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April 4, 2023

ELECTRONIC FILING

Mr. Adam J. Teitzman, Commission Clerk
Office of Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: Docket 20230023-GU, Petition for Rate Increase by Peoples Gas System, Inc.

Dear Mr. Teitzman:

Attached for filing on behalf of Peoples Gas System, Inc. in the above-referenced docket is the Direct Testimony of Eric Fox and Exhibit No. EF-1.

Thank you for your assistance in connection with this matter.

(Document 9 of 18)

Sincerely,

J. Jeffry Wahlen

cc: Charles J. Rehwinkel, Public Counsel
Jon Moyle, FIPUG
Major Thompson, OGC
Ryan Sandy, OGC

JJW/ne
Attachment

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 20230023-GU

IN RE: PETITION FOR RATE INCREASE
BY PEOPLES GAS SYSTEM, INC.

PREPARED DIRECT TESTIMONY AND EXHIBIT
OF
ERIC FOX

ON BEHALF OF
PEOPLES GAS SYSTEM, INC.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED DIRECT TESTIMONY

OF

ERIC FOX

ON BEHALF OF PEOPLES GAS SYSTEM, INC.

Q. Please state your name, address, occupation and employer.

A. My name is Eric Fox. My business address is 20 Park Plaza, Suite 428, Boston, Massachusetts 02116. I am employed by Itron, Inc.

Q. Please describe your duties and responsibilities in that position.

A. I am Director, Forecast Solutions, where I am responsible for supporting utilities, ISOs, and transmission companies' sales and energy forecasting requirements. My work also includes providing forecast and modeling training, supporting Itron's Energy Forecasting Group (EFG), providing regulatory support, and managing the Boston office forecasting group.

Q. Please provide a brief outline of your educational background, work, and regulatory experience.

A. I received my Master of Arts in Economics from San Diego State University in 1984 and my Bachelor of Arts in Economics from San Diego State University in 1981. While attending graduate school, I worked for Regional Economic Research, Inc. (“RER”) as an SAS programmer. After graduating, I worked as an Analyst in the Forecasting Department of San Diego Gas & Electric. I was later promoted to Senior Analyst in the Rate Department. I also taught statistics in the Economics Department of San Diego State University on a part-time basis.

In 1986, I was employed by RER as a Senior Analyst. I worked at RER for three years before moving to Boston and taking a position with New England Electric as a Senior Analyst in the Forecasting Group. I was later promoted to Manager of Load Research. In 1994, I left New England Electric to open the Boston office for RER, which was acquired by Itron in 2002.

Over the last 30 years, I have provided support for a wide range of utility operations and planning requirements, including forecasting, load research, weather normalization, rate design, financial analysis, and conservation and load management program evaluation. Clients include traditional integrated utilities, distribution companies, independent system operators, generation and power trading companies, and energy retailers. I have presented various forecasting and energy analysis topics at numerous forecasting conferences and forums. I also direct electric and gas forecasting workshops that focus on estimating econometric models and using statistical-based models for monthly sales and customer forecasting, weather normalization, and calculation of billed and unbilled sales. Over the last twenty years, I have provided forecast training to several hundred analysts from utilities and other industries.

In the area of forecasting, I have implemented and directed numerous forecasts to support utility financial planning and long-term resource planning. Recent works include developing and supporting an energy and demand forecast for AES Indiana's Integrated Resource Plan (IRP), developing a set of recommendations for improving the PJM system long-term load forecast, conducting commercial end-use analysis for the New York ISO (Independent System Operator), and assessing temperature trends and incorporating these trends in normalizing historical test-year sales for Sierra Pacific.

I have provided direct testimony as part of both rate and resource planning filings. My previous testimony includes supporting sales weather normalization for historical rate case test years and forecasts for rate case future test years and long-term resource planning. Further details of my work and regulatory experience are included in Document No. 2 of my Exhibit No. EF-1.

Q. Have you provided testimony before the Florida Public Service Commission?

A. Yes. I have provided testimony supporting the long-term forecast in Orlando Utilities Commission's 2006 determination of need for the Stanton Energy Center (Docket 20060155-EM), and review and assessment of Tampa Electric Company's 2013 base rate proceeding, (Docket 20130040-EI).

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

A. The purpose of my direct testimony is to support the Projected 2024 Test Year residential and small commercial sales for Peoples Gas System, Inc. ("Peoples" or the "company"). The forecast was completed in October 2022.

Q. Did you prepare any exhibits in support of your prepared direct testimony?

A. Yes. Exhibit EF-1 was prepared under my direction and supervision. My Exhibit consists of three documents entitled:

Document No. 1	List Of Minimum Filing Requirements Co-Sponsored By Eric Fox
Document No. 2	Resume - Work and Regulatory Experience
Document No. 3	Itron Forecast Report

The Itron Forecast Report was prepared under my direction and supervision.

Document No. 3 of my exhibit, the Itron Forecast Report, presents the company's gas forecast and includes an overview of gas sales trends, summary of the forecast results, a description of the modeling approach, and discussion about the forecast model assumptions.

Q. Please describe recent customer and sales trends.

A. Over the last five years Peoples' experienced strong customer growth with average residential customer growth of 4.3 percent and commercial average customer growth of 1.9 percent. This growth is the result of strong economic and population growth combined with expansion of the gas distribution system. As described in witness Richard K. Harper's prepared direct testimony, low interest rates helped to fuel a robust housing market coupled with strong state in-migration, business expansion, and second-home purchases. In addition to strong regional populations and household growth, customer growth was positively impacted by expansion of the gas distribution system to areas where gas was previously unavailable. In half of the company's Divisions, customer growth exceeded regional household growth.

Between 2017 and 2022 residential plus small commercial sales averaged 2.1 percent annual growth (i.e., 2.0 percent on a weather normal basis). Sales growth would have been significantly stronger if not for the impact of COVID-19. In 2020, Peoples experienced a sharp drop in sales as businesses closed and work and school activities shifted to homes. Small commercial sales fell 12.8 percent. Somewhat mitigating the impact, residential sales increased 5.3 percent. But as the small commercial classes account for roughly 75 percent of sales, the drop in commercial sales had a much larger overall impact than the increase in residential sales; total sales fell 8.8 percent (i.e., 10.5 percent weather normalized). Since the bottom of the pandemic, sales growth has recovered with strong customer growth (even through the pandemic, the company continued to add residential and commercial customers), with commercial average use trending back to pre-COVID-19 levels.

Q. Please summarize the forecast.

A. Over the next five years (i.e., 2023 through 2027) Peoples should see relatively strong sales growth driven by projected household and economic growth and COVID-19 sales recovery in the commercial sector. Moody's Analytics projects 1.7 percent state average annual household growth, up from 1.4 percent average growth over the last five years, and 1.4 percent annual employment growth, down from 1.9 percent as the prior-five-year average includes the COVID-19 2021 and 2022 job recovery.

Residential Sales. Over the next five years, on a normal weather basis, residential sales are expected to average 2.1 percent annual growth with annual customer growth of 3.4 percent. Weather-normal average use drops in 2023 as customer use trends back to pre-COVID-19 levels. Beyond 2023, average use declines on average 0.8 percent as gas end-use efficiencies continue to improve. Table 1 below shows residential sales, customers, and average use forecast with historical and weather-normalized data. Projected 2024 Test Year sales and customers are bolded.

Table 1: Residential Sales and Customer Forecast

Year	Sales (therms)	Cust	Avg Use	Sales WN	WN Avg Use
2017	76,267,938	338,068	226	84,104,940	249
2018	86,223,010	349,952	246	88,058,594	252
2019	85,073,881	361,488	235	89,856,569	249
2020	89,543,002	378,583	237	98,964,672	261
2021	100,985,239	398,211	254	103,351,372	260
2022	99,012,798	418,216	237	108,074,518	258
2023	109,311,311	434,943	251	109,311,311	251
2024	**111,861,046**	**449,661**	**249**	**111,861,046**	**249**
2025	114,274,553	464,150	246	114,274,553	246
2026	117,011,311	478,784	244	117,011,311	244
2027	119,868,776	493,489	243	119,868,776	243
Change					
2018	13.1%	3.5%	9.2%	4.7%	1.1%
2019	-1.3%	3.3%	-4.5%	2.0%	-1.2%
2020	5.3%	4.7%	0.5%	10.1%	5.2%
2021	12.8%	5.2%	7.2%	4.4%	-0.7%
2022	-2.0%	5.0%	-6.6%	4.6%	-0.4%
2023	10.4%	4.0%	6.2%	1.1%	-2.7%
2024	2.3%	3.4%	-1.0%	2.3%	-1.0%
2025	2.2%	3.2%	-1.0%	2.2%	-1.0%
2026	2.4%	3.2%	-0.7%	2.4%	-0.7%
2027	2.4%	3.1%	-0.6%	2.4%	-0.6%
17-22	**5.6%**	**4.3%**	**1.2%**	**5.2%**	**0.8%**
22-27	**3.9%**	**3.4%**	**0.6%**	**2.1%**	**-1.2%**

Projected 2024 Test Year residential sales are 111,861 thousand therms compared with 2022 year-end sales of 99,013 thousand therms. There is a large increase in 2023 sales as a result of the transition from below normal weather in 2022 to normal weather in 2023. On a weather normal basis, Projected 2024 Test Year sales are 3.5 percent higher than 2022 sales.

Commercial Sales. Commercial average use dropped significantly in 2020 because of the COVID-19 “work at home” mandate; normalized average use fell from 8,700 therms to slightly less than 7,600 therms. Average use has recovered since then and is expected to continue to recover with business operations trending back to pre-COVID-19 activity levels. Customer growth slows through the forecast period as it is tied to lower employment and residential customer growth projections. Table 2 below, shows commercial actual and forecasted sales.

Table 2: Small Commercial Sales and Forecast

Year	Sales (therms)	Cust	Avg Use	Sales WN	WN Avg Use
2017	290,069,504	34,225	8,475	297,678,163	8,698
2018	304,887,741	35,038	8,702	306,390,411	8,744
2019	304,290,965	35,563	8,557	309,299,409	8,697
2020	265,386,367	36,223	7,327	274,425,115	7,576
2021	298,524,407	36,809	8,110	300,705,456	8,169
2022	302,872,408	37,589	8,057	310,801,723	8,268
2023	316,844,060	38,313	8,270	316,844,060	8,270
2024	**330,390,281**	**38,929**	**8,487**	**330,390,281**	**8,487**
2025	338,834,799	39,482	8,582	338,834,799	8,582
2026	345,504,233	40,000	8,638	345,504,233	8,638
2027	351,037,107	40,530	8,661	351,037,107	8,661
Change					
2018	5.1%	2.4%	2.7%	2.9%	0.5%
2019	-0.2%	1.5%	-1.7%	0.9%	-0.5%
2020	-12.8%	1.9%	-14.4%	-11.3%	-12.9%
2021	12.5%	1.6%	10.7%	9.6%	7.8%
2022	1.5%	2.1%	-0.6%	3.4%	1.2%
2023	4.6%	1.9%	2.6%	1.9%	0.0%
2024	4.3%	1.6%	2.6%	4.3%	2.6%
2025	2.6%	1.4%	1.1%	2.6%	1.1%
2026	2.0%	1.3%	0.6%	2.0%	0.6%
2027	1.6%	1.3%	0.3%	1.6%	0.3%
17-22	**1.2%**	**1.9%**	**-0.7%**	**1.1%**	**-0.8%**
22-27	**3.0%**	**1.5%**	**1.5%**	**2.5%**	**0.9%**

Q. Please describe the overall forecasting approach.

A. A detailed summary of the forecast results, modeling approach, and model inputs are included in the Itron Forecast Report. To summarize, the forecast is based on a set of residential and small commercial customer and average use models estimated with historical billed sales and customer data. Models are estimated using linear regression and are specified to capture the impact of household and economic growth, weather, price, and end-use efficiency improvements on sales and customer growth. Separate models are estimated for each Peoples' service area and include residential and commercial customer models and residential and commercial average use models. Residential and small commercial sales forecasts are derived as the product of the customer and average use forecast.

Monthly average use models are estimated over the period January 2014 through July 2022, and monthly customer models from January 2016 through July 2022. Customer models are estimated using a shorter estimation period (than the average use models) to give more weight to the strong growth experienced over the last seven years; this period corresponds with significant expansion of the gas distribution system.

Q. Please describe how the customer models are developed.

A. Customer forecasts are based on Woods & Poole Metropolitan Statistical Area ("MSA") historical and forecasted household and employment data. MSA forecasts are mapped to Divisions based on the Division’s location. For model estimation, the Woods & Poole household and employment series are converted from an annual to monthly data series. The household forecast is used in the residential customer model and employment in the commercial models. In some Divisions, the relationship between commercial customer growth and employment is statistically weak or insignificant; in these Divisions predicted residential customers are used to drive commercial customer growth as there is a strong correlation between residential and small commercial customer growth. The initial customer forecasts were based on the Woods & Poole June 2022 forecast. The forecast was updated in October 2022 to reflect Moody Analytics’ slightly lower state household and employment projections.

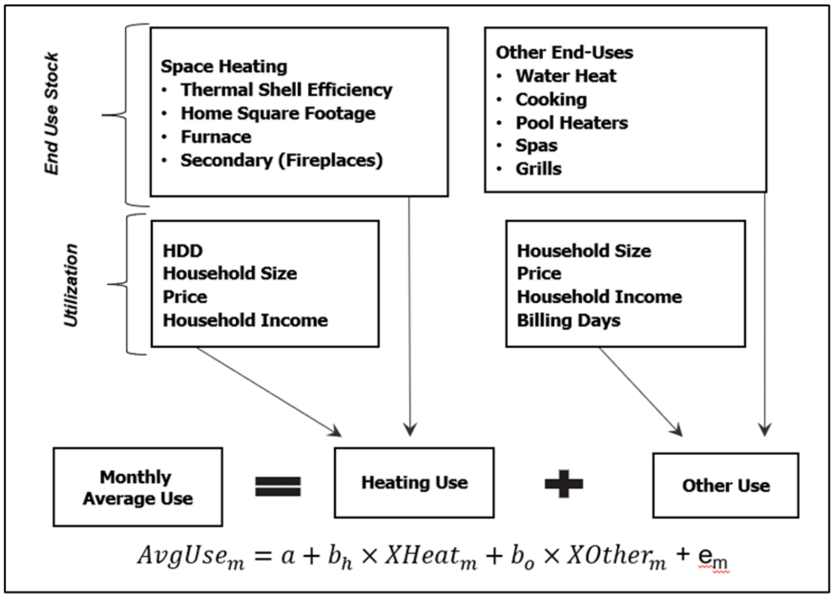
Customer models also include auto-regressive terms. Auto-regressive terms use prior customer growth to partly explain future customer growth. These terms capture variation in customer growth around the household and employment trend lines and account for customer growth that exceeds near-term household and employment forecasts.

Q. Please describe how the average use models were developed.

A. Average use models are estimated for both residential and small commercial customer classes using what is known as a Statistically Adjusted End-Use (SAE) model. The SAE model is an end-use framework that relates monthly average use to heating (XHeat variable) and non-heating end-use (XOther variable) gas requirements. Linear regression is used to estimate the relationship between average use and XHeat and XOther; the estimated model coefficients effectively calibrate or statistically adjust the XHeat and XOther to actual customer usage. XHeat and XOther include structural drivers (thermal shell and end-use efficiency and saturation trends) as well as variables that capture short-term and long-term monthly utilization (heating degree-days (HDD), number of days in the billing period, price, household size and income in the residential model, and employment and gross state product in the commercial model).

Figure 1 below, shows the residential SAE model structure.

__Figure 1: Residential SAE Model__



The commercial SAE model is similar. Monthly binary variables and auto-regressive terms are also included in the model specification to account for seasonal variation not captured by the XHeat and XOther model variables.

Q. How are the thermal shell and end-use intensity trends derived?

A. The thermal shell index (which captures improvements in housing structure efficiency gains) and end-use intensity trends (which captures both efficiency and saturation) are derived from the U.S. Energy Information Administration's (EIA) Annual Energy Outlook (AEO). Each year, Itron extracts the underlying end-use data (*e.g.*, end-use consumption, number of units, average stock efficiency, number of households, building shell efficiency index, and square footage) and constructs end-use intensity estimates (*i.e.*, end-use consumption per household in the residential sector and use per square foot in the commercial sector) that are organized in Excel spreadsheets and provided to Itron's Energy Forecasting Group ("EFG") members. The forecast is based on EIA's 2022 South Atlantic Census Division outlook.

Q. How are Heating Degree Days ("HDD") calculated?

A. HDDs are used to account for heating-related gas use and are based on the average daily temperature. HDD are positive when average daily temperature is below a defined temperature reference point. The NOAA published HDD is based on 65 degrees. If the average temperature is 55 degrees, the HDD would have a value of 10 (65 degrees – 55 degrees). The calendar-month HDD is the sum of the daily HDD. For most utilities, electric and gas heating use isn't visible until the average daily temperature falls below 60 degrees; weather normalization and forecast models can be improved using HDD with a base of 60 degrees rather than 65 degrees. For Peoples, Jacksonville is the only service area where this is true. In the rest of Florida, heating-related gas use is starting at

65 degrees. In many of the central and southern divisions, heating-related use is visible at even higher temperature breakpoints; heating at these breakpoints is likely capturing pool and spa gas heating. For all but Jacksonville, gas heating is relatively small with residential heating accounting for 25 percent to 40 percent of gas use across the divisions. In comparison, residential customers in the South Atlantic Census Division use roughly 70 percent of gas for space heating. Jacksonville residential heating use is close to that of the Census Division. In the commercial sector, heating use is relatively small accounting for 5 to 20 percent of gas use across the Divisions. In comparison, gas heating accounts for roughly a third of the South Atlantic Census Division commercial gas use.

