AUSLEY MCMULLEN

Attorneys and Counselors at Law
123 South Calhoun Street
P.O. Box 391 32302
Tallahassee, FL 32301
P: (850) 224-9115
F: (850) 222-7560
ausley.com

May 1, 2023

VIA: ELECTRONIC FILING

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

Re: Review of Tampa Electric Company's 2023 Ten-Year Site Plan
Staff's First Data Request (Nos. 3-95)
Undocketed 20230000-OT

Dear Mr. Teitzman:

Pursuant to an email from Patti Zellner to Tampa Electric Company dated February 27, 2023, enclosed for filing on behalf of Tampa Electric Company is the company's responses to Staff's First Data Request (Nos. 3-95) regarding the company's 2023 Ten-Year Site Plan.

Thank you for your assistance in connection with this matter.

Sincerely,

Malcolm N. Means

Malcolm N. Means

MNM/bml
Attachments
cc: Greg Davis w/fob (GDavis@psc.state.fl.us)
Phillip Ellis w/fob (PEllis@psc.state.fl.us)
Patti Zellner (PZellner@psc.state.fl.us)
Paul Brown (pkbrown@tecoenergy.com)
TECO Regulatory Department

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General Items

3. Please refer to the Excel Tables File (Financial Assumptions, Financial Escalation). Complete the tables by providing information on the financial assumptions and financial escalation assumptions used in developing the Company's TYSP. If any of the requested data is already included in the Company's current planning period TYSP, state so on the appropriate form.

A. The requested data is provided in the Excel Tables Spreadsheet, (BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx" tab Q3_Financial Assumptions and Q3_Financial Escalation.

Load & Demand Forecasting

Historic Load & Demand

4. [Investor-Owned Utilities Only] Please refer to the Excel Tables File (Hourly System Load). Complete the table by providing, on a system-wide basis, the hourly system load in megawatts (MW) for the period January 1 through December 31 of the year prior to the current planning period. For leap years, please include load values for February 29. Otherwise, leave that row blank.

a. Please also describe how loads are calculated for those hours just prior to and following Daylight Savings Time (March 13, 2022, and November 6, 2022).

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables", tab Q4_Hourly System Load.

a. Tampa Electric's Forecasting team receives the hourly system load data adjusted for Daylight Savings Time, except the generation. For the Spring Daylight Savings Time (March 13, 2022), there are 23 hours of data, with no data on Hour Ending 24. A zero hour is avoided by taking an average of the previous hour and the following hour to replace the zero on Hour Ending 24. For the Fall Daylight Savings Time (November 6, 2022), there are 25 hours of data. On the double hour, an average of the two hours is taken to replace that hour.

5. Please refer to the Excel Tables File (Historic Peak Demand). Complete the table by providing information on the monthly peak demand experienced during the three-year period prior to the current planning period, including the actual peak demand experienced, the amount of demand response activated during the peak, and the estimated total peak if demand response had not been activated. Please also provide the day, hour, and system-average temperature at the time of each monthly peak.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx", tab Q5_Historic Peak Demand.

Forecasted Load & Demand

6. Please identify the weather station(s) used for calculation of the system-wide temperature for the Company's service territory. If more than one weather station is utilized, please describe how a system-wide average is calculated.

A. Tampa Electric is presently using National Oceanic and Atmospheric Administration's ("NOAA") Tampa International Airport weather station for calculation of the system-wide temperature of the utility's service territory.

7. Please explain, to the extent not addressed in the Company's current planning period TYSP, how the reported forecasts of the number of customers, demand, and total retail energy sales were developed. In your response, please include the following information:

- Methodology.
- Assumptions.
- Data sources.
- Third-party consultant(s) involved.
- Anticipated forecast accuracy.
- Any difference/improvement(s) made compared with those forecasts used in the Company's most recent prior TYSP.

A. Tampa Electric's customer demand and energy forecast methodology, as well as assumptions and sources, are explained in detail in Chapter II of the 2023 Ten Year Site Plan ("TYSP") on pages 7 through 20.

Appliance efficiencies are based on data provided by the U.S. Energy Information Administration ("EIA"). The economic assumptions used in the forecast models are derived from Moody's Analytics and the University of Florida's Bureau of Economic and Business Research ("BEBR").

A third-party consultant was not involved in the development of the forecasts reported in the 2023 TYSP.

As for anticipated forecast accuracy, the target is to be within +/- 1 percent.

There were no significant differences or improvements made within the 2023 TYSP compared to the 2022 TYSP.

8. Please identify all closed and open Florida Public Service Commission (FPSC) dockets and all non-docketed FPSC matters which were/are based on the same load forecast used in the Company's current planning period TYSP.

A. Please see the dockets below for all open and closed FPSC dockets that used the same load forecast that is used in the company's current planning period TYSP.

20220001-EI-Fuel & Purchased Power Docket
20220007-EI-Environmental Cost Recovery Docket
20230002-EG
20230010-EI
20220148-EI-2023 GBRA Docket
20220161-EI-CETM Adjustment for ROE Trigger
20230019-EI-Storm Reserve Docket

9. Please explain if your Company evaluates the accuracy of its forecasts of customer growth and annual retail energy sales presented in its past TYSPs by comparing the actual data for a given year to the data forecasted one, two, three, four, five, or six years prior.

a. If your response is affirmative, please explain the method used in your evaluation, and provide the corresponding results, including work papers, in Excel format for the analysis of each forecast presented in the TYSPs filed with the Commission during the 20-year period prior to the current planning period. If your Company limits its analysis to a period shorter than 20 years prior to the current planning period, please provide what analysis you have and a narrative explaining why your Company limits its analysis period.

b. If your response is negative, please explain.

A. Yes, Tampa Electric does review the accuracy of its customer growth and retail energy sales forecasts.

a. The method used to review the accuracy of forecasts throughout time is referred to as an error fan. This approach is also used by the Florida Reliability Coordinating Council ("FRCC") in reviewing state forecast accuracy. Please refer to the provided Excel, "(BS_9) Accuracy2023.xlsx."

b. Not applicable.

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10. Please explain if your Company evaluates the accuracy of its forecasts of Summer/Winter Peak Energy Demand presented in its past TYSPs by comparing the actual data for a given year to the data forecasted one, two, three, four, five, or six years prior.

a. If your response is affirmative, please explain the method used in your evaluation, and provide the corresponding results, including work papers, in Excel format for the analysis of each forecast presented in the TYSPs filed with the Commission during the 20-year period prior to the current planning period. If your Company limits its analysis to a period shorter than 20 years prior to the current planning period, please provide what analysis you have and a narrative explaining why your Company limits its analysis period.

b. If your response is negative, please explain why.

A. Yes, Tampa Electric does review the accuracy of Summer/Winter peak demand forecasts.

a. The method used to review the accuracy of forecasts throughout time is referred to as an error fan. This approach is also used by the FRCC in reviewing state forecast accuracy. Please refer to the Tampa Electric electronic attachment in MS Excel format containing "(BS_9) Accuracy2023.xlsx."

b. Not applicable.

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11. Please explain any historic and forecasted trends in each of the following:

a. Growth of customers, by customer type (residential, commercial, industrial) as well as Total Customers, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

b. Average KWh consumption per customer, by customer type (residential, commercial, industrial), and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

c. Total Sales (GWh) to Ultimate Customers, identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

d. By customer type (residential, commercial, industrial) provide a detailed discussion of how the Company's demand-side management program(s) and conservation/energy-efficiency program(s) impact the observed trends in gigawatt hour sales (Schedule 3.3).

A. a. **RESIDENTIAL**: The residential sector's growth averaged 2.3 percent in 2022. Growth in 2023 is expected to be 2.0 percent. The uptick in growth in 2022 was driven by the multi-family sector. Since its peak in early 2022, the multi-family sector has been moderating. Customer growth is expected to increase at an annual average growth rate of 1.4 percent over the Ten-Year Site Plan's forecast horizon. The primary driver of customer growth will be new construction and increasing net in-migration to the service area.

COMMERCIAL: Commercial customer growth averaged 1.9 percent in 2022 and is expected to increase by 1.6 percent in 2023. Customers are expected to increase at an annual average growth rate of 0.6 percent over the forecast horizon.

GOVERNMENTAL: Governmental customer growth increased by 0.7 percent in 2022 and is expected to increase by 1.6 percent in 2023. Growth is projected to increase at a rate of 0.7 percent over the forecast horizon.

INDUSTRIAL: Industrial customer growth continued to decline in 2022. The decline is primarily in the smaller manufacturing segment, as well as some

migration to the commercial sector. The number of industrial accounts is anticipated to remain relatively flat over the next ten years.

TOTAL: Total customer growth in 2022 averaged 2.2 percent with the residential class being the engine behind the growth. Over the forecast horizon, customer growth is expected to increase at an average rate of 1.3 percent annually.

b. RESIDENTIAL: In 2022, average consumption per customer was slightly lower than in 2021, primarily from the offsetting effects of hotter weather and the returning to pre-Pandemic usage patterns. Average consumption per customer is expected to decline at an average annual rate of 0.1 percent over the Ten-Year Site Plan's forecast horizon. The primary drivers behind the declining per customer usage are increases in appliance efficiencies, lighting efficiencies, energy efficiency in new homes, conservation efforts, and housing mix.

COMMERCIAL: In 2022, commercial consumption per customer was slightly higher than in 2021, primarily due to hotter weather and the returning to pre-Pandemic usage patterns. It is projected to increase slightly (0.3%) over the Ten Year Site Plan's forecast horizon.

GOVERNMENTAL: Average per customer usage in 2022 was also higher than in 2021, primarily due to the in-migration of a large account from the commercial sector. Over the forecast horizon, usage is expected to decrease by an average of 0.2 percent.

INDUSTRIAL: Industrial per customer usage in 2022 was higher than 2021 primarily due to the industrial phosphate sector that had less self-serving generation and more energy purchases from Tampa Electric. Over the forecast horizon, average usage is expected to decrease slightly by an average of 0.3 percent.

c. **TOTAL RETAIL NET ENERGY FOR LOAD (RNEL**): RNEL in 2022 was 2.6 percent higher than in 2021, primarily due to record-breaking hot weather and higher phosphate energy consumption, Over the forecast horizon, RNEL is expected to increase by almost one percent a year. This is below the customer growth rate of 1.3 percent which is primarily due to continued per-customer-kWh declines, as well as declines in the phosphate sector as mining continues to move south and out of Tampa Electric's service territory.

d. The Company's demand-side management programs and conservation/ energy efficiency programs are discussed in Chapter II, page 13 of the 2023 TYSP. Overall, the observed trends in gigawatt hour sales is a reduction to energy sales.

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12. Please explain any historic and forecasted trends in each of the following components of Summer/Winter Peak Demand:

a. Demand Reduction due to the Company's demand-side management program(s) and Self Service, by customer type (residential, commercial, industrial) as well as Total Customers, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline in the trends.

b. Demand Reduction due to Demand Response, by customer type (residential, commercial, industrial), and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends.

c. Total Demand, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline in the trends.

d. Net Firm Demand, by the sources of peak demand appearing in Schedule 3.1 and Schedule 3.2 of the current planning period TYSP, and identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline in the trends.

