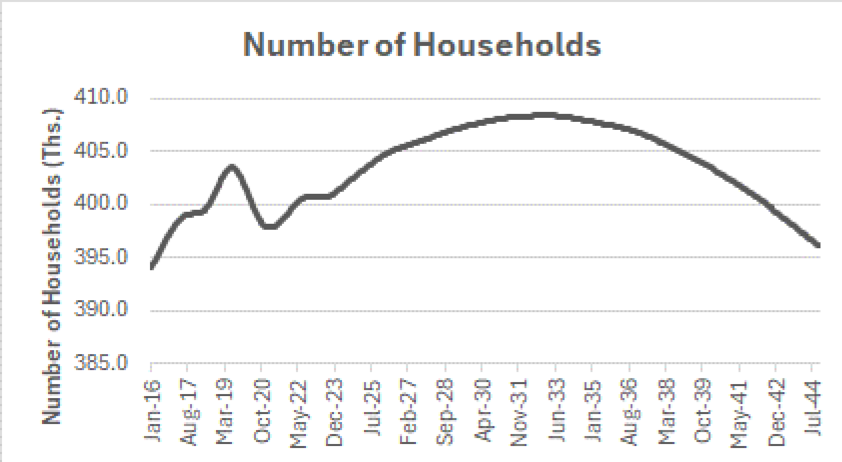

Employment
Employment(Ths.)
960.0
940.0
920.0
900.0
880.0
860.0
840.0
820.0
800.0
Jan-14
Oct-15
Jul-17
Apr-19
Jan-21
Oct-22
Jul-24
Apr-26
Jan-28
Oct-29
Jul-31
Apr-33
Jan-35
Oct-36
Jul-38
Apr-40
Jan-42
Oct-43

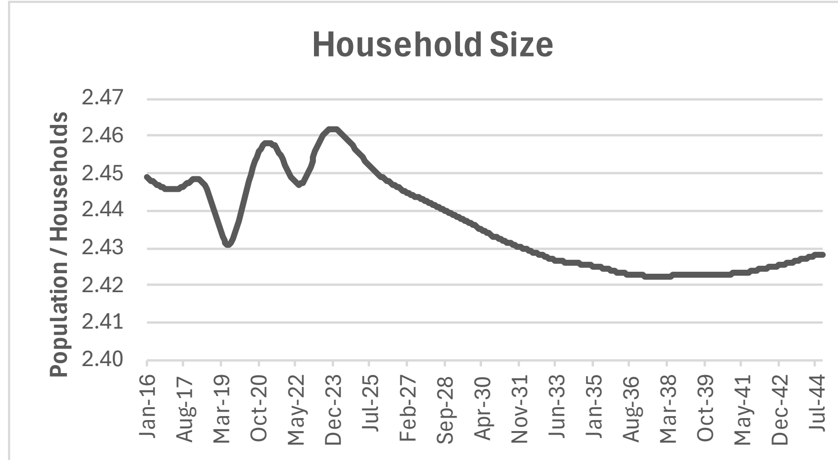

Unemployment Rate
Unemployment Rate (%)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan-14
Sep-15
May-17
Jan-19
Sep-20
May-22
Jan-24
Sep-25
May-27
Jan-29
Sep-30
May-32
Jan-34
Sep-35
May-37
Jan-39
Sep-40
May-42
Jan-44

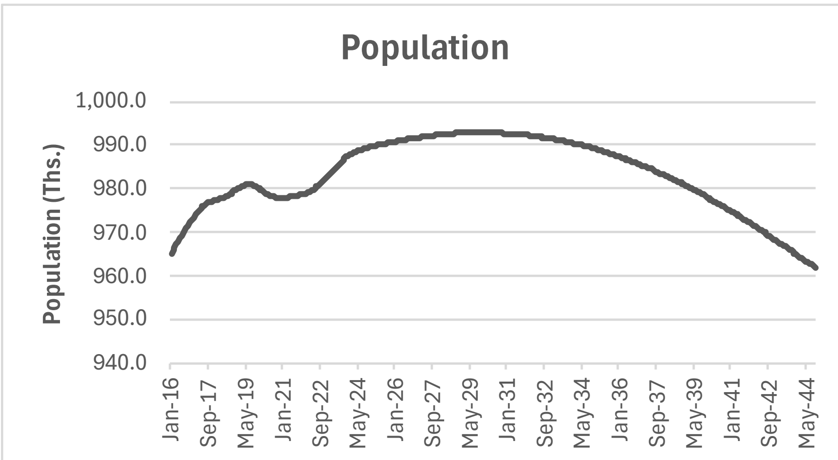

Non-Farm Employment
Non-Farm Employment (Ths.)
1,000.0
950.0
900.0
850.0
800.0
750.0
Jan-14
Oct-15
Jul-17
Apr-19
Jan-21
Oct-22
Jul-24
Apr-26
Jan-28
Oct-29
Jul-31
Apr-33
Jan-35
Oct-36
Jul-38
Apr-40
Jan-42
Oct-43

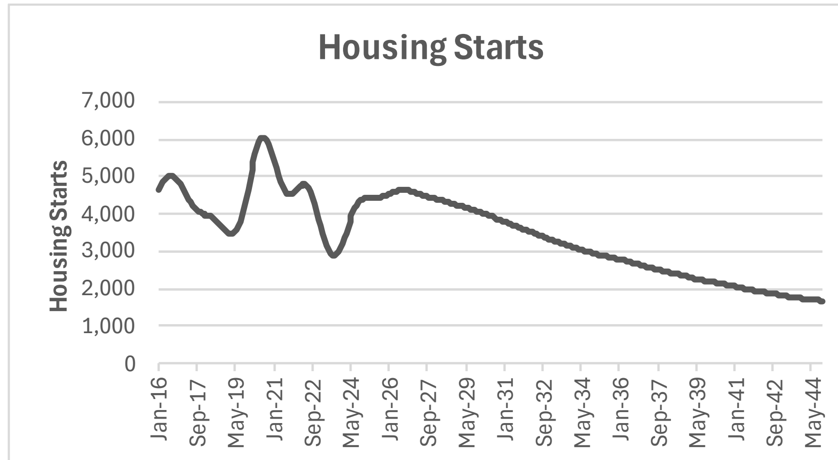

Gross Domestic Product
Gross Domestic Product (Mil. Ch. 2017 USD)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-14
Nov-15
Sep-17
Jul-19
May-21
Mar-23
Jan-25
Nov-26
Sep-28
Jul-30
May-32
Mar-34
Jan-36
Nov-37
Sep-39
Jul-41
May-43