Forecasted HDDs are based on a 20-year normal. Normal HDDs are calculated from daily average temperature data from January 1, 2002, through December 31, 2021. Daily average temperatures are first used to calculate daily HDDs. The daily HDDs are then averaged by date – all the January 1^{st} HDD are averaged, January 2^{nd} HDD are averaged, etc., through December 31^{st} across all twenty years. Actual and normal daily degree-days are then weighted based on the meter read schedule and summed across the billing month period. This results in monthly cycle-weighted HDDs that are consistent with the monthly billed sales data.

Q. What are the economic variables and sources used in constructing the average use model variables?

A. The economic variables incorporated into the XHeat and XOther model variables are from Moody's Analytics' October 2022 state forecast. In the residential model this includes average household income and household size. In the commercial model, the economic drivers include employment and economic output (gross state product). Moody's Analytics' forecast is used in the average use models, rather than Woods & Poole, as Moody's Analytics provides forecasts at lower-level periodicity (quarterly vs. annual basis) and more frequently updates the forecast. The lower-level periodicity allows the model to better capture short-terms sales variation tied to economic activity. The advantage of the Woods & Poole data is that it provides reasonably priced MSA level forecasts allowing us to better capture differences in customer growth across divisions.

Q. Do the average use models address the impacts of the COVID-19 pandemic?

A. Yes. Residential and commercial COVID-19 impact variables are also included in the average use models. The COVID-19 variables are based on Google Mobility Data which measures activity around generalized locations including homes, workplace, and retail. The COVID-19 model variables are statistically significant. For the forecast we assume that the COVID-19 variables trend back to the March 2020 baseline.

Q. How is the sales and customer forecast used?

A. Residential and small commercial customer and sales forecasts are used in estimating the Projected 2024 Test Year revenues at current rates. Residential sales and customers are allocated to three residential rate schedules and small commercial sales are allocated to four commercial rate schedules based on historical rate class shares of sales and customers. Rate-class level customer and sales forecasts are then priced at current tariff levels. A description of the base revenue forecast and revenue estimates are included in the prepared direct testimony of Peoples' witness Rachel B. Parsons.

SUMMARY

Q. Please summarize your prepared direct testimony.

A. Given economic and population projections coupled with COVID-19 recovery in the commercial sector, we expect to see continued strong growth in gas sales led by new gas customer connections. By 2024, Peoples is expected to add over 31,000 new residential customers and 1,300 commercial customers over 2022. There is likely to be near-term COVID-19 resets in both commercial (higher) and residential (lower) use as home and business activity recovers from the pandemic. Over the long term residential average use will decline, and commercial average use will slow as improvements in end-use efficiency outweigh positive economic impact on usage.

Q. Are Peoples' forecasts of customers and therms by rate class for the projected test year ending December 31, 2024, appropriate?

A. Yes. The customer and SAE average use models are theoretically and statistically strong as measured by model coefficient and overall model fit statistics; model statistics and results are included in the Itron Forecast Report. Forecast drivers are developed from highly regarded sources including Moody's Analytics, Woods & Poole, The Energy Information Agency, and Google Mobility Data.

The SAE model is based on an end-use modeling framework that has been adopted by numerous utilities in the U.S. and Canada for both electric and gas demand forecasting. SAE models have been used and accepted by state regulatory commissions across the country in support of both rate cases and Integrated Resource Plans. In Florida, the SAE modeling approach is used by Tampa Electric Company, Duke Energy, Orlando Utilities Commission, and Lakeland Electric and has been accepted by the Florida Public Service Commission in both resource-related and rate case filings.

The strength of the SAE model is that it captures both long-term structural trends (e.g., end-use saturation and efficiency trends) as well as the impact and interaction of weather conditions, number of billing days, price, household size, and economic activity. Itron has been supporting the SAE models for over 25 years through Itron's Energy Forecasting Group, model training, presentations, and participation in regulatory hearings.

The SAE average use models, coupled with customer models based on regional household and employment projections, results in Projected 2024 Test Year sales that are reasonable and consistent with historical customer and usage trends.

Q. Does this conclude your prepared direct testimony?

A. Yes.

EXHIBIT

OF

ERIC FOX

ON BEHALF OF PEOPLES GAS SYSTEM, INC.

Table of Contents

List of Minimum Filing Requirements
Co-Sponsored by Eric Fox

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G-2	P. 8	Projected Test Year - Revenues And Cost Of Gas
G-6		Projected Test Year - Major Assumptions

Resume and Project Experience

Eric Fox

Director, Forecast Solutions
Itron, Inc.

Education

- M.A. in Economics, San Diego State University, 1984
- B.A. in Economics, San Diego State University, 1981

Employment History

- Director, Forecasting Solutions, Itron, Inc. 2002 - present
- Vice President, Regional Economic Research, Inc. (now part of Itron, Inc.), 1999 – 2002
- Project Manager, Regional Economic Research, Inc., 1994 – 1999
- New England Electric Service Power Company, 1990 – 1994
  Positions Held:
  - Principal Rate Analyst, Rates
  - Coordinator, Load Research
  - Senior Analyst, Forecasting
- Senior Economist, Regional Economic Research, Inc., 1987 – 1990
- San Diego Gas & Electric, 1984 – 1987
  Positions Held:
  - Senior Analyst, Rate Department
  - Analyst, Forecasting and Evaluation Department
- Instructor, Economics Department, San Diego State University, 1985 – 1986

Experience

Mr. Eric Fox is Director, Forecasting Solutions with Itron where he directs electric and gas analytics and forecasting projects and manages Itron's Boston office. Mr. Fox has over 30 years of forecasting experience with expertise in financial forecasting and analysis, long-term energy and demand forecasting, and load research.

Mr. Fox and his team focus on developing and implementing forecast applications to streamline and support utility business operations. This work includes directing development and implementation of Itron's integrated sales and revenue forecasting application (*ForecastManager.net*) and load research system (*LRS*). He also engages in forecast support work, which includes developing energy and demand forecasts for financial and long-term planning, billed and unbilled sales and revenue analysis, weather normalization for monthly sales variance analysis and rate case support, and analyzing technology and economic trends and their impact on long-term energy usage.

Mr. Fox has provided expert testimony and support in rate and regulatory related issues. This support has included developing forecasts for IRP and rate filings, weather normalizing sales and demand for rate filing cost of service studies, providing rate case support and direct testimony and conducting forecast workshops with regulatory staff. He is one of Itron's primary forecast instructors. He provides forecast training through workshops sponsored by Itron, utility on-site training programs, and workshops held by other utility organizations.

Prior to joining RER/Itron, Mr. Fox supervised the load research group at New England Electric where he oversaw systems development, directed load research programs, and customer load analysis. He also worked in the Rate Department as a Principal Analyst where he was responsible for DSM rate and incentive filings, and related cost studies. The position required providing testimony in regulatory proceedings.

Projects, Reports, and Presentations

Commercial Data Development for Long-Term Forecasting and Electrification Study, NYISO, with Mike Russo, Oleg Moskatov, and Rich Simons, December 2022

Forecast Model Development and Training, ISO New England, with Mike Russo, November 2022

2022 Long-term Residential and Commercial Energy Intensity Trends Presentation, Itron Energy Forecasting Group, with Oleg Moskatov and Mike Russo, September 20th, 2022

2022 Model Review Report and Presentation, PJM, with Michael Russo, Dr. Stuart McMenamin, and Dr. Frank Monforte, September 2022

Modeling Climate Change, Itron Brownbag Presentation, with Mike Russo and Dr. Frank Monforte, July 12, 2022

Forecast Review and Presentation to the SRP Power Committee, Salt River Project, with Mark Quan, April 24, 2022

Cold Climate Heat Pump Study, Nova Scotia Power, July 2022, with Rich Simons

Long-Term Energy and Demand Outlook, Indiana Stakeholder Meeting, AES Indiana, with Mike Russo, January 24, 2022

Long-Term Energy and Demand Forecast, 2022 IRP, AES Indiana, with Mike Russo, December 2021

Delmarva Power & Light, Forecast Review, Delmarva Maryland, with Stuart McMenamin and Mike Russo, December 2021

Forecast Model Review and Recommendations, ISO New England, November 2021

Heat Pump Program Impact Study, Nova Scotia Power, with Rich Simons, August 2021

Sales, Customer, and Revenue Forecast Through 2040, Green Mountain Power Company, with Oleg Moskatov and Mike Russo, April 2021

Reacting to a Changing Environment: Trends in Estimated Load Impacts of COVID-19 Mitigation Policies, submitted to National Association of Regulatory Utility Commissioners, March 2021, with Frank Monforte, Ph.D.

Accounting for COVID-19 in the Sales Forecast, March 2021, Itron Brownbag Presentation, with Andy Sukenik, and Mike Russo

Long-Term Data Center Demand Analysis and Forecast, Salt River Project, March 2021, with Mike Russo

Temperature Trend Study, Puget Sound Energy, November 2020, with Rich Simons

Vermont Long-Term Energy and Demand Forecast, Vermont Electric Power Company, October 2020, with Oleg Moskatov and Mike Russo

IRP Forecast Support and Data Center Forecast, Dominion Energy, September 2020

Long-Term Temperature Trend Analysis and Workshop, NV Energy, August 2020, with Rich Simons

Sales and Revenue Forecast for 2020 Rate Case, with Mike Russo, Hydro Ottawa, March 2020

New York ISO Climate Impact Study: Phase 1 Long-Term Load Impact, New York ISO, December 2019, with Rich Simons, Oleg Moskatov, and Mike Russo

Cold Climate Heat Pump Study, Sample Design, December 2019, with Rich Simons, Nova Scotia Power

Long-Term Energy and Demand Forecast, *2020 IRP,* October 2019, with Mike Russo, Vectren (A CenterPoint Energy Company)

Fundamentals of Forecasting Workshop, October 2019, Washington DC

Development of Energy Efficiency Conservation Curves for Long-Term System Load Model, ISO New England, September 2019 with Mike Russo

Test-Year Weather Normalization and Filed Testimony, July 2019, with Oleg Moskotov, Liberty Utilities

Advanced Forecast Topics Workshop, Energy Forecasting Group 2019 Annual Meeting, April 2, 2019, Boston NA

*Long-Term Forecast Development and Modeling Worksho*p. Salt River Project, Tempe Arizona, March 26-27, 2019

Sales and Revenue Forecast for 2019 Rate Filing, with Oleg Moskatov and Mike Russo, Green Mountain Power Company, March 2019

Modeling Long-Term Peak Demand - Forecasting Workshop. ISO New England, December 19, 2018

Testimony and Supporting Sales Weather-Normalization for the 2018 Kansas Rate Case. Empire District Electric/Liberty Utilities, November 2018.

Load Research Training – Methods, Design, and LRS Applications. Colorado Springs Utilities. November 29-30, 2018

2018 Benchmark Survey – Energy Trends, Projections, and Methods. Electric Utility Forecaster Forum, November 13-14, 2018. Orlando, Florida

Forecasting Methods, Model Development, and Training. WEC Energy Group, Milwaukee WI, September 20 -21, 2018.

Development of Budget Sales and Customer Forecast Models, Report, and Forecast Training. Alectra Utilities, July 2018

Electricity Forecasting in a Dynamic Market. Presentation and Panel Participant, Organization of MISO States, Forecast Workshop & Spring Seminar, Des Moines Iowa, March 21 -23, 2018.

Load Research Methods and Results, IPL and Indiana Office of Utility Consumer Counselor (OUCC), March 12, 2018

Sales Weather Normalization to Support the IPL 2018 Rate Case, with Richard Simons, Indianapolis Power & Light, December 2017

Dominion Long-Term Electricity Demand Forecast Review. Dominion Energy Virginia, September 15, 2017.

Dominion Long-Term Electricity Demand Forecast Review. Dominion Energy Virginia, September 15, 2017.

Vermont Long-Term Energy and Demand Forecast, with Mike Russo and Oleg Moskatov, Presented to the Vermont State Forecast Committee, August 1, 2017

Utility Forecasting Trends and Approaches, with Rich Simons and Mike Russo, Presented to the Energy Information Administration, July 27, 2017

Sales and Revenue Forecast Delivery and Presentation, with Mike Russo, Indianapolis Power & Light, July 13, 2017

Forecasting Gas Demand When GDP No Longer Works, Southern Gas Association Gas Forecasters Forum, June13 to 17, Ft Lauderdale, Florida

Behind the Meter Solar Forecasting, with Rudy Bombien, Duke Energy, Electric Utility Forecaster Forum, May 3 to 5, 2017, Orlando, Florida

Advanced Forecast Training Workshop, with Mike Russo, EFG Meeting, Chicago Illinois, April 25th, 2017

Budget-Year Electric Sales, Customer, and Revenue Forecast, with Oleg Moskatov and Mike Russo, Green Mountain Power Company, March 2017

Solar Load Modeling, Statistic Analysis, and Software Training, Duke Energy, March 1 to 3, 2017

Development of a Multi-Jurisdictional Electric Sales and Demand Forecast Application, with Mike Russo and Rich Simons, Wabash Valley Power Cooperative, January 2017,

Regulatory Experience

June 2022: Provided testimony and supporting sales and weather-normalization for the 2022 Sierra Pacific Power Company (NV Energy) general rate case.

February 2022: Provided testimony and supporting sales and weather-normalization for the 2022 Oklahoma rate case. Empire District Electric/Liberty Utilities.

May 2021: Provided testimony and supporting sales and weather-normalization for the 2021 Missouri rate case. Empire District Electric/Liberty Utilities.

June 2020: Provided testimony and supporting analysis of weather trends and analysis as part of Nevada Power’s 2020 general rate review.

July 2019: Provided testimony and supporting sales and weather-normalization for the 2020 Missouri rate case. Empire District Electric/Liberty Utilities.

November 2018: Provided testimony and supporting sales weather-normalization for the 2018 Kansas rate case. Empire District Electric/Liberty Utilities.

December 2017: Provided testimony and support related to sales weather-normalization for the 2018 rate case. Indianapolis Power & Light.

October 2017: Provided testimony and support for the Dominion Energy Virginia 2017 Integrated Resource Plan

Jan 2015 – Dec 2016: Assisted Power Stream with developing and supporting the 2015 rate case sales and customer forecast before the Ontario Energy Board

Jan 2015 – Dec 2016: Assisted Hydro Ottawa with developing and supporting the 2015 rate case sales and customer forecast before the Ontario Energy Board

September 2015: Provided testimony and support related to sales weather-normalization for the 2015 rate case. Indianapolis Power & Light

October 2014 – July 2015: Assisted Entergy Arkansas with developing and supporting weather adjusted sales and demand estimates for the 2015 rate case.