A. a**.** CONSERVATION AND SELF SERVICE: Residential conservation at the time of the summer peak has historically increased by an average of 7 MW a year. Over the forecast horizon it is increasing by an average of 13.6 MW a year. At the time of the winter peak, residential conservation historically increased by an average of 8 MW a year and is projected to increase by an average of 11 MW a year. The primary driver of this growth is the increasing number of participants in Tampa Electric's conservation programs. Commercial and Industrial conservation at the time of the summer peak has increased by an average of 8 MW a year, and over the forecast horizon it is increasing by an average of 4.3 MW a year. At the time of the winter peak, it historically increased by an average of 5 MW a year and is projected to increase by 3 MW a year on average. Self-service is assumed to follow historical trends. If changes in self-service are known, forecasts will be adjusted for up or down.

b. DEMAND RESPONSE / LOAD MANAGEMENT: Since 2015, there have not been any residential load management or demand response programs. Starting in 2022 a new Prime Time Plus program will begin. Summer and Winter will ramp up and stabilize at an average annual increase of 8 MW

per year. Commercial and Industrial load management and demand response at the time of the summer and winter peaks has been relatively flat over the past five years and is projected to remain relatively flat (approximately 0.5 MW) over the forecast horizon. This trend is primarily due to no changes in the number of customers participating in the Standby Generator program and no expected contractual changes in the Demand Response program.

c. TOTAL DEMAND: Summer retail peaks historically increased on average by 57 MW a year and are expected to increase by an average of 38 MW (0.8 percent) a year over the forecast horizon. The slower decline over the forecast horizon is primarily due to the decline in Interruptible Phosphate loads. The 2022 summer peak was in line with 2021, both years were extremely hot. Historically, winter retail peaks vary significantly due to very mild winters and an occasional cold winter. Winter peaks are expected to increase by an average of 47 MW (1.0 percent) a year over the forecast horizon. The 2022 winter peak was 258 MW higher than the prior year's peak due to colder weather. Winter peaks increase at a slightly faster rate due to minimal impacts from rooftop solar at the time of winter peaks. Customer growth is the primary driver behind the growth in summer and winter total peak demands.

d. NET FIRM DEMAND: Summer firm peaks historically increased on average by 51 MW a year and are expected to increase by an average of 31 MW (0.7 percent) a year over the forecast horizon. The slower decline over the forecast horizon is primarily due to the decline in Interruptible Phosphate loads, which eventually stabilizes over the forecast horizon. The 2022 summer firm peak decreased by 31 MW due to slightly milder temperatures at the time of the peaks.

Historically, winter firm peaks vary significantly due to very mild winters and occasional cold winters. Winter firm peaks are expected to increase by an average of 41 MW (0.9 percent) a year over the forecast horizon. Customer growth is the primary driver behind the growth in summer and winter firm peak demands.

13. [FEECA Utilities Only] In the 2019 goal-setting proceeding, the Commission chose to continue the goals established by its 2014 goal-setting decision for the period 2020-2024. Beyond 2024 through the end of the forecasted period, how did the Company project what demand savings amounts are reflected on the DSM and Conservation-related portions of Schedules 3.1, 3.2, and 3.3? Please explain what assumptions are incorporated in those amounts, and why.

A. In 2020, Tampa Electric developed the company's 2020-2029 DSM Plan that supported the Commission's approved DSM goals that were established in 2014 for the 2020-2024 period. In the development of the Technical Potential that supports the company's proposed goals and the DSM Plan that was approved, provided updated or new demand and energy savings values for the summer and winter demand and annual energy contributions. In addition, the company also updated several other DSM programs demand and energy savings with either load research data from internal sources or used Department of Energy approved software (Energy Gauge) to develop these new demand and energy savings values. These updated or new demand and energy savings values were used for the conservation-related portions of Schedules 3.1, 3.2, and 3.3 for the 2020 period and beyond (including beyond 2024). All of these assumptions are provided in the company's Commission approved 2020-2029 DSM Plan that was approved by Consummating Order No. PSC-2020-0274-PAA-EG within Docket No. 20200053-EG.

14. On August 16, 2022, the Inflation Reduction Act of 2022 ("IRA") became law. Regarding the provisions of the IRA and related funding, please explain the following

a. Whether the conservation related provisions are reflected on the DSM and Conservation-related portions of Schedules 3.1, 3.2, and 3.3 through the forecast (planning) period, and if so, how. If the provisions of the Act are not reflected in such forecasts, please explain why.

b. Whether the electrification related provisions are reflected on the demand and energy load-related portions of Schedules 3.1, 3.2, and 3.3 through the forecast (planning) period, and if so, how. If the provisions of the IRA are not reflected in such forecasts, please explain why.

A. a. The conservation related provisions that are related to the portions of Schedules 3.1, 3.2, and 3.3 through the forecast (planning) period do not contain a specific adjustment related to the Inflation Reduction Act of 2022 ("IRA"). The reason why the IRA is not reflected in the DSM and Conservation Forecasts was because the forecasts were completed on May 2022, prior to the August passing of the IRA.

b. The electrification related provisions of the Inflation Reduction Act of 2022 are not reflected in the demand and energy load-related portions of Schedules 3.1, 3.2, and 3.3 through the forecast (planning) period due to the timing of when the forecast was prepared. The forecast was completed and approved in June of 2022.

15. Please explain any anomalies caused by non-weather events with regard to annual historical data points for the period 10 years prior to the current planning period that have contributed to the following, respectively:

a. Summer Peak Demand.

b. Winter Peak Demand.

c. Annual Retail Energy Sales**.**

A. Upon review of the company's summer and winter peak demand for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

a. Upon review of the company's summer peak demand for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

b. Upon review of the company's winter peak demand for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

c. Upon review of the company's annual retail energy sales for the ten years prior to the current planning period, there have been no anomalies caused by non-weather events.

16. Please provide responses to the following questions regarding the weather factors considered in the Company's retail energy sales and peak demand forecasts:

a. Please identify, with corresponding explanations, all the weather-related input variables that were used in the respective Retail Energy Sales, Winter Peak Demand, and Summer Peak Demand models.

b. Please specify the source(s) of the weather data used in the aforementioned forecasting models.

c. Please explain in detail the process/procedure/method, if any, the Company utilized to convert the raw weather data into the values of the model input variables.

d. Please specify with corresponding explanations:

i. How many years' historical weather data was used in developing each retail energy sales and peak demand model.

ii. How many years' historical weather data was used in the process of these models' calibration and/or validation.

e. Please explain how the projected values of the input weather variables (that were used to forecast the future sales or demand outputs for each planning years 2023 – 2032) were derived/obtained for the respective retail sales and peak demand models.

A. a. The Retail Energy Sales model uses the following weather-related input variables: monthly degree days and monthly normal degree days.

b. The source of the weather data Tampa Electric uses is the National Oceanic and Atmospheric Administration (NOAA)'s Tampa International Airport (TIA) weather station for calculation of the system-wide temperature of the utility's service territory.

c. For the Energy Sales models, Tampa Electric converts the daily average NOAA TIA dry bulb temperature into a daily degree day using the 65-degree base to determine if it is a heating degree day (less than 65-degree base) or cooling degree day (greater than 65-degree base).

Calendar degree days are converted to billing cycle degree days by proportioning degree days depending on how many billing cycles (i.e. cycle 1-21, 23) were billed during the billing period. In the Peak Demand models, dry bulb temperature data is also converted into a daily degree day using the 65-degree base for the peak day and lag peak day variables. For the variable representing the weather at the time of the peak, heating degree days are calculated using a 50-degree base and cooling degree day is calculated using a 80-degree base.

d.

i. The Retail Energy Sales and Peak Demand model typically use 10 years of historical weather data for the estimation period.

ii. See response to "i".

e. For the Energy Sales models, the projected values of the Normal degree day variables are determined by using 20 years of historical degree day data and running the Monte Carlo simulation to determine the normal degree days.

For Peak Demand models, the projected values of the Normal Peak Day temperatures are determined using 20 years of history, with the exception of January, which is based on the top 20 coldest peak days over the past 50 years.

17. [Investor-Owned Utilities Only] If not included in the Company's current planning period TYSP, please provide load forecast sensitivities (high band, low band) to account for the uncertainty inherent in the base case forecasts in the following TYSP schedules, as well as the methodology used to prepare each forecast:

a. Schedule 2.1 – History and Forecast of Energy Consumption and Number of Customers by Customer Class.

b. Schedule 2.2 - History and Forecast of Energy Consumption and Number of Customers by Customer Class.

c. Schedule 2.3 - History and Forecast of Energy Consumption and Number of Customers by Customer Class.

d. Schedule 3.1 - History and Forecast of Summer Peak Demand.

e. Schedule 3.2 - History and Forecast of Winter Peak Demand.

f. Schedule 3.3 - History and Forecast of Annual Net Energy for Load.

g. Schedule 4 - Previous Year and 2-Year Forecast of Peak Demand and Net Energy for Load by Month.

A. The high and low band sensitivities are included in the current planning period TYSP, within Chapter IV, pages 32 through 51 The methodology used to prepare load forecast sensitivities (high band, low band) for Schedules 2.1, 2.2, 2.3, 3.1, 3.2, 3.3 and 4 is listed with the 2023 TYSP, Chapter II, page 19 under "High and Low Scenario Forecast Assumptions".

a. Please see response above.

b. Please see response above.

c. Please see response above.

d. Please see response above.

e. Please see response above.

f. Please see response above.

g. Please see response above.

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18. Please provide responses to the following questions regarding the possible impacts of COVID-19 Pandemic (Pandemic) on the utility load forecast:

a. Please briefly summarize the impacts due to the Pandemic, if any, to the accuracy of the Company's respective forecast of annual retail energy sales and peak demands for 2021 and 2022.

b. Have any of your 2023 TYSP retail energy sales and peak demand forecasts incorporated the potential impacts of the Pandemic? Please explain your response.

A. a. The Pandemic impacts in 2021 were minimal and did not impact the accuracy of the forecasts. In 2022 there were no evident impacts due to the Pandemic, therefore accuracy was not impacted.

b. The Pandemic is no longer having any evident impacts on customer growth and energy consumption, therefore the forecasts in the 2023 TYSP do not consider the Pandemic.

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19. Please address the following questions regarding the impact of all customer-owned/leased renewable generation (solar and otherwise) and/or energy storage devices on the Utility's forecasts.

a. Please explain in detail how the Utility's load forecast accounts for the impact of customer's renewables and/or storage.

b. Please provide the annual impact, if any, of customer's renewables and/or storage on the Utility's retail demand and energy forecasts, by class and in total, for 2023 through 2032.

c. If the Utility maintains a forecast for the planning horizon (2023-2032) of the number of customers with renewables and/or storage, by customer class, please provide.

A. a. Tampa Electric's load forecasts account for the impact of customer- owned solar on energy and demand. Customer-owned solar forecasts are based on the historical number of PV installations and the average size of the PV systems installed in the service area. From this historical data, future penetration levels of PVs are based on assumptions used by the Energy Information Administration's (EIA) South Atlantic region. It is assumed Tampa Electric will no longer have to serve this portion of PV customers' load; therefore, the energy sales and demand forecasts are adjusted downward by the annual incremental change to incorporate the loss of this load. Tampa Electric load forecasts do not take into consideration energy storage devices as the impact is minimal currently**.**

b. Please refer to the chart below for the incremental impact of customer renewables [no energy storage, only PV] on retail demand and energy forecasts by class and in total for 2023 through 2032.

c. Please refer to the chart below for the number of customers with renewables [no energy storage, only PV] by customer class and in total for 2023 through 2032.

