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March 12, 2021

VIA ELECTRONIC FILING

Adam Teitzman, Commission Clerk
Division of the Commission Clerk and Administrative Services
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Docket No. 20210015-EI
Petition by FPL for Base Rate Increase and Rate Unification

Dear Mr. Teitzman:

Attached for filing on behalf of Florida Power & Light Company ("FPL") in the above-referenced docket are the Direct Testimony and Exhibits of FPL witness Jun K. Park.

Please let me know if you should have any questions regarding this submission.

(Document 15 of 69)

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Wade Litchfield', written in a cursive style.

R. Wade Litchfield
Vice President & General Counsel
Florida Power & Light Company

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION
FLORIDA POWER & LIGHT COMPANY
DIRECT TESTIMONY OF JUN K. PARK
DOCKET NO. 20210015-EI
MARCH 12, 2021

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I. INTRODUCTION AND SUMMARY

Q. Please state your name and business address.

A. My name is Jun K. Park, and my business address is Florida Power & Light Company, 700 Universe Boulevard, Juno Beach, Florida 33408.

Q. By whom are you employed and what is your position?

A. I am employed by Florida Power & Light Company (“FPL” or the “Company”) as the Manager of Load Forecasting.

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

A. I am responsible for the development of the customer, energy sales, and peak demand forecasts for FPL and Gulf Power (“Gulf”).

Q. Please describe your educational background and professional experience.

A. I graduated from the University of Alabama at Birmingham with a Bachelor of Science degree in Finance. I started my electric utility career in 1999 with Southern Company. Over the course of my career, I have held various positions with forecasting and analytical responsibilities, including forecasting wholesale energy prices, coordinating the development of price forecasts for fuel commodities and emissions allowances, and developing long-term energy and peak demand forecasts. I began leading Gulf’s forecasting team in 2014. In January 2019, Gulf was acquired by NextEra Energy, Inc., which also owns FPL. In the third quarter of 2019, the load forecasting teams for FPL and Gulf were consolidated, and I became the manager of the consolidated team.

1 **Q. Are you sponsoring any exhibits in this case?**

2 A. Yes. I am sponsoring the following exhibits:

3 • Exhibit JKP-1 Consolidated MFRs Sponsored or Co-sponsored by Jun

4 K. Park

5 • Exhibit JKP-2 Supplemental FPL and Gulf Standalone Information in

6 MFR Format Sponsored or Co-sponsored by Jun K. Park

7 • Exhibit JKP-3 Historical and Forecasted Consolidated FPL Customers

8 • Exhibit JKP-4 Historical and Forecasted Consolidated FPL Retail

9 Delivered Sales

10 • Exhibit JKP-5 Forecasted Consolidated FPL Summer Peak Demands

11 **Q. Are you sponsoring or co-sponsoring any consolidated Minimum Filing**

12 **Requirements (“MFRs”) in this case?**

13 A. Yes. Exhibit JKP-1 lists the consolidated MFRs that I am sponsoring and co-

14 sponsoring.

15 **Q. Are you sponsoring or co-sponsoring any schedules in “Supplement 1 –**

16 **FPL Standalone Information in MFR Format” and “Supplement 2 – Gulf**

17 **Standalone Information in MFR Format”?**

18 A. Yes. Exhibit JKP-2 lists the supplemental FPL and Gulf standalone information

19 in MFR format that I am sponsoring and co-sponsoring.

20 **Q. Have you previously provided testimony to the Florida Public Service**

21 **Commission (“FPSC” or the “Commission”)?**

22 A. Yes. I provided direct testimony and sponsored MFRs as the load forecasting

23 witness in Gulf’s 2016 rate case, Docket No. 160186-EI.

1 **Q. Please explain how you will be referring to FPL and Gulf in your**
2 **testimony.**

3 A. Gulf was acquired by FPL’s parent company, NextEra Energy, Inc., on January
4 1, 2019. On January 1, 2021, FPL and Gulf were legally merged but maintained
5 their status as separate ratemaking entities. In this proceeding, FPL is seeking
6 to consolidate the FPL and Gulf rates into a single FPL rate-regulated entity
7 effective January 1, 2022.

8
9 For purposes of my testimony, operations or time periods prior to January 1,
10 2019 (when Gulf Power Company was acquired by FPL’s parent company,
11 NextEra Energy, Inc.), “FPL” and “Gulf” will refer to their pre-acquisition
12 status, when they were legally and operationally separate companies. For
13 operations or time periods between January 1, 2019 and January 1, 2022, “FPL”
14 and “Gulf” will refer to their status as separate ratemaking entities, recognizing
15 that they were merged legally on January 1, 2021 and consolidation proceeded
16 throughout this period. Finally, in discussing operations or time periods after
17 January 1, 2022, most references will be only to “FPL” because Gulf will be
18 consolidated into FPL. Therefore, unless otherwise noted, my testimony
19 addresses requests for the consolidated Company.

20 **Q. What is the purpose of your testimony?**

21 A. The purpose of my testimony is to sponsor and explain the customer, energy
22 sales, and peak demand forecasts for the consolidated FPL system for the 2022
23 test year and 2023 subsequent year. My testimony also supports the inflation

1 forecast used as part of the budgeting process and for computing the
2 Commission's Operations and Maintenance ("O&M") Benchmark.

3 **Q. Please summarize your testimony.**

4 A. My testimony begins with an overview of the current economic conditions for
5 the FPL and Gulf service areas, including how the unprecedented COVID-19
6 pandemic has affected the economies and customers in those areas, as well as
7 the inflation forecast. Next, I provide an overview of the processes used to
8 develop the consolidated forecasts for customers, energy sales, and peak
9 demands and how these processes are fundamentally sound and consistent with
10 the criteria used by the Commission in evaluating forecasts. The overview
11 concludes with a brief discussion regarding the ways weather affects electricity
12 usage and how FPL's normal weather method and use of weather-normalized
13 historical data are consistent with industry best practices.

14
15 The next portion of my testimony discusses the customer forecasts along with
16 the factors that drive customer growth. The consolidated annual average
17 forecasts of total FPL customers are 5,717,534 and 5,785,456 for 2022 and
18 2023, respectively.

19
20 My testimony then discusses the energy sales forecasts and the methods,
21 models, and inputs used to develop those forecasts. The consolidated total FPL
22 retail delivered energy sales forecasts, including incremental Demand Side
23 Management ("DSM"), are 122,083 GWh and 122,980 GWh in 2022 and 2023,

1 The Great Recession, which lasted from December 2007 through June 2009,
2 affected Florida's economy to a greater degree than other parts of the US.
3 Between the first quarter of 2007 and the first quarter of 2010, Florida's total
4 nonfarm employment fell 11.4 percent compared to the U.S.'s decline of 5.7
5 percent. Florida continued to see lingering impacts on its economy well beyond
6 the end of the recession, with employment not recovering back to pre-recession
7 levels until mid-2015. Starting in the first quarter of 2016 through the fourth
8 quarter of 2019, Florida's economy gained momentum as employment grew
9 cumulatively 8.7 percent while the U.S. employment grew 5.8 percent.
10 However, growth halted in 2020 due to the COVID-19 pandemic and the
11 shelter-in-place orders that were implemented to mitigate the virus's spread.
12 This unprecedented shock to Florida's economy caused Florida's nonfarm
13 employment to decline by 13.0 percent by the end of April. Over the next three
14 months, Florida saw a slight rebound, with nonfarm employment growth of 4.5
15 percent during this period. Despite the rebound, nonfarm employment was still
16 down 6.6 percent from the start of the year. Starting in August, the beginning
17 point of the forecast, through the end of 2023, Florida's nonfarm employment
18 is expected to grow at an average of 2.7 percent per year. The COVID-19
19 pandemic is also affecting Florida's population growth. Through 2023,
20 population is projected to grow at an average annual rate of 1 percent, compared
21 to the average annual growth rate of 1.4 percent for the period from 2016
22 through 2019.
23

1 **Q. Has the COVID-19 pandemic affected energy usage?**

2 A. Yes. The shelter-in-place orders and associated business closures resulted in
3 significant reductions to commercial and industrial energy usage. However,
4 those very same restrictions resulted in increases to residential energy usage as
5 customers were spending more time at home. These impacts began to affect
6 usage patterns beginning in March 2020 and continued through the third quarter
7 of 2020. As the economy begins to recover from the impacts of the pandemic,
8 usage patterns are expected to return to more normal patterns. The impacts of
9 COVID-19 to date, and the projected recovery are captured in the forecasts.

10 **Q. What is the basis for the economic projections?**

11 A. The economic projections used for the customer, energy sales, and peak demand
12 forecasts are from IHS Markit's August 2020 economic forecast, while the CPI
13 projections are from IHS Markit's May 2020 economic forecast. IHS Markit is
14 a recognized industry expert who has consistently provided objective and
15 reliable economic projections.¹ FPL has relied on projections from IHS Markit
16 for forecasting and budgeting purposes, including for FPL's 2012 and 2016 rate
17 cases.

18

19 **Overview of Inflation Forecast**

20 **Q. What inflation measure is used by FPL for budgeting purposes?**

21 A. For its budgeting process, FPL uses IHS Markit's forecast of Consumer Price
22 Index ("CPI") for all goods and services, which is also called overall CPI. This

¹ S&P Global and IHS Markit, two of the largest providers of financial data, announced in November 2020 an agreement to merge.