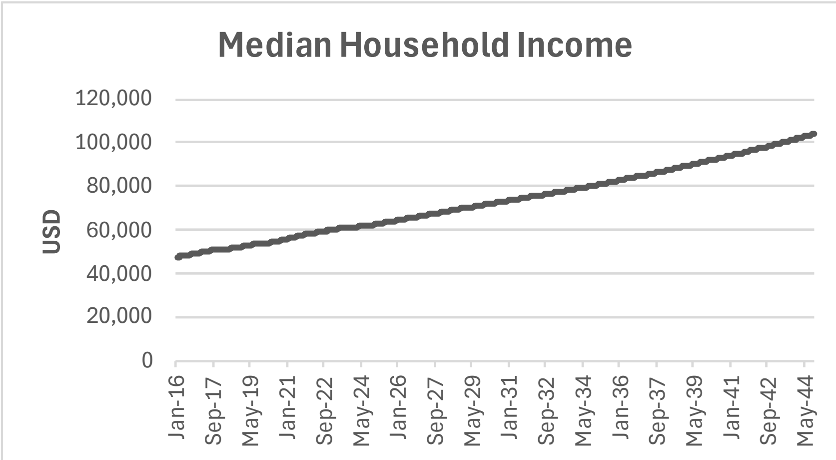
WEST SERVICE AREA

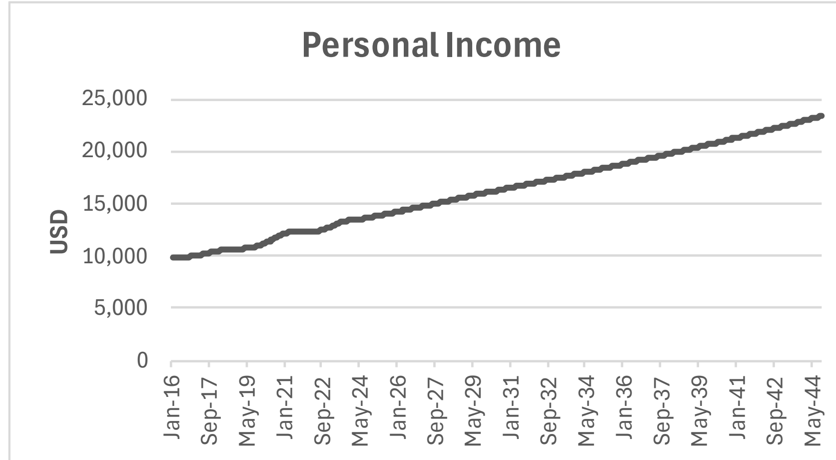


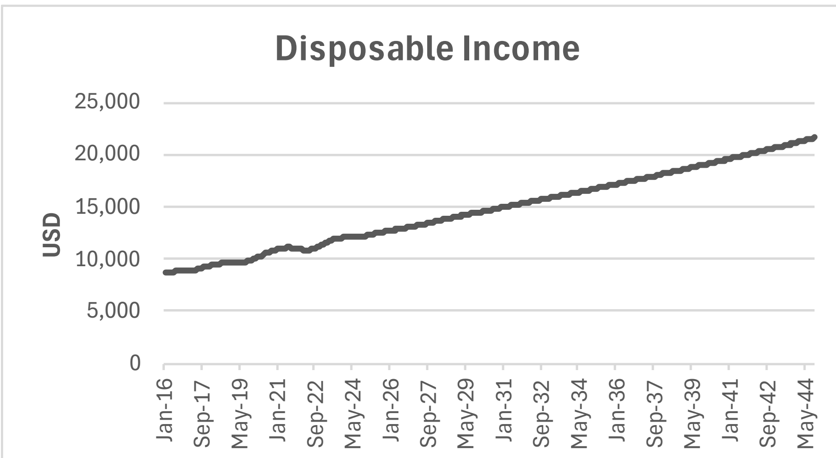


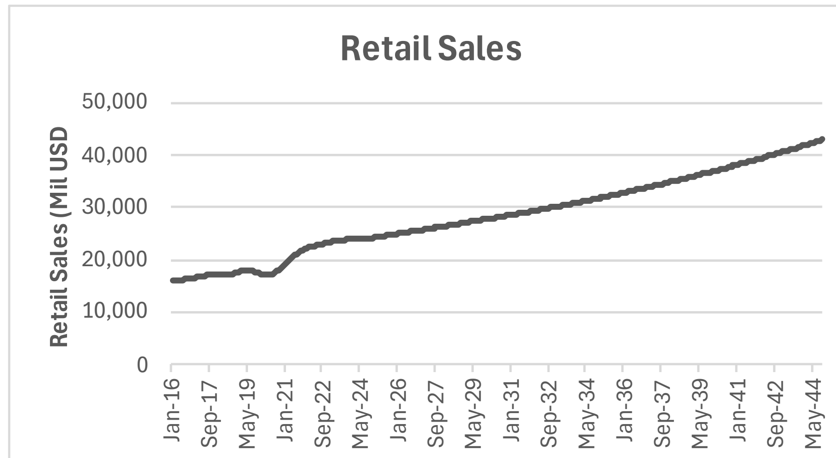


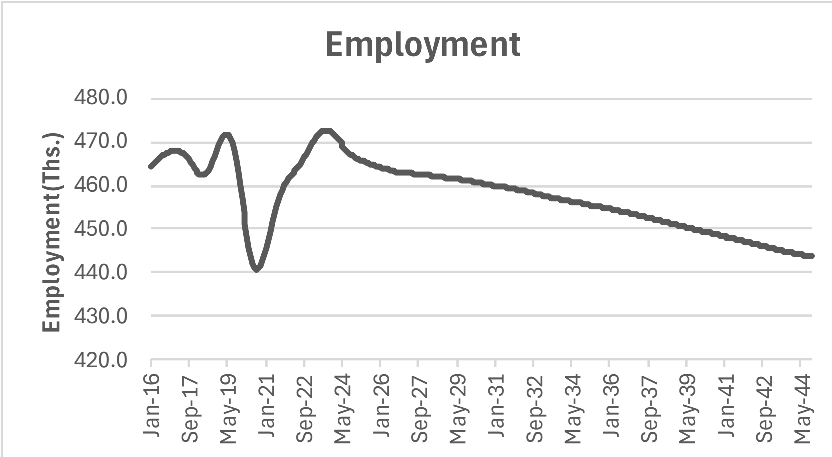


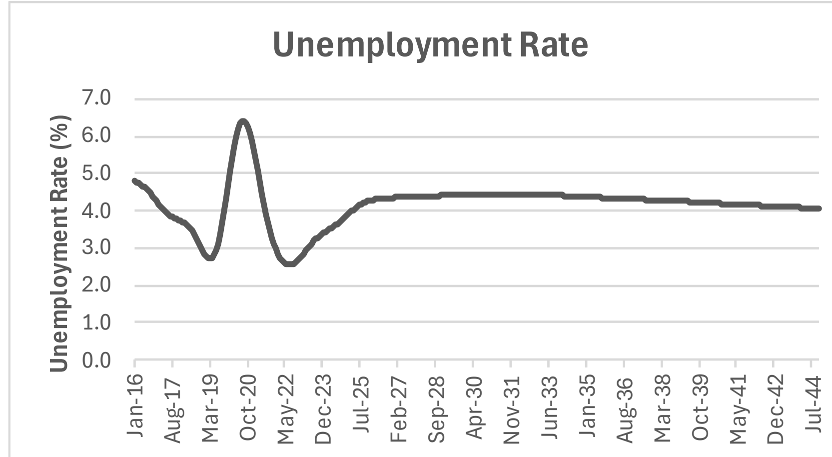

Median Household Income
USD
120,000
100,000
80,000
60,000
40,000
20,000
0
Jan-16
Sep-17
May-19
Jan-21
Sep-22
May-24
Jan-26
Sep-27
May-29
Jan-31
Sep-32
May-34
Jan-36
Sep-37
May-39
Jan-41
Sep-42
May-44

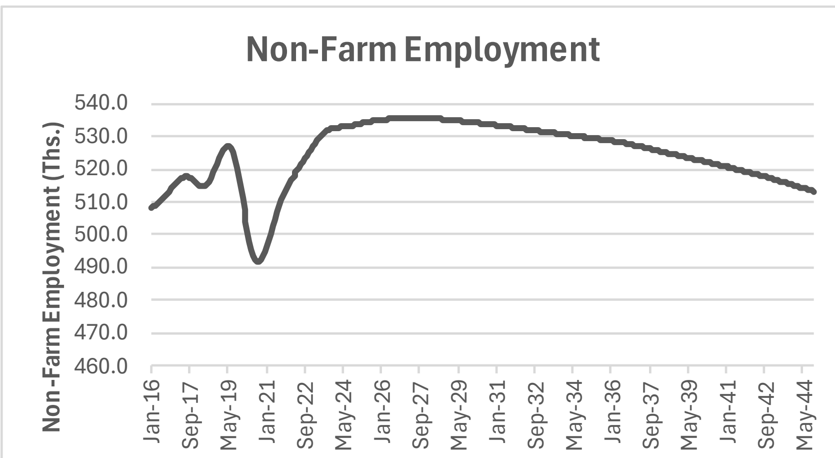

Personal Income
USD
25,000
20,000
15,000
10,000
5,000
0
Jan-16
Sep-17
May-19
Jan-21
Sep-22
May-24
Jan-26
Sep-27
May-29
Jan-31
Sep-32
May-34
Jan-36
Sep-37
May-39
Jan-41
Sep-42
May-44

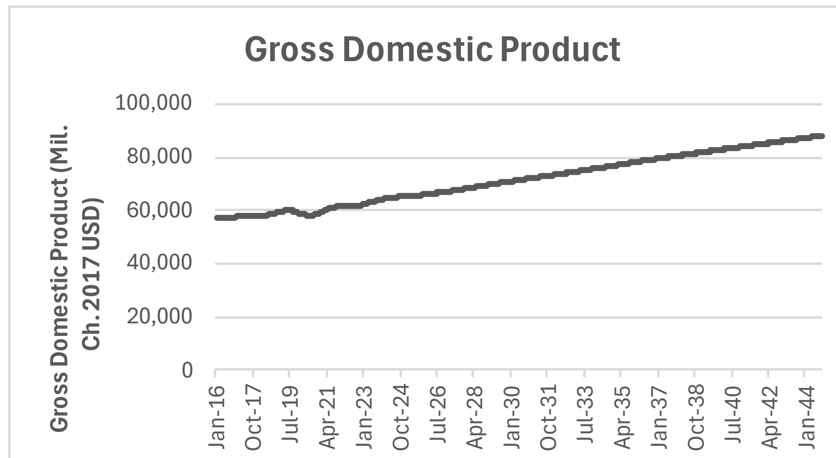

Disposable Income
USD
25,000
20,000
15,000
10,000
5,000
0
Jan-16
Sep-17
May-19
Jan-21
Sep-22
May-24
Jan-26
Sep-27
May-29
Jan-31
Sep-32
May-34
Jan-36
Sep-37
May-39
Jan-41
Sep-42
May-44


Retail Sales
Retail Sales (Mil USD
50,000
40,000
30,000
20,000
10,000
0
Jan-16
Sep-17
May-19
Jan-21
Sep-22
May-24
Jan-26
Sep-27
May-29
Jan-31
Sep-32
May-34
Jan-36
Sep-37
May-39
Jan-41
Sep-42
May-44

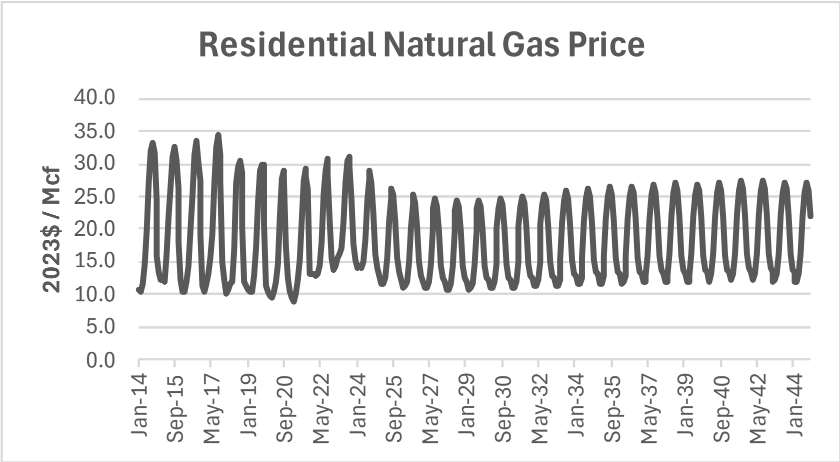

Employment
Employment (Ths.)
480.0
470.0
460.0
450.0
440.0
430.0
420.0
Jan-16
Sep-17
May-19
Jan-21
Sep-22
May-24
Jan-26
Sep-27
May-29
Jan-31
Sep-32
May-34
Jan-36
Sep-37
May-39
Jan-41
Sep-42
May-44

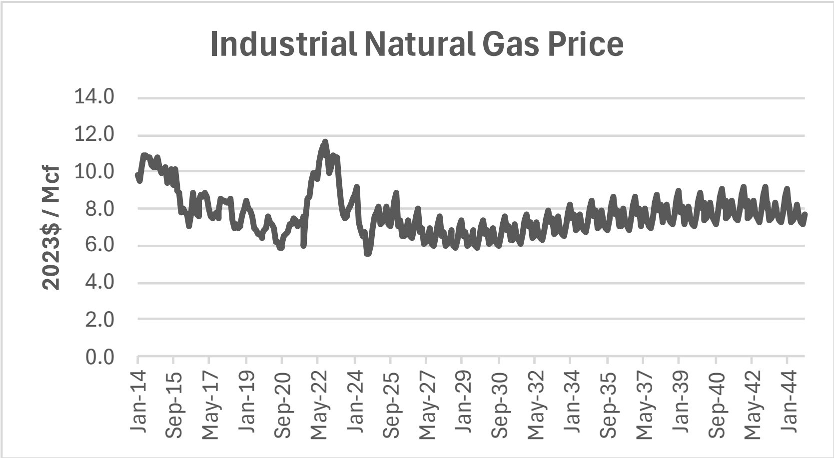

Unemployment Rate
Unemployment Rate (%)
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan-16
Aug-17
Mar-19
Oct-20
May-22
Dec-23
Jul-25
Feb-27
Sep-28
Apr-30
Nov-31
Jun-33
Jan-35
Aug-36
Mar-38
Oct-39
May-41
Dec-42
Jul-44

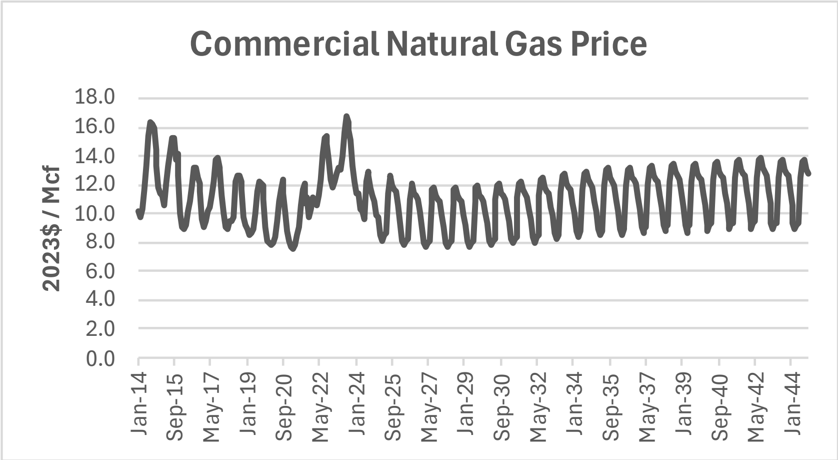

Non-Farm Employment
Non-Farm Employment (Ths.)
540.0
530.0
520.0
510.0
500.0
490.0
480.0
470.0
460.0
Jan-16
Sep-17
May-19
Jan-21
Sep-22
May-24
Jan-26
Sep-27
May-29
Jan-31
Sep-32
May-34
Jan-36
Sep-37
May-39
Jan-41
Sep-42
May-44


