AUSLEY & MCMULLEN

ATTORNEYS AND COUNSELORS AT LAW

123 SOUTH CALHOUN STREET
P.O. BOX 391 (ZIP 32302)
TALLAHASSEE, FLORIDA 32301
(850) 224-9115 FAX (850) 222-7560

May 17, 2021

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 2021 Ten-Year Site Plan
Supplemental Data Request #1 (Nos. 1-83)
Undocketed 20210000-OT

Dear Mr. Teitzman:

Attached for filing on behalf of Tampa Electric Company is the company's responses to Staff's First Supplemental Data Request #1 (Nos. 1-83) regarding the company's 2021 Ten-Year Site Plan.

An electronic PDF copy of Tampa Electric's 2021 Ten-Year Site Plan (Data Requests #1 and #2) was provided to Staff on April 1, 2021.

Thank you for your assistance in connection with this matter.

Sincerely,

James D. Beasley

JDB/bmp
Attachments
cc: Donald Phillips (w/o enc.) dphillip@psc.state.fl.us
Damian Kistner (w/o enc.) dkistner@psc.state.fl.us

TAMPA ELECTRIC COMPANY
UNDOCKETED: REVIEW OF TYSP'S
SUPPLEMENTAL DATA REQUEST
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General Items

1. Please provide an electronic copy of the Company's Ten-Year Site Plan (TYSP) for the period 2021-2030 (current planning period) in PDF format.

A. An electronic PDF copy of Tampa Electric's 2021 Ten-Year Site Plan was provided to Staff on April 1, 2021.

2. Please provide an electronic copy of all schedules and tables in the Company's current planning period TYSP in Microsoft Excel format.

A. An electronic Excel copy of Tampa Electric's Ten-Year Site Plan schedules and tables was provided to Staff on April 1, 2021.

3. Please refer to the Microsoft Excel document accompanying this data request titled "Data Request #1 – Excel Tables," (Excel Tables Spreadsheet). Please provide, in Microsoft Excel format, all data requested in the Excel Tables Spreadsheet for those sheets/tabs identified as associated with this question. 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, "Data Request #1 – Excel Tables.xls".

Environmental Compliance Costs

4. Please explain if the Company assumes 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:

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. a. Tampa Electric Company does not include CO2 compliance costs in the resource planning process.

b. Not Applicable.

c. Not Applicable.

Flood Mitigation

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

A. SUBSTATIONS:

All new substations that are built require permitting through the appropriate governmental agencies. This ensures that all state and local storm water requirements are met. Depending on the flood zone where a new substation is built, the elevation of the substation may be built above normal grade. Foundations and control houses may be elevated to mitigate water intrusion on lower elevation parcels.

For existing substations, Tampa Electric keeps current elevation above sea level and evacuation zone category data. For a few substations where past flooding has been an issue during a major storm event, mitigating efforts have been made such as building a wall around critical equipment, cameras to watch water levels in the stations, and installing sandbags around control house entry doors.

Power Plants: Tampa Electric uses a combination of strategies to mitigate the impact of flooding on new power plants. These strategies are primarily use of flood walls to prevent flood waters from reaching critical equipment, raising site elevation, and elevating critical equipment which is outside the flood wall to a height not anticipated to be affected by flooding. The Big Bend Modernization Project has incorporated mitigating actions such as site elevation and a 10' flood wall to protect the critical equipment.

Each existing power plant was constructed to comply with permitting and other regulations and mitigate flood risk through elevation. Each existing power plant has a storm plan that addresses potential flooding and actions taken to reduce flooding impacts to the electric system. The storm plans include the use of storm walls or doors, flood pumps, and sandbags to secure the plant, and other actions as appropriate for that plant. Polk Power Station and most solar generation sites are located inland and are not prone to flooding. They are designed for proper water management and a 100-year rain event.

Load & Demand Forecasting

6. [**Investor-Owned Utilities Only**] Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. Please also describe how loads are calculated for those hours just prior to and following Daylight Savings Time.

A. The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

7. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

8. 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 Tampa International Airport weather station for calculation of the system-wide temperature for the utility's service territory.

9. 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, and any difference/improvement 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 2 of the 2021 Ten-Year Site Plan (TYSP) on pages 7 through 22. 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 2021 TYSP.

There were no significant differences or improvements made within the 2021 TYSP compared to the 2020 TYSP. As for anticipated forecast accuracy, the target is to be within +/- 1 percent, however with the continuing COVID-19 situation we anticipate loads will be below projections for the non-residential sector and above projections for the residential sector. We continue to monitor these offsetting impacts.