1 same CPI is also used when calculating the O&M Benchmarks. As previously
2 discussed, the CPI projections are from IHS Markit's May 2020 economic
3 forecasts. FPL's budgeting process begins earlier than the load forecasting
4 process, and that is the reason why the budgeting process uses a different
5 vintage of IHS Markit's economic forecast compared to the load forecasting
6 process. This difference between the vintages for the CPI projections and the
7 economic projections used for load forecasting is consistent with prior planning
8 processes, including that used for FPL's 2016 rate case.

9 **Q. What has been the historical trend for inflation?**

10 A. Over the past 15 years, overall CPI has seen a cumulative increase of 28.1
11 percent. However, there are significant differences between the increase in
12 overall CPI versus the subcategories that make up overall CPI. For example,
13 over the same time period, food & beverage has increased by 35.8 percent,
14 housing has increased by 33.4 percent, and medical care has increased by 54.2
15 percent.

16 **Q. What is the forecast for inflation for 2022 and 2023?**

17 A. Overall CPI is projected to increase by 1.7 percent and 0.8 percent in 2022 and
18 2023, respectively. The cumulative increase from 2021 through 2025 is
19 projected to be 5.8 percent.

20

21 **Overview of Forecast Methodology**

22 **Q. What is the objective of the load forecasting process?**

23 A. The objective of FPL's load forecasting process is to produce reliable, unbiased

1 forecasts of customers, energy sales, and system peak demands for the FPL
2 system.

3 **Q. Please explain how customers, sales and peak demands are defined.**

4 A. Customer forecasts reflect the total number of active accounts served by FPL
5 and include the impacts of new service installations combined with other
6 factors, including changes in the number of inactive accounts. Retail delivered
7 energy sales reflect the amount of energy provided to all retail customers served
8 by FPL. Net Energy for Load (“NEL”) is another measure of energy sales that
9 takes into account the Megawatt Hours (“MWh”) FPL provides to its retail and
10 wholesale customers as well as system losses and energy used by company-
11 owned facilities. Peak demands refer to the highest hourly integrated net energy
12 for load over a given period of time.

13 **Q. How were the consolidated customer, energy sales, and peak demand
14 forecasts developed?**

15 A. The consolidated customer, energy sales, and peak demand forecasts were all
16 developed by combining the respective standalone forecasts for FPL and Gulf.
17 The consolidated FPL forecasts for customers and energy sales are the simple
18 sums of the respective standalone FPL and Gulf forecasts, while the
19 consolidated FPL forecast of peak demands also takes into account the impacts
20 of peak demand diversity, which is described later in my testimony.

21 **Q. Please summarize how the customer, energy sales, and peak demand
22 forecasts were developed.**

23 A. The forecasts were developed using econometric models as the primary tool.

1 The various econometric models are statistically sound and include logically
2 reasonable drivers obtained from leading industry experts. This approach
3 provides accurate forecasts that are used for all business purposes. Detailed
4 explanations for these models and their respective drivers, along with historical
5 forecast accuracies, are provided later in my testimony.

6 **Q. What statistical measures were used to evaluate the robustness of those**
7 **forecast models?**

8 A. Consistent with industry standard practices, FPL used adjusted R-squared,
9 Mean Absolute Percent Error (“MAPE”), and the Durbin-Watson statistic to
10 evaluate the robustness and accuracy of its forecast models. Additionally, the
11 variables included in each model were also evaluated using the p-values for
12 each variable. Below are descriptions of each statistical measure:

- 13 • The adjusted R-squared is a measure that quantifies how much of the
14 variations in history are explained by the models. Adjusted R-squared
15 values range from 0 to 100 percent, and higher values are preferred.
- 16 • MAPE is a measure of model residuals, which are the differences
17 between the model’s estimate for a historical period versus the actual
18 historical value. The residuals are expressed on an absolute percentage
19 basis and then averaged. MAPE values range from 0 percent and
20 upward, and lower values are preferred.
- 21 • Durbin-Watson is a measure of serial correlation in the model’s
22 residuals, where serial correlation is when the residual in one period is
23 highly correlated to residuals in prior periods. Ideally, model residuals

1 should have a random pattern. Durbin-Watson statistic values range
2 from 0 to 4, and 2 is the preferred value.

3 • P-value is a measure which indicates the statistical significance of a
4 variable to the model. P-values range from 0 to 100 percent, and lower
5 values are preferred.

6 **Q. Is this approach consistent with criteria used by the Commission in recent**
7 **years to evaluate utilities' forecasts?**

8 A. Yes. The Commission has evaluated utilities' forecasts based on the use of
9 statistically sound forecasting methods and reasonable input assumptions (*e.g.*,
10 Order Nos. PSC-16-0032-FOF-EI, PSC-14-0590-FOF-EI, PSC-13-0505-PAA-
11 EI, PSC-12-0179-FOF-EI, PSC-12-0187-FOF-EI, PSC-09-0283-FOF-EI and
12 PSC-08-0518-FOF-EI). The Commission has also considered whether a
13 forecast is applied consistently; that is, whether a forecast used for one purpose,
14 such as a rate filing, is the same forecast used for other purposes, such as
15 generation planning (Order No. PSC-09-0283-FOF-EI). Lastly, the
16 Commission has considered a utility's record of forecasting accuracy when
17 evaluating forecasts (Order No. PSC-16-0032-FOF-EI).

18 **Q. Did you develop customer, energy sales, and peak demand forecasts in**
19 **support of FPL's request for approval of a Solar Base Rate Adjustment**
20 **mechanism for years 2024 and 2025?**

21 A. Yes. I developed the customer, energy sales, and peak demand forecasts for
22 years 2021 through 2025 using actual data through August 2020 and IHS

1 Markit’s August 2020 economic projections. The consolidated forecasts for
2 years 2024 and 2025 are provided in exhibits JKP-3, JKP-4, and JKP-5.

3

4 **Overview of Weather**

5 **Q. What is the role of weather in the load forecasting process?**

6 A. Weather is a key driver for both energy sales and peak demands. Electricity
7 sales will increase during periods of warm weather due to higher cooling load,
8 which is additional electricity usage due to higher air conditioning usage.
9 Energy sales will also increase during periods of cold weather due to higher
10 heating load, which is additional electricity usage due to increased usage of
11 electric heating. Peak demands are also affected by weather; however, for any
12 given historical period, weather can have differing impacts on energy sales
13 versus peak demands. This is because peak demands are the highest hourly
14 energy usage, which means peak demands are affected by short-term weather
15 patterns. Energy sales, on the other hand, are the cumulative energy used over
16 a period of time, so energy sales are impacted by weather patterns that occur
17 over longer periods of time.

18 **Q. How are the impacts of weather captured in the load forecasting process?**

19 A. Weather impacts are captured in the load forecasting process by first identifying
20 the appropriate sources for weather data. Next, historical weather variables
21 specific to each model are then calculated and included in the respective
22 models. Finally, projected values for each weather variable, or “normal
23 weather,” are then calculated using the historical weather data.

1 **Q. What are the sources for the weather data?**

2 A. Consistent with industry standard practice, all historical weather data is based
3 on weather observations from the National Oceanic and Atmospheric
4 Administration (“NOAA”). The historical weather for the FPL service area is
5 based on a system average temperature using the weather data from the Miami,
6 West Palm Beach, Fort Myers, and Daytona Beach weather stations. The
7 weightings for each weather station are based on the proportion of total FPL
8 load served in the area represented by that weather station. The historical
9 weather for the Gulf service area is based on the Pensacola weather station.

10 **Q. What are the weather variables used in the forecasting process?**

11 A. The energy sales forecast models use cooling degree hours and heating degree
12 hours, while the peak demand models use peak day hourly temperatures or
13 degree hours. Cooling degree hours are a cumulative measure of temperatures
14 above the temperature threshold where cooling load increases, and heating
15 degree hours are a cumulative measure of temperatures below the temperature
16 threshold where heating load increases. Since energy sales are a cumulative
17 measure of energy sales over a given time period, cooling degree hours and
18 heating degree hours are appropriate weather variables for energy sales models.
19 Unlike energy sales, peak demand is the highest hourly integrated demand
20 during a given time period; therefore, peak day hourly temperatures or degree
21 hours are the appropriate weather variables for peak demand models. Detailed
22 descriptions for each of the weather variables are provided later in my
23 testimony.

1 **Q. How is normal weather calculated?**

2 A. Normal weather is calculated as the average of the most recent 20 years of
3 historical weather.

4 **Q. Is 20-year normal weather consistent with standard industry practice?**

5 A. Yes. Although there may be some exceptions, the 20-year normal weather is a
6 widely used industry practice. FPL and Gulf, along with Tampa Electric
7 Company, have relied on 20-year normal weather for forecasting and weather
8 normalization. The use of 20-year normal weather is appropriate because it
9 provides stability to the weather assumptions, which in turn provides greater
10 stability to the load forecasts, and this stability is especially important given the
11 inherent volatility of weather.