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	Tampa Electric Customer-Owned Solar/Photovoltaic [PV]					
	Residential Net Meter Customers	Non-Residential Net Meter Customers	Total Net Meter Customers	Cumulative Energy Generation [GWH]	Cumulative Installed Capacity Demand [MW_{AC}]	Cumulative Contribution at Retail Summer Peak Demand [MW_{AC}]
2023	22,769	295	23,064	336.3	213.3	81.1
2024	26,997	324	27,321	397.7	251.5	95.6
2025	30,099	335	30,434	440.3	279.2	106.1
2026	32,788	347	33,134	478.2	303.3	115.2
2027	35,307	357	35,664	513.7	325.8	123.8
2028	37,873	364	38,237	551.2	348.6	132.5
2029	40,413	374	40,787	585.4	371.3	141.1
2030	42,901	379	43,280	620.2	393.3	149.5
2031	45,481	389	45,871	656.5	416.4	158.2
2032	48,071	396	48,467	694.7	439.4	167.0

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20. Please discuss whether the Company included plug-in electric vehicle (PEV) loads in its demand and energy forecasts for its current planning period TYSP. If so, how were these impacts accounted for in the modeling and forecasting process?

a. Has the Company also included the impact of demand response and time of use rates for the PEV loads? If so, please provide the impact of these measures. If not, please explain why not.

A. Yes, Tampa Electric has included the impact of plug-in electric vehicle loads in its demand and energy forecasts for the current planning period in the TYSP. Tampa Electric developed estimates of the number of plug-in electric vehicles and their impacts on the demand and energy forecasts. These estimates were incorporated into the forecast results reported in the 2023 TYSP. The energy sales and retail peak forecasts are adjusted upward to incorporate the gain of this EV charging load. Specifically, the incremental effects of EV charging are added to the retail energy sales forecast and the incremental effects of the projected EV demand at the time of the retail peak are added to the retail peak forecast.

a. No, Tampa Electric has not included impacts of demand response and time of use rates for the plug-in electric vehicle loads. Currently, Tampa Electric offers no programs specific to EV managed charging.

21. Please discuss with detail any changes or modifications from the Company's previous TYSP report regarding the following PEV related topics:

a. The major drivers of the Company's PEV growth.

b. The methodology and the assumptions (or, if applicable, the source(s) of the data) used to estimate the number of PEVs operating in the Company's service territory and the methodology used to estimate the cumulative impact on system demand and energy consumption.

c. The Company's process for monitoring the installation of PEV public charging stations in its service area.

d. The processes or technologies, if any, that are in place to allow the Company to be notified when a customer has installed a PEV charging station in their home.

e. Any instances since January 1 of the year prior to the current planning period in which upgrades to the distribution system were made where PEVs were a contributing factor.

A. a**.** The major driver of the company's PEV growth is the forecast of PEV/EV sales as a percent of all new car sales published by the Energy Information Administration (EIA) for the South Atlantic region.

b. The electric vehicle forecast process begins with an estimate of the number of PEVs/EVs operating in Tampa Electric's service area using the most recent data provided by an independent third-party analyst. Future penetration levels of EVs are based on assumptions used by the Energy Information Administration's (EIA) for the South Atlantic region as mentioned in No. 21a... The demand and energy consumption associated with PEVEV charging is based on a number of assumptions including the average number of miles driven in a year, the weighted average battery size of common PEVEV models sold within the service area and the number of charges per year.

c. Tampa Electric does not have a formal process for monitoring the installation of third-party PEV public charging stations. Informally, the company's relationships with equipment installers, EV charging network operators, and key account customers help to identify existing and planned public charging stations, Tampa Electric also utilizes the Department of

Energy's Alternative Fuels Data Center to identify public charging stations. Tampa Electric also leverages relationships with local developers of large projects where public charging may, or could be, included. For "quick-charge" public charging stations requiring greater than 240-volt service, internal collaboration amongst various work teams ensures that new installations are properly identified, as these types of installations usually require Tampa Electric involvement for new utility service.

d. There is not a process in place that allows the company to be notified when a customer has installed a PEV charging station in their home.

e. Tampa Electric is not aware of any instances since January 1, 2022, in which PEVs were a contributing factor to upgrades required on the company's distribution system. However, the company is currently evaluating distribution system improvements that are expected to be required for serving one or more customer sites where commercial fleet PEV charging is planned. Tampa Electric will expect to provide details associated with any actual distribution system upgrades as part of a future response to this question.

22. Please refer to the Excel Tables File (Electric Vehicle Charging). Complete the table by providing estimates of the requested information within the Company's service territory for the current planning period. Direct current fast charger (DCFC) PEV charging stations are those that require a service drop greater than 240 volts and/or use three-phase power.

a. Please describe all significant technological, market, regulatory, or other events or announcements since the filing of the Company's 2022 TYSP which have impacted the metrics reported

b. Please explain if and how the tax incentives and grants for transportation electrification associated with the IRA, adopted in August 2022, has impacted the Company's PEV and PEV charging station adoption/installation, as well as the PEV energy/demand forecast(s). If the provisions of the IRA are not reflected in such forecasts, please explain why.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx", tab Q22_Electric Vehicle Charging.

a. While the company recognizes that technological, market, regulatory, and other events or announcements may impact the metrics reported in the Excel tables file, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx", No. 22, Electric Vehicle Charging, the company utilizes a forecasting methodology that is more clearly defined. Please refer to the company's response to Question No. 21b above. Only in a case where the company is directly made aware of a factor that will impact one or more of the metrics reported, would the company then include the relevant impact within the appropriate metric. In that regard, the metric for Number of PEVs for 2023 in the referenced Excel table file includes approximately 900 commercial PEVs that are planned to begin operating with the company's service territory in 2023.

b. While it is possible that tax incentives and grants related to transportation electrification have impacted the adoption/installation of PEV charging stations as indicated in the referenced Excel table, the company does not have specific knowledge of installations that utilized tax incentives or grants associated with the IRA. The impacts of IRA are not reflected in the forecasts published in the 2023 TYSP due to timing. The forecasts were prepared last Summer and approved in June 2023, prior to the passage of the IRA.

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23. Please describe any Company programs or tariffs currently offered to customers relating to PEVs and describe whether any new or additional programs or tariffs relating to PEVs will be offered to customers within the current planning period.

a. Of these programs or tariffs, are any designed for or do they include educating customers on electricity as a transportation fuel?
b. Does the Company have any programs where customers can express their interest or expectations for electric vehicle infrastructure as provided for by the Utility, and if so, please describe in detail.

A. Tampa Electric continues to be active on several activities and potential offerings of future programs or tariffs with plug-in electric vehicles.

In May 2017, Tampa Electric received Commission approval to enhance the Energy Education, Awareness and Agency Outreach DSM Program by partnering with high schools' driver's education in the classroom. This portion of the program focuses on providing opportunities to encourage the conservation of energy and promote energy efficiency through local school systems by partnering with high schools' driver's education classes.

In March 2020, Tampa Electric also received Commission approval for a variance to the traditional method for calculating contribution-in-aid-of-construction (CIAC) as described in Rule 25-6.064 Florida Administrative Code and as it applies to new primary line extensions to serve high-voltage EV chargers. As Company revenues from these new stations are likely to be low in the near term while the EV market continues to mature, a minimal credit against what is often a substantial line extension cost presents a barrier to developing these EV charging sites. During a five-year pilot period, the revenue estimation period is extended from five years to ten years. During the pilot period, Tampa Electric will gather information to determine whether it has a beneficial impact on the EV market and provide annual reporting to the Commission.

In August 2020, the Commission approved Tampa Electric's commercial/industrial Integrated Renewable Energy System (Pilot) Program. The construction of the project was completed in 2021, and in the beginning of 2022 the company started the five-year study phase to evaluate the capabilities and DSM opportunities of a fully integrated renewable energy system. The final system consists of an 862 kW photovoltaic array located on five carports, five commercial-sized powerpack batteries capable of storing 1,160 kWh of energy, six dual headed level two electric vehicle charging systems, and ten industrial

truck battery charging stations. This pilot program has three main purposes: the first is to evaluate the ability to maximize the demand side management benefits from this integrated system, second is to determine the ideal operating parameters that a commercial or industrial customer would operate this type of system, and third, to use the installation and its associated operational information as an education platform for commercial and industrial customers seeking information on this type of system and its benefits, concerns, and capabilities.

In May 2021, the Commission issued the Final Order granting approval for Tampa Electric's public EV charging pilot program, today called Drive Smart℠. Through this pilot, Tampa Electric is deploying approximately two hundred Level Two (240v) and up to four DC Fast Charger (DCFC) EV charging ports across the company service territory to collect valuable grid-related data that supports proper utility planning. Tampa Electric contributes up to $5,000 per port towards the cost of equipment and installation, and the participating customer is responsible for any costs exceeding that contribution. Hardware and installation costs for government and income qualified locations, as well as the DCFC locations, are fully covered by Tampa Electric. During the four-year pilot, Tampa Electric will own and maintain the charging ports and provide annual reporting to the Commission on all aspects of the pilot program. Tampa Electric will seek future approval from the Commission on recommended action beyond pilot period, whether terminating, extending, or modifying the pilot program. Currently 38 charging ports have been installed with an additional 44 ports in the installation process.

Regarding future programs or tariffs related to PEVs, and due in part to the company's work delivering the Drive Smart program, Tampa Electric is learning more about potential opportunities to support customer adoption of PEVs and the necessary charging infrastructure. The company is evaluating the feasibility for providing programs and tariffs that include PEV-supportive rates and PEV charging programs or services, however the details for such potential programs or tariffs have not been developed nor has determination been made as to the timing. Tampa Electric would follow established regulatory requirements for notifying the Commission of any new programs or tariffs related to PEVs. In addition, the company is currently in development of the next Technical Potential Study that will support the proposed DSM Goals and Programs for the 2025-2034 period. As part of this study, supporting EV technology is being evaluated as individual measures for this study which may lead to offerings impacting EV's for potential stand-alone rebate type programs as well as the potential for possible demand response programs.

a. Tampa Electric believes that any involvement in the PEV market provides some level of customer education, if only through awareness, on the benefits of electricity

as a transportation fuel. The enhancement to the Energy Education, Awareness and Agency Outreach DSM Program is specifically intended to educate future customers. The Integrated Renewable Energy System Program includes a major component to help educate commercial and industrial customers interested in the technology, and the Drive Smart EV charging program will help to educate participating site hosts on considerations for providing EV charging at their facilities, including installation and operating costs.

b. Tampa Electric's Drive Smart EV charging pilot program, provides customers an opportunity to express their interest in electric vehicle infrastructure as provided for by the Utility. To be considered for participation, commercial customers have an opportunity to self-nominate for consideration. Tampa Electric utilizes an on-line application process to initially evaluate customer locations, which helps to measure the level of interest from commercial customers. While the application process currently in use is not primarily intended to measure customer interest in such programs, Tampa Electric will be including relative data as part of the annual reporting to the Commission on pilot program activities.

24. Has the Company conducted or contracted any research to determine demographic and regional factors that influence the adoption of PEVs applicable to its service territory? If so, please describe in detail the methodology and findings.

A. The company has not conducted or contracted research to determine demographic and regional factors that influence the adoption of PEVs applicable to its service territory.

25. Please describe if and how Section 339.287, Florida Statutes, (Electric Vehicle Charging Stations; Infrastructure Plan Development) has impacted the Company's projection of PEV growth and related demand and energy growth.