September 2014: Assisted with developing the budget sales and revenue forecast and provided regulatory support related Horizon Utilities 2014 rate filing before the Ontario Energy Board

August 2013: Reviewed and provided testimony supporting Sierra Pacific Power Company's forecast for the 2013 Energy Supply Plan before the Nevada Public Utilities Commission

July 2013: Reviewed and provided testimony supporting Tampa Electric's forecast for the 2013 rate case before the Florida Public Service Commission

March 2013: Reviewed and provided testimony supporting Entergy Arkansas sales weather normalization for the 2013 rate filing before the Arkansas Public Service Commission

June 2012: Reviewed and provided testimony supporting Nevada Power Company's 2012 Long-Term Energy and Demand Forecast before the Nevada Public Utilities Commission

May 2010: Provided testimony supporting Sierra Pacific Power's Company's 2010 Long-Term Energy and Demand Forecast before the Nevada Public Utilities Commission

March 2010: Assisted with development of the IRP forecast and provided testimony supporting Nevada Power Company's 2010 Long-Term Energy and Demand Forecast before the Nevada Public Utilities Commission

August 2009: Reviewed Entergy Arkansas weather normalization and provided supporting testimony before the Arkansas Public Service Commission

February 2006: Developed long-term forecast and provided testimony to support Orlando Utilities Commission *Need for PowerApplication* before the Florida Public Service Commission

July 2005: Developed sales and customer forecast and provided testimony to support Central Hudson's electric rate filing before the New York Public Service Commission

April 2004: Held Weather Normalization Workshop with the Missouri Public Service Commission Staff

July 2001: Conducted workshop on long-term forecasting with the Colorado Public Utilities Commission Staff

2023 RESIDENTIAL AND SMALL COMMERCIAL GAS SALES AND CUSTOMER FORECAST REPORT

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February 24, 2023

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1 OVERVIEW

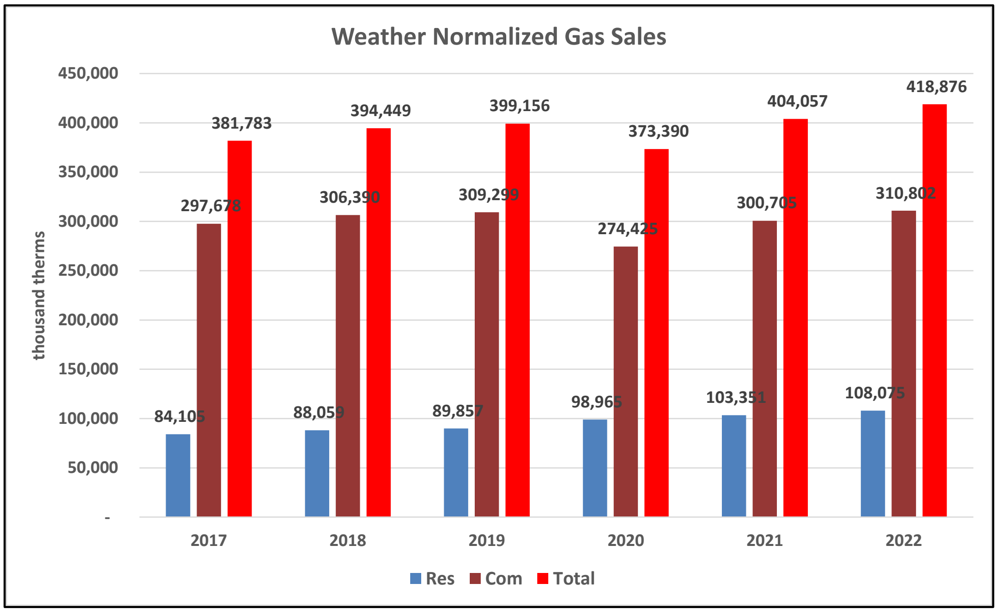
Itron Inc, was contracted by TECo People's Gas Systems (PGS) to develop the 2023 and 2024 budget forecast for the residential and small commercial revenue classes. In addition to supporting the 2023 and 2024 budget plan, the forecast is also being submitted as part of the 2023 general rate case filing for the 2024 test-year period. Monthly sales and customers are forecasted over the period January 2023 through December 2027. The forecast is based on sales and customer data through July 2022 and reflects Moody's Analytics October 2022 economic outlook.

Separate forecasts are developed for each of the 14 PGS service divisions for the residential and small commercial customer classes. Forecasts are based on monthly customer and average use linear regression models. The sales forecast is generated as the product of the customer and average use forecasts. Key model drivers include number of regional households and employment in the customer models and household income, employment, GDP, HDD, price, and end-use intensity trends in the average use models. Average use models also include a COVID shift variable based on Google's mobility data. Overall, we are projecting relatively strong gas sales growth driven largely by customer growth, and in the commercial sector, a continuing positive trend back to pre-COVID business activity. Customers are expected to average 3.2% annual growth with weather-normalized sales growth averaging 2.4%. over the next five years. Expected improvements in gas end-use efficiency counter some of the sales growth with expected average use declining roughly 0.8% per year. With Woods & Poole and Moody Analytics projecting relatively strong economic and household growth residential sales average 2.1% annual growth and commercial sales 2.5% average annual growth.

1.1 SYSTEM SALES GROWTH

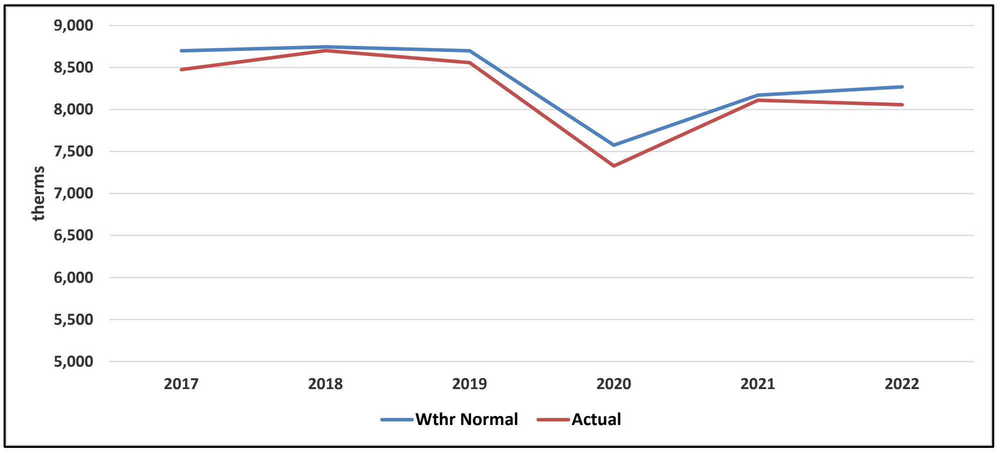
By 2022, total residential and small commercial weather-normalized gas sales reached 418,876 thousand therms compared with normalized sales of 381,783 in 2017. Even with the large COVID-related drop in 2020 commercial sales, sales are up nearly 10% from 2017. **FIGURE 1** shows residential and commercial annual sales from 2017 through estimated 2022.

FIGURE 1: GAS SALES TRENDS



Business sales saw a significant decline in sales due to COVID while residential sales (though not as visible) saw an increase in sales. Given the relative size of the commercial sector (approximately 75% of sales), the net impact was a large decline in 2020 sales. The COVID impact is even more visible when looking at the commercial average use. **FIGURE 2** shows commercial average use between 2017 and 2022.

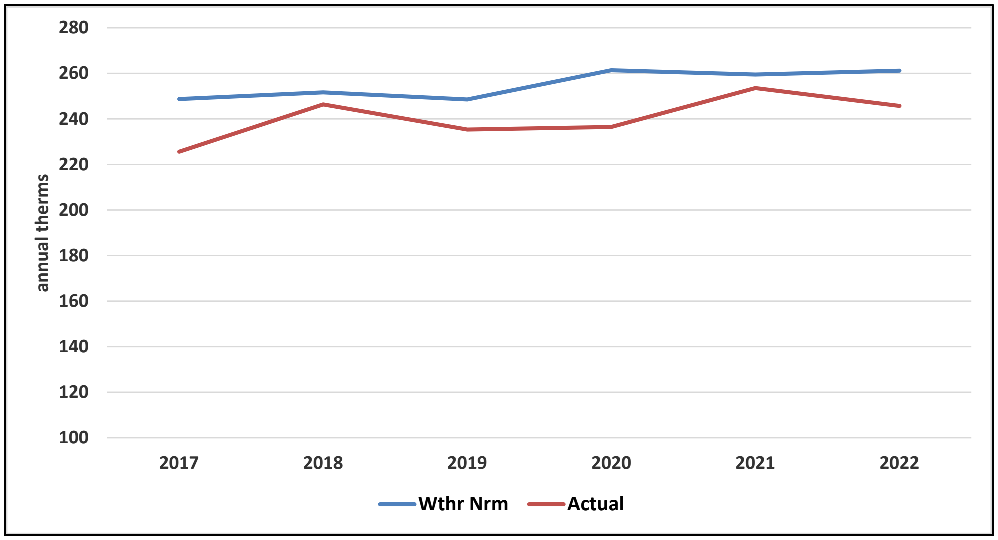
FIGURE 2: COMMERCIAL AVERAGE USE



In 2020, weather-normalized average use fell from roughly 8,600 therms to 7,500 therms. While there has been a significant recovery in gas use, given economic growth, we expect to trend closer to pre-COVID usage levels over the forecast period.

COVID had the opposite impact in the residential sector, contributing to a small positive impact in customer average use; we expect to see residential average use trend back down to pre-COVID levels with return to something closer to pre-COVID household activity. **FIGURE 3** shows residential average use.

FIGURE 3: RESIDENTIAL AVERAGE USE

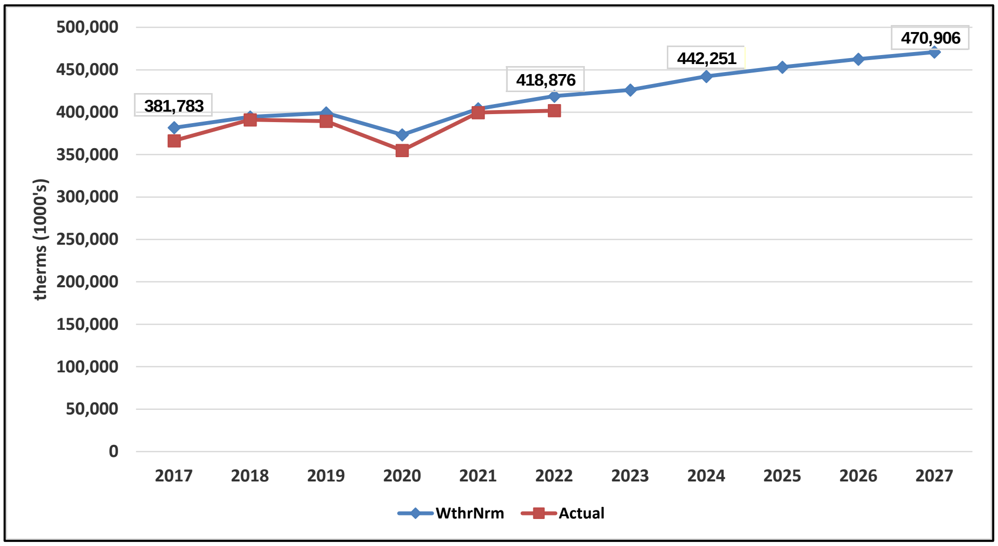


While there is little change in actual 2020 average use (compared with 2019), average use jumped 5.2% on a weather-normalized basis. Weather-normalized use is significantly higher than actual average use as the last five years have been much warmer than the 20-year normal weather.

1.2 SALES PROJECTIONS

The sales forecast is derived for residential and commercial revenue classes at the division level and then aggregated to the total system. We expect to see strong sales growth over the next five years, driven by strong customer growth, moderate economic growth, and commercial average use recovery from COVID-19. FIGURE 4 shows weather-normal and projected sales.

FIGURE 4: SALES FORECAST



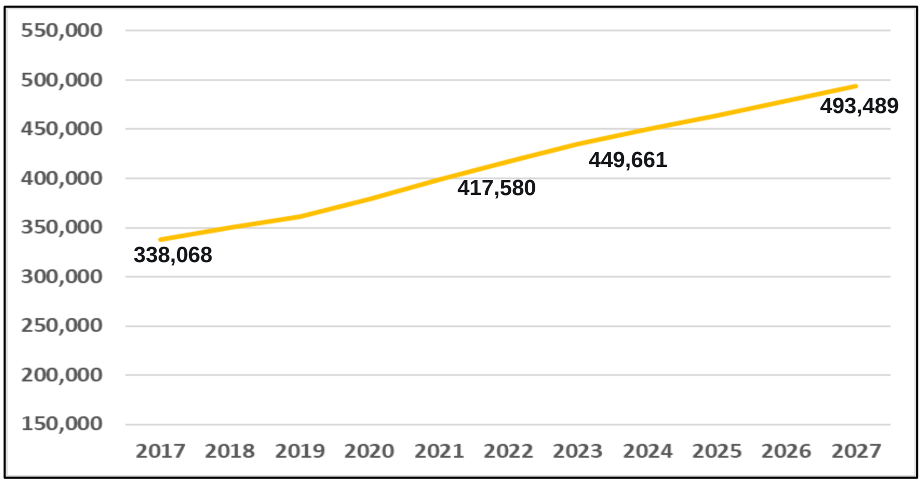
By 2024, we expect residential and small commercial sales of 442,251 thousand therms compared with 2022 weather-normalized sales of 418,876 thousand therms, representing a 5.7% increase. By 2027 sales are expected to reach 470,906 thousand therms with an average annual growth rate of 2.4%. **TABLE 1** shows the sales the forecast by Division. Test-year 2024 sales are highlighted.

TABLE 1: DIVISION GAS SALES PROJECTION (1000'S THERMS)

Year	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	Total
2022	89,237	56,449	20,320	71,291	3,964	40,190	7,007	11,179	1,176	39,142	13,109	12,574	20,896	32,341	418,876
2023	90,470	57,597	21,314	68,834	3,769	43,248	7,083	11,744	1,418	39,039	13,058	12,277	21,182	35,123	426,155
2024	**92,506**	**60,067**	**21,939**	**72,314**	**3,813**	**45,692**	**7,338**	**12,167**	**1,423**	**40,257**	**13,413**	**12,301**	**21,800**	**37,221**	**442,251**
2025	92,865	61,990	22,305	74,713	3,833	47,622	7,502	12,438	1,422	41,168	13,674	12,293	22,300	38,986	453,109
2026	93,102	63,708	22,558	76,518	3,847	49,408	7,623	12,636	1,421	42,010	13,914	12,294	22,778	40,698	462,516
2027	93,255	65,261	22,737	78,009	3,857	51,059	7,729	12,793	1,418	42,831	14,126	12,293	23,219	42,319	470,906
Chg															
2023	1.4%	2.0%	4.9%	-3.4%	-4.9%	7.6%	1.1%	5.1%	20.5%	-0.3%	-0.4%	-2.4%	1.4%	8.6%	1.7%
2024	2.3%	4.3%	2.9%	5.1%	1.2%	5.7%	3.6%	3.6%	0.4%	3.1%	2.7%	0.2%	2.9%	6.0%	3.8%
2025	0.4%	3.2%	1.7%	3.3%	0.5%	4.2%	2.2%	2.2%	0.0%	2.3%	1.9%	-0.1%	2.3%	4.7%	2.5%
2026	0.3%	2.8%	1.1%	2.4%	0.4%	3.7%	1.6%	1.6%	-0.1%	2.0%	1.8%	0.0%	2.1%	4.4%	2.1%
2027	0.2%	2.4%	0.8%	1.9%	0.3%	3.3%	1.4%	1.2%	-0.2%	2.0%	1.5%	0.0%	1.9%	4.0%	1.8%
Average	**0.9%**	**2.9%**	**2.3%**	**1.9%**	**-0.5%**	**4.9%**	**2.0%**	**2.7%**	**4.1%**	**1.8%**	**1.5%**	**-0.4%**	**2.1%**	**5.5%**	**2.4%**

Residential. Residential sales have largely been driven by strong customer growth as average use has been flat to declining (when normalized for weather and COVID's positive sales impact) largely because of end-use efficiency gains. Since 2017, PGS has added nearly 80,000 customers and is expected to add over 30,000 additional customers by the end of 2024. Customer projections are based on Woods & Poole 2022 regional household projections. Woods & Poole household forecast was completed in April 2022 based on data through 2021. The household forecast was adjusted down slightly to reflect Moody's Analytics' more current (October 2022) state economic outlook. We expect long-term residential customer growth of 3.4% per year compared with 4.3% average annual growth over the last five years. Affordable housing prices, low interest rates, and early COVID-19 related retirements coupled with PGS system expansion drove recent customer growth. **FIGURE 5** shows actual and forecasted residential customers from 2017 through 2027.

FIGURE 5: RESIDENTIAL CUSTOMERS



Projected customer growth varies significantly across Divisions from less than 1.0% annual growth in Panama City to over 8.3% in Fort Myers. Differences in customer growth reflect differences in household projections, recent customer growth, and gas connection availability. **TABLE 2** shows the customer forecast by Division. The 2024 test-year forecast is highlighted.

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TABLE 2: RESIDENTIAL CUSTOMER FORECAST

	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	Total
2022	51,608	77,964	21,635	52,317	5,876	43,362	4,793	8,147	256	50,770	13,011	15,323	50,703	22,453	418,216
2023	52,068	80,179	21,814	53,647	5,969	47,866	4,844	8,659	250	53,757	13,248	15,400	51,987	25,256	434,943
2024	**52,583**	**82,449**	**22,016**	**54,806**	**6,053**	**51,602**	**4,901**	**9,085**	**251**	**56,216**	**13,475**	**15,483**	**53,459**	**27,282**	**449,661**
2025	53,118	84,719	22,208	55,941	6,139	55,126	4,958	9,492	252	58,615	13,692	15,588	55,006	29,297	464,150
2026	53,682	86,991	22,403	57,111	6,228	58,547	5,014	9,840	254	61,086	13,914	15,712	56,618	31,385	478,784
2027	54,252	89,264	22,597	58,284	6,317	61,995	5,071	10,190	257	63,558	14,136	15,846	58,236	33,486	493,489
Chg															
2023	0.9%	2.8%	0.8%	2.5%	1.6%	10.4%	1.1%	6.3%	-2.4%	5.9%	1.8%	0.5%	2.5%	12.5%	4.0%
2024	1.0%	2.8%	0.9%	2.2%	1.4%	7.8%	1.2%	4.9%	0.3%	4.6%	1.7%	0.5%	2.8%	8.0%	3.4%
2025	1.0%	2.8%	0.9%	2.1%	1.4%	6.8%	1.2%	4.5%	0.5%	4.3%	1.6%	0.7%	2.9%	7.4%	3.2%
2026	1.1%	2.7%	0.9%	2.1%	1.4%	6.2%	1.1%	3.7%	0.8%	4.2%	1.6%	0.8%	2.9%	7.1%	3.2%
2027	1.1%	2.6%	0.9%	2.1%	1.4%	5.9%	1.1%	3.6%	0.9%	4.0%	1.6%	0.9%	2.9%	6.7%	3.1%
Average	**1.1%**	**2.7%**	**0.9%**	**2.2%**	**1.5%**	**7.4%**	**1.1%**	**4.6%**	**0.0%**	**4.6%**	**1.7%**	**0.7%**	**2.8%**	**8.3%**	**3.4%**

Average use is expected to trend down over the forecast period as households return to more "normal" pre-COVID activity and end-use efficiencies continue to improve. We assume that we ultimately get back to 80% of pre-COVID household and work activity by the end of the forecast period with the largest adjustments in 2023; we do not believe that we get totally back to pre-COVID household and business activity as a significant share of the workforce will continue to work at home as hybrid work schedules become part of the new normal. **FIGURE 6** shows actual and weather-normal average use projections.