Gross Domestic Product
Gross Domestic Product (Mil. Ch. 2017 USD)
100,000
80,000
60,000
40,000
20,000
0
Jan-16
Oct-17
Jul-19
Apr-21
Jan-23
Oct-24
Jul-26
Apr-28
Jan-30
Oct-31
Jul-33
Apr-35
Jan-37
Oct-38
Jul-40
Apr-42
Jan-44

MISSOURI AREA







APPENDIX 4. DETAILED STATISTICAL OUTPUT

East Service Area

4.1 Residential Service Customers

4.2 Residential Service Use Per Customer

4.3 Small General Gas Service Customers

4.4 Small General Gas Service Use Per Customer

4.5 Large General Gas Service Customers

4.6 Large General Gas Service Use Per Customer

4.7 Large Volume Service Customers

4.8 Large Volume Service Use Per Customer

4.9 Transportation Service Customers

4.10 Transportation Service Use Per Customer

West Service Area

4.11 Residential Service Customers

4.12 Residential Service Use Per Customer

4.13 Small General Gas Service Customers

4.14 Small General Gas Service Use Per Customer

4.15 Large General Gas Service Customers

4.16 Large General Gas Service Use Per Customer

4.17 Large Volume Service Customers

4.18 Large Volume Service Use Per Customer

4.19 Transportation Service Customers

4.20 Transportation Service Use Per Customer

Appendix 4.1: Residential Service Customers (RES_CUS) – East Service Area

Model Statistics – RES_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
RES_CUS-Model	12	0.984	0.984	1,163.109	0.133	124	0.953	0.379

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
RES_CUS-Model	AR1	Lag 1	1.209	0.087	13.956	0.000
	AR2	Lag 2	-0.222	0.102	-2.166	0.032
	AR5	Lag 5	-0.431	0.104	-4.125	0.000
	AR6	Lag 6	0.409	0.089	4.592	0.000
	POP	Lag 0	350.334	1.442	242.914	0.000
	January	Lag 0	7,525.946	751.200	10.019	0.000
	February	Lag 0	8,778.968	1,003.236	8.751	0.000
	March	Lag 0	10,743.641	1,147.641	9.361	0.000
	April	Lag 0	9,568.530	1,148.565	8.331	0.000
	May	Lag 0	7,606.143	1,002.304	7.589	0.000
	June	Lag 0	5,454.955	745.860	7.314	0.000
	July	Lag 0	2,014.144	437.370	4.605	0.000
	September	Lag 0	-2,940.815	312.908	-9.398	0.000
	October	Lag 0	-3,040.163	313.929	-9.684	0.000
	December	Lag 0	4,934.149	440.019	11.213	0.000
	D_May2020_Apr2024	Lag 0	2,515.010	1,083.737	2.321	0.022

Variable	Definition
POP	Total Population, (Ths.)
January	Dummy Variable - January
February	Dummy Variable - February
March	Dummy Variable - March
April	Dummy Variable - April
May	Dummy Variable - May
June	Dummy Variable - June
July	Dummy Variable - July
September	Dummy Variable - September
October	Dummy Variable - October
December	Dummy Variable - December
D_May2020_Apr2024	Dummy Variable - May 2020 through April 2024

Correlation Matrix – RES_CUS

Variable	POP	January	February	March	April	May	June	July	September	October	December	D_May2020_Apr2024
POP	1.000	-0.026	-0.014	-0.002	0.011	-0.035	-0.024	-0.012	0.010	0.021	0.042	0.538
January	-0.026	1.000	-0.097	-0.097	-0.097	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092	-0.015
February	-0.014	-0.097	1.000	-0.097	-0.097	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092	-0.015
March	-0.002	-0.097	-0.097	1.000	-0.097	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092	-0.015
April	0.011	-0.097	-0.097	-0.097	1.000	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092	-0.015
May	-0.035	-0.092	-0.092	-0.092	-0.092	1.000	-0.088	-0.088	-0.088	-0.088	-0.088	0.008
June	-0.024	-0.092	-0.092	-0.092	-0.092	-0.088	1.000	-0.088	-0.088	-0.088	-0.088	0.008
July	-0.012	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	1.000	-0.088	-0.088	-0.088	0.008
September	0.010	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	1.000	-0.088	-0.088	0.008
October	0.021	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	-0.088	1.000	-0.088	0.008
December	0.042	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	-0.088	-0.088	1.000	0.008
D_May2020_Apr2024	0.538	-0.015	-0.015	-0.015	-0.015	0.008	0.008	0.008	0.008	0.008	0.008	1.000

ACF/PACF Values – RES_CUS

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
RES_CUS - Model	ACF	-0.019	0.006	-0.006	-0.027	0.017	0.005	-0.003	0.083	-0.032	0.034	0.123	0.108
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.091	0.091	0.091	0.092
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.181	0.181	0.181	0.184

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
RES_CUS - Model	PACF	-0.019	0.006	-0.006	-0.027	0.016	0.006	-0.003	0.083	-0.028	0.032	0.127	0.119
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.2: Residential Service Use Per Customer (RES_UPC) – East Service Area

Model Statistics – RES_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
RES_UPC-Model	9	0.999	0.999	1.764	3.692	124	6.995	0.970

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
RES_UPC-Model	AR1	Lag 1	0.531	0.080	6.652	0.000
	RES.PRICE1	Lag 0	-0.103	0.042	-2.483	0.014
	HDD	Lag 0	0.143	0.001	178.635	0.000
	HHSIZE	Lag 0	6.426	0.416	15.434	0.000
	March	Lag 0	-2.375	0.538	-4.415	0.000
	April	Lag 0	-4.386	0.554	-7.911	0.000
	October	Lag 0	-7.790	0.597	-13.046	0.000
	November	Lag 0	-9.180	0.666	-13.793	0.000
	December	Lag 0	-4.466	0.584	-7.644	0.000
	D_Jan2022	Lag 0	-6.372	1.616	-3.943	0.000

Variable	Definition
RES.PRICE1	Missouri Residential Natural Gas Price Lagged 1 Month ($/Mcf)
HDD	Heating Degree Days
HHSIZE	Household size (POP / HH)
March	Dummy Variable - March
April	Dummy Variable - April
October	Dummy Variable - October
November	Dummy Variable - November
December	Dummy Variable - December
D_Jan2022	Dummy Variable - January 2022

Correlation Matrix – RES_UPC

Variable	RES.PRICE1	HDD	HHSIZE	March	April	October	November	December	D_Jan2022
RES.PRICE1	1.000	-0.578	-0.049	-0.310	-0.282	0.388	0.165	-0.163	-0.070
HDD	-0.578	1.000	0.033	0.145	-0.094	-0.121	0.158	0.342	0.185
HHSIZE	-0.049	0.033	1.000	0.000	-0.009	-0.011	-0.018	-0.025	-0.029
March	-0.310	0.145	0.000	1.000	-0.097	-0.092	-0.092	-0.092	-0.028
April	-0.282	-0.094	-0.009	-0.097	1.000	-0.092	-0.092	-0.092	-0.028
October	0.388	-0.121	-0.011	-0.092	-0.092	1.000	-0.088	-0.088	-0.027
November	0.165	0.158	-0.018	-0.092	-0.092	-0.088	1.000	-0.088	-0.027
December	-0.163	0.342	-0.025	-0.092	-0.092	-0.088	-0.088	1.000	-0.027
D_Jan2022	-0.070	0.185	-0.029	-0.028	-0.028	-0.027	-0.027	-0.027	1.000

ACF/PACF Values – RES_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
RES_UPC - Model	ACF	-0.024	-0.070	0.098	0.015	-0.014	0.099	0.019	0.089	0.055	0.066	0.151	0.156
	SE	0.090	0.090	0.090	0.091	0.091	0.091	0.092	0.092	0.093	0.093	0.093	0.095
	SE x 2	0.180	0.180	0.181	0.182	0.182	0.182	0.184	0.184	0.186	0.186	0.187	0.191

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
RES_UPC - Model	PACF	-0.024	-0.071	0.095	0.015	0.000	0.093	0.019	0.106	0.046	0.079	0.154	0.169
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.3: Small General Gas Service Customers (SGS_CUS) – East Service Area

Model Statistics – SGS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
SGS_CUS-Model	11	0.966	0.966	128.390	0.243	124	0.028	0.014

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
SGS_CUS-Model	SGS_CUS	Constant	30,928.450	2,355.044	13.133	0.000
	AR1	Lag 1	0.874	0.046	18.919	0.000
	NONFARMEMP	Lag 0	5.192	2.676	1.940	0.055
	January	Lag 0	1,329.434	60.937	21.817	0.000
	February	Lag 0	1,398.498	64.592	21.651	0.000
	March	Lag 0	1,458.234	65.785	22.167	0.000
	April	Lag 0	1,241.309	64.692	19.188	0.000
	May	Lag 0	850.627	61.073	13.928	0.000
	June	Lag 0	456.908	53.771	8.497	0.000
	July	Lag 0	131.130	40.702	3.222	0.002
	September	Lag 0	-153.282	30.605	-5.008	0.000
	November	Lag 0	433.882	40.720	10.655	0.000
	December	Lag 0	990.387	53.755	18.424	0.000

Variable	Definition
NONFARMEMP	Employment: Total Nonfarm Payroll, (Ths.)
January	Dummy Variable - January
February	Dummy Variable - February
March	Dummy Variable - March
April	Dummy Variable - April
May	Dummy Variable - May
June	Dummy Variable - June
July	Dummy Variable - July
September	Dummy Variable - September
November	Dummy Variable - November
December	Dummy Variable - December

Correlation Matrix – SGS_CUS

Variable	NONFARMEMP	January	February	March	April	May	June	July	September	November	December
NONFARMEMP	1.000	-0.014	-0.004	0.005	0.016	-0.034	-0.024	-0.015	0.005	0.024	0.033
January	-0.014	1.000	-0.097	-0.097	-0.097	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092
February	-0.004	-0.097	1.000	-0.097	-0.097	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092
March	0.005	-0.097	-0.097	1.000	-0.097	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092
April	0.016	-0.097	-0.097	-0.097	1.000	-0.092	-0.092	-0.092	-0.092	-0.092	-0.092
May	-0.034	-0.092	-0.092	-0.092	-0.092	1.000	-0.088	-0.088	-0.088	-0.088	-0.088
June	-0.024	-0.092	-0.092	-0.092	-0.092	-0.088	1.000	-0.088	-0.088	-0.088	-0.088
July	-0.015	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	1.000	-0.088	-0.088	-0.088
September	0.005	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	1.000	-0.088	-0.088
November	0.024	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	-0.088	1.000	-0.088
December	0.033	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	-0.088	-0.088	1.000