A. Section 339.287, Florida Statutes, (Electric Vehicle Charging Stations; Infrastructure Plan Development) has not had a notable impact to the Company's projection of PEV growth or any related demand and energy growth. However, considering that a lack of charging infrastructure remains a major barrier to EV adoption, and given that the plan includes pathways to significantly expand access to reliable EV charging throughout the State, Tampa Electric does believe that funding, federal or otherwise, used by the State to support the plan will increase PEV growth and therefore impact demand and energy growth. The timing for such impacts is not known and largely dependent upon the timing to implement the various portions of the plan.

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26. What has the Company learned about the impact of PEV ownership on the Company's actual and forecasted peak demand?

A. The company has insufficient data to quantify impacts of PEV ownership on the company's actual peak demand. The company has no process in place to identify customers with PEV charging use. With regard to forecasted peak demand, assumptions are used for battery size of common EV models sold within the service area and the number of charges per year based on miles driven per year.

27. If applicable, please describe any key findings and metrics of the Company's PEV pilot program(s) which reveal the PEV impact to the demand and energy requirements of the Company.

A. While the company is currently in the process of installing charging stations under its approved electric vehicle charging pilot program (Order No. PSC-2021-0144-PAA-EI), the company does not yet have key findings or metrics from the limited installations to reveal PEV impacts to demand and energy requirements. Since it is anticipated the program will be fully subscribed by early 2024, the company expects to begin compiling data that may help to reveal demand and energy requirements.

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Demand Response

28. [FEECA Utilities Only] Please refer to the Excel Tables File (DR Participation). Complete the table by providing for each source of demand response annual customer participation information for 10 years prior to the current planning period. Please also provide a summary of all sources of demand response using the table.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx", , tab Q28_DR Participation.

29. [FEECA Utilities Only] Please refer to the Excel Tables File (DR Annual Use). Complete the table by providing for each source of demand response annual usage information for 10 years prior to the current planning period. Please also provide a summary of all demand response using the table.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx", , tab Q29_DR Annual Use.

30. [FEECA Utilities Only] Please refer to the Excel Tables File (DR Peak Activation). Complete the table by providing for each source of demand response annual seasonal peak activation information for 10 years prior to the current planning period. Please also provide a summary of all demand response using the table.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP - Data Request 1.Excel Tables.xlsx", , tab Q30_DR Peak Activation.

31. Please refer to the Excel Tables File (LOLP). Complete the table by providing the loss of load probability, reserve margin, and expected unserved energy for each year of the planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q31_LOLP.

Generation & Transmission

Utility-Owned Generation

32. Please refer to the Excel Tables File (Unit Performance). Complete the table by providing information on each utility-owned generating resources' outage factors, availability factors, and average net operating heat rate (if applicable). For historical averages, use the past three years and for projected factors, use an average of the next ten-year period.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q32_Unit Performance.

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33. Please refer to the Excel Tables File (Utility Existing Traditional). Complete the table by providing information on each utility-owned traditional generation resource in service as of December 31 of the year prior to the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For capacity factor, use the net capacity as a basis.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q33_Utility Existing Traditional.

34. Please refer to the Excel Tables File (Utility Planned Traditional). Complete the table by providing information on each utility-owned traditional generation resource planned for in-service within the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For projected capacity factor, use the net capacity as a basis.

a. For each planned utility-owned traditional generation resource in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q34_Utility Planned Traditional.

a. Tampa Electric Company, working in collaboration with the MacDill Air Force Base, has executed and approved a land lease for 33 years to site up to four reciprocating internal combustion engines (RICE) and a 20 MW 2-hour battery energy storage system (BESS) on base property. The project has obtained its NEPA environmental approval, and the Tampa Electric transmission operator has evaluated and approved the interconnection request for a combined total of 95 MW.

Two Wartsila RICE engines have been contracted for. Tampa Electric is in the process of receiving construction bids from contractors. The expected in-service date is April 2025. The second two reciprocating engines are planned for 2030 but equipment contracts have not been firmed up at this time.

The Bayside station enhancements incorporates advanced hardware upgrades to its seven CTs to improve efficiency and increase generating capacity.

These capacity additions and enhancements to the existing units work in concert to provide cost savings, environmental, and reliability benefits for customers while also enhancing the system's operational flexibility.

Additionally, the distributed energy resources provide enhanced resiliency, islanding capability, avoid transmission and distribution investment, and reduce line losses to the bulk electric grid.

35. Please refer to the Excel Tables File (Utility Existing Renewable). Complete the table by providing information on each utility-owned renewable generation resource in service as of December 31 of the year prior to the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For capacity factor, use the net capacity as a basis.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q35_Utility Existing Renewable.

36. Please refer to the Excel Tables File (Utility Planned Renewable). Complete the table by providing information on each utility-owned renewable generation resource planned for in-service within the current planning period. For multiple small (<250 kW per installation) distributed resources of the same type and fuel source, please include a single combined entry. For projected capacity factor, use the net capacity as a basis.

a. For each planned utility-owned renewable resource in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q36_Utility Planned Renewable.

a. Alafia Solar, Juniper Solar, Lake Mabel Solar, and Dover Solar are currently under construction and should reach Commercial In-Service by December 2023. Bullfrog Creek and English Creek Solar are in permitting and are expected to reach Commercial In-Service by December 2024. Cotton Mouth Ranch Solar is in permitting and is expected to reach Commercial In-Service by December 2025. All other sites identified as Future Solar are in various stages of development. Future sites are being evaluated and will be identified once the sites have been purchased.

37. Please list and discuss any planned utility-owned renewable resources that have, within the past year, been cancelled, delayed, or reduced in scope. What was the primary reason for the changes? What, if any, were the secondary reasons?

A. There have been no planned utility-owned renewable resources that have, within the past year, been cancelled, delayed, or reduced in scope.

38. [Investor-Owned Utilities Only] Please refer to the Excel Tables File (As-Available Energy Rate). Complete the table by providing, on a system-wide basis, the historical annual average as-available energy rate in the Company's service territory for the 10-year period prior to the current planning period. Also, provide the projected annual average as-available energy rate in the Company's service territory for the current planning period. If the Company uses multiple areas for as-available energy rates, please provide a system-average rate as well.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q38_As-available Energy Rate.

39. Please refer to the Excel Tables File (Planned PPSA Units). Complete the table by providing information on all planned traditional units with an in-service date within the current planning period. For each planned unit, provide the date of the Commission's Determination of Need and Power Plant Siting Act certification, if applicable.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q39_Planned PPSA units.

40. For each of the planned generating units, both traditional and renewable, contained in the Company's current planning period TYSP, please discuss the "drop dead" date for a decision on whether or not to construct each unit. Provide a timeline for the construction of each unit, including regulatory approval, and final decision point.

A. The Company has already procured major pieces of equipment for the 600 MWAC of solar being installed through 2023 as identified in Tampa Electric's Ten-Year Site Plan and all but four of these sites are in service, with the remaining sites under construction. These utility-scale solar projects received regulatory approval for cost recovery in the 2021 rate case. There are multiple projects planned, each less than 75 MW in capacity. The construction of these projects began in 2020 and will continue through 2023. The remaining four projects totaling 229.5 MW are expected to be in service in December 2023. These projects do not require Power Plant Siting Act or Need Determination approvals.

As a result of the present material shortages, transportation delays and increased product lead times, Tampa Electric estimates a final decision point for procuring and constructing a typical solar facility to be approximately 18 months prior to the expected in-service date. The 18 months is comprised of 15 months for engineering, procurement, and permitting, which could vary depending on the site location, and 9 months for construction. The 18-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Future solar projects beyond 2023 that are identified in Tampa Electric Company's 2023 Ten Year Site Plan have already procured or will be procuring (in 2023) major pieces of equipment, including solar modules, inverters and tracker components. The procurement of equipment in 2022 allowed the projects to safe harbor the Investment Tax Credit (ITC) or Production Tax Credit (PTC) to reduce the cost to our customers. The planned solar projects began construction and/or development in 2022 to provide enough time to ensure safety, sufficient work force and account for schedule disruptions due to weather.

Tampa Electric estimates a final decision point for procuring and constructing a typical reciprocating internal combustion engine (RICE) to be approximately 30 months prior to the expected in-service date. The 30 months is comprised of 18 months for engineering, procurement, and permitting, which could vary depending on the site location, and 15 months for construction. The 30-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Considering present material shortages, transportation delays, and increased product lead times, Tampa Electric estimates a final decision point for procuring and constructing a typical battery energy storage system (BESS) to be approximately 18 months prior to the expected in-service date. The 18 months is comprised of 15 months for engineering, procurement, and permitting, which could vary depending on the site location, and 9 months for construction. The 18- month time estimate may be improved or extended based upon major equipment availability and site permitting.

41. Please refer to the Excel Tables File (Capacity Factors). Complete the table by providing the actual and projected capacity factors for each existing and planned unit on the Company's system for the 11-year period beginning one year prior to the current planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q41_Capacity Factors.

42. [Investor-Owned Utilities Only] For each existing unit on the Company's system, please provide the planned retirement date. If the Company does not have a planned retirement date for a unit, please provide an estimated lifespan for units of that type and a non-binding estimate of the retirement date for the unit.

A. Refer to the 2023 Ten Year Site Plan, Chapter 1 Schedule 1. Currently the company is depreciating its existing units in accordance with the remaining depreciable life approved in its most recent depreciation study.

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43. Please refer to the Excel Tables File (Steam Unit CC Conversion). Complete the table by providing information on all of the Company's steam units that are potential candidates for repowering to operation as Combined Cycle units.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q43_Steam Unit CC Conversion.

44. Please refer to the Excel Tables File (Steam Unit Fuel Switching). Complete the table by providing information on all of the Company's steam units that are potential candidates for fuel-switching.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q44_Steam Unit Fuel Switching.

45. Please refer to the Excel Tables File (Transmission Lines). Complete the table by providing a list of all proposed transmission lines for the current planning period that require certification under the Transmission Line Siting Act. Please also include in the table transmission lines that have already been approved but are not yet in-service.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q45_Transmission Lines.

Tampa Electric does not currently have any transmission lines scheduled to be in-service for the current planning period that require certification under the Transmission Line Siting Act. The excel spreadsheet identifies the transmission lines that have already been approved but are not yet in-service.

Purchases and Sales

46. Please refer to the Excel Tables File (Firm Purchases). Complete the table by providing information on the Utility's firm capacity and energy purchases.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q46_Firm Purchases.

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47. Please refer to the Excel Tables File (PPA Existing Traditional). Complete the table by providing information on each purchased power agreement with a traditional generator still in effect by December 31 of the year prior to the current planning period pursuant to which energy was delivered to the Company during said year.

A. Tampa Electric has one (1) purchased power agreement that was in effect December 31 of the year prior to the current planning period that will deliver energy during the current planning year. That agreement is with Duke Energy Florida (DEF) for 250 MW. The term is November 2022 through February 2023. Also, the purchase is non-firm November and December 2022 and firm January and February 2023.

The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q47_PPA Existing Traditional.

48. Please refer to the Excel Tables File (PPA Planned Traditional). Complete the table by providing information on each purchased power agreement with a traditional generator pursuant to which energy will begin to be delivered to the Company during the current planning period.

a. For each purchased power agreement in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q48_PPA Planned Traditional.

a. The company has two (2) purchased power agreements that begin January 2023. The purchases are (i) 50 MW from the Florida Municipal Power Agency (FMPA) and (ii) 100 MW from Orlando Utilities Commission (OUC). These winter purchases are short-term and provide firm capacity for the period January through February 2023.