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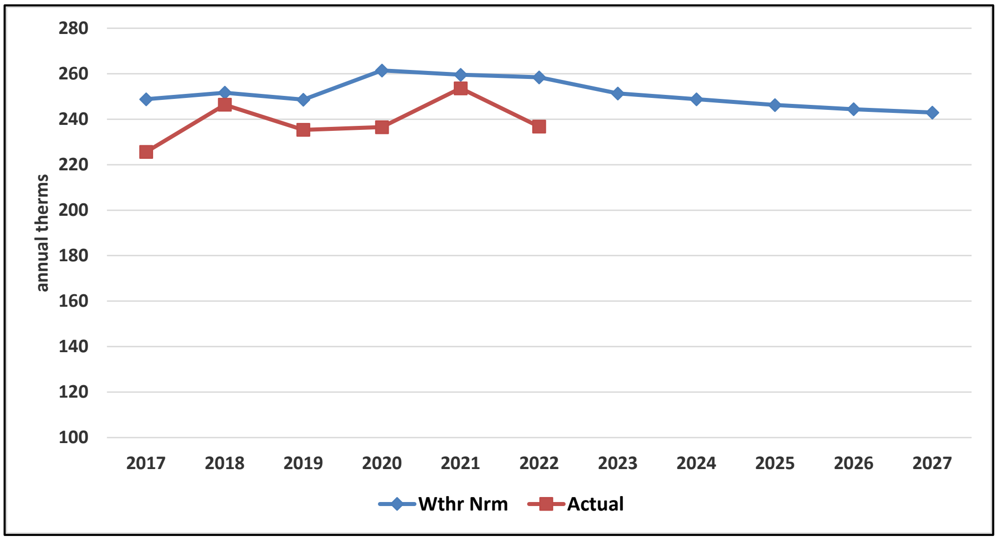
FIGURE 6: RESIDENTIAL AVERAGE USE



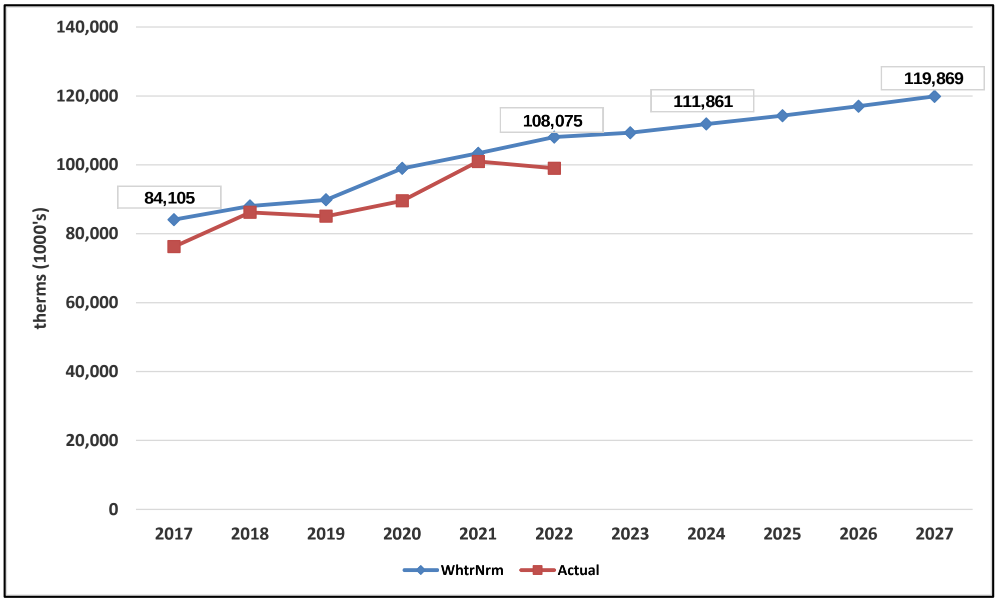
On a weather-normal basis, average use is back to 2017 levels by 2024. Average use varies significantly across the state, reflecting differences in temperature, home size, and gas end-use appliance ownership. **TABLE 3** shows forecasted Residential average use by Division.

TABLE 3: RESIDENTIAL AVERAGE USE FORECAST (THERMS)

	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	System
2022	330	238	169	274	178	188	161	176	134	323	417	225	186	373	258
2023	326	227	164	254	178	203	157	185	136	316	397	218	184	340	251
2024	**325**	**222**	**162**	**254**	**177**	**202**	**157**	**185**	**138**	**312**	**386**	**217**	**183**	**335**	**249**
2025	323	218	160	255	175	201	156	183	138	307	376	215	181	330	246
2026	321	215	158	256	174	200	156	182	138	304	369	214	180	326	244
2027	320	213	157	257	173	199	156	181	138	301	364	213	179	323	243
Chg															
2023	-1.3%	-4.7%	-2.7%	-7.2%	-0.4%	8.2%	-2.1%	5.0%	1.7%	-2.1%	-4.9%	-3.1%	-1.0%	-8.9%	-2.7%
2024	-0.4%	-2.0%	-1.5%	0.0%	-0.5%	-0.3%	-0.1%	-0.4%	1.2%	-1.4%	-2.8%	-0.5%	-0.6%	-1.6%	-1.0%
2025	-0.6%	-1.7%	-1.4%	0.1%	-0.8%	-0.7%	-0.5%	-0.8%	0.3%	-1.4%	-2.5%	-0.7%	-0.8%	-1.5%	-1.0%
2026	-0.5%	-1.3%	-1.0%	0.4%	-0.6%	-0.5%	-0.3%	-0.6%	0.2%	-1.1%	-1.8%	-0.6%	-0.7%	-1.1%	-0.7%
2027	-0.5%	-1.1%	-0.9%	0.5%	-0.6%	-0.5%	-0.2%	-0.6%	0.0%	-0.9%	-1.4%	-0.6%	-0.6%	-0.9%	-0.6%
Average	**-0.7%**	**-2.2%**	**-1.5%**	**-1.2%**	**-0.6%**	**1.2%**	**-0.6%**	**0.5%**	**0.7%**	**-1.4%**	**-2.7%**	**-1.1%**	**-0.7%**	**-2.8%**	**-1.2%**
Excluding 2023	**-0.5%**	**-1.5%**	**-1.2%**	**0.3%**	**-0.6%**	**-0.5%**	**-0.3%**	**-0.6%**	**0.4%**	**-1.2%**	**-2.1%**	**-0.6%**	**-0.7%**	**-1.3%**	**-0.8%**

The table also shows the average growth rate excluding 2023, as the decline to pre-COVID levels in 2023 distorts the long-term trend. Residential sales are derived as the product of average use and number of customers. **FIGURE 7** shows the system residential sales forecast.

FIGURE 7: RESIDENTIAL SALES PROJECTION



By 2024, we expect residential sales of 111,861 thousand therms to increase to 119,869 thousand therms by 2027. **TABLE 4** shows residential sales forecast by Division.

TABLE 4: RESIDENTIAL SALES BY DIVISION (1000'S THERMS)

	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	Total
2022	17,045	18,537	3,655	14,343	1,048	8,137	770	1,438	34	16,390	5,432	3,443	9,417	8,386	108,075
2023	16,972	18,174	3,585	13,651	1,060	9,719	762	1,605	34	16,985	5,259	3,354	9,556	8,595	109,311
2024	**17,074**	**18,311**	**3,565**	**13,947**	**1,069**	**10,442**	**770**	**1,677**	**35**	**17,514**	**5,197**	**3,356**	**9,771**	**9,134**	**111,861**
2025	17,139	18,489	3,546	14,257	1,076	11,077	776	1,738	35	18,003	5,149	3,355	9,977	9,658	114,275
2026	17,236	18,740	3,540	14,610	1,085	11,700	782	1,790	35	18,562	5,138	3,362	10,202	10,227	117,011
2027	17,338	19,026	3,540	14,985	1,093	12,328	789	1,844	35	19,140	5,144	3,371	10,426	10,810	119,869
Chg															
2023	-0.4%	-2.0%	-1.9%	-4.8%	1.2%	19.5%	-1.1%	11.6%	-0.7%	3.6%	-3.2%	-2.6%	1.5%	2.5%	1.1%
2024	0.6%	0.7%	-0.5%	2.2%	0.9%	7.4%	1.1%	4.5%	1.5%	3.1%	-1.2%	0.0%	2.3%	6.3%	2.3%
2025	0.4%	1.0%	-0.5%	2.2%	0.6%	6.1%	0.7%	3.6%	0.9%	2.8%	-0.9%	0.0%	2.1%	5.7%	2.2%
2026	0.6%	1.4%	-0.2%	2.5%	0.8%	5.6%	0.9%	3.0%	1.0%	3.1%	-0.2%	0.2%	2.3%	5.9%	2.4%
2027	0.6%	1.5%	0.0%	2.6%	0.8%	5.4%	0.9%	3.0%	0.9%	3.1%	0.1%	0.3%	2.2%	5.7%	2.4%
Average	**0.3%**	**0.5%**	**-0.6%**	**0.9%**	**0.9%**	**8.8%**	**0.5%**	**5.1%**	**0.7%**	**3.2%**	**-1.1%**	**-0.4%**	**2.1%**	**5.2%**	**2.1%**

Sales projections vary significantly across Divisions, reflecting differences in household growth, customer size and type, end-use mix, weather, and Division gas connection availability.

Commercial. Commercial customer growth has also been relatively strong, particularly in recent years in Divisions where there has been significant expansion of the gas distribution system. The commercial customer forecasts are primarily based on Woods & Poole MSA employment projections with separate forecasts developed for each Division. Jacksonville and Jupiter customer forecasts are tied to residential customer forecast as employment was statistically insignificant when combined with model auto-regressive terms. Between 2017 and expected year-end 2022, customer growth averaged 1.8% annual growth. Even during the COVID period, PGS continued to add commercial customers. Customer growth is expected to slow slightly to a 1.5% annual rate over the next five years resulting from slower employment growth projections. **FIGURE 8** shows the commercial customer forecast. By 2024, we expect close to 39,000 commercial customers and over 40,500 customers by 2027.

FIGURE 8: COMMERCIAL CUSTOMER PROJECTION

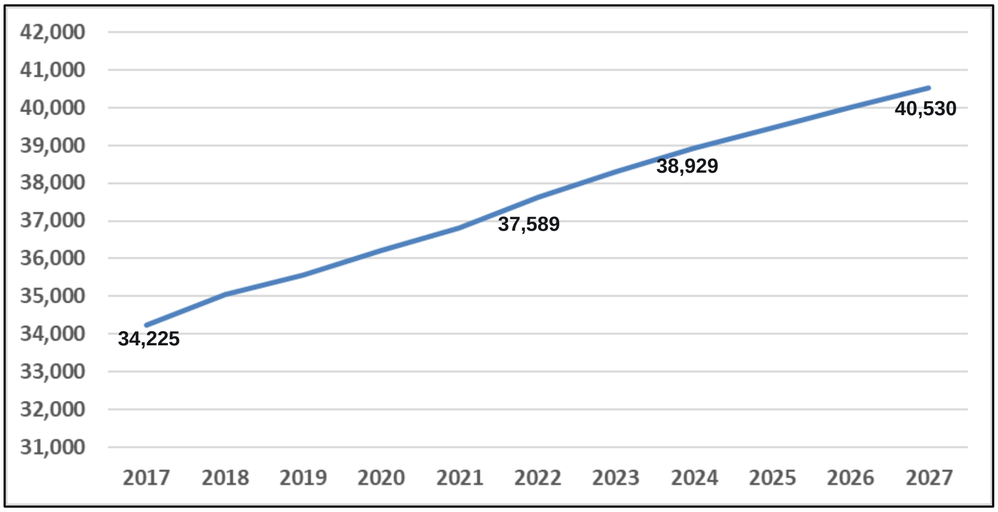


TABLE 5 shows the Division commercial customer forecast.

TABLE 5: DIVISION COMMERCIAL CUSTOMER FORECASTS

	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	Total
2022	8,752	4,480	2,369	5,260	468	4,037	712	1,382	108	2,888	871	1,610	1,665	2,988	37,589
2023	8,772	4,607	2,391	5,353	471	4,173	725	1,391	108	2,954	891	1,605	1,689	3,181	38,313
2024	**8,815**	**4,723**	**2,410**	**5,439**	**475**	**4,277**	**738**	**1,402**	**108**	**3,017**	**906**	**1,602**	**1,718**	**3,297**	**38,929**
2025	8,850	4,834	2,424	5,508	478	4,378	748	1,411	109	3,064	921	1,602	1,747	3,408	39,482
2026	8,877	4,942	2,435	5,562	480	4,482	755	1,418	109	3,101	937	1,604	1,775	3,523	40,000
2027	8,905	5,050	2,446	5,619	483	4,588	763	1,426	109	3,140	953	1,607	1,804	3,638	40,530
Chg															
2023	0.2%	2.8%	1.0%	1.8%	0.8%	3.4%	1.9%	0.7%	0.7%	2.3%	2.3%	-0.3%	1.5%	6.4%	1.9%
2024	0.5%	2.5%	0.8%	1.6%	0.8%	2.5%	1.7%	0.8%	0.1%	2.1%	1.7%	-0.2%	1.7%	3.7%	1.6%
2025	0.4%	2.4%	0.6%	1.3%	0.6%	2.3%	1.3%	0.6%	0.0%	1.6%	1.7%	0.0%	1.7%	3.4%	1.4%
2026	0.3%	2.2%	0.4%	1.0%	0.5%	2.4%	1.0%	0.5%	0.0%	1.2%	1.7%	0.1%	1.6%	3.4%	1.3%
2027	0.3%	2.2%	0.5%	1.0%	0.5%	2.4%	1.1%	0.5%	0.0%	1.2%	1.7%	0.2%	1.6%	3.3%	1.3%
Average	**0.3%**	**2.4%**	**0.6%**	**1.3%**	**0.6%**	**2.6%**	**1.4%**	**0.6%**	**0.2%**	**1.7%**	**1.8%**	**0.0%**	**1.6%**	**4.0%**	**1.5%**

While customer growth has been strong, business response to COVID resulted in a significant decline in sales. **FIGURE 9** shows historical and forecasted commercial average use.

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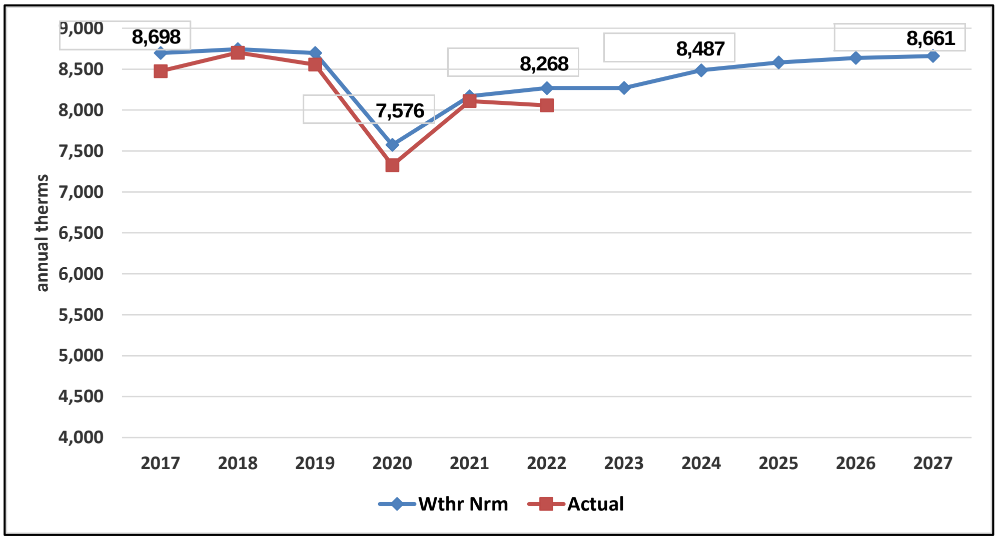
FIGURE 9: COMMERCIAL AVERAGE USE PROJECTION



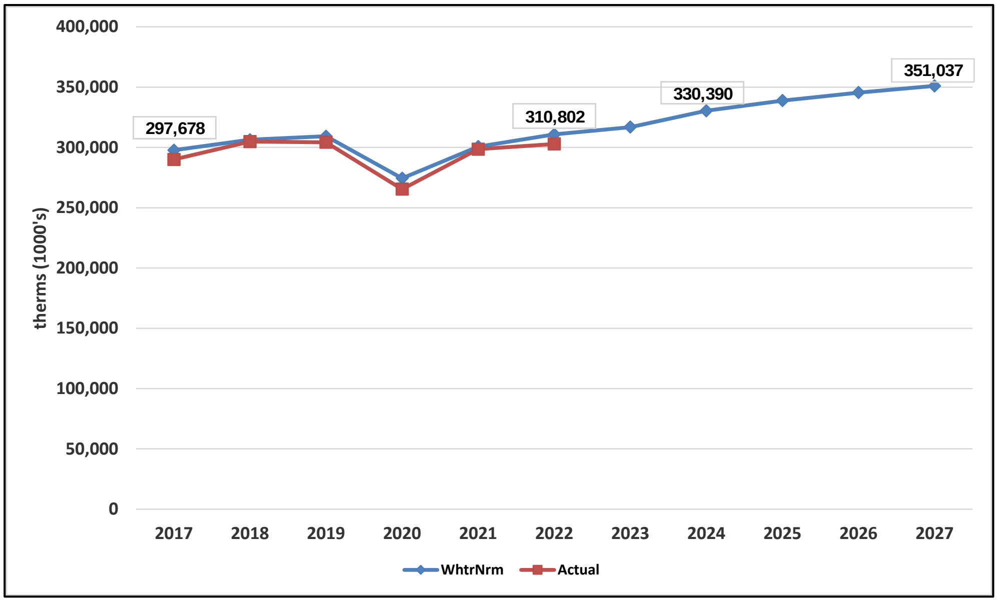
Weather-normal average use fell 13% in 2020 before recovering 8% in 2021 and another 1.0% in 2022. Continued COVID recovery coupled with moderate economic growth contributes to strong average use growth recovery with average use close to 8,500 therms by 2024. Average use growth slows after 2024 with expected continued improvements in commercial end-use efficiency. **TABLE 6** shows the Divisional average use forecast.