12 **Q. What is weather normalization?**

13 A. Weather normalization refers to the process of adjusting actual energy sales or
14 peak demands to reflect average, or normal weather. For example, the weather
15 in the FPL service area was warmer than normal during 2019 and this warmer
16 than normal weather resulted in higher energy sales for FPL during 2019. The
17 first step in weather normalizing 2019 energy sales is to compare 2019 actual
18 weather versus normal weather. The energy sales impact of the difference is
19 then quantified using energy sales models. Finally, the impacts of weather are
20 removed from 2019 actual energy sales to arrive at 2019 weather normalized
21 sales.

22 **Q. Why is it necessary to use weather-normalized historical data?**

23 A. The use of weather-normalized historical data is necessary when calculating

1 growth rates. If the growth rates are calculated using historical data that is not
2 weather-normalized, the resulting calculated growth rates will be affected by
3 the variability of weather. Weather normalizing historical data removes the
4 variability of weather and the resulting growth rates reflect the true underlying
5 growth trends. Similarly, weather-normalized historical data is also necessary
6 when determining the accuracy of a forecast.

7 **Q. Is the use of weather-normalized data an industry best practice?**

8 A. Yes. It is an industry best practice to use weather-normalized data when
9 calculating growth rates and determining forecast accuracy. For example,
10 electric utilities in Florida have relied on weather-normalized sales variances in
11 their rate filings consistent with the Commission's policy that rates be based on
12 weather-normalized sales (Order No. PSC-11-0103-FOF-EI).

13

14

III. CUSTOMER FORECAST

15

16 **Customer Forecast Overview**

17 **Q. What is the objective of the customer forecast process?**

18 A. The objective of the customer forecast process is to produce reliable, unbiased
19 forecasts for the number of total customers and retail customers by revenue
20 class, where a customer is defined as an active service account.

21 **Q. What are the forecasts for total customers for 2022 and 2023?**

22 A. Table JKP-1 summarizes the total customer forecasts for 2022 and 2023.

Table JKP-1		
Total Customer Forecasts		
	2022	2023
Standalone FPL	5,238,591	5,301,693
Standalone Gulf	478,943	483,764
Consolidated FPL	5,717,534	5,785,456

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4

Additionally, Exhibit JKP-3 shows the consolidated forecasts for years 2024 and 2025, along with historical customer data beginning 2010. The historical customer data was developed by summing the FPL and Gulf customers.

5

Q. What are the drivers of the customer forecast?

6

A. The primary driver of the customer forecast is the number of households, where a household is a separate living arrangement for one or more persons. Households are directly related to residential customers, and residential customers make up the majority of total customers. Other factors that drive the customer forecast are retail sales activity and housing starts, which is a function of new construction activity. Retail sales activity drives the commercial customer forecast because changes in retail sales activity affect the number of commercial businesses. Housing starts drive the industrial customer forecast primarily associated with new construction activity.

15

Q. Have any other factors influenced customer growth in recent years?

16

A. Yes. One factor specific to FPL was initiated in the second half of 2013. FPL began using Automated Metering Infrastructure (“AMI” or “smart meter”) technology to reduce the number of unknown usage (“UKU”) premises. A UKU premise is a location where electricity is being consumed without an active customer account. If a UKU premise was identified, the occupants of the premise would have to open an account or have the electric service terminated.

21

1 This program was implemented beginning in the second half of 2013 and has
2 resulted in an increase in the number of active accounts.

3

4 Another factor that influenced Gulf's recent customer growth was Hurricane
5 Michael, which struck the eastern portion of the Gulf service area in October
6 2018. The Category 5 storm devastated the Panama City area, and significant
7 numbers of premises were temporarily or permanently destroyed, resulting in
8 substantial customer losses.

9

10 Recessions also affect customer growth. For example, the Great Recession,
11 which lasted from December 2007 through June 2009, caused severe
12 slowdowns in both FPL's and Gulf's customer growth rates for several years
13 after the end of the recession.

14

15 Finally, customer growth is affected by acquisitions. For example, the electric
16 utility customers previously served by the City of Vero Beach became FPL
17 customers in late 2018.

18 **Q. How was the consolidated customer forecast developed?**

19 A. The consolidated customer forecast was developed using a "bottom-up"
20 approach, where the total customer forecast is the sum of the customer forecasts
21 for the individual revenue classes. The revenue classes included in the total
22 forecast are residential, commercial, industrial, street & highway lighting,
23 railroads & railways, other, and wholesale requirements. The consolidated

1 revenue class customer forecasts were developed by summing the respective
2 standalone revenue class customer forecasts for FPL and Gulf. This approach
3 is consistent with the methodology used to develop the customer forecast
4 provided in the combined 2020-2029 Ten Year Site Plan for FPL and Gulf
5 (hereinafter, the “FPL/Gulf 2020 TYSP”) that was approved in the
6 Commission’s Review of the 2020 Ten-Year Site Plans of Florida’s Electric
7 Utilities, issued on October 6, 2020. The consolidated customer forecasts for
8 2022 and 2023 are shown in Table JKP-1 and Table JKP-14. Additionally,
9 Exhibit JKP-3 shows the consolidated customer forecasts for years 2024 and
10 2025, along with historical customer data beginning 2010. The historical
11 customer data was developed by summing the FPL and Gulf customers.

12 **Q. Have there been any changes to the customer forecast methodology since**
13 **the prior rate cases for either FPL or Gulf?**

14 A. Yes, certain changes described below were made beginning with the forecasts
15 presented in the FPL/Gulf 2020 TYSP. These changes are reasonable and
16 ensure that the standalone FPL and Gulf customer forecasts employ the same
17 methodology.

18
19 In its 2016 rate case, FPL used a “top-down” approach to develop its customer
20 forecast, where the number of total customers was forecasted using a regression
21 model. The customer forecasts for the residential and commercial revenue class
22 were then adjusted by the difference between the sum of the revenue class
23 forecasts and the total customer forecast. The current customer forecast is based

1 on a “bottom-up” approach used by Gulf, which is described in more detail later
2 in my testimony. FPL’s adoption of the bottom-up approach allows the
3 customer forecasts to reflect better differences in growth rates between the
4 customer classes.

5
6 In its 2016 rate case, residential customers for Gulf were forecasted based on
7 inputs from Gulf’s field marketing managers for the first two forecast years and
8 then tied to household growth for subsequent years. Commercial customers for
9 Gulf were forecasted based on inputs from Gulf’s field marketing managers for
10 the first forecast year and then tied to residential customer growth for
11 subsequent years. Industrial customers for Gulf were forecasted based on
12 inputs from Gulf’s field marketing managers for the first forecast year and then
13 grown based on historical trends. The customer forecast methodology used in
14 this proceeding adopts FPL’s approach and relies on multiple linear regression
15 (or “regression”) models or exponential smoothing (or “exponential”) models
16 for the entire forecast period. Gulf’s adoption of models for forecasting
17 customers improves productivity while still providing accurate forecasts.

18 **Q. Does the current method provide accurate customer forecasts?**

19 A. Yes. The accuracy of the current method is demonstrated by comparing the
20 2020 actuals with the forecasts developed for the FPL/Gulf 2020 TYSP using
21 the same method, which were within 0.4 and 0.3 percent for FPL and Gulf,
22 respectively.

23

1 **Residential Customer Forecasts**

2 **Q. How was the consolidated residential customer forecast developed?**

3 A. The consolidated residential customer forecast was developed by summing the
4 standalone FPL and Gulf residential customer forecasts. These standalone
5 forecasts were developed using two regression models, one for each of the
6 companies, and the primary driver for each model was the number of
7 households.

8 **Q. What is the relationship between the number of households and
9 population?**

10 A. The number of households is directly related to population and the only
11 differentiating factor is the number of persons per household. If the number of
12 persons per household is constant, then household growth is the same as
13 population growth. But if the number of persons per household is decreasing,
14 then the household growth will be higher than population growth. A slight
15 decrease in the number of persons per household is projected over the next few
16 years as the economy is projected to begin to recover, and the result is that the
17 number of households are projected to grow slightly faster than population
18 growth.

19 **Q. What was the source of the household growth projections?**

20 A. The household growth projections used in the models were from the August
21 2020 economic projections provided by IHS Markit. Both FPL and Gulf have
22 relied on economic projections from IHS Markit for a number of years,
23 including the forecasts provided in the FPL/Gulf 2020 TYSP.

1 **Q. Do the residential models rely on additional variables beyond households?**

2 A. Yes. Along with households, the standalone FPL residential customer forecast
3 regression model also included two lagged dependent variables, a variable for
4 unknown usage premises (previously described in my testimony) and binary
5 terms. The other variables included in the standalone Gulf residential customer
6 forecast were a lagged dependent variable, a binary term, and two moving
7 averages to address serial correlation in model residuals. A detailed list of all
8 variables, including descriptions, is provided in MFR F-5.

9 **Q. Are the residential models statistically sound?**

10 A. Yes. Table JKP-2 summarizes the adjusted R-squared (“R²”), MAPE, and
11 Durbin-Watson (“D-W”) statistics for the residential models.

Table JKP-2			
Residential Customer Models			
	R²	MAPE	D-W
Standalone FPL	99.99%	0.05%	2.00
Standalone Gulf	99.94%	0.07%	1.87

12

13 These statistics indicate both models display excellent goodness of fit, have
14 minimal model residuals, and have insignificant serial correlation.