49. Please refer to the Excel Tables File (PPA Existing Renewable). Complete the table by providing information on each purchased power agreement with a renewable generator still in effect by December 31 of the year prior to the current planning period pursuant to which energy was delivered to the Company during said year.

A. As noted in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q49_PPA Existing Renewable, Tampa Electric does not have an existing renewable purchased power agreement.

50. Please refer to the Excel Tables File (PPA Planned Renewable). Complete the table by providing information on each purchased power agreement with a renewable generator pursuant to which energy will begin to be delivered to the Company during the current planning period.

a. For each purchased power agreement in the table, provide a narrative response discussing the current status of the project.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q50_PPA Planned Renewable.

a. Tampa Electric has one (1) planned purchased power agreement with a renewable facility. That agreement is with Pasco County (Pasco) for Tampa Electric to purchase up to 25 MW from Pasco's waste-to-energy (WTE) facility and, if approved by the Florida Public Service Commission, begins in 2025. The agreement has an initial capacity of 21 MW and increases to 25 MW if Pasco expands the facility's generating capacity. The agreement is firm with a 10-year term beginning January 2025.

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51. Please list and discuss any purchased power agreements with a renewable generator that have, within the past year, been cancelled, delayed, or reduced in scope. What was the primary reason for the change? What, if any, were the secondary reasons?

A. Tampa Electric has no purchased power agreement with a renewable generator that have, within the past year, been cancelled, delayed, or reduced in scope.

52. Please refer to the Excel Tables File (PSA Existing). Complete the table by providing information on each power sale agreement still in effect by December 31 of the year prior to the current planning period pursuant to which energy was delivered from the Company to a third-party during said year.

A. As of December 31, 2022, Tampa Electric had one (1) power sale agreement. The contract is with Seminole Electric Cooperative for up to 18 MW, but the capacity is non-firm. The agreement continues indefinitely unless terminated by either party with three years' prior notice. That is also Tampa Electric's only planned sale for the current planning period.

The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q52_PSA Existing.

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53. Please refer to the Excel Tables File (PSA Planned). Complete the table by providing information on each power sale agreement pursuant to which energy will begin to be delivered from the Company to a third-party during the current planning period.

a. For each power sale agreement in the table, provide a narrative response discussing the current status of the agreement.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q53_PSA Planned.

a. As noted in the response to Data Request No. 52, Tampa Electric's non-firm sale with Seminole Electric Cooperative for up to 18 MW is Tampa Electric's only planned sale for the current planning period.

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54. Please list and discuss any long-term power sale agreements within the past year that were cancelled, expired, or modified. What was the primary reason for the change? What, if any, were the secondary reasons?

A. Tampa Electric had no long-term power sale agreements within the past year that were cancelled, expired, or modified.

Renewable Generation

55. Please refer to the Excel Tables File (Annual Renewable Generation). Complete the table by providing the actual and projected annual energy output of all renewable resources on the Company's system, by source, for the 11-year period beginning one year prior to the current planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q55_Annual Renewable Generation.

56. Please describe any actions the Company engages in to encourage production of renewable energy within its service territory.

A. As market conditions continue to change and technology improves, resiliency is top-of-mind for a growing number of customers, renewable alternatives like solar and battery storage become more attractive. Between January 2022 and December 2022, with tax incentives and the incentive provided by the FPSC's net metering rule, over 6,604 customers installed solar panels on their homes or businesses, indicating the increasing acceptance of customer owned renewable generation. Through December 2022, more than 17,966 customers installed PV systems on their homes or businesses, accounting for more than 206 MWDC of net metered, distributed solar generation interconnected on Tampa Electric's grid. Tampa Electric customers/contractors continue to experience the streamlined online interconnection application process that was implemented in 2018 and continues to be streamlined by another system upgrade in 2022 as volume increases.

For over sixteen years, Tampa Electric's Renewable Energy Program has offered residential and commercial and industrial customers the opportunity to purchase 200 kWh renewable energy "blocks" for their home or business. The program also allows residential and commercial and industrial customers the opportunity to purchase renewable energy to power a specific event. This program enables a family, a business or a venue to make a statement about their commitment to the environment and to renewable energy. The funds from this program build small, community-sited PV arrays at highly visible locations. These demonstration arrays are designed to educate students and the public on the benefits of renewable energy.

Through December 2022 Tampa Electric's Renewable Energy Program has 1,150 customers purchasing over 2,000 blocks of renewable energy each month. The company's renewable-generation portfolio is a mix of various technologies and renewable generating sources, including smaller, company-owned photovoltaic (PV) arrays throughout the community and an increasing number of large-scale PV systems that provide ample solar kWh for the Renewable Energy Block Program. The smaller, community-sited PV arrays are installed at the Museum of Science and Industry ("MOSI"), Middleton High schools, Tampa Electric's Manatee Viewing Center, Tampa's Lowry Park Zoo, the Florida Aquarium, LEGOLAND Florida's Imagination Zone, and at the Florida Conservation and Technology Center (FCTC), an environmental and energy education facility located in Apollo Beach, solar trees that provide solar powered charging stations for small

electronics (cell phones, tablets) at MOSI and at a community organic farm on the edge of downtown Tampa.

The Renewable Energy Program installations are strategically located throughout the community and are designed to educate students and the public on the benefits of renewable energy. Educational signage touts the advantages of solar energy and interactive displays provide hands-on experience to engage visitors' interest in clean, renewable technologies.

Tampa Electric installed PV integrated with battery storage picnic tables at the Manatee Viewing Center. These PV-topped structures have bench seating and table-tops equipped with charging ports for small electronics and each solar tree has solar energy education signage. In addition, Tampa Electric installed a solar "flower" at the Florida Conservation & Technology Center which will further the encouragement of renewable energy.

In 2020, the company also received Commission approval to add renewable energy education to the company's existing Energy Education, Awareness and Agency Outreach Demand Side Management Program. Tampa Electric is currently in the process of enhancing the company's website to provide more information to help customers make informed decisions on renewable energy and its benefits to encourage its further adoption and providing a third-party entity to ensure customers receive the best possible experience once they make the decision to install their own renewable energy system. This resource is slated to go live by the end of June 2023.

In 2019, Tampa Electric launched a Shared Solar Program, called Sun Select, providing another choice for customers unable to install rooftop solar but prefer their energy generated from solar. Residential and small business customers can purchase locally generated solar power to match 25%, 50% or 100% of the electricity they use. Business and commercial customers can purchase solar in increments of 1,000 kWh. Sun Select participants pay a locked-in solar rate for the solar energy they purchase instead of paying the fuel charge for that portion of participants' electricity use. The energy is generated at two sites totaling 31.4 MW AC, specifically built to support the new shared solar program.

On December 17, 2022, Tampa Electric achieved the milestone of more than a gigawatt (GW) of utility solar with the completion of the company's 17th site, which is enough electricity to power more than 160,000 homes. With 1,023.4 megawatts (MW) now in service, Tampa Electric generates 1,225 watts per customer of solar capacity and over 10 percent of Tampa Electric's generation comes from the sun.

In 2023, four additional utility solar sites will be constructed, adding 230 MW to the company's growing portfolio of solar, with more planned by the end of 2025. By then, the company will have more than 1,600 MW of solar, enough to serve 260,000 homes. This expansion will significantly reduce Tampa Electric's carbon dioxide emissions and give customers the benefit of zero fuel-cost solar generation for years to come. These utility solar sites along with solar generating facilities constructed at Legoland Florida, Tampa International Airport, and other innovative solar research facilities like the company's new Floating Solar project, its new Agrivoltaics project, and an integrated renewable energy system, consisting of solar PV carports that charge commercial-sized batteries, which re-charge the company's growing EV fleet will further the development and enable the expansion of renewable energy within Tampa Electric's service area.

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57. [Investor-Owned Utilities Only] Please discuss whether the Company has been approached by renewable energy generators during the year prior to the current planning period regarding constructing new renewable energy resources. If so, please provide the number and a description of the type of renewable generation represented.

A. Tampa Electric was not approached by any renewable energy generators in 2022.

58. Does the Company consider solar PV to contribute to one or both seasonal peaks for reliability purposes? If so, please provide the percentage contribution and explain how the Company developed the value.

A. For the fixed tilt PV sites Tampa Electric considers 38 percent firm capacity value contribution towards the summer reserve margin, and zero percent firm capacity value contribution towards the winter reserve margin.

For the single axis tracking PV sites, Tampa Electric considers 56 percent firm capacity value contribution towards the summer reserve margin, and zero percent firm capacity value contribution towards the winter reserve margin.

These capacity values are derived using solar PV simulation software and hourly projections from vendor data.

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59. Please identify and describe any programs the Company offers that allows its customers to contribute towards the funding of specific renewable projects, such as community solar programs.

a. Please describe any such programs in development with an anticipated launch date within the current planning period.

A. a. In 2019, Tampa Electric launched a Shared Solar Program, called Sun Select, providing another choice for customers unable to install rooftop solar. Residential and small business customers can purchase locally generated solar power to match 25%, 50% or 100% of the electricity they use. Business and commercial customers can purchase solar in increments of 1,000 kWh. Sun Select participants pay a locked-in solar rate for the solar energy they purchase instead of paying the fuel charge for that portion of participants' electricity use. The energy is generated at two sites totaling 31.4 MW AC, specifically built to support the new shared solar program

For over 16 years, Tampa Electric's Renewable Energy Program (Sun to Go) has offered residential, and commercial and industrial customers the opportunity to purchase 200 kWh renewable energy "blocks" for their home or business. The program also allows residential, and commercial and industrial customers the opportunity to purchase renewable energy to power a specific event. This program enables a family, a business or a venue to make a statement about their commitment to the environment and to renewable energy. The funds from this program build small, community-sited PV arrays at highly visible locations. These demonstration arrays are designed to educate students and the public on the benefits of renewable energy.

Energy Storage

60. Briefly discuss any progress in the development and commercialization of non-lithium-ion based battery storage technology the Company has observed in recent years**.**

A. Tampa Electric continuously monitors and evaluates developing technologies including various battery storage technologies. While lithium batteries remain the most mature and widely adopted battery technology, other battery technologies such as flow batteries and other forms of long duration energy storage show potential. Their ability to accommodate repeated cycles with minimal degradation is appealing. However, their higher round trip efficiency losses and initial capital installation costs remain a challenge.

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61. If applicable, please describe the strategy of how the Company charges and discharges its energy storage facilities. As part of the response discuss if any recent legislation, including the IRA has changed how the Company dispatches its energy storage facilities.

A. Tampa Electric runs dispatch models to optimize the dispatch of all resources, including battery storage. These models optimize when and to what extent energy storage facilities charge and discharge. In order maximize the Investment Tax Credit benefit to customers that was available at the time, the Big Bend Energy Storage facility is limited to charge from the Big Bend Solar facility at times when solar energy is being produced. Due to the recent passage of the IRA, future energy storage facilities may be designed without this constraint and therefore dispatch more economically.

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62. Briefly discuss any considerations reviewed in determining the optimal positioning of energy storage technology in the Company's system (e.g., Closer to/further from sources of load, generation, or transmission/distribution capabilities).

A. There are a variety of factors that can influence the optimal positioning of an energy storage facility within Tampa Electric's system. The type of energy storage technology being used may impact the viability at certain locations. Placing energy storage closer to the load can improve customer resiliency, effectively shave the peak, and defer or avoid transmission and/or distribution system upgrades. Energy storage systems can also be used to address possible voltage support and frequency regulation issues. Placing energy storage systems at an existing generating facility can provide black start capability. Locating energy storage nearby existing substation or transmission infrastructure can potentially minimize the required investment. In addition, the availability of land to place energy storage in densely developed areas remains a consideration.