TABLE 6: COMMERCIAL AVERAGE USE BY DIVISION (1000'S THERMS)

	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	Total
2022	8,249	8,462	7,036	10,826	6,234	7,940	8,758	7,049	10,607	7,878	8,817	5,672	6,895	8,016	8,268
2023	8,378	8,557	7,413	10,310	5,746	8,035	8,715	7,288	12,763	7,467	8,754	5,558	6,882	8,339	8,270
2024	**8,557**	**8,841**	**7,625**	**10,731**	**5,772**	**8,241**	**8,902**	**7,481**	**12,796**	**7,539**	**9,070**	**5,582**	**7,000**	**8,518**	**8,487**
2025	8,557	8,999	7,739	10,976	5,766	8,348	8,996	7,582	12,788	7,560	9,252	5,579	7,054	8,605	8,582
2026	8,547	9,100	7,812	11,130	5,751	8,412	9,057	7,647	12,771	7,562	9,365	5,569	7,083	8,650	8,638
2027	8,525	9,156	7,849	11,216	5,727	8,442	9,090	7,681	12,742	7,546	9,425	5,551	7,090	8,662	8,661
Chg															
2023	1.6%	1.1%	5.4%	-4.8%	-7.8%	1.2%	-0.5%	3.4%	20.3%	-5.2%	-0.7%	-2.0%	-0.2%	4.0%	0.0%
2024	2.1%	3.3%	2.8%	4.1%	0.5%	2.6%	2.1%	2.6%	0.3%	1.0%	3.6%	0.4%	1.7%	2.1%	2.6%
2025	0.0%	1.8%	1.5%	2.3%	-0.1%	1.3%	1.1%	1.4%	-0.1%	0.3%	2.0%	-0.1%	0.8%	1.0%	1.1%
2026	-0.1%	1.1%	0.9%	1.4%	-0.3%	0.8%	0.7%	0.9%	-0.1%	0.0%	1.2%	-0.2%	0.4%	0.5%	0.6%
2027	-0.3%	0.6%	0.5%	0.8%	-0.4%	0.4%	0.4%	0.4%	-0.2%	-0.2%	0.6%	-0.3%	0.1%	0.1%	0.3%
Average	**0.4%**	**1.7%**	**1.4%**	**2.1%**	**-1.6%**	**1.2%**	**0.8%**	**1.7%**	**4.0%**	**-0.8%**	**1.4%**	**-0.4%**	**0.6%**	**1.6%**	**0.9%**

Commercial sales are the product of division-level customer and average use forecasts. **FIGURE 10** shows the system commercial sales forecasts.

FIGURE 10: COMMERCIAL SALES FORECAST



By year-end 2022, normalized sales are back to pre-COVID levels as customer growth compensates for the COVID-related drop in average use. With average use still recovering, coupled with moderate customer growth, 2024 normalized sales reach 330,390 thousand therms - a 6.3% increase over normalized 2022 sales. **TABLE 7** shows Division commercial sales forecasts.

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TABLE 7: COMMERCIAL SALES BY DIVISION (1000'S THERMS)

	Miami	Tampa	St Pete	Orlando	Eustis	Jackson	Lakeland	Daytona	AvonPark	Sarasota	Jupiter	Panama	Ocala	FtMyers	Total
2022	72,192	37,913	16,665	56,948	2,916	32,053	6,237	9,741	1,142	22,753	7,677	9,130	11,479	23,955	310,802
2023	73,498	39,423	17,729	55,183	2,709	33,529	6,321	10,140	1,384	22,054	7,799	8,923	11,626	26,528	316,844
2024	**75,432**	**41,757**	**18,374**	**58,367**	**2,743**	**35,250**	**6,568**	**10,490**	**1,388**	**22,743**	**8,217**	**8,946**	**12,029**	**28,087**	**330,390**
2025	75,726	43,501	18,758	60,456	2,757	36,545	6,726	10,701	1,388	23,165	8,524	8,938	12,323	29,328	338,835
2026	75,866	44,969	19,018	61,907	2,762	37,708	6,841	10,846	1,386	23,448	8,776	8,932	12,576	30,470	345,504
2027	75,916	46,236	19,197	63,024	2,763	38,732	6,939	10,950	1,383	23,692	8,982	8,922	12,793	31,509	351,037
Chg															
2023	1.8%	4.0%	6.4%	-3.1%	-7.1%	4.6%	1.4%	4.1%	21.2%	-3.1%	1.6%	-2.3%	1.3%	10.7%	1.9%
2024	2.6%	5.9%	3.6%	5.8%	1.3%	5.1%	3.9%	3.5%	0.3%	3.1%	5.4%	0.3%	3.5%	5.9%	4.3%
2025	0.4%	4.2%	2.1%	3.6%	0.5%	3.7%	2.4%	2.0%	-0.1%	1.9%	3.7%	-0.1%	2.4%	4.4%	2.6%
2026	0.2%	3.4%	1.4%	2.4%	0.2%	3.2%	1.7%	1.4%	-0.1%	1.2%	3.0%	-0.1%	2.1%	3.9%	2.0%
2027	0.1%	2.8%	0.9%	1.8%	0.0%	2.7%	1.4%	1.0%	-0.2%	1.0%	2.3%	-0.1%	1.7%	3.4%	1.6%
Average	**1.0%**	**4.1%**	**2.9%**	**2.1%**	**-1.0%**	**3.9%**	**2.2%**	**2.4%**	**4.2%**	**0.8%**	**3.2%**	**-0.5%**	**2.2%**	**5.7%**	**2.5%**

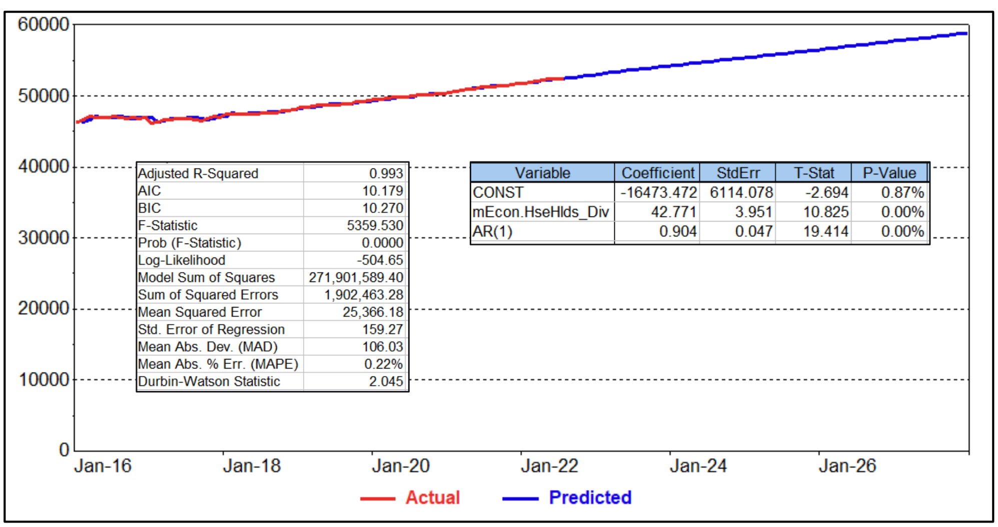
2 FORECAST MODELS

Separate forecast models are estimated for each Division. Sales forecasts are derived as the product of customer and average use forecasts. Models include residential and commercial customer models, and residential and commercial average use models. Regression models are estimated using monthly billed sales and customer data.

2.1 CUSTOMER MODELS

The primary drivers are the number of households in the residential class and employment in the commercial sector; commercial customer forecasts are tied to residential customers where employment is either weak or statistically insignificant. Forecasts are based on Woods & Poole Spring 2022 Metropolitan Statistical Area (MSA) household and employment forecasts; forecasts were adjusted to reflect Moody's Analytics slightly lower October 2022 household and employment forecasts. The model estimation period is January 2016 through July 2022. The customer models are estimated starting in 2016 (and in a few cases a little later) as it was after this point that PGS saw a significant uptick in customer growth partly because of the system expansion work. The customer models also include auto-regressive terms where past customer growth partially drives future customer expectations. The auto-regressive terms tie projected customers to recent customer trends that exceed and vary around the MSA-level household and employment projections. **FIGURE 11** shows the Orlando customer model. This is the general specification used for all divisions though there are variations that may include alternative auto-regressive model variables.

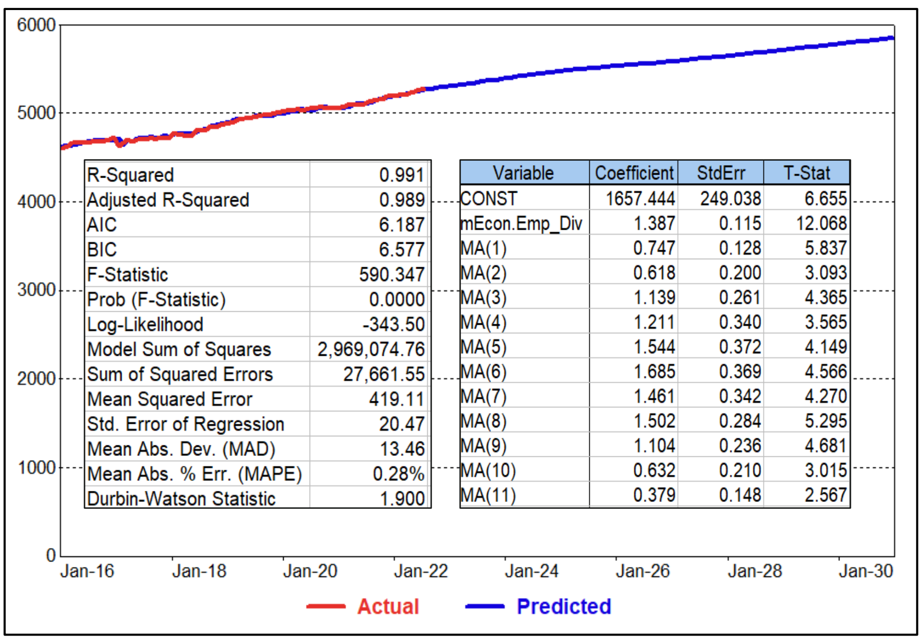
FIGURE 11: RESIDENTIAL CUSTOMER MODEL (ORLANDO)



Both the number of households and the auto-regressive term (AR(1)) term are highly statistically significant. The mean absolute percent error (MAPE) is 0.22%; the MAPE is a measure of the average forecast error. The Adjusted R-Squared is nearly 1 (perfect correlation) as there is a strong relationship between the customers in any given month with customers in the prior months, which is captured in the AR(1) term.

The commercial customer model specification is similar to residential. The primary drivers in the commercial customer models are Woods & Poole MSA employment projections. For Jacksonville and Jupiter, commercial customers are tied to residential customers as this proved to be a better driver of customer growth; in the Jacksonville model, the employment variable was statistically insignificant. Commercial models also include auto-regressive terms to account for variation around the employment trend and where commercial customer growth is significantly higher than employment growth projections. **FIGURE 12** shows the Orlando commercial customer model.

FIGURE 12: COMMERCIAL CUSTOMER MODEL (ORLANDO)



R-Squared	0.991
Adjusted R-Squared	0.989
AIC	6.187
BIC	6.577
F-Statistic	590.347
Prob (F-Statistic)	0.0000
Log-Likelihood	-343.50
Model Sum of Squares	2,969,074.76
Sum of Squared Errors	27,661.55
Mean Squared Error	419.11
Std. Error of Regression	20.47
Mean Abs. Dev. (MAD)	13.46
Mean Abs. % Err. (MAPE)	0.28%
Durbin-Watson Statistic	1.900

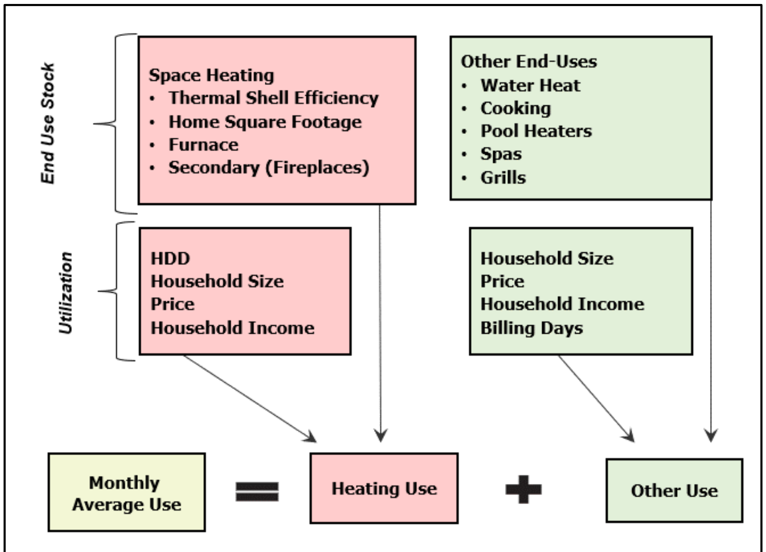
Variable	Coefficient	StdErr	T-Stat
CONST	1657.444	249.038	6.655
mEcon.Emp_Div	1.387	0.115	12.068
MA(1)	0.747	0.128	5.837
MA(2)	0.618	0.200	3.093
MA(3)	1.139	0.261	4.365
MA(4)	1.211	0.340	3.565
MA(5)	1.544	0.372	4.149
MA(6)	1.685	0.369	4.566
MA(7)	1.461	0.342	4.270
MA(8)	1.502	0.284	5.295
MA(9)	1.104	0.236	4.681
MA(10)	0.632	0.210	3.015
MA(11)	0.379	0.148	2.567

In this model, a series of MA (moving average) terms are used to capture the variation around the employment trend line. The MA terms are used rather than an AR term as the AR term swamps the employment driver impact. The impact of the MA term on the forecast is short while the impact of the AR term is much longer. The estimated customer models are included in Appendix A.

2.2 AVERAGE USE MODELS

The second component of the forecast is the average use models. In addition to capturing the COVID impact, average use models include heating-degree days (HDD) - which are a measure of heating requirements, measure of economic activity based on state-level income, employment, and output projections, end-use efficiency trends, and long-term natural gas price projections. Models are estimated using what is called a Statistically Adjusted End-Use (SAE) specification. This entails constructing monthly heating (XHeat) and non-weather-sensitive gas use (XOther) variables and estimating monthly regression models that calibrate or *statistically adjust* the end-use estimates to actual sales. **FIGURE 13** shows the residential SAE model framework.

FIGURE 13: RESIDENTIAL STASTICALLY ADJUSTED END-USE (SAE) MODEL FRAMEWORK

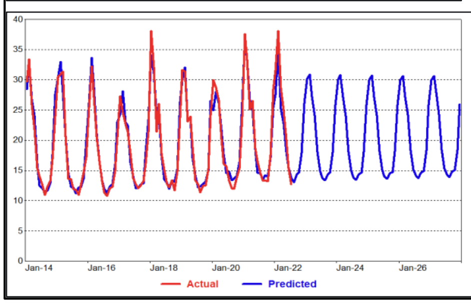


$$AvgUse_m = a + b_h \times XHeat_m + +b_o \times XOther_m + e_m$$

XHeat and XOther incorporate variables that account for structural change (improvements in end-use stock and building shell efficiency) and variables that impact the month-to-month utilization including number of HDD, number of billing days, price, household size, and household income. The b_h and b_0 model coefficients are estimated using a linear regression. Average use models are estimated over the period January 2014 through July 2022. **FIGURE 14** shows the Orlando estimated average use model.