ACF/PACF Values – SGS_CUS

		Residual ACF											
Model		1	2	3	4	5	6	7	8	9	10	11	12
SGS_CUS - Model	ACF	-0.135	0.179	-0.077	-0.080	-0.026	-0.085	0.090	0.109	-0.023	0.064	0.099	0.123
	SE	0.090	0.091	0.094	0.095	0.095	0.095	0.096	0.097	0.098	0.098	0.098	0.099
	SE x 2	0.180	0.183	0.188	0.189	0.190	0.191	0.192	0.193	0.195	0.195	0.196	0.197

		Residual PACF											
Model		1	2	3	4	5	6	7	8	9	10	11	12
SGS_CUS - Model	PACF	-0.135	0.164	-0.036	-0.127	-0.031	-0.062	0.075	0.150	-0.041	0.004	0.158	0.178
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.4: Small General Gas Service Use Per Customer (SGS_UPC) – East Service Area

Model Statistics – SGS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
SGS_UPC-Model	7	0.996	0.996	9.800	6.508	124	6.538	0.962

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
SGS_UPC-Model	AR1	Lag 1	0.419	0.085	4.926	0.000
	EMP	Lag 0	0.049	0.002	20.991	0.000
	HDD	Lag 0	0.426	0.003	123.567	0.000
	March	Lag 0	-19.983	3.019	-6.620	0.000
	April	Lag 0	-25.497	3.049	-8.363	0.000
	October	Lag 0	-41.558	3.209	-12.950	0.000
	November	Lag 0	-59.063	3.528	-16.741	0.000
	December	Lag 0	-29.161	3.277	-8.898	0.000

Variable	Definition
EMP	Employment, (Ths.)
HDD	Heating Degree Days
March	Dummy Variable - March
April	Dummy Variable - April
October	Dummy Variable - October
November	Dummy Variable - November
December	Dummy Variable - December

Correlation Matrix – SGS_UPC

Variable	EMP	HDD	March	April	October	November	December
EMP	1.000	-0.009	-0.010	-0.007	0.010	0.012	0.015
HDD	-0.009	1.000	0.160	-0.089	-0.116	0.157	0.405
March	-0.010	0.160	1.000	-0.091	-0.091	-0.091	-0.091
April	-0.007	-0.089	-0.091	1.000	-0.091	-0.091	-0.091
October	0.010	-0.116	-0.091	-0.091	1.000	-0.091	-0.091
November	0.012	0.157	-0.091	-0.091	-0.091	1.000	-0.091
December	0.015	0.405	-0.091	-0.091	-0.091	-0.091	1.000

ACF/PACF Values – SGS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
SGS_UPC - Model	ACF	0.003	-0.076	0.059	0.073	-0.083	0.134	-0.014	0.133	0.010	-0.144	0.061	0.147
	SE	0.090	0.090	0.090	0.091	0.091	0.092	0.093	0.093	0.095	0.095	0.097	0.097
	SE x 2	0.180	0.180	0.181	0.181	0.182	0.183	0.187	0.187	0.190	0.190	0.193	0.194

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
SGS_UPC - Model	PACF	0.003	-0.076	0.059	0.067	-0.075	0.145	-0.039	0.165	-0.005	-0.153	0.090	0.075
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.5: Large General Gas Service Customers (LGS_CUS) – East Service Area

Model Statistics – LGS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LGS_CUS-Model	16	0.978	0.978	19.209	0.296	124	6.495	0.961

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LGS_CUS-Model	LGS_CUS	Constant	4,501.311	19.965	225.459	0.000
	AR1	Lag 1	0.259	0.088	2.928	0.004
	AR2	Lag 2	0.468	0.088	5.312	0.000
	UNEMPRATE	Lag 0	-13.165	4.265	-3.087	0.003
	January	Lag 0	61.394	6.532	9.399	0.000
	February	Lag 0	59.985	7.250	8.274	0.000
	March	Lag 0	66.488	7.101	9.363	0.000
	April	Lag 0	51.032	7.175	7.113	0.000
	May	Lag 0	24.697	6.550	3.771	0.000
	June	Lag 0	20.216	6.457	3.131	0.002
	September	Lag 0	-29.841	5.432	-5.494	0.000
	December	Lag 0	31.710	6.294	5.038	0.000
	D_Oct2019_EndxTrend	Lag 0	-2.791	0.362	-7.699	0.000
	D_Jun2023	Lag 0	-64.375	20.403	-3.155	0.002
	D_Jul2023_Oct2023	Lag 0	-251.043	17.669	-14.208	0.000
	D_Aug2023	Lag 0	232.408	18.823	12.347	0.000
	D_Nov2023_Dec2023	Lag 0	-455.304	18.795	-24.225	0.000
	D_Jan2024	Lag 0	-307.049	20.474	-14.997	0.000
	D_Feb2024	Lag 0	-478.457	19.638	-24.364	0.000

Variable	Definition
UNEMPRATE	Unemployment Rate, (%)
January	Dummy Variable - January
February	Dummy Variable - February
March	Dummy Variable - March
April	Dummy Variable - April
May	Dummy Variable - May
June	Dummy Variable - June
September	Dummy Variable - September
December	Dummy Variable - December
D_Oct2019_EndxTrend	Dummy Variable - October 2019 to end of Forecast Period Multiplied by Trend Variable
D_Jun2023	Dummy Variable - June 2023
D_Jul2023_Oct2023	Dummy Variable - July 2023 through October 2023
D_Aug2023	Dummy Variable - August 2023
D_Nov2023_Dec2023	Dummy Variable - November 2023 through December 2023
D_Jan2024	Dummy Variable - January 2024
D_Feb2024	Dummy Variable - February 2024

Correlation Matrix – LGS_CUS

Variable	UNEMPRATE	January	February	March	April	May	June	September	December	D_Oct2019_EndxTrend	D_Jun2023	D_Jul2023_Oct2023	D_Aug2023	D_Nov2023_Dec2023	D_Jan2024	D_Feb2024
UNEMPRATE	1.000	0.021	0.015	0.010	0.004	0.016	0.009	-0.010	-0.028	-0.410	-0.075	-0.139	-0.069	-0.090	-0.061	-0.059
January	0.021	1.000	-0.097	-0.097	-0.097	-0.092	-0.092	-0.092	-0.092	0.005	-0.028	-0.057	-0.028	-0.040	0.289	-0.028
February	0.015	-0.097	1.000	-0.097	-0.097	-0.092	-0.092	-0.092	-0.092	0.014	-0.028	-0.057	-0.028	-0.040	-0.028	0.289
March	0.010	-0.097	-0.097	1.000	-0.097	-0.092	-0.092	-0.092	-0.092	0.022	-0.028	-0.057	-0.028	-0.040	-0.028	-0.028
April	0.004	-0.097	-0.097	-0.097	1.000	-0.092	-0.092	-0.092	-0.092	0.030	-0.028	-0.057	-0.028	-0.040	-0.028	-0.028
May	0.016	-0.092	-0.092	-0.092	-0.092	1.000	-0.088	-0.088	-0.088	-0.034	-0.027	-0.054	-0.027	-0.038	-0.027	-0.027
June	0.009	-0.092	-0.092	-0.092	-0.092	-0.088	1.000	-0.088	-0.088	-0.027	0.304	-0.054	-0.027	-0.038	-0.027	-0.027
September	-0.010	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	1.000	-0.088	-0.007	-0.027	0.114	-0.027	-0.038	-0.027	-0.027
December	-0.028	-0.092	-0.092	-0.092	-0.092	-0.088	-0.088	-0.088	1.000	0.018	-0.027	-0.054	-0.027	0.197	-0.027	-0.027
D_Oct2019_EndxTrend	-0.410	0.005	0.014	0.022	0.030	-0.034	-0.027	-0.007	0.018	1.000	0.168	0.367	0.178	0.279	0.204	0.209
D_Jun2023	-0.075	-0.028	-0.028	-0.028	-0.028	-0.027	0.304	-0.027	-0.027	0.168	1.000	-0.016	-0.008	-0.012	-0.008	-0.008
D_Jul2023_Oct2023	-0.139	-0.057	-0.057	-0.057	-0.057	-0.054	-0.054	0.114	-0.054	0.367	-0.016	1.000	0.494	-0.023	-0.016	-0.016
D_Aug2023	-0.069	-0.028	-0.028	-0.028	-0.028	-0.027	-0.027	-0.027	-0.027	0.178	-0.008	0.494	1.000	-0.012	-0.008	-0.008
D_Nov2023_Dec2023	-0.090	-0.040	-0.040	-0.040	-0.040	-0.038	-0.038	-0.038	0.197	0.279	-0.012	-0.023	-0.012	1.000	-0.012	-0.012
D_Jan2024	-0.061	0.289	-0.028	-0.028	-0.028	-0.027	-0.027	-0.027	-0.027	0.204	-0.008	-0.016	-0.008	-0.012	1.000	-0.008
D_Feb2024	-0.059	-0.028	0.289	-0.028	-0.028	-0.027	-0.027	-0.027	-0.027	0.209	-0.008	-0.016	-0.008	-0.012	-0.008	1.000

ACF/PACF Values – LGS_CUS

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_CUS - Model	ACF	0.034	0.031	-0.031	0.011	-0.061	0.005	0.020	0.070	0.017	-0.056	-0.094	-0.057
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.091	0.091	0.091	0.092
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.181	0.181	0.181	0.182	0.182	0.182	0.184

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_CUS - Model	PACF	0.034	0.030	-0.033	0.012	-0.060	0.008	0.024	0.065	0.013	-0.065	-0.088	-0.047
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.6: Large General Gas Service Use Per Customer (LGS_UPC) – East Service Area

Model Statistics – LGS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LGS_UPC-Model	17	0.991	0.991	161.310	4.131	124	4.911	0.914

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LGS_UPC-Model	LGS_UPC	Constant	1,161.764	103.487	11.226	0.000
	AR1	Lag 1	0.523	0.086	6.099	0.000
	UNEMPRATE2	Lag 0	-48.982	24.226	-2.022	0.046
	JanHDDxJan2014_Aug2021	Lag 0	4.265	0.074	57.951	0.000
	FebHDDxJan2014_Aug2021	Lag 0	4.297	0.083	51.950	0.000
	MarHDDxJan2014_Aug2021	Lag 0	4.309	0.124	34.890	0.000
	AprHDDxJan2014_Aug2021	Lag 0	3.913	0.234	16.718	0.000
	MayHDDxJan2014_Aug2021	Lag 0	4.280	0.654	6.545	0.000
	OctHDDxJan2014_Aug2021	Lag 0	2.818	0.269	10.491	0.000
	NovHDDxJan2014_Aug2021	Lag 0	3.536	0.121	29.103	0.000
	DecHDDxJan2014_Aug2021	Lag 0	3.946	0.090	43.807	0.000
	JanHDDxSep2021_End	Lag 0	4.496	0.115	38.998	0.000
	FebHDDxSep2021_End	Lag 0	5.232	0.170	30.838	0.000
	MarHDDxSep2021_End	Lag 0	5.232	0.232	22.558	0.000
	AprHDDxSep2021_End	Lag 0	4.606	0.469	9.826	0.000
	MayHDDxSep2021_End	Lag 0	8.553	2.243	3.813	0.000
	OctHDDxSep2021_End	Lag 0	2.908	0.502	5.797	0.000
	NovHDDxSep2021_End	Lag 0	3.649	0.207	17.645	0.000
	DecHDDxSep2021_End	Lag 0	4.315	0.157	27.439	0.000