63. Please explain whether customers have expressed interest in energy storage technologies. If so, describe the type of customer (residential, commercial industrial) and how have their interests been addressed.

A. In March of 2018, Tampa Electric began interconnecting customer-owned battery subsystems. Since then, over 750 customers have interconnected batteries for a total of 6.7 MW installed capacity. Almost all of the interconnections are residential and each subsystem ranges from one to eight batteries (of various capacities).

The application process follows the same path as the renewable energy interconnection process; customers typically install a battery subsystem and PV at the same time.

64. Please refer to the Excel Tables File (Existing Energy Storage). Complete the table by providing information on all energy storage technologies that are currently either part of the Company's system portfolio or are part of a pilot program sponsored by the Company.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q64_Existing Energy Storage.

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65. Please refer to the Excel Tables File (Planned Energy Storage). Complete the table by providing information on all energy storage technologies planned for in-service during the current planning period either as part of the Company's system portfolio or as part of a pilot program sponsored by the Company.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q65_Planned Energy Storage.

66. Please identify and describe the objectives and methodologies of all energy storage pilot programs currently running or in development with an anticipated launch date within the current planning period. If the Company is not currently participating in or developing energy storage pilot programs, has it considered doing so? If not, please explain.

a. Please discuss any pilot program results, addressing all anticipated benefits, risks, and operational limitations when such energy storage technology is applied on a utility scale (> 2 MW) to provide for either firm or non-firm capacity and energy.

b. Please provide a brief assessment of how these benefits, risks, and operational limitations may change over the current planning period.

c. Please identify and describe any plans to periodically update the Commission on the status of your energy storage pilot programs.

A. a. Tampa Electric currently does not have any pilot programs on a utility scale > 2 MW.

b. Non- Applicable.

c. Tampa Electric has two conservation initiatives involving energy storage programs. The first is the company's "Integrated Renewable Energy Storage System (Pilot)" program and the second is the company's "Small to mid-size Commercial Battery Storage conservation research and development ("CRD") initiative.

Integrated Renewable Energy Storage System (Pilot): This program was approved by the Commission as part of the company 2020-2029 DSM Plan. This program was initially looked at as a DSM Conservation Research and Development ("CRD") project that started in 2017.

In 2017, Tampa Electric partnered with USF's Center for Urban Transportation Research ("CUTR") to study the potential benefits that electric vehicles could provide to a DSM Program. The partnership developed two studies. The first study was the electric vehicle energy education study which has been fully implemented into three high schools in Hillsborough County. The second study was to perform in-depth research on the benefits that Tampa Electric could potentially realize if the

company offered a DSM Program related to electric vehicles. As the performance of this report was being conducted, Tampa Electric began exploring the operational capabilities and characteristics of large commercial electric vehicle lithium-ion batteries and their potential capability to export power to the company's electrical grid during peak times. The company explored developing a separate R&D project that would involve installing truck batteries (either a three (3) kW or 10 kW sized battery) within three of the company's line trucks to evaluate the potential energy consumed by the charging stations and the amount of demand that can be exported to the grid. In addition, the ability to control the level of discharge to a specified point will also be evaluated to understand the operational impacts of performing these exports during the summer and winter peak season hours. Other items the project would analyze will include the following:

- Economics and cost-effectiveness
- Customer site integration
- Integration of multiple trucks

Because of the costs for batteries seen in the other small to mid-size Commercial Battery Storage project, Tampa Electric made the decision that this R&D project would be placed on hold until additional funding was available, or the battery and associated costs decreased to an acceptable level. In early 2019, the company decided that this CRD project would provide additional benefits if it were included as part of the Integrated Renewable Energy System (Pilot) Program proposed in the company's 2020-2029 DSM Plan.

As part of Tampa Electric's 2020-2029 DSM Plan, Tampa Electric proposed the Integrated Renewable Energy System (Pilot) program to study and understand the potential opportunities and interactions of a fully integrated renewable energy system that contains a photovoltaic system, batteries, car charging and industrial truck charging. The pilot program was designed to be a very cost-effective way to gain the knowledge regarding load shifting during current peak times, load shifting during changing peak times due to high solar penetration, and how to maximize the DSM benefits of these integrated systems (Solar Photovoltaic ("PV") Array, Large Electric Vehicle Charging, Electric Vehicle Charging, Battery Storage). Another important part of the pilot was to make the technology available for viewing and education by potential commercial/industrial customers that are interested in these systems. The Integrated Renewable Energy System was designed to include the following components:

1. 800 kW (AC) solar PV array

2. 290 kW / 1,160 kWh battery energy storage system
3. 10 large electric vehicle access plugs for charging
4. Six (6) dual headed passenger vehicle charging stations

In 2022, the company has completed its first full year of operation following its commissioning in 2021. The integrated renewable energy system was constructed at Tampa Electric's Eastern Service Area and consists of 862 kW photovoltaic system located on five carports, five commercial-sized powerpack batteries capable of storing 1,160 kWh of energy, six dual headed level "2" electric vehicle charging systems, and 10 industrial truck battery charging stations. Tampa Electric provided an update on the lessons learned during the first year of operation of this integrated renewable energy systems within the company's annual 2022 DSM Report that was filed with the Commission on March 1, 2023. These lessons learned will be used to assist commercial and industrial customers seeking information on this type of system and its benefits, concerns, and capabilities. Tampa Electric will continue to provide updates in the company's annual DSM reports on the ongoing results of the performance of the system and lessons learned.

Small to mid-size Commercial Battery Storage: In 2022, the company has been monitoring the costs of applicable battery systems and believes the cost of these systems will enable the company to install two systems, at separate customer locations, in 2023. This second phase is the identification of one or two commercial facilities for potential battery installation which requires site visits and face-to-face interactions with customers.

In the last quarter of 2016, Tampa Electric partnered with the University of South Florida ("USF") College of Engineering to assist in the performance of this CRD project to evaluate the feasibility of potentially offering a battery storage DSM program for commercial/industrial customers. This CRD project will evaluate these small to mid-size commercial battery storage through research and field study with at least one battery being installed at a commercial/industrial customer's facility. Tampa Electric specified the size of battery for this CRD project to be between 10 kW and 150 kW with the project from inception to completion lasting approximately three-years. The original timeline was to afford enough time to study these batteries and potentially justify a DSM program within the company's 2020-2029 DSM Plan if the results were positive. The original R&D project was

projected to cost approximately $250,000 to achieve the following objectives:

- Evaluate the potential for battery storage for the use of load shifting on demand savings.
- Evaluate the efficiency of load shifting from a battery storage system and the associated control and monitoring system.
- Evaluate the impact on the total energy consumption of the battery and facility when used in a load shifting capacity (versus reliability).
- Evaluate and compare batteries based on performance and cycling tolerance when used in Florida's climate.
- Examine the associated costs from cradle to disposition of battery.
- Evaluate the load profile impact on power vs. capacity tradeoffs.

To achieve these objectives, the small to mid-size Commercial Battery Storage project was broken down into the following four main phases:

1. Battery selection
2. Identify commercial facilities
3. Battery vendor selection
4. Installation of storage system

Phase 1 was completed by USF in 2017. Tampa Electric included a copy of the battery research study in the company's annual DSM report that was filed with the Commission on March 1, 2018. In 2017, after completion of the initial portion of the CRD project, the company sought product availability and costs and found that the prices were greater than the allocation of funds allowed as an R&D program and placed the pursuit of this CRD project on hold until the prices of the batteries dropped to an acceptable level. The company's Commercial Energy Management Team ("CEMT") has continued to keep a pulse on the market and monitors the prices of the batteries to continue the CRD project. In addition to monitoring the prices of the batteries to continue the CRD project, Tampa Electric also filed for an increase in the allowable funds to be used for CRD in the company's most recently filed and Commission approved 2020-2029 DSM Plan. In the 2020-2029 DSM Plan, the program costs were increased on an annual basis from $200,000 per year to $400,000 per year and increased the five-year period total allowable costs from $1,000,000 to $2,000,000.

Tampa Electric has had preliminary facilities identified for follow-up in 2022 with customers that may be interested in participating in this CRD project. The two preliminary facilities include a 911-call center and a low-income community center.

67. If the Company utilizes non-firm generation sources in its system portfolio, please detail whether it currently utilizes or has considered utilizing energy storage technologies to provide firm capacity from such generation sources. If not, please explain.

a. Based on the Company's operational experience, please discuss to what extent energy storage technologies can be used to provide firm capacity from non-firm generation sources. As part of your response, please discuss any operational challenges faced and potential solutions to these challenges.

A. a. While intermittent during the day, solar could be coupled with energy storage to provide a capacity benefit to serve system peak early the next morning or later in the day when the solar is not generating at its maximum output. Thus, battery storage offers the opportunity to complement solar generation.

Other

68. Please identify and discuss the Company's role in the research and development of utility power technologies, including, but not limited to research programs that are funded through the Energy Conservation Cost Recovery Clause. As part of this response, please describe any plans to implement the results of research and development into the Company's system portfolio and discuss how any anticipated benefits will affect your customers.

A. There is currently no utility power technology research being funded through the Energy Conservation Cost Recovery Clause. The company has a Clean Energy Center where energy storage technology is being tested but it is too soon to conclude research results. The company's most recent generation expansion plan, filed in the April 1, 2023 Ten Year Site Plan, does not incorporate any of the technology being tested.

Environmental

69. Please explain if the Company assumes carbon dioxide (CO2) compliance costs in the resource planning process used to generate the resource plan presented in the Company's current planning period TYSP. If the response is affirmative, answer the following questions:

a. Please identify the year during the current planning period in which CO2 compliance costs are first assumed to have a non-zero value.

b. [Investor-Owned Utilities Only] Please explain if the exclusion of CO2 compliance costs would result in a different resource plan than that presented in the Company's current planning period TYSP.

c. [Investor-Owned Utilities Only] Please provide a revised resource plan assuming no CO2 compliance costs.

A. Tampa Electric Company does not currently include any CO2 compliance costs in the resource planning process.

a. N/A

b. N/A

c. N/A

70. Provide a narrative explaining the impact of any existing environmental regulations relating to air emissions and water quality or waste issues on the Company's system during the previous year. As part of your narrative, please discuss the potential for existing environmental regulations to impact unit dispatch, curtailments, or retirements during the current planning period.

A. AIR EMISSIONS:

In 2022, Tampa Electric Company (TEC) did not experience significant impacts from environmental regulations relating to air emissions and does not anticipate significant impacts during the current planning period. Due to grid connectivity, it is possible that air related environmental regulations may impact the operational characteristics of neighboring generating resources to the point of impacting the reliability of the company's system.

In 2017, EPA implemented an update to CSAPR that removed Florida from the CSAPR program based on updated modeling and emission reduction commitments. In December 2019, EPA proposed to approve Florida's Infrastructure State Implementation Plan (SIP) related to the 2015 ozone NAAQS, and on March 5, 2020, the Florida Department of Environmental Protection (FDEP) announced that Florida meets all National Ambient Air Quality Standards (NAAQS) statewide.