FIGURE 14: ORLANDO RESIDENTIAL AVERAGE USE MODEL

Variable	Coefficient	StdErr	T-Stat
mResVars.XHeat	1.623	0.077	20.985
mResVars.XOther	0.496	0.137	3.636
mBin.Mar	2.135	0.605	3.530
mBin.Apr	3.246	0.654	4.962
mBin.May	1.432	0.591	2.422
mUPC.ResCVD	7309.594	4274.015	1.710
mBin.TrendVar	0.240	0.062	3.879
MA(1)	0.398	0.104	3.836



R-Squared	0.953
Adjusted R-Squared	0.950
AIC	1.101
BIC	1.306
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-194.86
Model Sum of Squares	5,403.67
Sum of Squared Errors	265.21
Mean Squared Error	2.79
Std. Error of Regression	1.67
Mean Abs. Dev. (MAD)	1.20
Mean Abs. % Err. (MAPE)	6.00%
Durbin-Watson Statistic	1.878

The Orlando model is typical of the Division residential models with statistically significant coefficients on *XHeat* and *XCool* as indicated by the T-Statistics, and strong model fit, as indicated by the Adjusted R-Squared. The COVID variable (*ResCVD*) is statistically significant at the 90% level of confidence. The constant is excluded from the model as this allows *XOther* to account for all non-weather sensitive gas use. The Orlando model also includes a linear trend term that captures slightly stronger average use growth than what is accounted for in the model drivers. Models will often include monthly binaries to capture seasonal variations that are not captured in the monthly *XHeat* and *XOther* variables. The Orlando model includes monthly binaries for March, April, and May.

Variable Construction. XHeat and XOther are the primary model variables. The variables are constructed by combining annual end-use intensity projections (measured in therms per household) with HDD in the XHeat variable and number of days in the XOther variable. The other variables that impact monthly usage including household size (*HHSize*), real household income (*HsehldInc*), and real gas prices (*Price*) are interacted with HDD and number of billing days. Small elasticities (from the Itron Census Division models) are imposed on these variables as the impact of these variables on month-to-month usage is small; elasticities give the percent change in *HeatUse* and *BaseUse* for a given change in the household size, household income, and price.

The XHeat specification is shown below:

- $XHeat_m = HeatEI_a \times HeatUse_m$
- $HeatUse_m = HDD_m \times HHSize_m^{.30} \times HsehldInc_m^{.10} \times Price_m^{-.12}$

The heating intensity (*HeatEI*) reflects heating requirements per household for the South Atlantic Census Division. Heating intensity is scaled down to Florida where average annual use is roughly a third of that for the Census Division. In addition to space heat, *HeatEI* is also capturing gas pool and spa heating.

The non-weather sensitive end-uses (XOther) include water heating, dryers, and cooking. XOther is specified as:

- $XOther_m = OtherEI_a \times BaseUse_m$
- $BaseUse_m = Days_m \times HHSize_m^{.60} \times HsehldInc_m^{.10} \times Price_m^{-.12}$

FIGURE 15 shows the constructed XHeat and XOther variables for Orlando.

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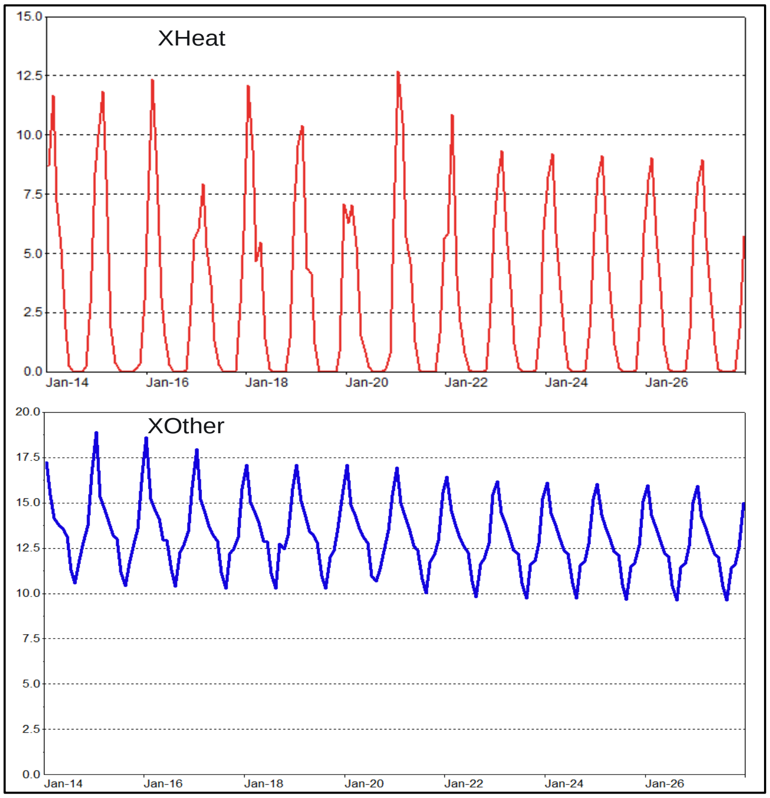
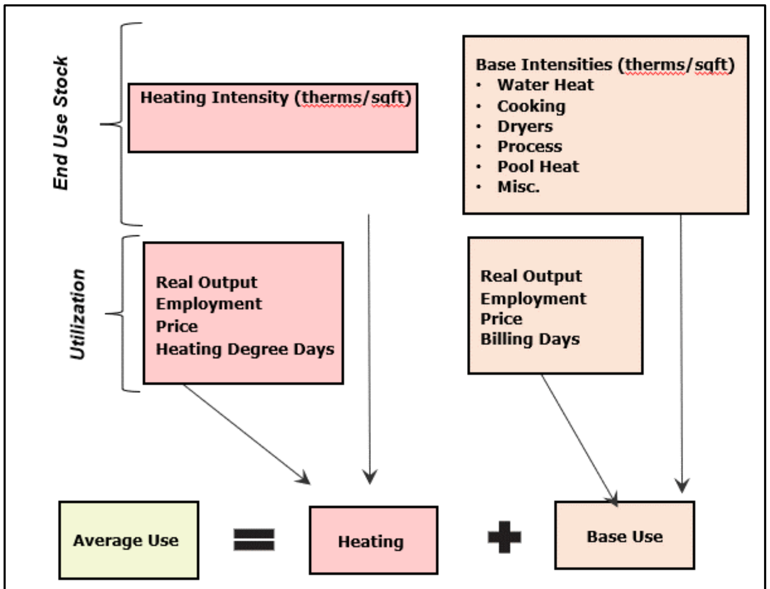
FIGURE 15: RESIDENTIAL MODEL VARIABLES (THERMS)



The commercial average use model is similar to the residential average use model, but end-use intensities are on a use per square foot basis. **FIGURE 16** shows the commercial average use model.

FIGURE 16: COMMERCIAL AVERAGE USE MODEL



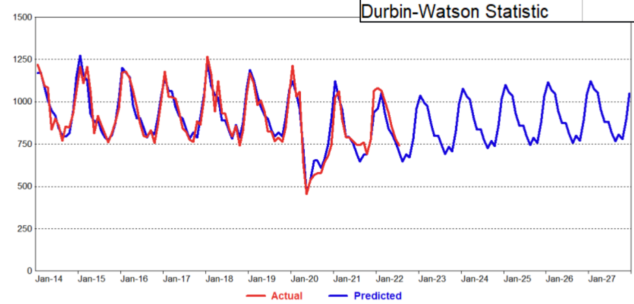
$$AvgUse_m = \quad a + b_c \times XHeat_m + b_o \times XOther_m + e$$

As in the residential model, coefficients are estimated for the monthly heating variable *XHeat* and non-weather sensitive variable *XOther*. The commercial end-use intensities and price are derived from EIA's 2022 commercial energy forecast model for the South Atlantic Census Division. The primary drivers in the utilization variable are HDD, output (state gross product), state employment projections, and price. HDD is based on regional temperature data and output and employment are based on Moody's Analytics October 2022 state economic projections. **FIGURE 17** shows the Orlando commercial average use model.

FIGURE 17: COMMERCIAL AVERAGE USE MODEL (ORLANDO)

Variable	Coefficient	StdErr	T-Stat
mComVars.XHeat	8111.249	638.984	12.694
mComVars.XOther	9834.231	139.778	70.356
mUPC.NResCVD	27568.237	2783.952	9.903
mBin.Mar	70.174	21.432	3.274
mBin.Jul	-56.410	23.350	-2.416
mBin.Aug	-84.110	24.245	-3.469
mBin.Sep	-106.267	24.518	-4.334
mBin.Oct	-76.098	24.166	-3.149
mBin.May20	-285.652	61.966	-4.610
mBin.Jun20	-213.977	61.891	-3.457
mBin.Apr21	-106.704	60.658	-1.759

R-Squared	0.891
Adjusted R-Squared	0.879
AIC	8.278
BIC	8.559
F-Statistic	#NA
Prob (F-Statistic)	#NA
Log-Likelihood	-561.45
Model Sum of Squares	2,663,656.54
Sum of Squared Errors	327,336.25
Mean Squared Error	3,558.00
Std. Error of Regression	59.65
Mean Abs. Dev. (MAD)	44.52
Mean Abs. % Err. (MAPE)	4.97%
Durbin-Watson Statistic	1.629



The Orlando model specification is similar to those specified for the other divisions. In addition to monthly binaries, the model also includes specific-month binaries for May 2020, June 2020, and April 2021. This type of variable is designed to capture large changes in usage that are either due to billing adjustments, meter reading processes, or other large changes that are not captured by the model variables. Isolating these months strengthens the explanatory variables. *XHeat*, *XOther*, and the COVID variable (*NResCVD*) are highly statistically significant. Prior to COVID, average use is relatively flat as improvements in end-use efficiency outweigh increases in utilization. Going forward, we expect strong increases in average use as business activity trends back to pre-COVID levels with some dampening in the later years from continuing, but small efficiency gains.

Estimated residential and commercial average use models are included in Appendix A

3 FORECAST MODEL DRIVERS

3.1 ECONOMIC DRIVERS

Given the wide economic and weather diversity, each Division is modeled separately. Monthly customer and average use models are estimated for the residential and small commercial revenue classes. Customer forecasts are based on Woods & Poole Spring 2022 Metropolitan Statistical Areas (MSA) household and employment forecasts. Each division is mapped to the most relevant MSA. **TABLE 8** lists the divisions and associated MSA.

TABLE 8: OPERATING DIVISIONS AND ASSOCIATED ECONOMIC REGIONS

DivNumber	DivName	MSA
1	Dade-Broward	Miami - Fort Lauderdale-Pompano Beach
2	Tampa	Tampa - St. Petersburg-Clearwater
3	St Pete	Tampa - St. Petersburg-Clearwater
4	Orlando	Orlando-Kissimee-Sandford
5	Eustis	Gainseville-Lake City
6	Jacksonville	Jacksonville
8	Lakeland	Lakeland-Winter Haven
9	Daytona	Deltona-Daytona Beach - Ormond Beach
10	Avon Park	Sebring-Avon Park
11	Sarasota	North Port-Sarasota-Bradenton
13	Jupiter	Port St. Lucie
14	Panama City	Panama City
15	Oscala	Ocala
16	Ft Mayers	Cape Coral-Fort Myers

While Woods & Poole MSA customer and employment forecast are used to drive customer growth, Moody's Analytics state-level economic forecast is used in constructing the average use model variables (*XHeat* and *XOther*). Moody's is used (and not Woods & Poole) as it provides more current forecasts (forecasts are updated every month) and at a higher frequency (Moody's provides quarterly forecasts vs. Woods & Poole's annual forecasts). Higher frequency forecasts capture more of the economic variability embedded in the monthly usage data.

The initial forecast was developed based on Moody's Analytics December 2021 and Woods & Poole Spring 2022 economic projections. Moody's adjusted their forecast slightly lower in October 2022. For consistency, Woods & Poole household and employment forecasts are also adjusted based on the relationship between Moody's state forecast and Woods & Poole MSA forecasts. Both Moody's Analytics at the state level and Woods & Poole at the

MSA level, project strong household and employment growth. **TABLE 9** shows Moody's state household and employment projections. Division forecasts are included in Appendix B.

TABLE 9: STATE HOUSEHOLD AND EMPLOYMENT (MOODY'S OCTOBER 2022 FORECAST)

Year	Households (1000's)	chg	Employment (1000's)	chg
2017	8,202		8,569	
2018	8,279	0.9%	8,781	2.5%
2019	8,409	1.6%	8,965	2.1%
2020	8,465	0.7%	8,524	-4.9%
2021	8,604	1.6%	8,915	4.6%
2022	8,781	2.1%	9,368	5.1%
2023	8,950	1.9%	9,602	2.5%
2024	9,099	1.7%	9,756	1.6%
2025	9,248	1.6%	9,877	1.2%
2026	9,404	1.7%	9,965	0.9%
2027	9,559	1.6%	10,065	1.0%
2017 - 22		**1.4%**		**1.9%**
2022 - 27		**1.7%**		**1.4%**

Over the next five years, Moody's is projecting 1.7% average annual household growth compared with 1.4% over the prior five years. Employment projected growth is lower, averaging 1.4% through 2027 compared with 1.9% over the last five years. The large jump in employment growth in 2021 and 2022 reflects recovery from COVID.

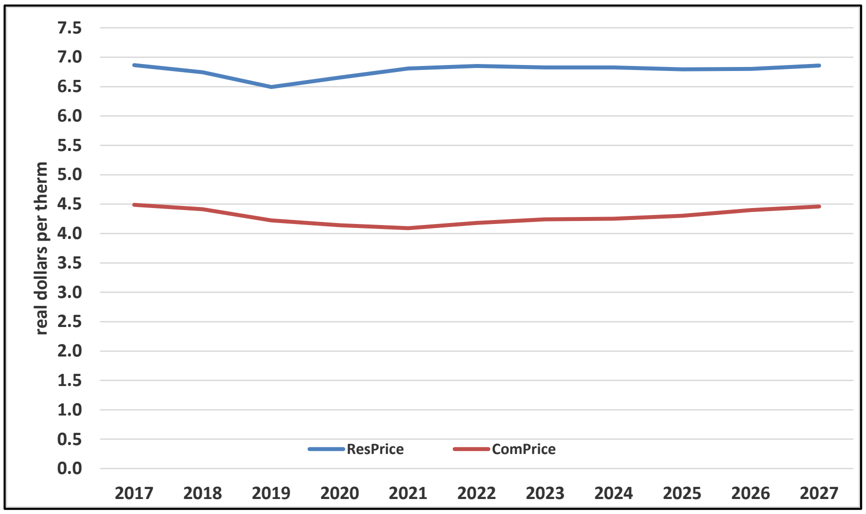
TABLE 10 shows household income and real state output. State household income is used in the residential average use model and state output (along with state employment) are used in the commercial average use models.

TABLE 10: STATE INCOME AND OUTPUT (MOODY'S OCTOBER 2022 FORECAST)

Year	Income Per Hsehld	chg	State Output (1000's)	chg
2017	86,151		912,906	
2018	88,535	2.8%	943,372	3.3%
2019	89,763	1.4%	971,639	3.0%
2020	93,497	4.2%	943,991	-2.8%
2021	96,377	3.1%	1,008,535	6.8%
2022	91,421	-5.1%	1,037,138	2.8%
2023	92,147	0.8%	1,065,197	2.7%
2024	93,808	1.8%	1,102,124	3.5%
2025	95,088	1.4%	1,143,923	3.8%
2026	96,411	1.4%	1,187,714	3.8%
2027	97,658	1.3%	1,231,853	3.7%
2017 - 22		**1.3%**		**2.6%**
2022 - 27		**1.3%**		**3.5%**

Gas price projections are from the EIA's 2022 Annual Outlook for the South Atlantic Census Division. **FIGURE 18** shows residential and commercial price projections.

FIGURE 18: EIA PRICES FOR THE SOUTH ATLANTIC CENSUS DIVISION



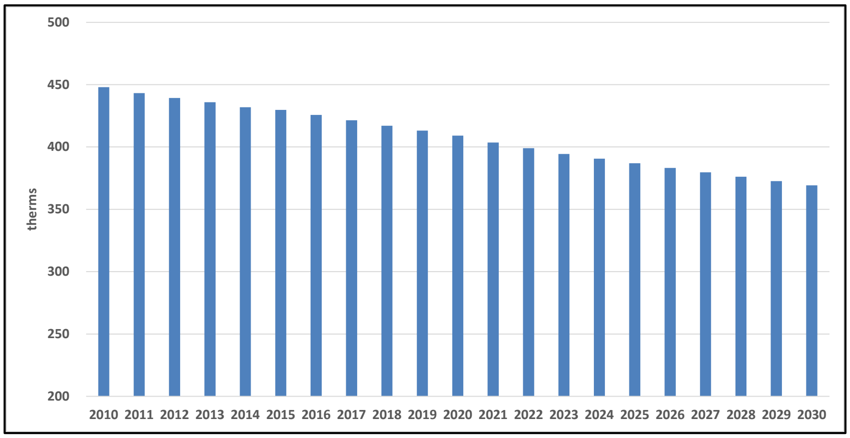
EIA projects flat real prices in the residential sector and a 1.3% average annual increase in commercial prices; combined with a small elasticity, prices have a small impact on commercial average use and no impact on residential average use.