15

16 **Commercial Customer Forecasts**

17 **Q. How was the consolidated commercial customer forecast developed?**

18 A. Similar to the residential customer forecast, the consolidated commercial
19 customer forecast was developed by summing the standalone FPL and Gulf
20 commercial customer forecasts. These standalone forecasts were developed
21 using two exponential models and two regression models.

1 **Q. Please describe the commercial customer exponential models.**

2 A. One exponential model was used to forecast large commercial customers
3 (customers on demand rates of 500 kW and above) for FPL, and another
4 exponential model was used to forecast large commercial customers (customers
5 25 kW or greater) for Gulf.

6 **Q. Please describe the commercial customer regression models.**

7 A. One commercial regression model was used to forecast small/medium
8 commercial customers (customers on energy only rates and demand rates less
9 than 500 kW) for FPL, and another regression model was used to forecast small
10 commercial customers (customers less than 25 kW) for Gulf. A detailed list of
11 all model variables, including descriptions, is provided in MFR F-5.

12 **Q. Are these commercial customer models statistically sound?**

13 A. Yes. The statistics for the commercial customer models are shown in Table
14 JKP-3.

Table JKP-3				
Commercial Customer Models				
		R²	MAPE	D-W
Standalone FPL	Large	98.28%	0.34%	1.91
	Small/Medium	99.99%	0.04%	1.89
Standalone Gulf	Large	96.30%	0.15%	1.89
	Small	99.80%	0.26%	1.91

15

16 These statistical measures indicate the commercial customer models display
17 excellent goodness of fit, have minimal model residuals, and have insignificant
18 serial correlation.

19

20

1 **Industrial Customer Forecasts**

2 **Q. How was the consolidated industrial customer forecast developed?**

3 A. The consolidated industrial customer forecast was also developed by summing
4 the standalone FPL and Gulf industrial customer forecasts. These standalone
5 forecasts were developed using three exponential models and one regression
6 model.

7 **Q. Please describe the industrial customer exponential models.**

8 A. One exponential model was used to forecast medium industrial customers
9 (customers on demand rates less than 500 kW) for FPL, another exponential
10 model was used to forecast large industrial customers (customers on demand
11 rates 500 kW and above) for FPL, and a final exponential model was to forecast
12 industrial customers for Gulf.

13 **Q. Please describe the industrial customer regression model.**

14 A. A regression model was used to forecast small industrial customers (customers
15 on energy only rates) for FPL. The model variables were housing starts, lagged
16 dependent variables, and historical binary terms. A detailed list of all model
17 variables, including descriptions, is provided in MFR F-5.

18 **Q. Are the industrial customer models statistically sound?**

19 A. Yes. The statistics for the industrial customer models are shown in Table JKP-
20 4.

Table JKP-4				
Industrial Customer Models				
		R²	MAPE	D-W
Standalone FPL	Large	88.20%	0.75%	1.98
	Medium	94.96%	0.70%	2.00
	Small	99.78%	0.82%	1.96
Standalone Gulf	Industrial	95.96%	0.63%	2.00

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Customer Forecasts for All Other Revenue Classes

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Q. How were the consolidated forecasts for all other retail revenue classes developed?

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A. The other retail revenue classes are street & highway lighting, railroads & railways, and other. The street & highway lighting class forecasts for both standalone companies were provided by FPL’s Rate Development and Lighting teams regarding expected growth trends. The FPL customer forecasts for the railroads & railways and other revenue classes were developed using exponential models. Gulf does not have customers in the railroads & railways and other revenue classes.

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New Service Accounts Forecast

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Q. What is a new service account (“NSA”), and how is the NSA forecast used in this rate proceeding?

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A. A NSA is when service is established for the first time at a new premise. The

1 NSA forecast is used by various departments, including Power Delivery and
2 Financial Forecasting, as one of the indicators of future growth.

3 **Q. What are the NSA forecasts for 2022 and 2023?**

4 A. NSAs for 2022 and 2023 are forecasted to be 86,638 and 91,480, respectively.
5 Cumulative NSA growth from 2019 through 2023 is forecasted to be 425,497.

6 **Q. How was the consolidated NSA forecast developed?**

7 A. The consolidated NSA forecast was developed by summing the standalone FPL
8 and Gulf NSA forecasts. The standalone forecasts were developed using three
9 regression models.

10

11 The standalone FPL residential NSA regression model included variables for
12 income, housing starts, a binary term, and two autoregressive terms. The
13 standalone FPL commercial NSA regression model included variables for
14 housing starts, a lagged dependent variable, binary terms, and two
15 autoregressive terms.

16

17 The standalone Gulf residential NSA regression model included variables for
18 housing starts and an autoregressive term. The standalone Gulf commercial
19 NSA forecast was developed by multiplying the Gulf residential NSA forecast
20 by the FPL commercial versus residential NSA ratio.

21 **Q. Are the NSA models statistically sound?**

22 A. Yes. The statistics for the NSA models are shown in Table JKP-5.

Table JKP-5				
NSA Models				
		R²	MAPE	D-W
Standalone FPL	Residential	92.67%	12.96%	2.09
	Commercial	91.94%	10.75%	2.00
Standalone Gulf	Residential	79.96%	21.37%	2.37

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2

These statistical measures indicate the NSA models display excellent goodness of fit, have acceptable model residuals, and have little serial correlation.

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IV. ENERGY SALES FORECAST

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Energy Sales Forecast Overview

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Q. What is the objective of the energy sales forecast process?

9

A. The objective of the energy sales forecast process is to produce reliable, unbiased forecasts of all components of NEL. The components of NEL are retail delivered energy sales, wholesale delivered energy sales, and total losses including company use.

10

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Q. What are the drivers of the NEL forecast?

14

A. The primary driver of the NEL forecast is the retail energy sales forecast because retail energy is the largest component of NEL. However, changes in wholesale requirements sales contracts can also affect the NEL forecast. Table JKP-6 summarizes the components that make up the consolidated NEL.

15

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Table JKP-6		
Net Energy for Load Build Up		
Annual GWh	2022	2023
Retail Billed Sales	122,097	122,937
+ Retail Unbilled Sales	-13	44
= Retail Delivered Sales	122,083	122,980
+ Wholesale Delivered Sales	7,209	7,272
+ Losses	6,287	6,334
= NEL	135,579	136,586

1

2 **Q. What are the consolidated retail energy sales forecasts for 2022 and 2023?**

3 A. Table JKP-7 summarizes the retail energy sales forecasts by revenue class.

Table JKP-7		
Retail Billed and Unbilled Sales Forecasts		
Annual GWh	2022	2023
Residential Billed	65,361	65,602
+ Commercial Billed	51,411	51,887
+ Industrial Billed	4,858	5,006
+ Street & Highway Billed	362	337
+ Railroad & Railways Billed	85	85
+ Other Billed	20	20
= Retail Billed Sales	122,097	122,937
+ Retail Unbilled Sales	-13	44
= Retail Delivered Sales	122,083	122,980

4

5 Exhibit JKP-4 shows the consolidated retail delivered energy sales forecasts for
6 years 2024 and 2025, along with weather-normalized historical energy sales
7 data beginning 2010. The historical weather-normalized energy sales data was
8 developed by summing the FPL and Gulf weather-normalized energy sales.

9 **Q. How was the retail energy sales forecast developed?**

10 A. Similar to the customer forecast, the retail energy sales forecast was developed
11 using a “bottom-up” approach, where the total retail energy sales forecast was
12 the sum of the energy sales forecasts for each of the retail revenue classes. The
13 revenue class forecasts were primarily developed using econometric models.

1 Where appropriate, the model results were then adjusted for factors that were
2 not otherwise captured in the respective model histories.

3 **Q. What are the retail revenue classes used in the consolidated energy sales**
4 **forecast?**

5 A. The retail revenue classes are residential, commercial, industrial, street and
6 highway lighting, railroads & railways, and other. FPL has customers in all
7 classes, while Gulf has customers in all classes except railroads & railways and
8 other.

9 **Q. What factors drive the econometric models and model adjustments?**

10 A. The econometric models are driven primarily by a combination of weather,
11 economic conditions, electricity prices, and changes in equipment efficiencies.
12 Some of the model results were adjusted for the impacts of new technologies
13 such as electric vehicles, increased adoption of private solar generation, and
14 Company-sponsored programs such as those included in the Companies'
15 Commission-approved DSM plans. Detailed descriptions of the models and
16 any adjustments are provided later in my testimony.

17 **Q. Have there been any changes to the retail energy sales forecast**
18 **methodology since the prior rate cases for either FPL or Gulf?**

19 A. Yes, changes described below were made beginning with the forecasts
20 presented in the FPL/Gulf 2020 TYSP. These changes are reasonable and
21 ensure that the standalone FPL and Gulf energy sales forecast now rely on the
22 same methodology.

1 In its 2016 rate case, FPL employed a “top-down” approach where forecasts
2 were developed for NEL, retail energy sales, wholesale energy sales, and losses.
3 The retail energy sales forecast was then adjusted to ensure the sum of the retail,
4 wholesale, and losses forecasts matched the NEL forecast. The current forecast
5 is based on Gulf’s “bottom-up” approach where NEL is the sum of the forecasts
6 for retail energy sales, wholesale energy sales, and losses. FPL’s adoption of
7 the bottom-up approach allows the energy sales forecast to reflect better the
8 differences in energy usage patterns between the customer classes, such as the
9 previously discussed usage changes which occurred as a result of the COVID-
10 19 pandemic.