Tampa Electric can meet the Mercury and Air Toxics Standards (MATS) without considerable impacts. Tampa Electric's coal-fired unit, Big Bend Unit 4, is equipped with an electrostatic precipitator, scrubber and SCR, and the Polk Unit 1 IGCC unit emissions are minimized in the gasification process. As a result, Tampa Electric has demonstrated compliance on all applicable units with the most stringent "Low Emitting Electric Generating Unit" classification for MATS with nominal additional capital investment, minimizing the impact of this rule.

In June 2019, the Environmental Protection Agency (EPA) issued the Affordable Clean Energy (ACE) rule, which established guidelines for states to develop greenhouse gas reduction standards for existing coal-fired electric utility generating units (EGUs) through the implementation of heat rate improvement as the best system of emissions reductions. In January 2021, the ACE rule was vacated, clearing the way for the new EPA Administration to issue a replacement rule regulating CO2 emissions from existing power plants. The outcome of the rule-making process and its impact on TEC's businesses is uncertain at this time; however, it could result in increased operating costs, and/or decreased operations at Tampa Electric's fossil fuel plants which may have an impact on

dispatch and retirement schedules. EPA's proposed replacement rule is anticipated mid-year 2023.

On March 9, 2022, the EPA published a final rule to amend the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Combustion that removed the stay for natural gas-fired, stationary combustion turbines (CT) and established emission limitations for stationary CTs located at major sources of HAP emissions. Tampa Electric's Big Bend Station is subject to the Rule, and CT Units 4A, 5, and 6 have demonstrated compliance with the formaldehyde standard. The Unit 4B compliance demonstration is ongoing, and the Unit will not be dispatched until compliance is achieved.

WATER QUALITY:
Tampa Electric discharges cooling water and low volume industrial wastewater at Big Bend, Bayside and Polk Power Stations. These discharges are required to meet water quality effluent limits for both chemical and thermal components. For chemical constituents at all three stations, Tampa Electric implements a combination of control measures, including internal treatment technologies, waste-stream discharge restrictions and recycling of internal waste-streams. At Big Bend Power Station, the only low volume wastewater discharge is the blowdown from the FGD System. All other internal waste-streams are recycled continuously in a zero liquid discharge system which provides makeup water for plant processes. For compliance with thermal permit limitations at Big Bend and Bayside Power Stations, both of which employ once-through cooling technology, the only method of discharge control available is limiting unit output (derating) to reduce thermal loading. Ambient temperature conditions requiring such measures typically occur only in the hottest months (July-September) of the year.
Polk Power Station employs a recirculating Cooling Reservoir for thermal control.

WASTE
There were no waste issues affecting the Company's system during the previous year. Waste regulations are not expected to impact unit dispatch or require curtailments or retirements during the current planning period.

71. For the U.S. EPA's Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units Rule:

a. Will your Company be materially affected by the rule?

b. What compliance strategy does the Company anticipate employing for the rule?

c. If the strategy has not been completed, what is the Company's timeline for completing the compliance strategy?

d. Will there be any regulatory approvals needed for implementing this compliance strategy? How will this affect the timeline?

e. Does the Company anticipate asking for cost recovery for any expenses related to this rule? Refer to the Excel Tables File (Emissions Cost). Complete the table by providing information on the costs for the current planning period.

f. If the answer to any of the above questions is not available, please explain why.

A. a. Yes.

b. The Big Bend Unit 1 modernization project involved the repowering of Unit 1 with a highly efficient, state of the art, natural gas-fired, combined cycle generating unit. The new units comply the referenced standards.

c. The compliance strategy was completed in 2022.

d. All regulatory approvals have been received.

e. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q71_Emissions Cost. Tampa Electric does not anticipate asking for cost recovery for any expenses related to this rule.

f. Not applicable.

72. Explain any expected reliability impacts resulting from each of the EPA rules listed below. As part of your explanation, please discuss the impacts of transmission constraints and changes to units not modified by the rule that may be required to maintain reliability.

a. Mercury and Air Toxics Standards (MATS) Rule.

b. Cross-State Air Pollution Rule (CSAPR).

c. Cooling Water Intake Structures (CWIS) Rule.

d. Coal Combustion Residuals (CCR) Rule.

e. Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units.

f. Affordable Clean Energy Rule or its replacement.

g. Effluent Limitations Guidelines and Standards (ELGS) from the Steam Electric Power Generating Point Source Category.

A. a. None.

b. None.

c. TEC has completed CWIS modifications associated with the repowering of Big Bend Unit 1. TEC has also completed the first phase of the modifications for Bayside. The final phase is expected to be completed during a 4-6 month outage in early 2024. Effects on reliability related to compliance with this rule will depend on the compliance option implemented for Big Bend 4. If, for example, unit operation is contingent on the function of intake structure modifications, then malfunction of screens or pumps could limit or prevent operation of associated generating units.

d. None.

e. None.

f. Until a proposed rule is published, the reliability impacts of the Affordable Clean Energy replacement rule are unknown.

g. None

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73. Please refer to the Excel Tables File (EPA Operational Effects). Complete the table by identifying, for each unit affected by one or more of EPA's rules, what the impact is for each rule, including; unit retirement, curtailment, installation of additional emissions controls, fuel switching, or other impacts identified by the Company.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q73_EPA Operational Effects.

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74. Please refer to the Excel Tables File (EPA Cost Effects). Complete the table by identifying, for each unit impacted by one or more of the EPA's rules, what the estimated cost is for implementing each rule over the course of the planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q74_EPA Cost Effects.

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75. Please refer to the Excel Tables File (EPA Unit Availability). Complete the table by identifying, for each unit impacted by one or more of EPA's rules, when and for what duration units would be required to be offline due to retirements, curtailments, installation of additional controls, or additional maintenance related to emission controls. Include important dates relating to each rule.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q75_EPA Unit Availability.

76. If applicable, identify any currently approved costs for environmental compliance investments made by your Company, including but not limited to renewable energy or energy efficiency measures, which would mitigate the need for future investments to comply with recently finalized or proposed EPA regulations. Briefly describe the nature of these investments and identify which rule(s) they are intended to address.

A. The anticipated approved compliance costs for 316(b) and the Effluent Limitation Guidelines are included in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q74_EPA Cost Effects.

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Fuel Supply & Transportation

77. Please refer to the Excel Tables File (Fuel Usage & Price). Complete the table by providing, on a system-wide basis, the actual annual fuel usage (in GWh) and average fuel price (in nominal $/MMBTU) for each fuel type utilized by the Company in the 10-year period prior to the current planning period. Also, provide the forecasted annual fuel usage (in GWh) and forecasted annual average fuel price (in nominal $/MMBTU) for each fuel type forecasted to be used by the Company in the current planning period.

A. The requested data is provided in the Excel Tables Spreadsheet, "(BS_2) 2023 TYSP – Data Request 1 Excel Tables.xlsx," tab Q77_Fuel Usage & Price.

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78. Please discuss how the Company compares its fuel price forecasts to recognized, authoritative independent forecasts.

A. Fuel commodity price forecasting is derived through analysis of historical and current prices combined with price forecasts obtained from various consultants and agencies. These sources include the New York Mercantile Exchange (NYMEX), Energy Information Administration (EIA), S&P Global Future Energy Outlooks, S&P Global Market Intelligence, Argus Coal and Petroleum Coke Publications, and Coaldesk, LLC Publications. The Company carefully examines its final fuel forecasts for trending relationships among fuels and anomalies (e.g., an unexplainable spike in natural gas prices) to eliminate elements that could impact the validity of long-term energy pricing and planning. The resulting fuel price forecasts, including high and low internal fuel forecasts, are compared to independent sources such as NYMEX, EIA, and the S&P Global Future Energy Outlooks for reasonableness.

79. Please identify and discuss expected industry trends and factors for each fuel type listed below that may affect the Company during the current planning period.

a. Coal

b. Natural Gas

c. Nuclear

d. Fuel Oil

e. Other (please specify each, if any)

A. a**.** The overall trend of reduced domestic demand for coal should continue through the planning period as more renewable generation comes online and coal retirements continue. However, global events, like the Ukraine invasion, can significantly alter supply and demand conditions for domestic and global energy quickly, creating unexpected conditions and challenges. Despite seeing some recent improvement, labor shortages continue to impact rail transportation for coal in the U.S. Although domestic coal supply, pricing and inventories have improved after a very mild winter in the U.S., it is possible that other unexpected events could impact the Company's coal procurement, transportation and inventories over the planning period.

Tampa Electric's coal consumption as a percentage of system fuel mix is expected to be minimal over the current planning period. The forecast of coal in its energy mix is 4.9 percent in 2023, declining to just about 1 percent in the year 2025 forward. Although Tampa Electric's forecasted coal usage is low, it could experience short-term price volatility in and limited access to coal because of various issues like the ones mentioned above—i.e., Ukraine conflict, transportation challenges, etc. Furthermore, Tampa Electric having limited access to coal could result in the company's need to maintain a higher coal inventory to mitigate supply chain disruptions.

b. After 2 years of very strong gas demand domestically following COVID-19, and globally due to the Ukraine invasion, gas demand and pricing have cratered following a very mild winter and production and storage inventories are on the rise. Several fundamental factors are influencing supply and demand currently and should continue into the near and mid-term of the planning period. On the supply side, gas production has been strong

recently and is expected to steadily grow over the planning period. On the demand side, U.S. Liquified Natural Gas (LNG) export facilities continue to operate at maximum capacity consuming over 13,000,000 MMBtu of feed gas per day with several new projects and capacity additions expected to start as early as 2025. A strong growth trend in exports will likely continue. In fact, the U.S. is expected to be a net exporter of gas over the planning period. Both the high European and Asian demand for LNG and increasing U.S. delivery of natural gas to Mexico foster this natural gas export trend.

Although we do expect the transition to more renewable generation to reduce the Company's need for fossil fuels throughout the planning period, the invasion of Ukraine not only brings much price uncertainty and volatility into the planning period especially in the near term, but also could have long lasting impacts in the energy industry. As the demand from U.S. LNG exports continues to grow, the relationship between domestic and international gas pricing could become more correlated over the planning period. In addition, as the country continues to see more and more LNG projects get announced and come online, the market could experience an increase in competition for gas supply.

Extreme weather events such as Winter Storm Uri and Winter and Storm Elliott can also drive short-term price volatility and reduce the short-term availability of the commodity. Tampa Electric acknowledges that uncertain weather events may occur during the planning period. Thus, the company constantly monitors the market for any indicators of events that could impact the gas market, as well as continually evaluates and enhances its portfolio of natural gas assets and supply arrangements to reliably meet the increasing percentage of fuel mix supplied by natural gas over the current planning period.

c. Tampa Electric does not have nuclear generation as part of its energy mix.

d. Like natural gas, the U.S. is expected to be a net exporter of oil and petroleum products over the planning period. Domestic demand in the U.S. has flattened with the ongoing transition to cleaner energy. Most of the global petroleum demand is driven by China and other emerging markets. Domestic supply has improved since the Ukraine invasion and is now exceeding pre COVID-19 levels. However, price and supply volatility and uncertainty remain in the near to mid-term of the planning period with continued impacts from the Ukraine invasion, variations in OPEC and Russian supply, effects of producer capital discipline and Strategy

Petroleum Reserves actions. Other supply and demand drivers are electric vehicle penetration or other transportation trends, global economic growth, and geopolitical developments. Since Tampa Electric has a small quantity of oil-capable units and uses oil solely as a back-up fuel, its projected use of oil for energy production is less than one percent. Thus, oil price volatility will have a limited impact on the Company.

e. Non-Applicable.