3.2 END-USE INTENSITY TRENDS

End-use intensities capture the long-term trend in gas end-use efficiency and saturation. As gas end-use saturation is high in gas-serviced homes (by definition), gas intensities mostly reflect improvements in end-use efficiency.

Residential. The primary end-uses are heating, water heating, cooking, dryers, and miscellaneous use (e.g., spas pools, fireplaces). Heating is by far the largest end-use. **FIGURE 19** shows EIA heating intensity trend for South Atlantic Census Division.

FIGURE 19: RESIDENTIAL HEATING INTENSTIY TREND (SOUTH ATLANTIC)



At the census level, space heating accounts for roughly 60% of typical home gas consumption; including gas fireplaces, pools, and spas, weather-sensitive heating use accounts for nearly 70% of gas usage. For Florida, heating-related use is significantly lower than other regions. Estimated residential models show on average, heating represents approximately 36% of gas use. In Orlando, the average use model indicates that heating is approximately 26% of customer gas use. For Jacksonville, heating represents 68% of average customer growth in line with the Census Division. Over the last ten years there has been significant improvements in heating systems and thermal shell efficiency resulting in 1.0% annual decrease in heating intensity. EIA projects heating intensities will continue to decline at this rate over the next ten years.

FIGURE 20 shows the energy intensity for the non-weather sensitive end-uses.

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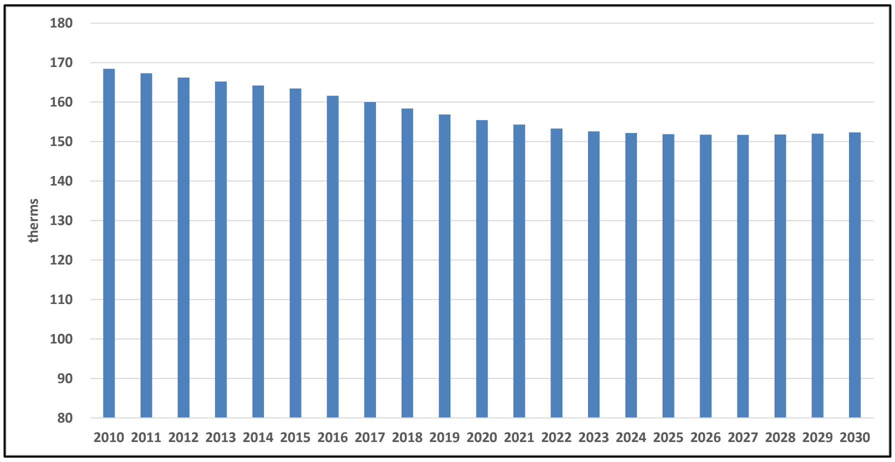
FIGURE 20: RESIDENTIAL NON-WEATHER SENSITIVE INTENSITY (SOUTH ATLANTIC)



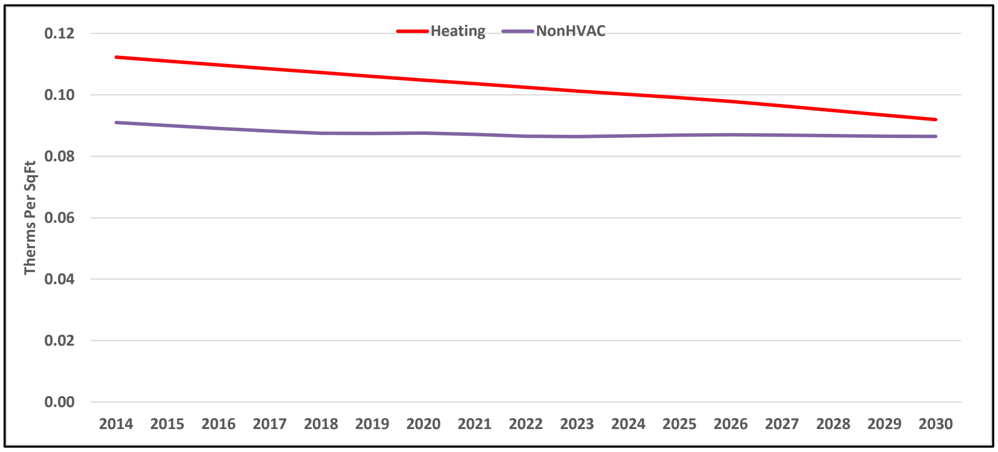
The primary non-weather sensitive end-uses include water heating, cooking, and dryers. Water heating accounts for roughly 90% of non-weather sensitive gas use; it is largely water heating efficiency improvements that have contributed to 0.8% annual decline in the non-weather sensitive intensity. Water heating efficiency gains are beginning to slow as the stock in place is nearing maximum efficiency levels, given there are no new standards on the books. After 2024, non-weather sensitive intensity is flat.

Florida gas-use for non-weather sensitive end-uses is much closer to the Census level. The average for the state is approximately 160 therms per customer compared with the South Atlantic Census Division of 153 therms per year.

Commercial. The commercial end-uses include heating, cooling, water heating, cooking, and other use. Other use includes drying and other process gas use. At the census level, for commercial customers with gas service, heating accounts for roughly 33% of gas use, cooling less than 2%, and cooking, water heating and other end uses approximately 65%. For PGS, commercial customers, heating accounts for roughly 10% of gas sales.

FIGURE 21 shows the commercial heating and non-heating gas intensity trends for South Atlantic Census Division.

FIGURE 21: COMMERCIAL GAS INTENSITY TRENDS



While heating intensity declines over 1.0% per year, it has only a small impact on commercial sales, given that heating is a small part of commercial gas use. Non-heating related gas use intensities have declined 0.6% annually, largely as a result of water heating efficiency gains; the intensity slows to a 0.1% decline as water heating efficiency gains are small going forward.

3.3 WEATHER IMPACT

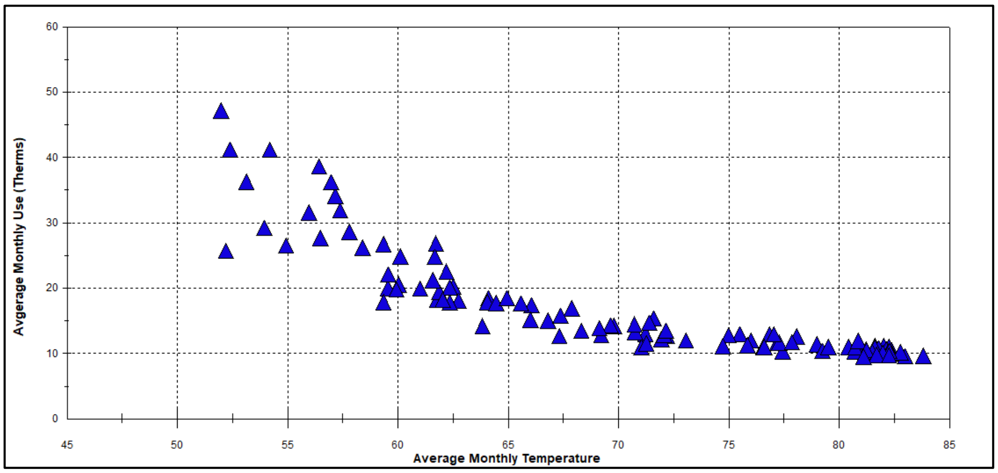
Temperatures generally have a significant impact on gas use, given a large share of gas consumption is for space heating. While this is true for PGS residential customers, temperatures have a much smaller impact on commercial sales, given commercial gas heating is relatively small. Heating requirements are accounted for using heating degree days (HDD). HDD are what are called spline variables as they take on a value when temperatures are below a temperature reference point and are 0 otherwise. A commonly used HDD is one in which the temperature breakpoint is 65 degrees. HDD with a 65-degree temperature breakpoint is calculated as:

- *HDD65 = If temperature <= 65, HDD = 65 – temperature, otherwise HDD = 0*

If the average temperature is below 65, HDD have a positive value. If temperatures are at or above 65, HDD is 0. As an example, if the daily temperature is 60 degrees, the formula returns a value of 5 HDD. If the temperature is 70 degrees, the formula returns a value of 0.

PGS provided daily temperature back to 1997 for each Division. Average daily temperature data is used to construct daily and then monthly HDD variables. In most parts of the country, heating generally starts when average daily temperatures are below 60 and, in some regions, even 55 degrees. Jacksonville is the only Division where HDD with a 60-degree day base temperature (*HDD60*) provides the best model fit. Each point in Figure 24 represents the average monthly use and the average monthly temperature.

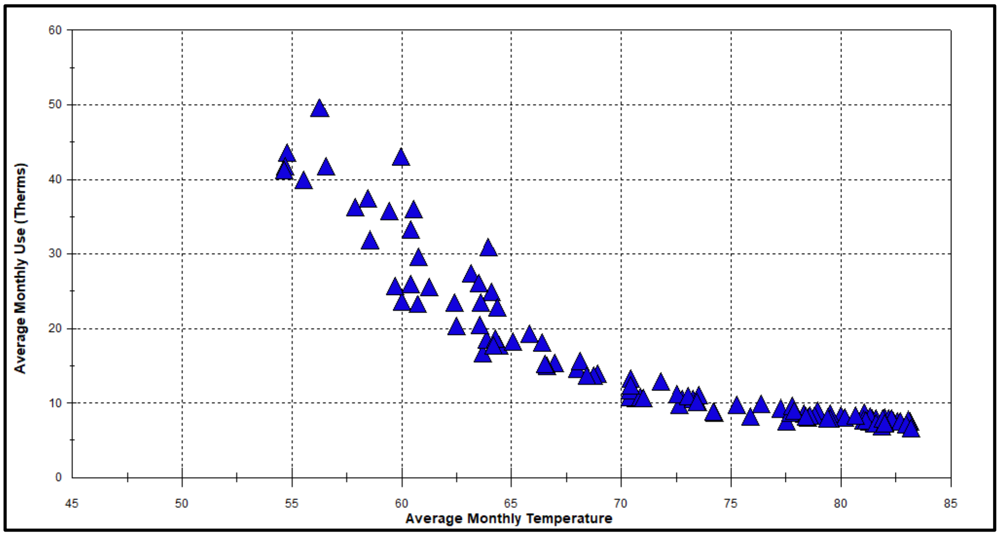
FIGURE 22: AVERAGE MONTHLY USE VS AVERAGE MONTHLY TEMPERATURE (JACKSONVILLE)



In most regions in the country, the relationship between winter average temperature and winter monthly average use is much tighter. The more disperse relationship between average use and average temperature reflects the wide range of daily average temperatures across the month. In Florida, there can be heating on one day and cooling the next. The month of January can have cooling degree-days as well as heating degree-days. There are even days where there is heating load in the morning and cooling loads in the late afternoon.

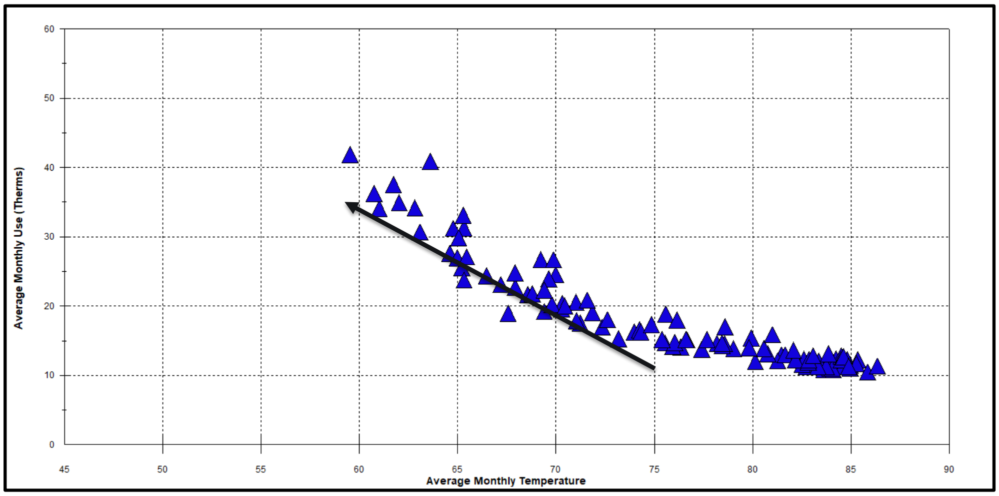
HDD with 65-degree temperature base (*HDD65*) works well for the other Divisions. Figure 23 shows the average use / temperature relationship for Ocala, which has approximately 50,000 residential customers.

FIGURE 23: AVERAGE MONTHLY USE VS AVERAGE MONTHLY TEMPERATURE (OCALA)



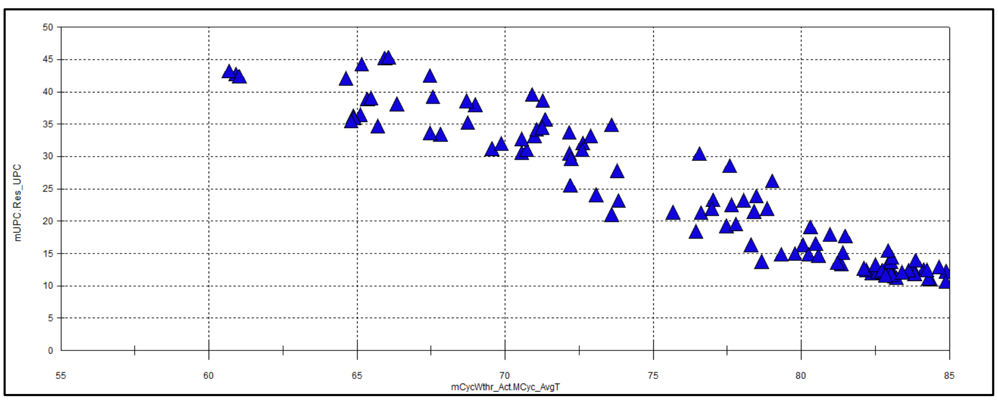
For Ocala and several other Divisions, the best model fit were HDDs with a 65-degree temperature base (HDD65). For a number of Divisions (particularly in the middle and south of the state), the model fit could be further improved with HDD that had higher temperature bases. In Tampa, Orlando, and St. Petersburg, the best model fit was with HDD with a base of 75 degrees. Figure 24 shows the residential temperature/use scatter for Tampa.

FIGURE 24: AVERAGE MONTHLY USE VS AVERAGE MONTHLY TEMPERATURE (TAMPA)



For Fort Myers, Sarasota, and Miami the best temperature base was 85 degrees. At these temperature breakpoints, the HDDs are likely accounting for pool and spa heating, as there is measurable heating load in every month. Figure 25 shows the temperature / use relationship for Sarasota.

FIGURE 25: SARASOTA RESIDENTIAL TEMPERATURE / USE RELATIONSHIP



Average-use increases as temperatures decrease across the entire temperature range with average monthly temperature seldom below 65 degrees. Table 11 shows the best HDD breakpoint in terms of statistical fit for each Division.

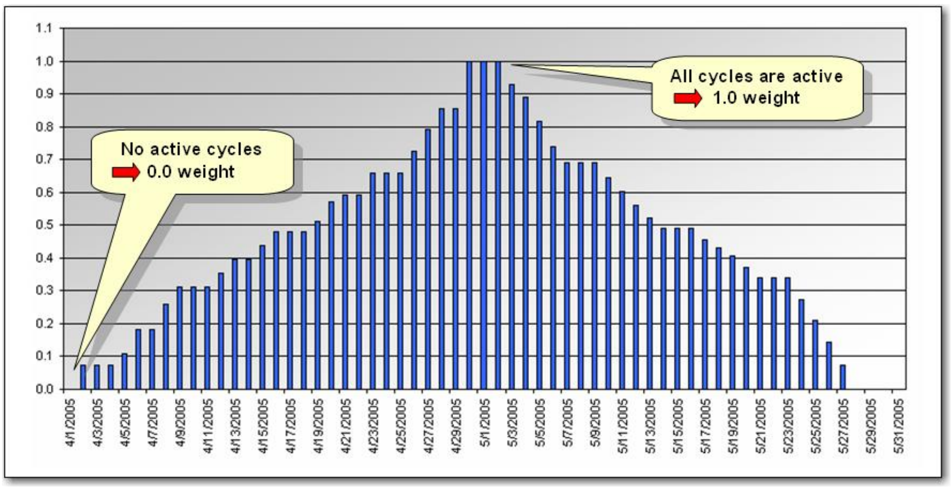
TABLE 11: HDD TEMPERATURE BREAKPOINTS

DivNumber	DivName	HDD
1	Dade-Broward	85
2	Tampa	75
3	St Pete	75
4	Orlando	75
5	Eustis	65
6	Jacksonville	60
8	Lakeland	65
9	Daytona	65
10	Avon Park	75
11	Sarasota	85
13	Jupiter	85
14	Panama City	65
15	Ocala	65
16	Ft Myers	85

Cycle-Weighted HDD. Billed-month sales includes sales from the current and prior calendar months. January billed sales for example, includes sales that occurred in calendar-month December and calendar-month January. This is a result of how meters are read. Customer meters are generally read over 21 billing periods or cycles, which spread meter reading and processing over the month. The first billing cycle is on the first-week day of the month; most of the consumption will be from the prior month. The last billing cycle is mostly consumption from the current month as it falls on the last workdays of the month. The other 19 billing cycles will include billing days in both current and prior month. Depending on the day that meters are read, a billing cycles can span 28 to 33 days.