11
12 In its 2016 rate case, the industrial sales forecast for Gulf was primarily driven
13 by inputs from Gulf’s account representatives who identified expected load
14 changes for the largest industrial customers. The current industrial sales
15 forecast adopts FPL’s approach and is based on the result of multiplying the
16 forecast of customers by the forecast of energy usage per customer. Gulf’s
17 adoption of models for industrial usage improves productivity while still
18 providing accurate forecasts.

19 **Q. Does the current method provide accurate retail energy sales forecasts?**

20 A. Yes. The accuracy of the current method is demonstrated by comparing the
21 2020 weather-normalized retail energy sales with the forecasts developed for
22 the FPL/Gulf 2020 TYSP using the same method, which were within 1.5 and
23 1.2 percent for FPL and Gulf, respectively.

1 **Residential Energy Sales Forecast**

2 **Q. How was the consolidated residential energy sales forecast developed?**

3 A. The consolidated residential energy sales forecast was developed by summing
4 the standalone FPL and Gulf residential sales forecasts. These sales forecasts
5 were developed by multiplying the residential customer forecasts by the
6 residential energy usage forecasts and average billing days. The residential
7 usage forecasts were developed using two regression models, one for each
8 company. The average billing days were developed using historical averages.

9 **Q. What variables are included in the residential usage models?**

10 A. The standalone FPL model includes variables for cooling degree hours, heating
11 degree hours, income, electricity prices, energy efficiency codes and standards,
12 binary terms, and an autoregressive term. The standalone Gulf model includes
13 variables for cooling degree hours, heating degree hours, electricity prices,
14 energy efficiency codes and standards, binary terms, and an autoregressive
15 term. A detailed list of all model variables, including descriptions, is provided
16 in MFR F-5.

17 **Q. Are these models statistically sound?**

18 A. Yes. The statistics for the residential usage models are shown in Table JKP-8.

Table JKP-8			
Residential Usage Models			
	R²	MAPE	D-W
Standalone FPL	99.09%	1.36%	1.91
Standalone Gulf	98.91%	1.72%	1.90

19

20 These statistical measures indicate both models display excellent goodness of
21 fit, have minimal model residuals, and have insignificant serial correlation.

1 **Q. Were any adjustments applied to the residential energy sales forecasts?**

2 A. Yes. The residential energy sales forecasts were adjusted for unbilled energy,
3 Commission-approved DSM plans, impacts from private solar, and impacts
4 from plug-in electric vehicles.

5

6 The unbilled energy adjustments were needed to adjust billed energies to
7 calendar or delivered energies. The residential models were developed using
8 billed historical energy data that reflects staggered usage across both the current
9 and prior months. The unbilled adjustment corrects for the staggered usage and
10 results in delivered energy that aligns with a calendar month.

11

12 The DSM adjustments capture the incremental DSM energy savings that are
13 above and beyond those already reflected in the historical data for FPL and
14 Gulf. These impacts are consistent with the 2020-2029 DSM goals established
15 by the Commission in Order No. PSC-2019-0509-FOF-EG and incorporate
16 actuals through July 2020.

17

18 The private solar adjustment captures the load impacts from private solar
19 generation located behind customers' meters that are not otherwise reflected in
20 the historical data. The private solar adjustment starts with the forecast of
21 installed solar capacity for the state of Florida provided by external consultant
22 Wood Mackenzie. Next, the shares of solar capacity in the FPL and Gulf
23 service areas were estimated using the historical proportion of solar capacity

1 within the service areas. Finally, the energy impacts are calculated using solar
2 profiles from the National Renewable Energy Laboratory’s PVWatts calculator.

3

4 The electric vehicle (“EV”) adjustments capture the load impacts from EV
5 charging that were not otherwise reflected in the historical data for FPL and
6 Gulf. The EV adjustment starts with the Bloomberg New Energy Forecast of
7 plug-in EVs for the U.S. Next, the share of EVs in the FPL and Gulf service
8 areas were estimated using Florida Department of Motor Vehicles data for the
9 counties in the service areas. Finally, the energy impacts are calculated using
10 an estimate of kilowatt-hours per vehicle.

11

12 **Commercial Energy Sales Forecast**

13 **Q. How was the consolidated commercial energy sales forecast developed?**

14 A. The consolidated commercial energy sales forecast was developed by summing
15 the standalone FPL and Gulf commercial sales forecasts. These standalone
16 sales forecasts were developed by multiplying the commercial customer
17 forecasts by the commercial energy usage forecasts and average billing days.
18 The commercial usage forecasts were developed using four regression models.
19 The two FPL commercial usage models were for small/medium commercial
20 (energy only rates and demand rates less than 500 kW) and large commercial
21 (demand rates 500 kW and above). The two Gulf commercial usage models
22 were for small commercial (rates less than 25 kW) and large commercial (rates

1 25 kW or greater). The commercial class segments are consistent between the
2 customer forecasts and energy usage forecasts.

3 **Q. What variables are included in the commercial usage models?**

4 A. The standalone FPL small/medium commercial usage model included variables
5 for cooling degree hours, electricity prices, energy efficiency codes and
6 standards, employment, binary terms, and an autoregressive term. The
7 standalone FPL large commercial usage model included variables for cooling
8 degree hours, electricity price, employment, binary terms, and an
9 autoregressive term.

10

11 The standalone Gulf small commercial usage model included variables for
12 cooling degree hours, heating degree hours, electricity prices, energy efficiency
13 codes and standards, binary terms, and an autoregressive term. The standalone
14 Gulf large commercial usage model included variables for cooling degree
15 hours, heating degree hours, electricity prices, energy efficiency codes and
16 standards, binary terms, and an autoregressive term.

17

18 A detailed list of all model variables, including descriptions, is provided in
19 MFR F-5.

20 **Q. Are these commercial usage models statistically sound?**

21 A. Yes. The commercial usage models' statistics are shown in Table JKP-9.

Table JKP-9				
Commercial Usage Models				
		R²	MAPE	D-W
Standalone FPL	Large	91.95%	1.49%	1.94
	Small/Medium	98.29%	0.95%	1.78
Standalone Gulf	Large	98.43%	1.32%	2.15
	Small	98.14%	1.92%	2.21

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These statistical measures indicate the standalone FPL and Gulf models display excellent goodness of fit, have minimal model residuals, and have insignificant serial correlation.

Q. Were any adjustments applied to the commercial energy sales forecast adjustments?

A. Yes. The commercial energy sales forecasts were adjusted for unbilled energy, Commission-approved DSM plans, impacts from private solar, and impacts from economic development tariffs. The adjustments for unbilled energy, Commission-approved DSM plans, and impacts from private solar were described previously in my testimony. An adjustment for economic development tariffs was needed in order to capture the additional load to standalone FPL associated with economic development tariffs. These tariffs provide discounts to customers who are adding new or incremental load, which would not otherwise be reflected in the historical data. The additional load impact was provided by FPL’s Rate Development and Economic Development teams.

1 **Industrial Energy Sales Forecast**

2 **Q. How was the consolidated industrial energy sales forecast developed?**

3 A. The consolidated industrial energy sales forecast was developed by summing
4 the standalone FPL and Gulf industrial energy sales forecasts. The standalone
5 FPL large industrial sales forecast was developed by multiplying the industrial
6 customer forecasts by the industrial energy usage forecasts; the other standalone
7 industrial sales forecasts were developed by multiplying the customer forecasts
8 by the energy usage forecasts and average billing days. The industrial usage
9 forecasts were developed using one regression model and three exponential
10 models.

11 **Q. Please describe the industrial usage models.**

12 A. The standalone FPL industrial usage was forecasted using a regression model
13 for small industrial customers, an exponential model for medium industrial
14 customers, and an exponential model for large industrial customers. The
15 standalone FPL small industrial regression model included variables for cooling
16 degree hours, a binary term, and an autoregressive term. The standalone Gulf
17 industrial usage was forecasted using an exponential model. A detailed list of
18 all regression model variables, including descriptions, is provided in MFR F-5.

19 **Q. Are the industrial usage models statistically sound?**

20 A. Yes. The statistics for the industrial usage models are shown in Table JKP-10.

Table JKP-10				
Industrial Usage Models				
		R²	MAPE	D-W
Standalone FPL	Large	56.55%	4.39%	2.04
	Medium	75.33%	1.67%	2.24
	Small	92.16%	3.40%	2.10
Standalone Gulf	Industrial	81.20%	4.58%	2.00

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Energy Sales Forecasts for All Other Retail Revenue Classes

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Q. How were the consolidated forecasts for the remaining retail revenue classes developed?

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A. The street & highway lighting energy forecasts for both standalone companies

1 were provided by FPL's Rate Development and Lighting teams regarding
2 expected growth trends. The FPL railroads & railways and other energy
3 forecasts were developed by multiplying the forecasted number of customers
4 by the forecasted energy usage. The railroads & railways energy usage forecast
5 was developed using a regression model which included binary terms and an
6 autoregression term. A detailed list of all variables in the regression model is
7 provided in MFR F-5. The other energy usage forecast was developed using an
8 exponential model. Gulf does not have customers in the railroads & railways
9 and other revenue classes.