Variable	Definition
UNEMPRATE2	Unemployment Rate, (%)
JanHDDxJan2014_Aug2021	Dummy Variable - January Heating Degree Days January 2014 through August 2021
FebHDDxJan2014_Aug2021	Dummy Variable - February Heating Degree Days January 2014 through August 2021
MarHDDxJan2014_Aug2021	Dummy Variable - March Heating Degree Days January 2014 through August 2021
AprHDDxJan2014_Aug2021	Dummy Variable - April Heating Degree Days January 2014 through August 2021
MayHDDxJan2014_Aug2021	Dummy Variable - May Heating Degree Days January 2014 through August 2021
OctHDDxJan2014_Aug2021	Dummy Variable - October Heating Degree Days January 2014 through August 2021
NovHDDxJan2014_Aug2021	Dummy Variable - November Heating Degree Days January 2014 through August 2021
DecHDDxJan2014_Aug2021	Dummy Variable - December Heating Degree Days January 2014 through August 2021
JanHDDxSep2021_End	Dummy Variable - January Heating Degree Days September 2021 to end of Forecast Period
FebHDDxSep2021_End	Dummy Variable - February Heating Degree Days September 2021 to end of Forecast Period
MarHDDxSep2021_End	Dummy Variable - March Heating Degree Days September 2021 to end of Forecast Period
AprHDDxSep2021_End	Dummy Variable - April Heating Degree Days September 2021 to end of Forecast Period
MayHDDxSep2021_End	Dummy Variable - May Heating Degree Days September 2021 to end of Forecast Period
OctHDDxSep2021_End	Dummy Variable - October Heating Degree Days September 2021 to end of Forecast Period
NovHDDxSep2021_End	Dummy Variable - November Heating Degree Days September 2021 to end of Forecast Period
DecHDDxSep2021_End	Dummy Variable - December Heating Degree Days September 2021 to end of Forecast Period

Correlation Matrix – LGS_UPC

Variable	UNEMPRATE2	JanHDDxJan2014_Aug2021	FebHDDxJan2014_Aug2021	MarHDDxJan2014_Aug2021	AprHDDxJan2014_Aug2021	MayHDDxJan2014_Aug2021	OctHDDxJan2014_Aug2021	NovHDDxJan2014_Aug2021	DecHDDxJan2014_Aug2021	JanHDDxSep2021_End	FebHDDxSep2021_End	MarHDDxSep2021_End	AprHDDxSep2021_End	MayHDDxSep2021_End	OctHDDxSep2021_End	NovHDDxSep2021_End	DecHDDxSep2021_End
UNEMPRATE2	1.000	0.154	0.177	0.125	0.117	0.157	0.108	0.080	0.096	-0.063	-0.060	-0.062	-0.063	-0.056	-0.062	-0.065	-0.063
JanHDDxJan2014_Aug2021	0.154	1.000	-0.018	-0.018	-0.017	-0.016	-0.016	-0.016	-0.017	-0.036	-0.036	-0.036	-0.036	-0.035	-0.036	-0.036	-0.036
FebHDDxJan2014_Aug2021	0.177	-0.018	1.000	-0.017	-0.017	-0.016	-0.016	-0.016	-0.017	-0.035	-0.035	-0.035	-0.035	-0.035	-0.035	-0.036	-0.035
MarHDDxJan2014_Aug2021	0.125	-0.018	-0.017	1.000	-0.017	-0.016	-0.016	-0.016	-0.017	-0.035	-0.035	-0.035	-0.035	-0.035	-0.035	-0.035	-0.035
AprHDDxJan2014_Aug2021	0.117	-0.017	-0.017	-0.017	1.000	-0.015	-0.015	-0.015	-0.016	-0.033	-0.033	-0.033	-0.033	-0.033	-0.034	-0.034	-0.034
MayHDDxJan2014_Aug2021	0.157	-0.016	-0.016	-0.016	-0.015	1.000	-0.015	-0.015	-0.015	-0.032	-0.032	-0.032	-0.032	-0.032	-0.033	-0.033	-0.033
OctHDDxJan2014_Aug2021	0.108	-0.016	-0.016	-0.016	-0.015	-0.015	1.000	-0.015	-0.015	-0.032	-0.032	-0.032	-0.032	-0.032	-0.032	-0.032	-0.032
NovHDDxJan2014_Aug2021	0.080	-0.016	-0.016	-0.016	-0.015	-0.015	-0.015	1.000	-0.015	-0.032	-0.032	-0.032	-0.032	-0.032	-0.033	-0.033	-0.033
DecHDDxJan2014_Aug2021	0.096	-0.017	-0.017	-0.017	-0.016	-0.015	-0.015	-0.015	1.000	-0.033	-0.033	-0.033	-0.033	-0.033	-0.034	-0.034	-0.034
JanHDDxSep2021_End	-0.063	-0.036	-0.035	-0.035	-0.033	-0.032	-0.032	-0.032	-0.033	1.000	-0.070	-0.070	-0.070	-0.069	-0.071	-0.071	-0.071
FebHDDxSep2021_End	-0.060	-0.036	-0.035	-0.035	-0.033	-0.032	-0.032	-0.032	-0.033	-0.070	1.000	-0.069	-0.070	-0.069	-0.071	-0.071	-0.071
MarHDDxSep2021_End	-0.062	-0.036	-0.035	-0.035	-0.033	-0.032	-0.032	-0.032	-0.033	-0.070	-0.069	1.000	-0.070	-0.069	-0.071	-0.071	-0.071
AprHDDxSep2021_End	-0.063	-0.036	-0.035	-0.035	-0.033	-0.032	-0.032	-0.032	-0.033	-0.070	-0.070	-0.070	1.000	-0.069	-0.071	-0.071	-0.071
MayHDDxSep2021_End	-0.056	-0.035	-0.035	-0.035	-0.033	-0.032	-0.032	-0.032	-0.033	-0.069	-0.069	-0.069	-0.069	1.000	-0.071	-0.071	-0.070
OctHDDxSep2021_End	-0.062	-0.036	-0.035	-0.035	-0.034	-0.033	-0.032	-0.033	-0.034	-0.071	-0.071	-0.071	-0.071	-0.071	1.000	-0.072	-0.072
NovHDDxSep2021_End	-0.065	-0.036	-0.036	-0.035	-0.034	-0.033	-0.032	-0.033	-0.034	-0.071	-0.071	-0.071	-0.071	-0.071	-0.072	1.000	-0.072
DecHDDxSep2021_End	-0.063	-0.036	-0.035	-0.035	-0.034	-0.033	-0.032	-0.033	-0.034	-0.071	-0.071	-0.071	-0.071	-0.070	-0.072	-0.072	1.000

ACF/PACF Values – LGS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_UPC - Model	ACF	-0.088	0.166	0.002	0.009	-0.057	0.024	0.045	-0.021	0.016	-0.047	0.011	-0.024
	SE	0.090	0.090	0.093	0.093	0.093	0.093	0.093	0.093	0.093	0.094	0.094	0.094
	SE x 2	0.180	0.181	0.186	0.186	0.186	0.186	0.187	0.187	0.187	0.187	0.187	0.187

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_UPC - Model	PACF	-0.088	0.160	0.030	-0.015	-0.065	0.016	0.070	-0.017	-0.008	-0.048	0.007	-0.001
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.7: Large Volume Service Customers (LVS_CUS) – East Service Area

[Forecast was not based on econometric analysis]

Appendix 4.8: Large Volume Service Use Per Customer (LVS_UPC) – East Service Area

Model Statistics – LVS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LVS_UPC-Model	5	0.881	0.881	1,478.381	6.966	124	11.518	0.997

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LVS_UPC-Model	AR1	Lag 1	0.527	0.080	6.546	0.000
	EMP	Lag 0	12.060	0.384	31.417	0.000
	HDD	Lag 0	10.724	0.558	19.207	0.000
	February	Lag 0	-1,158.983	410.466	-2.824	0.006
	D_Jan2016	Lag 0	-12,142.675	1,355.492	-8.958	0.000
	D_Jan2017	Lag 0	-12,516.709	1,343.269	-9.318	0.000

Variable	Definition
EMP	Employment, (Ths.)
HDD	Heating Degree Days
February	Dummy Variable - February
D_Jan2016	Dummy Variable - January 2016
D_Jan2017	Dummy Variable - January 2017

Correlation Matrix – LVS_UPC

Variable	COM.PRICE	HDD	February	March	D_Jan2016	D_Jan2017	D_Feb2024
COM.PRICE	1.000	-0.595	-0.249	-0.237	-0.099	-0.100	-0.005
HDD	-0.595	1.000	0.379	0.145	0.151	0.119	0.042
February	-0.249	0.379	1.000	-0.097	-0.028	-0.028	0.289
March	-0.237	0.145	-0.097	1.000	-0.028	-0.028	-0.028
D_Jan2016	-0.099	0.151	-0.028	-0.028	1.000	-0.008	-0.008
D_Jan2017	-0.100	0.119	-0.028	-0.028	-0.008	1.000	-0.008
D_Feb2024	-0.005	0.042	0.289	-0.028	-0.008	-0.008	1.000

ACF/PACF Values – LVS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LVS_UPC - Model	ACF	0.009	-0.038	-0.013	-0.013	0.072	-0.031	0.031	0.165	-0.012	0.090	0.149	0.009
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.091	0.091	0.093	0.093	0.094	0.096
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.181	0.181	0.181	0.186	0.186	0.187	0.191

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LVS_UPC - Model	PACF	0.009	-0.038	-0.013	-0.014	0.072	-0.034	0.037	0.165	-0.012	0.101	0.165	0.016
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.9: Transportation Service Customers (TS_CUS) – East Service Area

Model Statistics – TS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
TS_CUS-Model	6	0.988	0.988	1.203	0.389	124	1.215	0.455

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
TS_CUS-Model	TS_CUS	Constant	78.445	39.199	2.001	0.048
	AR1	Lag 1	0.998	0.006	155.563	0.000
	GDP6	Lag 0	0.000	0.000	1.909	0.059
	D_Nov2015	Lag 0	5.495	0.472	11.642	0.000
	D_Feb2016	Lag 0	1.496	0.472	3.170	0.002
	D_Dec2018	Lag 0	2.020	0.472	4.280	0.000
	D_Dec2020	Lag 0	3.037	0.472	6.429	0.000
	D_Apr2023	Lag 0	2.005	0.472	4.248	0.000

Variable	Definition
GDP6	Gross Domestic Product: Total, (Mil. Chained 2017 $) Lagged 6 Months
D_Nov2015	Dummy Variable - November 2015
D_Feb2016	Dummy Variable - February 2016
D_Dec2018	Dummy Variable - December 2018
D_Dec2020	Dummy Variable - December 2020
D_Apr2023	Dummy Variable - April 2023