Monthly HDD and billing days are inputs in the average use models. From a modeling perspective, it is important that the monthly HDD and number of billing days are aligned with the billing month period. To calculate cycle-weighted or billing month HDD (and number of billing days), the meter read cycle start-dates and end-dates are used to calculate a daily weight that reflects the number of cycles that are active on each day. On any given day, one or more billing cycle is collecting daily usage data or is “active”. The daily wight is calculated by dividing the number active cycles by 21 (the number of total cycles). On the first day, only Cycle 1 is active. The weight for that day is 1/21 or .048. On the second day, the second and first cycles are active; the weight for the second day is 2/21 or .095. This continues over the billing month period as illustrated in Figure 26.

FIGURE 26: CYCLE WEIGHT EXAMPLE



In the middle of the period, all cycles are active, resulting in a daily weight of 1 (21 active cycles/ 21 total cycles). The daily cycle-weighted HDD is calculated by multiplying the daily HDD and the daily cycle weight. The monthly cycle-weighted HDD is then derived by summing the daily weighted HDD days over the billing month period. As a rough estimate, the cycle-weighted (or billing-month) HDD includes half the daily degree days from the prior month and half from the current month.

Normal HDD. Normal HDDs are used in isolating the weather-related "noise" in the historical data and developing forecasts that reflect expected future weather conditions. The standard approach is to assume that expected weather conditions in any one period of time will look like the average over a historical time period. PGS, Tampa Electric, and numerous other utilities us a twenty-year period to define normal weather. For the PGS forecast, the twenty-year period is 2002 to 2021. Normal HDDs are calculated by first constructing daily HDD from the historical daily average temperature data. The daily HDD are then averaged across the twenty year period by date – all the January 1st HDD are averaged, January 2nd, …. through December 31st. This results in a daily average or normal HDD series. Separate daily normal HDD series are generated for each temperature breakpoint (e.g., 60 degrees, 65 degrees, 70 degrees). Figure 27 shows the daily normal HDD series for Jacksonville.

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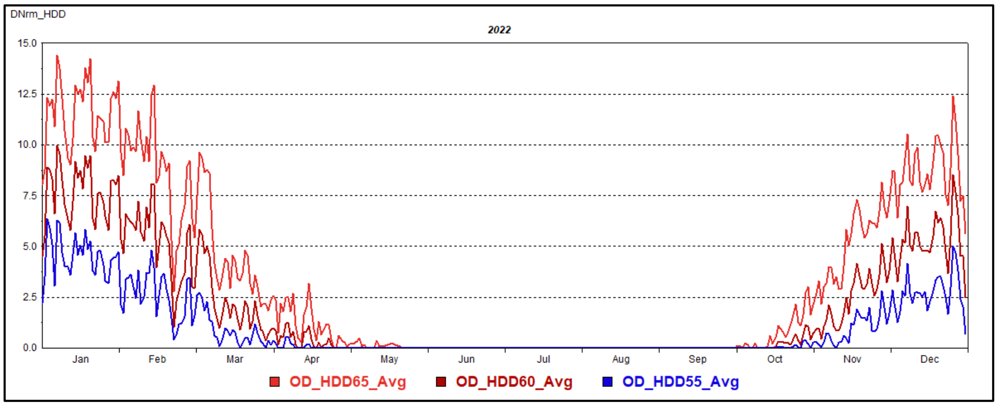
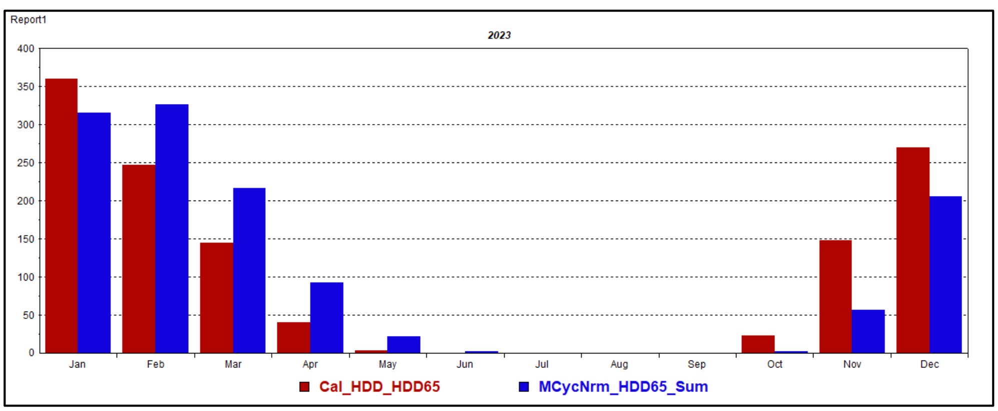
FIGURE 27: JACKSONVILLE DAILY NORMAL HDD



*Daily normal HDD are calculated for each Division.

As in the calculation of actual HDD, the normal HDD are cycle-weighted to reflect the billing month period. Figure 28 compares calendar-month HDD (in red) with the cycle-weighted HDD (in blue).

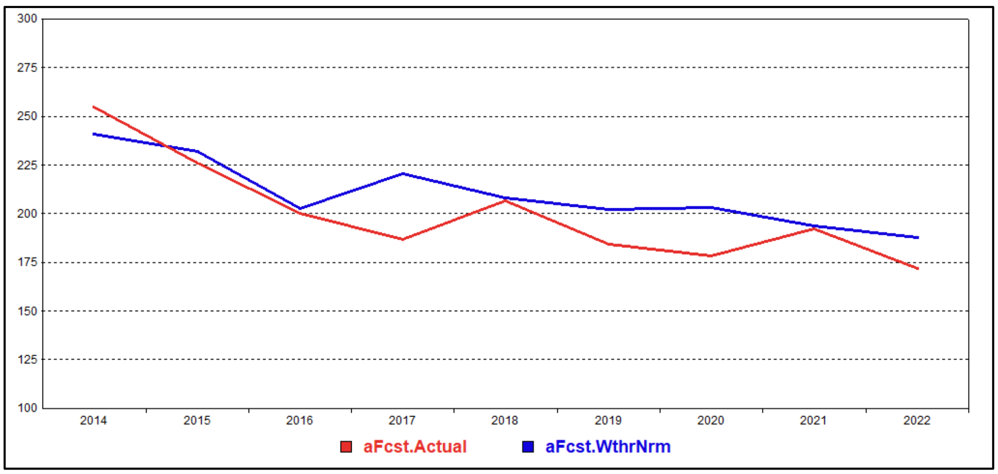
FIGURE 28: JACKSONVILLE MONTHLY NORMAL HDD (BASE 65)



While on a calendar-month basis, January is on average the coldest month of the year, on a billing-cycle basis, the coldest month is February. Most of the daily HDD for billing-month February comes from the last half of January and the first half of February.

Weather Normalization. Weather normalization is a key process in evaluating and understanding energy usage trends. Weather normalization involves isolating monthly variation due to weather (as much as possible) in order to visualize and understand gas usage trends. Historical average use and sales are weather normalized using the estimated average use models. The weather impact is calculated as the difference between what the model predicts with actual weather and what the model predicts with normal weather. Monthly normal average use is then derived by subtracting the weather impact from actual average use. Figure 29 shows Jacksonville residential average (in red) against weather normal average use (in blue).

FIGURE 29: JACKSONVILLE RESIDENTAIL AVERAGE USE

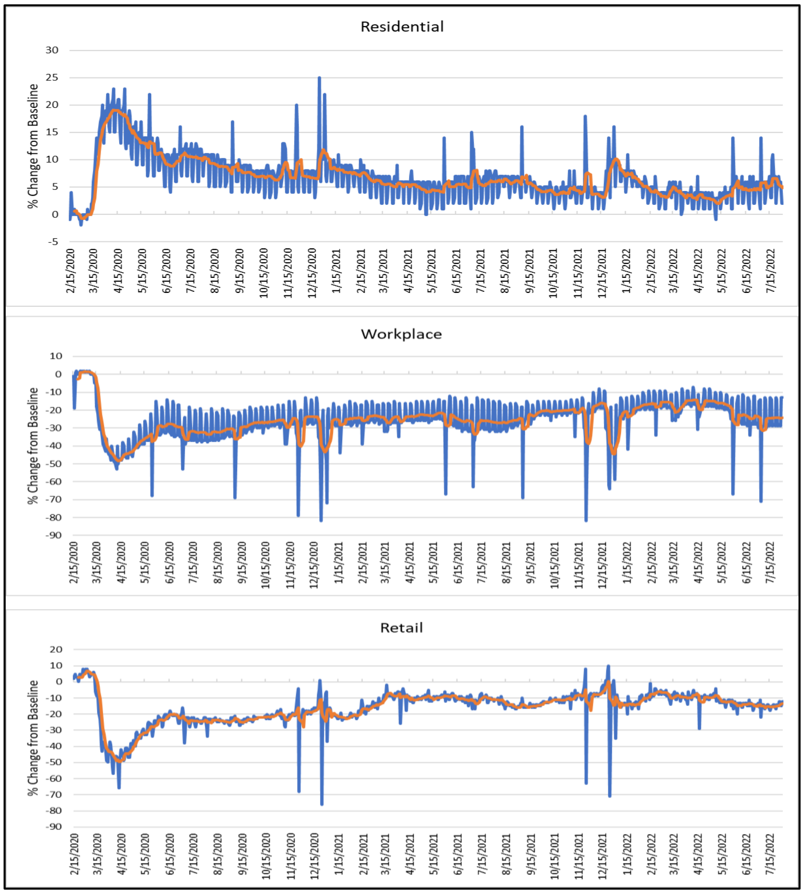


While both actual and weather normal show a downward trend in average use, the weather-normal trend is more obvious. Normalized average use declines from 225 therms in 2017 to less than 200 therms in 2022. The decline in usage can mostly be explained by improvements in heating system efficiency and water heating to a lesser extent.

3.4 COVID-19 IMPACT

Starting in March 2020, Florida and other state governments issued "work at home" mandates. Travel was also limited. The impact is that utilities saw a significant drop in commercial energy use (both gas and electricity) and an increase in residential customer use. Since then, there has been a variable recovery to pre-COVID levels of home and business activity. The transition back has been relatively slow, as many businesses have adopted hybrid work models and general business and tourism travel is slowly recovering. One variable that has tracked customer energy use well is the Google Mobility Index. At the beginning of the pandemic, Google began collecting and making available data that reflected people's home, work, retail, and recreation locations. This data was made available by region and state. The indices measured the daily change in people's location relative to pre-COVID locations. Florida residential mobility data is used in constructing the COVID residential model variable and combination of the work and retail index for constructing the commercial COVID variable. Figure 30 shows the Florida mobility data.

FIGURE 30: GOOGLE MOBILITY DATA (FLORIDA)



The blue lines are the actual daily reads, and the orange lines are weekly moving-averages. To smooth out the noise, the weekly daily moving average is used in constructing the COVID model variables. Figure 31 shows the constructed COVID model variables.

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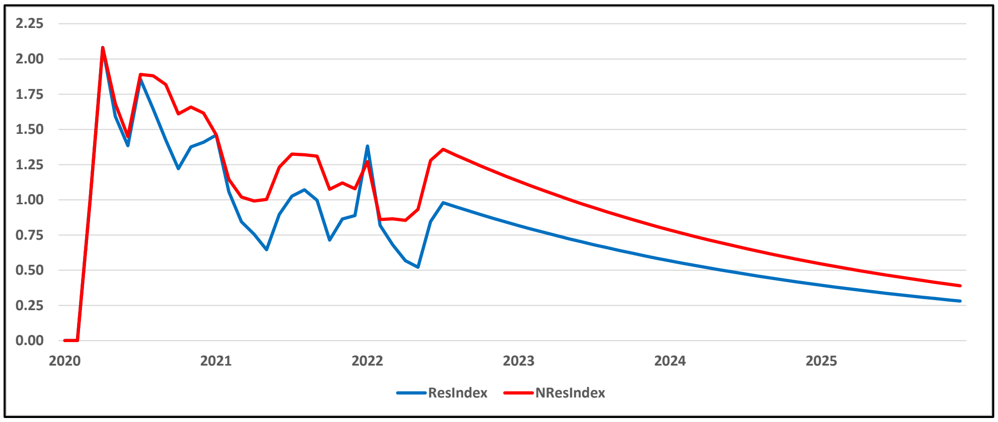
FIGURE 31: COVID MODEL VARIABLES



The last actual data point is July 2022 (the end of the model estimation period). We assume that we slowly trend back to the pre-COVID base, but do not totally get there over the forecast period; some fraction of customers will likely continue to work at home as companies embrace the hybrid work model.

The largest impact happens in the near-term (2022 through 2024) as depicted in Figure 32 and Figure 33. The blue line shows the predicted residential and commercial average use for Tampa. The red line shows the impact of the COVID model variables.

FIGURE 32: TAMPA RESIDENTIAL COVID IMPACT (THERMS)

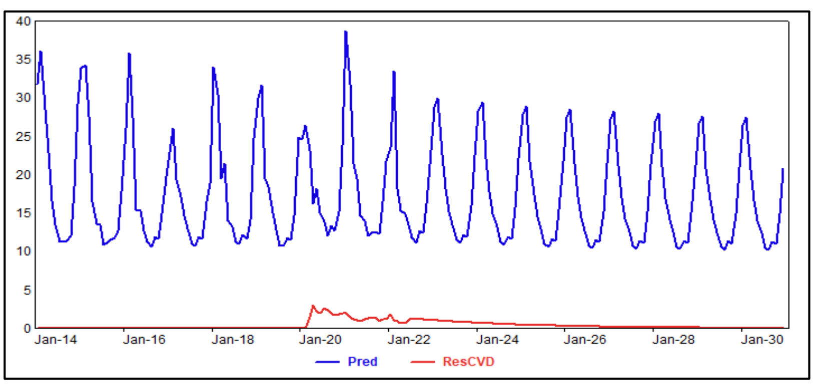
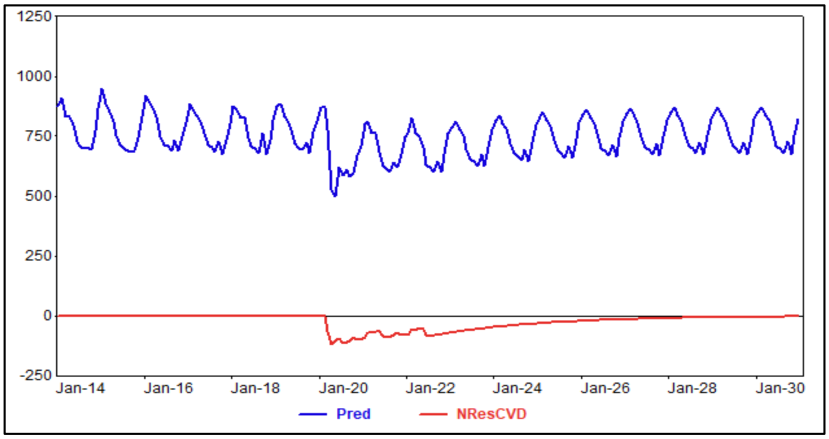


FIGURE 33: TAMPA COMMERCIAL COVID IMPACT (THERMS)



4 SUMMARY

Given economic and population projections, along with COVID recovery in the commercial sector, we expect to see continued strong growth in gas sales led by new gas customer connections. By 2024, PGS is expected to add over 31,000 new residential customers and 1,300 commercial customers. There is likely to be near-term COVID resets in both commercial (higher) and residential (lower) use as home and business activity recover from the pandemic. Over the long-term residential, average use will decline and commercial average use growth will slow as improvements in end-use efficiency outweigh positive economic impact on usage. Sales are largely driven by customer growth. Test-year 2024 residential sales are expected to reach 111,861 thousand therms and commercial sales 330,390 thousand therms. On a weather normalized basis, this represents a 5.6% increase over 2022.

The forecast is based on a set of average use and customer models that are both theoretically and statistically strong, driven by reasonable household and employment growth projections, state economic forecasts, end-use efficiency trends, normal weather conditions, and COVID impact trends. The model inputs are derived from highly regarded data sources including Woods & Poole, Moody's Analytics, The Energy Information Administration, and Google Mobility Data.

Constructed SAE models are based on an end-use modeling framework developed by Itron. It is an end-use modeling approach that has been adopted by numerous utilities in the U.S. and Canada. The strength of the SAE model is that it combines structural trends such as thermal shell efficiency, square footage, end-use intensity trends with model variables that drive month-to-month utilization including weather, economic activity, and price.

The SAE model has been successfully used in regulatory filings supporting both rate case and Integrated Resource Plans (IRP). The PGS models provide a solid foundation for determining 2024 test-year revenues.