10

11 **Energy Forecasts for Territorial Wholesale Sales, Losses, and NEL**

12 **Q. How were the energy forecasts for territorial wholesale sales, losses, and**
13 **NEL developed?**

14 A. The development of the wholesale energy sales forecasts began with
15 information regarding which wholesale contracts are known. The energies
16 associated with those contracts were then forecasted using a combination of
17 contract terms, energy sales forecasts provided by the counterparty, and
18 econometric modeling. The forecast of energy losses was developed using a
19 historical loss factor. The forecast of NEL was developed by adding together
20 the energy forecasts for retail sales, wholesale sales, and losses. Table JKP-6,
21 shown earlier in my testimony, summarizes the components that add up to the
22 NEL forecast.

23

1 FPL and Gulf result in peak demands occurring in different hours for the
 2 standalone companies. These differences mean the consolidated peak demand
 3 will be lower than the sum of the standalone peak demand values. When the
 4 hourly load forecasts for the standalone companies are combined, the resulting
 5 highest hourly load for the consolidated system will capture the impacts of the
 6 differences in hourly load profiles.

7 **Q. What is peak demand diversity?**

8 A. Peak demand diversity is when the peak demand for a combined system is less
 9 than the sum of the peak demands for the individual components that make up
 10 the combined system. This reduction in the combined system peak demand is
 11 due to differences in the hourly load profiles, and these differences are typically
 12 due to different customer compositions, weather patterns, and time zones.

13 **Q. What are the peak demand forecasts for 2022 and 2023?**

14 A. The monthly peak demand forecasts, including incremental DSM, are provided
 15 in MFR E-18. The summer and winter peak demand forecasts for 2022 and
 16 2023 are summarized in tables JKP-11 and JKP-12, along with the standalone
 17 peak demand forecasts and the peak demand reductions to the consolidated peak
 18 demands due to peak demand diversity. Finally, Exhibit JKP-5 provides the
 19 consolidated summer peak demand forecasts for years 2021 through 2025.

Table JKP-11		
Summer Peak Demand Forecasts		
MW	2022	2023
Standalone FPL	24,908	25,353
Standalone Gulf	2,428	2,441
Consolidated FPL	27,205	27,661
Diversity Benefit	-131	-133

Table JKP-12		
Winter Peak Demand Forecasts		
MW	2022	2023
Standalone FPL	20,289	20,672
Standalone Gulf	2,413	2,423
Consolidated FPL	22,436	22,826
Diversity Benefit	-267	-270

20

1 **Q. When are the summer peak demands expected to occur?**

2 A. The consolidated summer peak is expected to occur in August between 4-5 PM
3 Eastern time zone. The consolidated summer peak is driven by both the FPL
4 summer peak, which is also expected to occur in August between 4-5 PM
5 Eastern, and the Gulf summer peak, which is expected to occur in July between
6 the hours of 4-5 PM Eastern. The summer peak demand diversity for the
7 consolidated system is due to the differences in the timing of the summer peaks
8 for the standalone companies.

9 **Q. When are the winter peak demands expected to occur?**

10 A. The consolidated winter peak is expected to occur in January between 7-8 AM
11 Eastern time zone. Like the consolidated summer peak, the winter peak is also
12 driven by both the FPL winter peak, which is also expected to occur in January
13 between 7-8 AM Eastern, and the Gulf winter peak, which is expected to occur
14 in January between the hours of 7-8 AM Eastern. Although both standalone
15 companies are expected to peak during the same month and hour, the day of the
16 peaks are expected to be different because historically, the two standalone
17 systems rarely experience their winter peaks during the same day. Because of
18 this historical relationship, the consolidated winter peak demand does reflect
19 diversity benefits.

20 **Q. Has there been a change to the peak demand forecast methodology since
21 the prior rate cases for FPL and Gulf?**

22 A. The peak demand forecast methodology is the same methodology used in FPL's
23 2016 rate case. This methodology is a change from the peak demand forecast

1 methodology used by Gulf in its 2016 rate case. In its 2016 rate case, Gulf's
2 peak demands were forecasted using a Southern Company proprietary model
3 that developed individual class-level hourly loadshapes, which were then
4 combined to arrive at the total system hourly. The monthly peak demands were
5 the highest hourly load within each month. Beginning with the forecasts
6 presented in the FPL/Gulf 2020 TYSP, the current standalone Gulf forecast
7 method relies on regression models and is consistent with the FPL forecast
8 method.

9 **Q. Does the current method provide accurate peak demand forecasts?**

10 A. Yes. The accuracy of the current method is demonstrated by comparing the
11 2020 weather-normalized summer peak demands with the forecasts developed
12 for the FPL/Gulf 2020 TYSP using the same method, which were within 1.3
13 and 0.6 percent for FPL and Gulf, respectively.

14

15 **Standalone Monthly Peak Demand Forecasts**

16 **Q. What is the method for developing the standalone monthly peak demand**
17 **forecasts for FPL and Gulf?**

18 A. The development of the standalone monthly peak demand forecasts begins with
19 forecasting summer peak demands and winter peak demands using peak
20 demand per customer regression models. Next, the model results were
21 multiplied by the number of customers and then adjusted for factors that were
22 not otherwise captured in the respective model histories. Finally, the monthly

1 peak demands for the other months are forecasted based on the historical
2 relationships between the peaks in those months and the annual summer peak.

3
4 The standalone FPL summer peak demand forecast was developed using a
5 regression model with variables for weather, employment, energy efficiency
6 codes and standards, a binary term, and an autoregressive term. The winter
7 peak demand forecast was developed using a regression model with variables
8 for weather, employment, and historical binary terms. A detailed list of all
9 model variables, including descriptions, is provided in MFR F-5. The historical
10 relationships between the annual summer peak and the peaks for all other
11 months excluding January were developed using the average of the past 20
12 years. Adjustments for wholesale requirements, private solar, plug-in electric
13 vehicles, and the impact of economic development tariffs were made to the
14 model results to arrive at the final monthly peak demand forecasts.

15
16 The standalone Gulf summer peak demand forecast was developed using a
17 regression model with variables for weather, income, energy efficiency codes
18 and standards, and a moving average term. The winter peak demand forecast
19 was developed using a regression model with variables for weather, number of
20 customers, energy efficiency codes and standards, a binary term, and two
21 autoregressive terms. A detailed list of all model variables, including
22 descriptions, is provided in MFR F-5. The historical relationships between the
23 annual summer peak and the peaks for all other months excluding January were

1 developed using the average of the past 20 years. Adjustments for private solar
2 and plug-in electric vehicles were made to the model results to arrive at the final
3 monthly peak demand forecasts.

4 **Q. Are these summer and winter peak demand models statistically sound?**

5 A. Yes. The statistics for the summer and winter peak demand models are shown
6 in Table JKP-13.

Table JKP-13				
Peak Demand Models				
		R²	MAPE	D-W
Standalone FPL	Summer	88.43%	1.38%	1.89
	Winter	85.31%	4.08%	2.04
Standalone Gulf	Summer	95.50%	0.89%	1.58
	Winter	96.53%	1.52%	2.06

7

8 These statistics indicate both models display excellent goodness of fit, have
9 minimal model residuals, and have insignificant serial correlation.

10 **Q. Please describe the peak demand adjustments.**

11 A. Both standalone FPL and Gulf monthly peak demand forecasts were adjusted
12 for the impacts of incremental DSM, private solar, and plug-in electric vehicles.
13 The adjustments for incremental DSM were based on the DSM plans which
14 were approved by the Commission in Order No. PSC-2020-0291-CO-EG. The
15 private solar and plug-in electric vehicle adjustments were calculated by FPL's
16 Development team. Additionally, the FPL monthly peak demand forecasts
17 were adjusted for wholesale requirements contracts and impacts from economic
18 development tariffs.

19

20

1 **Hourly Load Forecasts**

2 **Q. How were the hourly load forecasts developed?**

3 A. The consolidated hourly load forecast was developed by adding together the
4 standalone FPL and Gulf hourly load forecasts. The standalone hourly load
5 forecasts were developed by applying the standalone FPL and Gulf respective
6 forecasted monthly peak demands and NELs to an hourly seedshape, which is
7 the hourly load profile template. The resulting hourly forecast will have an
8 hourly profile similar to the seedshape, but the highest hourly load in each
9 month will match the forecasted monthly peaks, and the sum of the hourly loads
10 in each month will equal the forecasted monthly NEL. The seedshapes for each
11 standalone company were selected by determining which historical month had
12 weather that was most similar to normal weather. The hourly loads for that
13 month were then adjusted to ensure the peak day occurs on a weekday, and this
14 process was repeated for each of the companies. Additionally, the Gulf hourly
15 seedshape was adjusted to reflect Eastern time zone.

16

17 **VI. SUMMARY**

18

19 **Q. Please provide a summary of the forecasts for customers, energy sales, and**
20 **peak demands for years 2022 and 2023.**

21 A. Table JKP-14 summarizes the consolidated forecasts for customers, retail
22 energy sales, and summer peak demands for years 2022 and 2023.

Table JKP-14		
Consolidated FPL Forecast Summary		
	2022	2023
Total Retail Customers (average)	5,717,534	5,785,456
Retail Delivered Sales (GWh)	122,083	122,980
Summer Peak Demand (MW)	27,205	27,661

1

2

These forecasts were developed using well-established methods that have

3

consistently provided accurate and reliable forecasts that are used for all

4

regulatory and planning purposes.