Correlation Matrix – TS_CUS

Variable	GDP6	D_Nov2015	D_Feb2016	D_Dec2018	D_Dec2020	D_Apr2023
GDP6	1.000	-0.072	-0.069	-0.039	-0.023	0.145
D_Nov2015	-0.072	1.000	-0.008	-0.008	-0.008	-0.008
D_Feb2016	-0.069	-0.008	1.000	-0.008	-0.008	-0.008
D_Dec2018	-0.039	-0.008	-0.008	1.000	-0.008	-0.008
D_Dec2020	-0.023	-0.008	-0.008	-0.008	1.000	-0.008
D_Apr2023	0.145	-0.008	-0.008	-0.008	-0.008	1.000

ACF/PACF Values – TS_CUS

		Residual ACF											
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_CUS - Model	ACF	-0.009	0.002	0.062	-0.048	-0.013	0.054	0.049	-0.005	-0.050	0.001	0.001	0.024
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.091	0.091	0.091	0.091	0.091	0.091
	SE x 2	0.180	0.180	0.180	0.180	0.181	0.181	0.181	0.182	0.182	0.182	0.182	0.182

		Residual PACF											
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_CUS - Model	PACF	-0.009	0.002	0.062	-0.048	-0.015	0.051	0.057	-0.005	-0.060	-0.001	0.010	0.030
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.10: Transportation Service Use Per Customer (TS_UPC) – East Service Area

Model Statistics – TS_UPC

Model Statistics									
		Model Fit statistics						White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
TS_UPC-Model	10	0.934	0.934	9,465.291	4.751	124	0.431	0.194

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
TS_UPC-Model	AR3	Lag 3	0.397	0.088	4.536	0.000
	AR6	Lag 6	0.277	0.094	2.937	0.004
	AR7	Lag 7	0.194	0.077	2.520	0.013
	COM.PRICE	Lag 0	-1,959.156	722.032	-2.713	0.008
	JanHDD	Lag 0	91.177	4.025	22.653	0.000
	FebHDD	Lag 0	74.491	4.339	17.168	0.000
	MarHDD	Lag 0	91.609	6.637	13.803	0.000
	AprHDD	Lag 0	77.303	13.924	5.552	0.000
	OctHDD	Lag 0	64.391	14.257	4.516	0.000
	NovHDD	Lag 0	66.317	5.129	12.929	0.000
	DecHDD	Lag 0	109.158	20.240	5.393	0.000
	EMP	Lag 0	163.342	12.628	12.935	0.000
	December	Lag 0	-35,041.006	16,061.163	-2.182	0.031

Variable	Definition
COM.PRICE	Missouri Commercial Natural Gas Price ($/Mcf)
JanHDD	Dummy Variable - January Heating Degree Days
FebHDD	Dummy Variable - February Heating Degree Days
MarHDD	Dummy Variable - March Heating Degree Days
AprHDD	Dummy Variable - April Heating Degree Days
OctHDD	Dummy Variable - October Heating Degree Days
NovHDD	Dummy Variable - November Heating Degree Days
DecHDD	Dummy Variable - December Heating Degree Days
EMP	Employment, (Ths.)
December	Dummy Variable - December

Correlation Matrix – TS_UPC

Variable	COM.PRICE	JanHDD	FebHDD	MarHDD	AprHDD	OctHDD	NovHDD	DecHDD	EMP	December
COM.PRICE	1.000	-0.234	-0.257	-0.220	-0.177	0.119	-0.054	-0.190	0.136	-0.187
JanHDD	-0.234	1.000	-0.094	-0.094	-0.091	-0.087	-0.089	-0.090	-0.024	-0.092
FebHDD	-0.257	-0.094	1.000	-0.092	-0.089	-0.085	-0.087	-0.088	-0.062	-0.089
MarHDD	-0.220	-0.094	-0.092	1.000	-0.089	-0.085	-0.087	-0.088	-0.006	-0.090
AprHDD	-0.177	-0.091	-0.089	-0.089	1.000	-0.083	-0.084	-0.086	-0.008	-0.087
OctHDD	0.119	-0.087	-0.085	-0.085	-0.083	1.000	-0.081	-0.082	0.003	-0.083
NovHDD	-0.054	-0.089	-0.087	-0.087	-0.084	-0.081	1.000	-0.084	0.033	-0.085
DecHDD	-0.190	-0.090	-0.088	-0.088	-0.086	-0.082	-0.084	1.000	0.022	0.985
EMP	0.136	-0.024	-0.062	-0.006	-0.008	0.003	0.033	0.022	1.000	0.032
December	-0.187	-0.092	-0.089	-0.090	-0.087	-0.083	-0.085	0.985	0.032	1.000

ACF/PACF Values – TS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_UPC - Model	ACF	0.061	0.055	0.010	-0.091	0.016	0.000	0.067	0.074	0.060	-0.086	0.095	0.078
	SE	0.090	0.090	0.090	0.090	0.091	0.091	0.091	0.092	0.092	0.092	0.093	0.094
	SE x 2	0.180	0.180	0.181	0.181	0.182	0.182	0.182	0.183	0.184	0.185	0.186	0.188

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_UPC - Model	PACF	0.061	0.052	0.004	-0.095	0.026	0.008	0.067	0.057	0.050	-0.104	0.114	0.087
	SE	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090	0.090
	SE x 2	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180	0.180

Appendix 4.11: Residential Service Customers (RES_CUS) – West Service Area

Model Statistics – RES_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
RES_CUS-Model	13	0.970	0.970	2,773.492	0.326	100	2.100	0.650

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
RES_CUS-Model	AR1	Lag 1	0.650	0.103	6.276	0.000
	AR2	Lag 2	0.344	0.105	3.292	0.001
	HH	Lag 0	1199.674	49.206	24.380	0.000
	January	Lag 0	11,026.941	917.670	12.016	0.000
	February	Lag 0	11,688.706	956.085	12.226	0.000
	March	Lag 0	13,398.707	972.019	13.784	0.000
	April	Lag 0	11,877.123	959.808	12.374	0.000
	May	Lag 0	9,394.770	953.197	9.856	0.000
	June	Lag 0	5,760.623	825.593	6.978	0.000
	July	Lag 0	2,663.312	730.834	3.644	0.000
	November	Lag 0	3,579.532	731.073	4.896	0.000
	December	Lag 0	6,937.429	859.222	8.074	0.000
	D_May2017	Lag 0	-16,656.663	1,860.096	-8.955	0.000
	D_Sep2018	Lag 0	-18,705.698	1,757.613	-10.643	0.000
	D_Dec2018	Lag 0	-14,266.504	1,874.870	-7.609	0.000

Variable	Definition
HH	Number of Households: Total, (Ths.)
January	Dummy Variable - January
February	Dummy Variable - February
March	Dummy Variable - March
April	Dummy Variable - April
May	Dummy Variable - May
June	Dummy Variable - June
November	Dummy Variable - November
December	Dummy Variable - December
D_May2017	Dummy Variable - May 2017
D_Sep2018	Dummy Variable - September 2018
D_Dec2018	Dummy Variable - December 2018

Correlation Matrix – RES_CUS

Variable	HH	January	February	March	April	May	June	July	November	December	D_May2017	D_Sep2018	D_Dec2018
HH	1.000	-0.043	-0.029	-0.015	-0.001	-0.026	-0.014	-0.003	0.037	0.047	-0.043	0.052	0.111
January	-0.043	1.000	-0.099	-0.099	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093	-0.032	-0.032	-0.032
February	-0.029	-0.099	1.000	-0.099	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093	-0.032	-0.032	-0.032
March	-0.015	-0.099	-0.099	1.000	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093	-0.032	-0.032	-0.032
April	-0.001	-0.099	-0.099	-0.099	1.000	-0.093	-0.093	-0.093	-0.093	-0.093	-0.032	-0.032	-0.032
May	-0.026	-0.093	-0.093	-0.093	-0.093	1.000	-0.087	-0.087	-0.087	-0.087	0.341	-0.030	-0.030
June	-0.014	-0.093	-0.093	-0.093	-0.093	-0.087	1.000	-0.087	-0.087	-0.087	-0.030	-0.030	-0.030
July	-0.003	-0.093	-0.093	-0.093	-0.093	-0.087	-0.087	1.000	-0.087	-0.087	-0.030	-0.030	-0.030
November	0.037	-0.093	-0.093	-0.093	-0.093	-0.087	-0.087	-0.087	1.000	-0.087	-0.030	-0.030	-0.030
December	0.047	-0.093	-0.093	-0.093	-0.093	-0.087	-0.087	-0.087	-0.087	1.000	-0.030	-0.030	0.341
D_May2017	-0.043	-0.032	-0.032	-0.032	-0.032	0.341	-0.030	-0.030	-0.030	-0.030	1.000	-0.010	-0.010
D_Sep2018	0.052	-0.032	-0.032	-0.032	-0.032	-0.030	-0.030	-0.030	-0.030	-0.030	-0.010	1.000	-0.010
D_Dec2018	0.111	-0.032	-0.032	-0.032	-0.032	-0.030	-0.030	-0.030	-0.030	0.341	-0.010	-0.010	1.000

ACF/PACF Values – RES_CUS

		Residual ACF											
Model		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
RES_CUS - Model	ACF	-0.050	0.060	0.083	-0.007	-0.036	0.053	0.052	-0.029	-0.043	0.037	-0.041	0.013
	SE	0.100	0.100	0.101	0.101	0.101	0.101	0.102	0.102	0.102	0.102	0.102	0.103
	SE x 2	0.200	0.200	0.202	0.202	0.202	0.202	0.204	0.204	0.204	0.204	0.204	0.206

		Residual PACF											
Model		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
RES_CUS - Model	PACF	-0.050	0.058	0.089	-0.002	-0.047	0.042	0.064	-0.022	-0.064	0.026	-0.021	0.017
	SE	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	SE x 2	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200

Appendix 4.12: Residential Service Use Per Customer (RES_UPC) – West Service Area

Model Statistics – RES_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
RES_UPC-Model	10	0.998	0.998	2.698	5.575	100	7.042	0.970

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
RES_UPC-Model	RES_UPC	Constant	7.165	1.810	3.958	0.000
	AR1	Lag 1	0.300	0.102	2.946	0.004
	AR4	Lag 4	-0.271	0.105	-2.586	0.011
	RES.PRICE1	Lag 0	-0.374	0.071	-5.288	0.000
	HDD	Lag 0	0.135	0.002	78.966	0.000
	January	Lag 0	6.242	1.203	5.190	0.000
	February	Lag 0	4.556	1.052	4.332	0.000
	May	Lag 0	6.932	1.270	5.457	0.000
	June	Lag 0	12.032	1.473	8.171	0.000
	July	Lag 0	13.857	1.438	9.639	0.000
	August	Lag 0	15.926	1.470	10.836	0.000
	September	Lag 0	13.201	1.350	9.775	0.000
	D_Oct2023_Apr2024	Lag 0	-5.050	1.279	-3.949	0.000

Variable	Definition
RES.PRICE1	Missouri Residential Natural Gas Price Lagged 1 Month ($/Mcf)
HDD	Heating Degree Days
January	Dummy Variable - January
February	Dummy Variable - February
May	Dummy Variable - March
June	Dummy Variable - June
July	Dummy Variable - July
August	Dummy Variable - August
September	Dummy Variable - September
D_Oct2023_Apr2024	Dummy Variable - October 2023 through April 2024