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80. Please provide a comparison of the Utility's 2022 fuel price forecast and the actual 2022 delivered fuel prices.

A.

	*2022 Fuel Price Forecast ($/MMBtu)	**2022 Actual Fuel Prices ($/MMBtu)	Delta
Jan	5.05	5.38	0.33
Feb	4.96	7.10	2.14
Mar	4.69	5.88	1.19
Apr	4.23	6.31	2.08
May	4.16	8.64	4.48
Jun	4.06	9.95	5.89
Jul	4.08	9.14	5.06
Aug	4.04	12.44	8.40
Sep	4.07	10.62	6.55
Oct	4.09	8.09	4.00
Nov	4.31	6.43	2.12
Dec	4.43	8.43	4.00
Average	4.35	8.20	3.85

*Jan-Dec forecast prices from filing on 9/3/21
*Jan-Jun actual prices from filing on 7/27/22 and Jul-Dec actual prices from monthly A schedule filings

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81. Please explain any notable changes in the Utility's forecast of fuel prices used to prepare the Utility's 2023 TYSP compared to the fuel process used to prepare the Utility's 2022 TYSP.

A. There were no notable process changes in Tampa Electric's forecast of fuel prices from its 2022 TYSP to its 2023 TYSP.

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82. Please identify and discuss steps that the Company has taken to ensure natural gas supply availability and transportation over the current planning period.

A. Tampa Electric continually evaluates its natural gas portfolio to ensure it has adequate natural gas assets in place to deliver reliable, lower-cost gas from the supply area directly to our generating facilities. Recently, Tampa Electric has acquired additional SESH upstream pipeline capacity to mitigate Mobile Bay supply risk as well as providing access to abundant, lower-cost supply closer to productions areas. In the spring of 2023, Tampa Electric will acquire additional FGT pipeline capacity for the summer only to meet the increased natural gas requirements as the Company continues its transition away from coal to natural gas and renewables. Lastly, Tampa Electric has begun the design and engineering phase to add additional backup fuel to the power stations to further mitigate gas pipeline interruption risk and support energy production during extreme weather events,

Other areas of focus include evaluating opportunities for

1) further enhancing the portfolio of fuel assets to mitigate supply or transport interruptions to support extreme peak demand requirements
2) improving pipeline transportation commercial terms upon renewal
3) assessing the quality of pipeline receipt points and requesting changes as production evolves
4) targeting seasonal firm supply during the Company's annual natural gas supply RFP that is less susceptible to interruptions from extreme conditions and
5) adding market area or upstream pipeline capacity or storage to meet growing gas requirements and mitigate Mobile Bay supply risk.

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83. Please identify and discuss any existing or planned natural gas pipeline expansion project(s), including new pipelines and those occurring or planned to occur outside of Florida that would affect the Company during the current planning period.

A. Numerous natural gas pipeline projects have been completed, are in the works, or are proposed to move natural gas from the Mid-continent, Appalachia, and Permian production areas, to markets across the United States. The basis for some of the projects is to supply LNG feed gas. These are the primary projects that directly impact the Florida market and the Company:

- Alabama - Transco's Hillabee Expansion Phase III project; part of the Southeast Market Pipelines project (2024)

- Louisiana - Multiple gulf coast pipeline projects (Gator Express, Driftwood, Creole Trail) feeding LNG exports and other Gulf Coast markets (various phases)

- Texas - Multiple pipeline projects (Port Arthur, Matterhorn, Whistler, Warrior) from the Permian and other shale basins to Carthage or the Gulf Coast (various phases)

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84. Please identify and discuss expected liquefied natural gas (LNG) industry factors and trends that will impact the Company, including the potential impact on the price and availability of natural gas, during the current planning period.

A. As existing U.S. LNG facilities expand and additional LNG facilities are planned, the impact to price and supply availability over the planning period is growing. LNG exports continue to operate existing capacity at full utilization. LNG feed gas demand is expected to average 13,000,000 MMBtu per day in 2023 and will reach 20,000,000 MMBtu per day by 2027 with the first new LNG capacity coming online in 2025. The majority of U.S. natural gas demand growth during the planning period will be driven by LNG exports. The Company expects impacts to price and supply through the planning period as global demand has increased competition for mid-term gas supply and the linkage between domestic and global LNG continues to impact short term price volatility.

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85. Please identify and discuss the Company's plans for the use of firm natural gas storage during the current planning period.

A. Tampa Electric currently maintains 2,000,000 MMBtu of underground natural gas storage capacity. This high-deliverable salt dome storage is a key component of the Company's natural gas portfolio. The storage serves both as a reliable supply source of natural gas during supply interruptions and a key component of balancing supply and demand daily. Tampa Electric attempts to keep its storage levels around 80 percent of contracted capacity but increases inventories close to full in advance of winter and summer seasons. Maintaining this volume allows the storage to be a reliable source of supply that provides risk mitigation against various events, such as production freeze-offs during the winter and summertime production shut-ins due to storms (e.g., hurricanes) in the Gulf of Mexico that impact Mobile Bay, Destin, and other offshore facilities. The Company utilized significant storage inventory during Storm Uri to prevent fuel interruptions at Tampa Electric's generating facilities. Storage was also utilized last summer to mitigate Mobile Bay supply shortages during extreme weather and various pipeline operational issues in the Southeast. The Company continuously evaluates the amount of required storage capacity in its portfolio based on market conditions and weather events.

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86. Please identify and discuss expected coal transportation industry trends and factors, for transportation by both rail and water that will impact the Company during the current planning period. Please include a discussion of actions taken by the Company to promote competition among coal transportation modes, as well as expected changes to terminals and port facilities that could affect coal transportation.

A. Tampa Electric enjoys the benefit of having access to rail and water vessel transportation, which provides optionality and resilience to the solid fuel supply chain. Although Tampa Electric's percentage of coal in its generation mix is small, trending down to about 1 percent over the current planning period, the benefit of bi-modal coal transportation has been very important over the past two years to ensure reliable, low-cost fuel for our customers. After a year and a half of rail transportation challenges, low coal inventories and strong domestic and international demand for coal, we are starting to see some improvements in 2023 following a very mild winter. Although rail transportation continues to deal with labor challenges, we are starting to see some reduction in turn times and more consistency in overall rail performance. With natural gas prices plummeting at the start of the year, coal inventories are replenishing as power generation switches to natural gas as the economic fuel and more renewable generation comes online.

Although coal consumption is declining at Tampa Electric and natural gas appears to be the economic choice in the near term, it will be important for the Company to keep bi-model transportation agreements to encourage market liquidity and support increased reliability of solid fuel supply should one source experience interruption. The Company will continue to focus on bi-modal agreements for reliable, economic coal deliveries to our plants.

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87. Please identify and discuss any expected changes in coal handling, blending, unloading, and storage at coal generating units during the current planning period. Please discuss any planned construction projects that may be related to these changes.

A. There are no expected changes in coal handling, blending, unloading or storage facilities for the period 2023 through 2032.

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88. Please identify and discuss the Company's plans for the storage and disposal of spent nuclear fuel during the current planning period. As part of this discussion, please include the Company's expectation regarding short-term and long-term storage, dry cask storage, litigation involving spent nuclear fuel, and any relevant legislation.

A. Non-Applicable.

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89. Please identify and discuss expected uranium production industry trends and factors that will affect the Company during the current planning period.

A. Non-Applicable.

90. [FPL Only] The following questions are with regard to hydrogen fuel creation and use at the Cavendish NextGen Hydrogen Hub:

a. Please explain how FPL plans to account for the produced hydrogen fuel that is integrated into the natural gas system for use at FPL's Okeechobee Clean Energy Center.

b. Please explain how FPL plans to price the produced hydrogen fuel that is integrated into FPL's natural gas system over the Ten-Year Site Plan time horizon

A. a. Non-Applicable.

b. Non-Applicable.

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Extreme Weather

91. Please identify and discuss steps, if any, that the Company has taken to ensure continued energy generation in case of a severe cold weather event.

A. Tampa Electric takes several steps to ensure continued energy generation in case of a severe cold weather event. First, Tampa Electric maintains and regularly updates Freeze Protection plans for its generation stations: Bayside, Big Bend, Polk Power Station and its solar photovoltaic sites. The freeze protection plans provide guidance for preparing for, and operating reliably during, a severe cold event. Additionally, Tampa Electric regularly reviews the resiliency of Tampa Electric's generating units and transmission and distribution network to a major and unusual extreme cold weather event. The most recent review was particularly detailed considering the events in ERCOT in February 2021. This review identified opportunities for improving equipment's resistance to extreme cold weather. Those equipment improvements were completed before the winter of 2022/23. Finally, Tampa Electric assures that fuel supply, fuel inventory and fuel transportation assets are prepared to meet customer's energy generation needs during a severe cold weather event. Tampa Electric enhances fuel resiliency by diversifying fuel receipt points, having access to, and delivery of, fuel via multiple pipelines or modes, and having backup fuel or dual fuel capability at multiple generation stations.

92. Please identify any future winterization plans, if any, the Company intends to implement over the current planning period.

A. Throughout the current planning period, Tampa Electric will continue to regularly review the resiliency of its generation fleet, distribution network, fuel supply portfolio, training, planning and operations to enhance the winterization of its system to ensure reliable energy delivery to customers during a severe winter cold, hurricane, or other disruptive event.

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93. Please explain the Company's planning process for flood mitigation for current and proposed power plant sites and transmission/distribution substations.

A. The Company has a robust flood mitigation plan that incorporates adequate floodwalls for power plants specifically Big Bend Station and Bayside Power Station. The recently commissioned Big Bend Modernization Units have a 10' perimeter floodwall which will suffice for the tide range in Southern Hillsborough County in the event of a severe storm or heavy rain and flooding is experienced. Older units at Big Bend have 17' floodwalls and in the anticipation of any floodwalls experiencing a breach by flood waters, affected units will be secured for preservation.

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94. Please address the following questions regarding the impact of all major storm events, such as Hurricane Ian, with associated flooding, destruction of utility facilities and customer buildings, and forced customer permanent migration.

a. Based on actual data, please briefly summarize the impact that major storms have had on your utility's customer number, retail sales and peak load.

b. Please explain whether the above discussed impact is include in your company's customer/retail energy sales/demand forecasts.

c. If your response to subpart (b) is affirmative, please explain how this impact is modeled**.**

A. Tampa Bay has experienced major storm events including:

2004: Charley (Aug 13), Frances (Sep 5), Jeanne (Sep 25)
2017: Irma (Sep 10)
2022: Ian (Sep 26-30)

a. These major storm events have not impacted Tampa Electric Company's utility customer growth nor retail peak demand. Customers have not been forced to permanently migrate to other areas, and retail peak demand has occurred on a different day.

Out of the mentioned major storm events, Hurricane Ian had the largest impact on Retail Net Energy for Load (RNEL) of just under 2%, compared to the other storms.

b. The historical actuals of customers, retail energy sales, and retail peak load are all included in the forecasts.

c. Depending on the anomaly of the retail energy sales, a binary can be applied to exclude the anomalous historic data from being used in the forecasting models.

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95. Has the Company had to make any upgrades to any generating units or changes to operations practices as a result of any FERC Orders addressing extreme weather planning within the last two years? If so, please describe.

A. Yes. The Stations have updated their generating unit-specific freeze protection plans, training and corrective actions plans to meet the compliance requirements found in EOP-011, EOP-012, and TOP-002. These include a thorough evaluation, improvements, and changes in operating practices performed as a result of extreme weather planning.