5

Q. Does this conclude your direct testimony?

6

A. Yes.

Florida Power & Light Company

CONSOLIDATED MFRs SPONSORED OR CO-SPONSORED BY JUN K. PARK

MFR	Period	Title
SOLE SPONSOR:		
C-40	Test Subsequent	O & M COMPOUND MULTIPLIER CALCULATION
E-18	Test Subsequent	MONTHLY PEAKS
F-06	Test Subsequent	FORECASTING MODELS - SENSITIVITY OF OUTPUT TO CHANGES IN INPUT DATA
F-07	Test Subsequent	FORECASTING MODELS - HISTORICAL DATA
CO-SPONSOR:		
C-12	Test Subsequent	ADMINISTRATIVE EXPENSES
C-13	Historic	MISCELLANEOUS GENERAL EXPENSES
C-14	Historic Test Subsequent	ADVERTISING EXPENSES
C-15	Historic Test Subsequent	INDUSTRY ASSOCIATION DUES
C-33	Test Subsequent	PERFORMANCE INDICES
C-34	Historic Subsequent	STATISTICAL INFORMATION
C-35	Test Subsequent	PAYROLL AND FRINGE BENEFIT INCREASES COMPARED TO CPI
C-36	Test Subsequent	NON-FUEL OPERATION AND MAINTENANCE EXPENSE COMPARED TO CPI
C-37	Test Subsequent	O & M BENCHMARK COMPARISON BY FUNCTION
E-09	Test Subsequent	COST OF SERVICE - LOAD DATA
E-11	Test Subsequent	DEVELOPMENT OF COINCIDENT AND NON COINCIDENT DEMANDS FOR COST STUDY

Florida Power & Light Company

CONSOLIDATED MFRs SPONSORED OR CO-SPONSORED BY JUN K. PARK

MFR	Period	Title
CO-SPONSOR:		
E-12	Test Subsequent	ADJUSTMENT TO TEST YEAR REVENUE
E-15	Test Subsequent	PROJECTED BILLING DETERMINANTS - DERIVATION
E-16	Prior Test Subsequent	CUSTOMERS BY VOLTAGE LEVEL
E-19a	Test Subsequent	DEMAND AND ENERGY LOSSES
E-19b	Test Subsequent	ENERGY LOSSES
E-19c	Test Subsequent	DEMAND LOSSES
F-05	Test Subsequent	FORECASTING MODELS
F-08	Test Subsequent	ASSUMPTIONS

Florida Power & Light Company

**SUPPLEMENT 1 - FPL STANDALONE INFORMATION IN MFR FORMAT SPONSORED OR
 CO-SPONSORED BY JUN K. PARK**

Schedule	Period	Title
SOLE SPONSOR:		
C-40	Test Subsequent	O & M COMPOUND MULTIPLIER CALCULATION
E-18	Test Subsequent	MONTHLY PEAKS
F-06	Test Subsequent	FORECASTING MODELS - SENSITIVITY OF OUTPUT TO CHANGES IN INPUT DATA
F-07	Test Subsequent	FORECASTING MODELS - HISTORICAL DATA
CO-SPONSOR:		
C-12	Test Subsequent	ADMINISTRATIVE EXPENSES
C-14	Test Subsequent	ADVERTISING EXPENSES
C-15	Test Subsequent	INDUSTRY ASSOCIATION DUES
C-33	Test Subsequent	PERFORMANCE INDICES
C-34	Subsequent	STATISTICAL INFORMATION
C-35	Test Subsequent	PAYROLL AND FRINGE BENEFIT INCREASES COMPARED TO CPI
C-36	Test Subsequent	NON-FUEL OPERATION AND MAINTENANCE EXPENSE COMPARED TO CPI
C-37	Test Subsequent	O & M BENCHMARK COMPARISON BY FUNCTION
E-09	Test Subsequent	COST OF SERVICE - LOAD DATA
E-11	Test Subsequent	DEVELOPMENT OF COINCIDENT AND NON COINCIDENT DEMANDS FOR COST STUDY

**SUPPLEMENT 1 - FPL STANDALONE INFORMATION IN MFR FORMAT SPONSORED OR
 CO-SPONSORED BY JUN K. PARK**

Schedule	Period	Title
CO-SPONSOR:		
E-12	Test Subsequent	ADJUSTMENT TO TEST YEAR REVENUE
E-15	Test Subsequent	PROJECTED BILLING DETERMINANTS - DERIVATION
E-16	Test Subsequent	CUSTOMERS BY VOLTAGE LEVEL
E-19a	Test Subsequent	DEMAND AND ENERGY LOSSES
E-19b	Test Subsequent	ENERGY LOSSES
E-19c	Test Subsequent	DEMAND LOSSES
F-05	Test Subsequent	FORECASTING MODELS
F-08	Test Subsequent	ASSUMPTIONS

Florida Power & Light Company

**SUPPLEMENT 2 - GULF STANDALONE INFORMATION IN MFR FORMAT SPONSORED OR
 CO-SPONSORED BY JUN K. PARK**

Schedule	Period	Title
SOLE SPONSOR:		
C-40	Test Subsequent	O & M COMPOUND MULTIPLIER CALCULATION
E-18	Test Subsequent	MONTHLY PEAKS
F-06	Test Subsequent	FORECASTING MODELS - SENSITIVITY OF OUTPUT TO CHANGES IN INPUT DATA
F-07	Test Subsequent	FORECASTING MODELS - HISTORICAL DATA
CO-SPONSOR:		
C-12	Test Subsequent	ADMINISTRATIVE EXPENSES
C-14	Test Subsequent	ADVERTISING EXPENSES
C-15	Test Subsequent	INDUSTRY ASSOCIATION DUES
C-33	Test Subsequent	PERFORMANCE INDICES
C-34	Subsequent	STATISTICAL INFORMATION
C-35	Test Subsequent	PAYROLL AND FRINGE BENEFIT INCREASES COMPARED TO CPI
C-36	Test Subsequent	NON-FUEL OPERATION AND MAINTENANCE EXPENSE COMPARED TO CPI
C-37	Test Subsequent	O & M BENCHMARK COMPARISON BY FUNCTION
E-09	Test Subsequent	COST OF SERVICE - LOAD DATA
E-11	Test Subsequent	DEVELOPMENT OF COINCIDENT AND NON COINCIDENT DEMANDS FOR COST STUDY

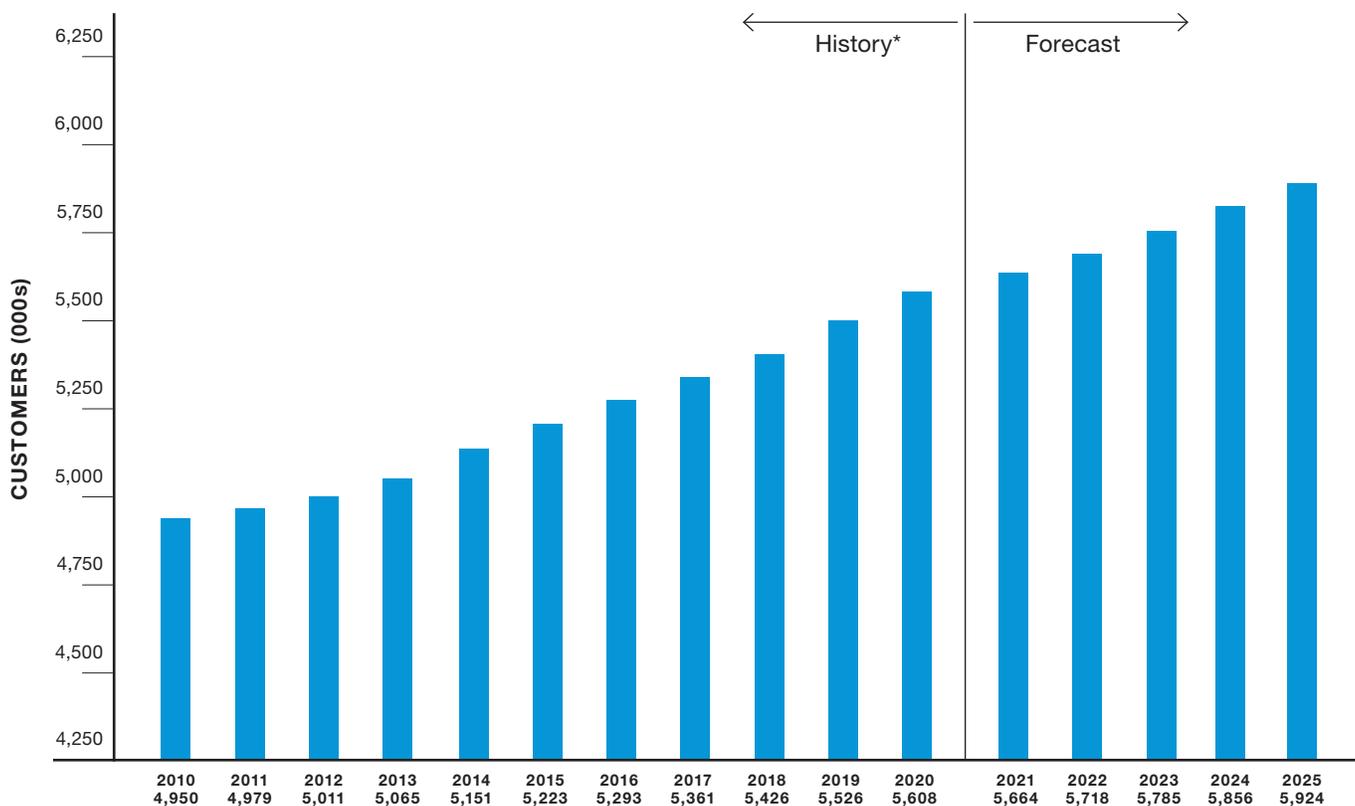
**SUPPLEMENT 2 - GULF STANDALONE INFORMATION IN MFR FORMAT SPONSORED OR
 CO-SPONSORED BY JUN K. PARK**