Correlation Matrix – RES_UPC

Variable	RES.PRICE1	HDD	January	February	May	June	July	August	September	D_Oct2023_Apr2024
RES.PRICE1	1.000	-0.570	-0.275	-0.310	-0.200	-0.050	0.224	0.407	0.458	-0.017
HDD	-0.570	1.000	0.532	0.356	-0.231	-0.308	-0.309	-0.308	-0.290	0.138
January	-0.275	0.532	1.000	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093	0.051
February	-0.310	0.356	-0.099	1.000	-0.093	-0.093	-0.093	-0.093	-0.093	0.051
May	-0.200	-0.231	-0.093	-0.093	1.000	-0.087	-0.087	-0.087	-0.087	-0.081
June	-0.050	-0.308	-0.093	-0.093	-0.087	1.000	-0.087	-0.087	-0.087	-0.081
July	0.224	-0.309	-0.093	-0.093	-0.087	-0.087	1.000	-0.087	-0.087	-0.081
August	0.407	-0.308	-0.093	-0.093	-0.087	-0.087	-0.087	1.000	-0.087	-0.081
September	0.458	-0.290	-0.093	-0.093	-0.087	-0.087	-0.087	-0.087	1.000	-0.081
D_Oct2023_Apr2024	-0.017	0.138	0.051	0.051	-0.081	-0.081	-0.081	-0.081	-0.081	1.000

ACF/PACF Values – RES_UPC

Model		Residual ACF											
		1	2	3	4	5	6	7	8	9	10	11	12
RES_UPC - Model	ACF	0.057	-0.139	-0.051	-0.050	0.063	0.006	-0.014	-0.108	-0.050	-0.044	0.140	0.054
	SE	0.100	0.100	0.102	0.102	0.103	0.103	0.103	0.103	0.104	0.105	0.105	0.107
	SE x 2	0.200	0.201	0.204	0.205	0.205	0.206	0.206	0.206	0.209	0.209	0.209	0.213

Model		Residual PACF											
		1	2	3	4	5	6	7	8	9	10	11	12
RES_UPC - Model	PACF	0.057	-0.143	-0.035	-0.066	0.060	-0.020	0.000	-0.112	-0.033	-0.079	0.135	0.004
	SE	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	SE x 2	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200

Appendix 4.13: Small General Gas Service Customers (SGS_CUS) – West Service Area

Model Statistics – SGS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
SGS_CUS-Model	9	0.859	0.859	218.434	0.439	67	0.582	0.253

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
SGS_CUS-Model	SGS_CUS	Constant	22,453.279	1,491.703	15.052	0.000
	AR1	Lag 1	0.440	0.121	3.634	0.001
	GDP	Lag 0	0.121	0.025	4.939	0.000
	January	Lag 0	988.436	118.447	8.345	0.000
	February	Lag 0	998.314	120.196	8.306	0.000
	March	Lag 0	1,050.566	120.402	8.726	0.000
	April	Lag 0	897.899	119.153	7.536	0.000
	May	Lag 0	622.890	119.648	5.206	0.000
	June	Lag 0	256.591	105.164	2.440	0.018
	November	Lag 0	431.976	98.208	4.399	0.000
	December	Lag 0	518.829	113.416	4.575	0.000

Variable	Definition
GDP	Gross Domestic Product: Total, (Mil. Chained 2017 $)
January	Dummy Variable - January
February	Dummy Variable - February
March	Dummy Variable - March
April	Dummy Variable - April
May	Dummy Variable - May
June	Dummy Variable - June
November	Dummy Variable - November
December	Dummy Variable - December

Correlation Matrix – SGS_CUS

Variable	GDP	January	February	March	April	May	June	November	December
GDP	1.000	0.010	0.026	0.041	0.056	-0.039	-0.026	-0.022	-0.006
January	0.010	1.000	-0.098	-0.098	-0.098	-0.089	-0.089	-0.098	-0.098
February	0.026	-0.098	1.000	-0.098	-0.098	-0.089	-0.089	-0.098	-0.098
March	0.041	-0.098	-0.098	1.000	-0.098	-0.089	-0.089	-0.098	-0.098
April	0.056	-0.098	-0.098	-0.098	1.000	-0.089	-0.089	-0.098	-0.098
May	-0.039	-0.089	-0.089	-0.089	-0.089	1.000	-0.081	-0.089	-0.089
June	-0.026	-0.089	-0.089	-0.089	-0.089	-0.081	1.000	-0.089	-0.089
November	-0.022	-0.098	-0.098	-0.098	-0.098	-0.089	-0.089	1.000	-0.098
December	-0.006	-0.098	-0.098	-0.098	-0.098	-0.089	-0.089	-0.098	1.000

ACF/PACF Values – SGS_CUS

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
SGS_CUS - Model	ACF	-0.143	0.247	0.108	0.073	0.217	0.126	0.097	0.065	0.057	-0.116	0.212	-0.118
	SE	0.122	0.125	0.132	0.133	0.134	0.139	0.141	0.142	0.142	0.142	0.144	0.148
	SE x 2	0.244	0.249	0.263	0.266	0.267	0.278	0.281	0.283	0.284	0.285	0.287	0.297

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
SGS_CUS - Model	PACF	-0.143	0.232	0.182	0.060	0.185	0.159	0.044	-0.029	-0.027	-0.232	0.080	-0.069
	SE	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122
	SE x 2	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244

Appendix 4.14: Small General Gas Service Use Per Customer (SGS_UPC) – West Service Area

Model Statistics – SGS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
SGS_UPC-Model	10	0.992	0.992	14.741	10.767	67	1.655	0.563

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
SGS_UPC-Model	SGS_UPC	Constant	42.709	16.971	2.517	0.015
	COM.PRICE1	Lag 0	-3.056	1.054	-2.898	0.005
	HDD	Lag 0	0.379	0.011	33.243	0.000
	UNEMPRATE	Lag 0	-4.396	1.729	-2.542	0.014
	January	Lag 0	47.084	10.013	4.702	0.000
	February	Lag 0	36.773	8.722	4.216	0.000
	June	Lag 0	44.169	8.495	5.200	0.000
	July	Lag 0	49.556	8.681	5.708	0.000
	August	Lag 0	55.963	8.946	6.256	0.000
	September	Lag 0	42.997	8.862	4.852	0.000
	December	Lag 0	18.765	8.325	2.254	0.028

Variable	Definition
COM.PRICE1	Missouri Commercial Natural Gas Price Lagged 1 Month ($/Mcf)
HDD	Heating Degree Days
UNEMPRATE	Unemployment Rate, (%)
January	Dummy Variable - January
February	Dummy Variable - February
June	Dummy Variable - June
July	Dummy Variable - July
August	Dummy Variable - August
September	Dummy Variable - September
December	Dummy Variable - December

Correlation Matrix – SGS_UPC

Variable	COM.PRICE1	HDD	UNEMPRATE	January	February	June	July	August	September	December
COM.PRICE1	1.000	-0.366	-0.457	-0.174	-0.181	-0.030	0.160	0.277	0.290	-0.096
HDD	-0.366	1.000	-0.036	0.512	0.379	-0.314	-0.315	-0.314	-0.298	0.340
UNEMPRATE	-0.457	-0.036	1.000	-0.010	-0.009	0.009	0.012	0.016	0.020	-0.010
January	-0.174	0.512	-0.010	1.000	-0.098	-0.089	-0.089	-0.089	-0.089	-0.098
February	-0.181	0.379	-0.009	-0.098	1.000	-0.089	-0.089	-0.089	-0.089	-0.098
June	-0.030	-0.314	0.009	-0.089	-0.089	1.000	-0.081	-0.081	-0.081	-0.089
July	0.160	-0.315	0.012	-0.089	-0.089	-0.081	1.000	-0.081	-0.081	-0.089
August	0.277	-0.314	0.016	-0.089	-0.089	-0.081	-0.081	1.000	-0.081	-0.089
September	0.290	-0.298	0.020	-0.089	-0.089	-0.081	-0.081	-0.081	1.000	-0.089
December	-0.096	0.340	-0.010	-0.098	-0.098	-0.089	-0.089	-0.089	-0.089	1.000

ACF/PACF Values – SGS_UPC

		Residual ACF											
Model		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
SGS_UPC - Model	ACF	0.173	0.076	0.022	-0.103	-0.057	-0.028	-0.073	-0.091	-0.113	-0.144	-0.073	0.146
	SE	0.122	0.126	0.126	0.127	0.128	0.128	0.128	0.129	0.130	0.131	0.134	0.134
	SE x 2	0.244	0.252	0.253	0.253	0.256	0.256	0.256	0.258	0.260	0.263	0.267	0.268

		Residual PACF											
Model		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
SGS_UPC - Model	PACF	0.173	0.048	0.002	-0.114	-0.024	-0.001	-0.062	-0.081	-0.091	-0.110	-0.038	0.169
	SE	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122	0.122
	SE x 2	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244	0.244

Appendix 4.15: Large General Gas Service Customers (LGS_CUS) – West Service Area

Model Statistics – LGS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LGS_CUS-Model	11	0.879	0.879	38.940	0.878	100	7.595	0.978

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LGS_CUS-Model	AR1	Lag 1	0.867	0.052	16.652	0.000
	EMP	Lag 0	1.930	0.600	3.216	0.002
	GDP	Lag 0	0.011	0.005	2.210	0.030
	January	Lag 0	91.349	20.134	4.537	0.000
	February	Lag 0	96.575	21.044	4.589	0.000
	March	Lag 0	118.916	21.038	5.652	0.000
	April	Lag 0	95.624	20.127	4.751	0.000
	May	Lag 0	58.596	17.965	3.262	0.002
	June	Lag 0	39.008	13.740	2.839	0.006
	September	Lag 0	-39.884	10.408	-3.832	0.000
	November	Lag 0	43.904	13.761	3.190	0.002
	December	Lag 0	57.693	17.994	3.206	0.002

Variable	Definition
EMP	Employment, (Ths.)
GDP	Gross Domestic Product: Total, (Mil. Chained 2017 $)
January	Dummy Variable - January
February	Dummy Variable - February
March	Dummy Variable - March
April	Dummy Variable - April
May	Dummy Variable - May
June	Dummy Variable - June
September	Dummy Variable - September
November	Dummy Variable - November
December	Dummy Variable - December

Correlation Matrix – LGS_CUS

Variable	EMP	GDP	January	February	March	April	May	June	September	November	December
EMP	1.000	0.562	0.001	0.007	0.014	0.020	-0.027	-0.021	-0.002	0.009	0.015
GDP	0.562	1.000	-0.003	0.006	0.016	0.026	-0.040	-0.031	-0.001	0.019	0.030
January	0.001	-0.003	1.000	-0.099	-0.099	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093
February	0.007	0.006	-0.099	1.000	-0.099	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093
March	0.014	0.016	-0.099	-0.099	1.000	-0.099	-0.093	-0.093	-0.093	-0.093	-0.093
April	0.020	0.026	-0.099	-0.099	-0.099	1.000	-0.093	-0.093	-0.093	-0.093	-0.093
May	-0.027	-0.040	-0.093	-0.093	-0.093	-0.093	1.000	-0.087	-0.087	-0.087	-0.087
June	-0.021	-0.031	-0.093	-0.093	-0.093	-0.093	-0.087	1.000	-0.087	-0.087	-0.087
September	-0.002	-0.001	-0.093	-0.093	-0.093	-0.093	-0.087	-0.087	1.000	-0.087	-0.087
November	0.009	0.019	-0.093	-0.093	-0.093	-0.093	-0.087	-0.087	-0.087	1.000	-0.087
December	0.015	0.030	-0.093	-0.093	-0.093	-0.093	-0.087	-0.087	-0.087	-0.087	1.000