Schedule	Period	Title
CO-SPONSOR:		
E-12	Test Subsequent	ADJUSTMENT TO TEST YEAR REVENUE
E-15	Test Subsequent	PROJECTED BILLING DETERMINANTS - DERIVATION
E-16	Test Subsequent	CUSTOMERS BY VOLTAGE LEVEL
E-19a	Test Subsequent	DEMAND AND ENERGY LOSSES
E-19b	Test Subsequent	ENERGY LOSSES
E-19c	Test Subsequent	DEMAND LOSSES
F-05	Test Subsequent	FORECASTING MODELS
F-08	Test Subsequent	ASSUMPTIONS



Historical and Forecasted Consolidated FPL Customers

Consolidated FPL Customers (Annual Average, 000s)

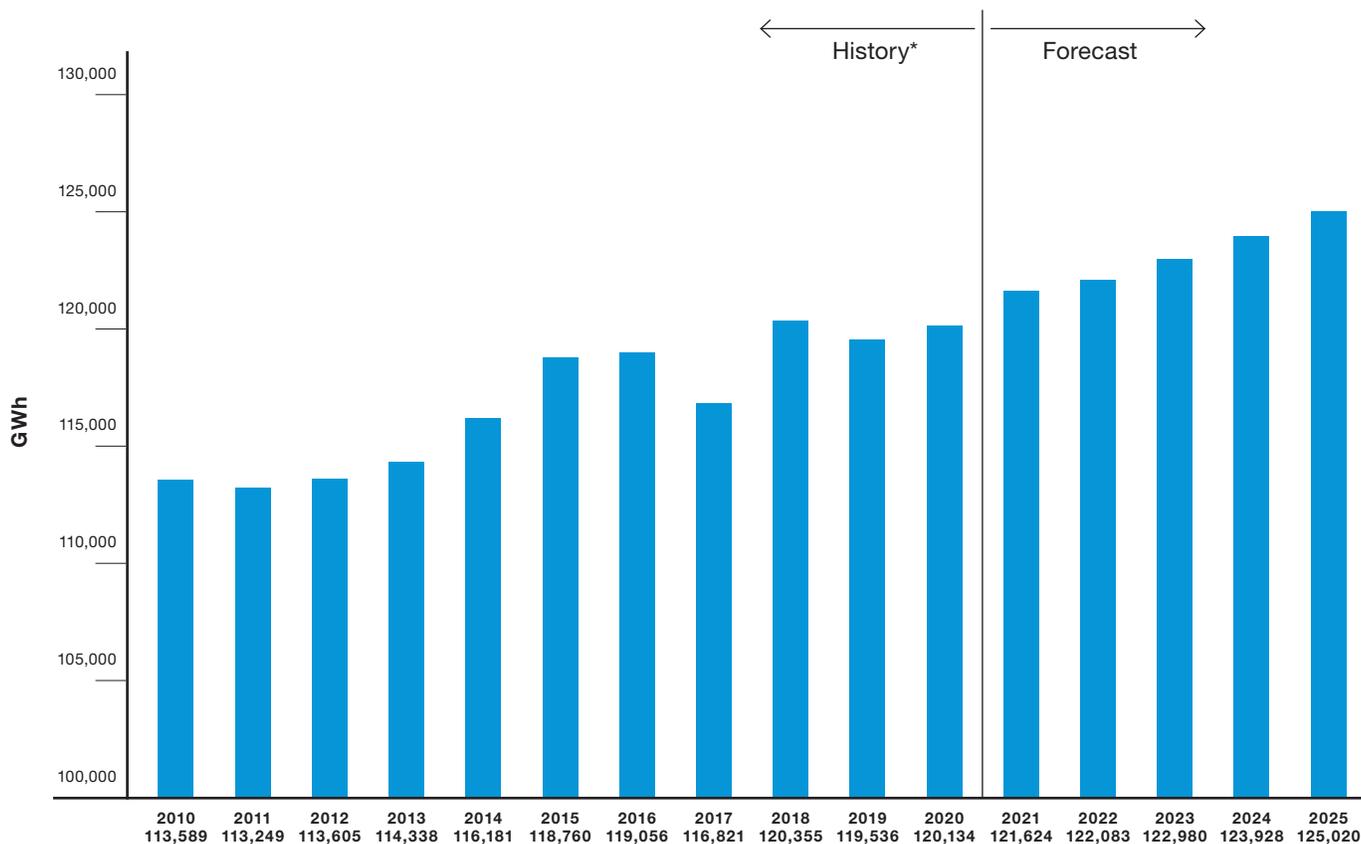


*Historical data for Consolidated FPL calculated as the sum of Legacy FPL and Legacy Gulf



Historical and Forecasted Consolidated FPL Retail Delivered Sales

Consolidated FPL Retail Delivered Energy Sales (GWh)

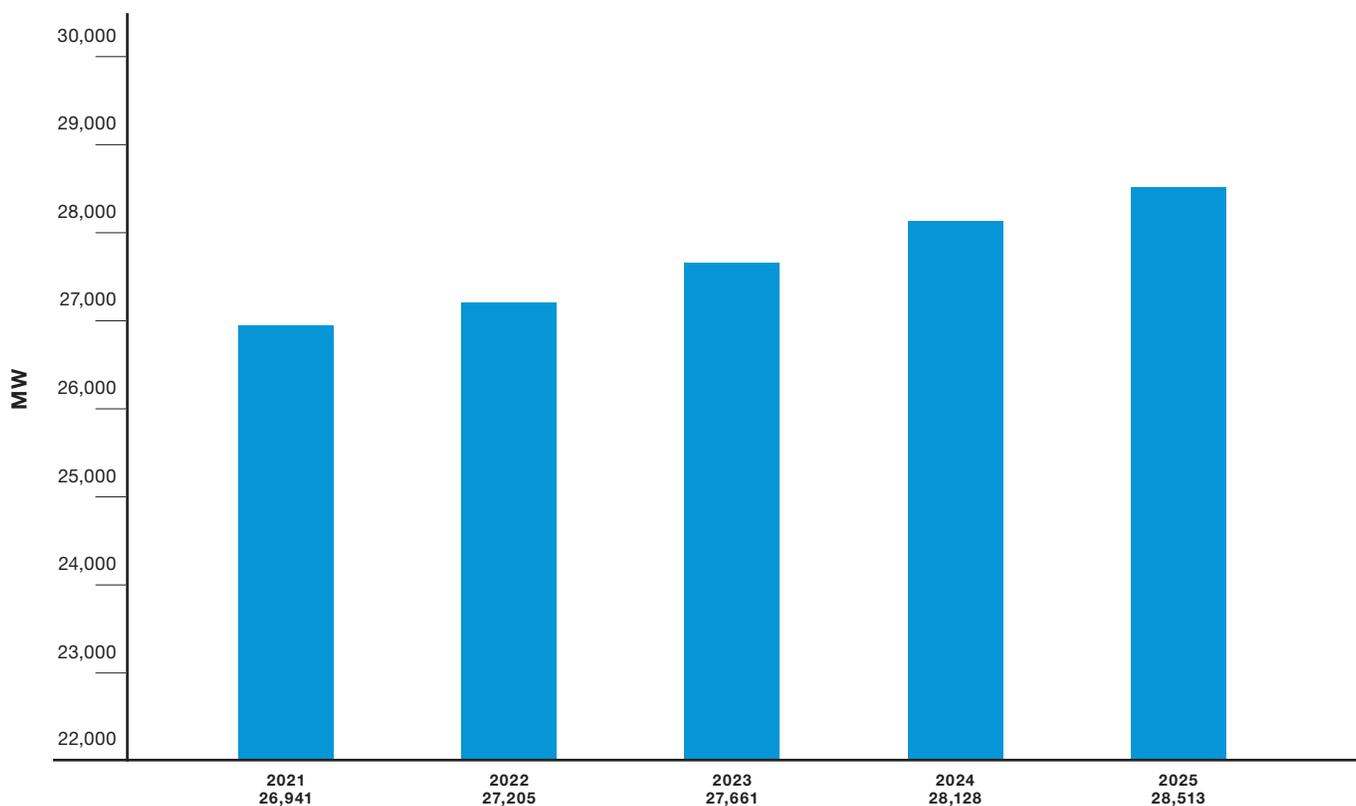


*Historical data for Consolidated FPL calculated as the sum of Legacy FPL and Legacy Gulf



Forecasted Consolidated FPL Summer Peak Demands

Consolidated FPL Summer Peak Demands (MW)



**Historical peak demand data for Consolidated FPL is not available.*