ACF/PACF Values – LGS_CUS

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_CUS - Model	ACF	0.054	-0.025	-0.014	-0.020	0.068	0.008	0.051	0.085	-0.100	-0.086	0.014	-0.072
	SE	0.100	0.100	0.100	0.100	0.100	0.101	0.101	0.101	0.102	0.103	0.104	0.104
	SE x 2	0.200	0.201	0.201	0.201	0.201	0.202	0.202	0.202	0.204	0.206	0.207	0.207

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_CUS - Model	PACF	0.054	-0.028	-0.011	-0.019	0.070	-0.001	0.054	0.082	-0.105	-0.075	0.022	-0.087
	SE	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	SE x 2	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200

Appendix 4.16: Large General Gas Service Use Per Customer (LGS_UPC) – West Service Area

Model Statistics – LGS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LGS_UPC-Model	2	0.976	0.976	188.767	8.736	100	6.191	0.955

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LGS_UPC-Model	AR1	Lag 1	0.518	0.089	5.802	0.000
	AR2	Lag 2	-0.179	0.066	-2.720	0.008
	AR10	Lag 10	0.128	0.054	2.396	0.019
	AR12	Lag 12	0.530	0.077	6.918	0.000
	HDD	Lag 0	2.847	0.118	24.190	0.000
	UNEMPRATE	Lag 0	-28.377	13.668	-2.076	0.041

Variable	Definition
HDD	Heating Degree Days
UNEMPRATE	Unemployment Rate, (%)

Correlation Matrix – LGS_UPC

Variable	HDD	UNEMPRATE
HDD	1.000	-0.001
UNEMPRATE	-0.001	1.000

ACF/PACF Values – LGS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_UPC - Model	ACF	-0.116	0.083	0.005	-0.028	-0.079	-0.030	-0.101	0.077	-0.070	-0.121	0.020	-0.044
	SE	0.100	0.101	0.102	0.102	0.102	0.103	0.103	0.104	0.104	0.105	0.106	0.106
	SE x 2	0.200	0.203	0.204	0.204	0.204	0.205	0.206	0.208	0.209	0.210	0.212	0.213

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LGS_UPC - Model	PACF	-0.116	0.070	0.022	-0.032	-0.090	-0.045	-0.098	0.064	-0.045	-0.158	-0.020	-0.037
	SE	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	SE x 2	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200

Appendix 4.17: Large Volume Service Customers (LVS_CUS) – West Service Area

Model Statistics – LVS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LVS_CUS-Model	3	0.722	0.722	1.794	4.760	25	1.353	0.492

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LVS_CUS-Model	AR1	Lag 1	0.843	0.109	7.697	0.000
	GDP	Lag 0	0.000	0.000	16.301	0.000
	December	Lag 0	-1.979	0.869	-2.277	0.033
	D_May2022	Lag 0	-3.552	1.231	-2.886	0.009

Variable	Definition
GDP	Gross Domestic Product: Total, (Mil. Chained 2017 $)
December	Dummy Variable - December
D_May2022	Dummy Variable - May 2022

Correlation Matrix –LVS_CUS

Variable	GDP	December	D_May2022
GDP	1.000	0.070	-0.270
December	0.070	1.000	-0.060
D_May2022	-0.270	-0.060	1.000

ACF/PACF Values – LVS_CUS

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LVS_CUS - Model	ACF	-0.140	0.156	-0.128	0.233	-0.291	-0.021	-0.103	-0.135	-0.021	-0.017	0.044	-0.289
	SE	0.200	0.204	0.209	0.212	0.222	0.237	0.237	0.238	0.242	0.242	0.242	0.242
	SE x 2	0.400	0.408	0.417	0.424	0.444	0.473	0.473	0.477	0.483	0.483	0.483	0.484

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LVS_CUS - Model	PACF	-0.140	0.139	-0.093	0.195	-0.238	-0.140	-0.021	-0.249	0.070	-0.032	-0.018	-0.292
	SE	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
	SE x 2	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400

Appendix 4.18: Large Volume Service Use Per Customer (LVS_UPC) – West Service Area

Model Statistics – LVS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
LVS_UPC-Model	6	0.880	0.880	14,717.684	16.378	25	4.195	0.877

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
LVS_UPC-Model	HDD	Lag 0	62.668	8.724	7.183	0.000
	EMP	Lag 0	113.368	9.376	12.092	0.000
	D_Mar2023	Lag 0	-79418.484	15398.999	-5.157	0.000
	D_Sep2023	Lag 0	-43,941.279	15,368.619	-2.859	0.010
	D_Dec2023	Lag 0	-87,462.722	15,509.287	-5.639	0.000
	D_Feb2024	Lag 0	73,894.443	15,237.974	4.849	0.000

Variable	Definition
HDD	Heating Degree Days
EMP	Employment, (Ths.)
D_Mar2023	Dummy Variable - March 2023
D_Sep2023	Dummy Variable - September 2023
D_Dec2023	Dummy Variable - December 2023
D_Feb2024	Dummy Variable - February 2024

Correlation Matrix – LVS_UPC

Variable	HDD	EMP	D_Mar2023	D_Sep2023	D_Dec2023	D_Feb2024
HDD	1.000	0.203	0.189	-0.208	0.221	0.131
EMP	0.203	1.000	0.108	0.216	0.153	0.088
D_Mar2023	0.189	0.108	1.000	-0.042	-0.042	-0.042
D_Sep2023	-0.208	0.216	-0.042	1.000	-0.042	-0.042
D_Dec2023	0.221	0.153	-0.042	-0.042	1.000	-0.042
D_Feb2024	0.131	0.088	-0.042	-0.042	-0.042	1.000

ACF/PACF Values – LVS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LVS_UPC - Model	ACF	-0.125	-0.215	0.049	0.073	-0.143	-0.078	0.040	-0.173	-0.093	0.075	0.148	-0.001
	SE	0.200	0.203	0.212	0.212	0.213	0.217	0.218	0.219	0.224	0.226	0.227	0.230
	SE x 2	0.400	0.406	0.424	0.425	0.427	0.435	0.437	0.437	0.448	0.451	0.453	0.461

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
LVS_UPC - Model	PACF	-0.125	-0.234	-0.014	0.031	-0.128	-0.104	-0.051	-0.236	-0.178	-0.094	0.059	0.036
	SE	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
	SE x 2	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400	0.400

Appendix 4.19: Transportation Service Customers (TS_CUS) – West Service Area

Model Statistics – TS_CUS

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
TS_CUS-Model	2	0.985	0.985	5.643	0.448	100	1.312	0.481

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
TS_CUS-Model	AR1	Lag 1	1.178	0.091	12.966	0.000
	AR2	Lag 2	0.314	0.151	2.086	0.040
	AR3	Lag 3	-0.496	0.092	-5.386	0.000
	GDP	Lag 0	0.008	0.001	12.365	0.000
	D_May2022_Apr2023	Lag 0	-2.854	1.528	-1.868	0.065

Variable	Definition
GDP	Gross Domestic Product: Total, (Mil. Chained 2017 $)
D_May2022_Apr2023	Dummy Variable - May 2022 through April 2023

Correlation Matrix – TS_CUS

Variable	GDP	D_May2022_Apr2023
GDP	1.000	0.372
D_May2022_Apr2023	0.372	1.000

ACF/PACF Values – TS_CUS

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_CUS - Model	ACF	-0.034	-0.078	0.160	-0.145	-0.011	0.038	-0.007	0.036	0.006	-0.027	-0.088	-0.040
	SE	0.100	0.100	0.101	0.103	0.105	0.105	0.105	0.105	0.105	0.106	0.106	0.106
	SE x 2	0.200	0.200	0.201	0.206	0.210	0.210	0.211	0.211	0.211	0.211	0.211	0.213

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_CUS - Model	PACF	-0.034	-0.079	0.155	-0.146	0.010	-0.010	0.041	0.018	0.005	-0.025	-0.096	-0.040
	SE	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	SE x 2	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200

Appendix 4.20: Transportation Service Use Per Customer (TS_UPC) – West Service Area

Model Statistics – TS_UPC

Model Statistics								
		Model Fit statistics					White's Test	
Model	Number of Predictors	Adjusted R-squared	R-squared	RMSE	MAPE	Observations	White Stat	Significance
TS_UPC-Model	6	0.924	0.924	5,260.458	5.288	100	0.219	0.104

ARIMA Model Parameters						
Model	Variable		Estimate	SE	t	Sig.
TS_UPC-Model	AR3	Lag 3	0.319	0.096	3.310	0.001
	AR7	Lag 7	-0.304	0.096	-3.170	0.002
	HDD	Lag 0	40.241	1.507	26.700	0.000
	EMP	Lag 0	142.928	2.059	69.430	0.000
	D_Jan2016	Lag 0	33,763.208	5,388.625	6.266	0.000
	D_Apr2020	Lag 0	-17,750.724	4,821.852	-3.681	0.000
	D_Sep2020_End	Lag 0	-8,547.187	1,116.157	-7.658	0.000
	D_Feb2022	Lag 0	15,934.853	4,899.203	3.253	0.002

Variable	Definition
HDD	Heating Degree Days
EMP	Employment, (Ths.)
D_Jan2016	Dummy Variable - January 2016
D_Apr2020	Dummy Variable - April 2020
D_Sep2020_End	Dummy Variable - September 2020 through the End of the Forecast Period
D_Feb2022	Dummy Variable - February 2022

Correlation Matrix – TS_UPC

Variable	HDD	EMP	D_Jan2016	D_Apr2020	D_Sep2020_End	D_Feb2022
HDD	1.000	0.005	0.178	-0.007	0.017	0.133
EMP	0.005	1.000	0.016	-0.199	-0.044	-0.005
D_Jan2016	0.178	0.016	1.000	-0.010	-0.089	-0.010
D_Apr2020	-0.007	-0.199	-0.010	1.000	-0.089	-0.010
D_Sep2020_End	0.017	-0.044	-0.089	-0.089	1.000	0.113
D_Feb2022	0.133	-0.005	-0.010	-0.010	0.113	1.000

ACF/PACF Values – TS_UPC

Residual ACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_UPC - Model	ACF	0.161	0.186	-0.037	-0.059	0.025	0.027	0.001	-0.095	0.061	-0.085	0.162	0.100
	SE	0.100	0.103	0.106	0.106	0.106	0.106	0.106	0.106	0.107	0.108	0.108	0.111
	SE x 2	0.200	0.205	0.212	0.212	0.213	0.213	0.213	0.213	0.215	0.215	0.217	0.221

Residual PACF													
Model		1	2	3	4	5	6	7	8	9	10	11	12
TS_UPC - Model	PACF	0.161	0.164	-0.094	-0.076	0.073	0.038	-0.039	-0.111	0.118	-0.073	0.146	0.084
	SE	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
	SE x 2	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200