10. 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. 20200001-EI
20200007-EI
20200092-EI
20200064-EI
20200234-EI
20200002-EG
20210063-EQ

11. 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 Microsoft 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 customers 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, "Accuracy2021.xlsx".

b. Not applicable.

12. 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 Microsoft 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 Florida Reliability Coordinating Council (FRCC) in reviewing state forecast accuracy. Please refer to the provided Excel, "Accuracy2021.xlsx".

b. Not applicable.

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13. Please explain any historic and forecasted trends in:

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 Billed Retail Energy Sales** (GWh) [**for FPL**], or
Net Energy for Load (GWh) [**for other companies**], identify the major factors (historically, currently, and in the forecasted period) that contribute to the growth/decline of the trends. Please include a detailed discussion of how the Company's demand management program(s) and conservation/energy-efficiency program(s) impact the growth/decline of the trends.

A. a. **RESIDENTIAL:**

The residential sector's growth averaged 2.0 percent in 2020. Growth in 2021 is expected to be 1.8 percent. Customer growth is expected to increase at an annual average growth rate of 1.4 percent over the next ten years. The primary driver of customer growth will be new construction and increasing net in-migration to the service area.

COMMERCIAL:

Commercial customer growth average 1.0 percent in 2020 and is expected to increase by 0.7 percent in 2021. Customers are expected to increase at an annual average growth rate of 0.6 percent over the next ten years.

GOVERNMENTAL:

Governmental customer growth increased by 0.8 percent in 2020 and is expected to increase by 1.0 percent in 2021. Growth is projected to increase at a rate of 0.9 percent over the next ten years.

INDUSTRIAL:

Industrial customer growth continued to decline in 2020. 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 2020 averaged 1.8 percent with the residential class being the engine behind the growth. Over the next ten years customer growth is expected to increase at an average rate of 1.4 percent annually.

b. **RESIDENTIAL**:

Average consumption per customer increased in 2020 due to hotter than normal weather and more people working/schooling from home due to COVID-19. The COVID-19 impacts on energy consumption are expected to be slowing back to more normal levels during 2021. Average consumption per customer is expected to decline at an average annual rate of 0.2 percent over the next ten years. 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:

Commercial consumption per customer decreased in 2020 due to the impacts of COVID-19. It is expected to get to more normal levels by the end of 2021. Over the forecast horizon it is projected to increase at a rate of 0.2 percent.

GOVERNMENTAL:

Average per customer usage in 2020 decreased for the same reasons as the commercial class. Over the forecast horizon, usage is expected to decline by an average of 0.2 percent.

INDUSTRIAL:

Industrial per customer usage also declined due to COVID-19. Over the forecast horizon, average usage is expected to increase by an average of 0.2 percent.

c. **TOTAL RETAIL NET ENERGY FOR LOAD (NEL):**

Usage in 2020 was higher (1.4 percent) than in 2019. This was primarily due to the much hotter than normal weather which offset the adverse effects of COVID-19, Over the forecast horizon, NEL is expected to increase by 0.9 percent a year. This is below the customer growth rate of 1.4 percent primarily due to continued per-customer declines in the Residential sector (see discussion in B. above), as well as declines in the phosphate sector as mining continues to move south and out of Tampa Electric's service territory.

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

a. **Demand Reduction due to Conservation 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. **<u>CONSERVATION AND SELF SERVICE:</u>**

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 6 MW a year. At the time of the winter peak, residential conservation historically increased by an average of 9 MW a year and is projected to increase by an average of 8 MW a year.

Commercial and Industrial conservation at the time of the summer peak has increased by an average of 3 MW a year, and over the forecast horizon it is increasing by an average of 0.5 MW a year. At the time of the winter peak, it historically increased by an average of 2 MW a year and is projected to increase by 1 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.

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 increase by 1 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 37 MW a year and are expected to increase by an average of 42 MW (1.0%) a year over the forecast horizon. The 2020 summer peak was slightly lower than the 2019 peak, primarily due to slightly milder weather at the time of the peak.

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 51 MW (1.1%) a year over the forecast horizon. The 2020 winter peak was higher than 2019's peak due to slightly cooler temperatures. 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 39 MW a year and are expected to increase by an average of 44 MW (1.1%) a year over the forecast horizon. The 2020 summer firm peak was slightly lower than 2019 due to slightly lower temperatures on the peak day.

Historical peaks increased at a slower rate than forecasted peaks due to the declining loads in the Phosphate (Interruptible rate) sector. This decline in Phosphate load stabilizes over the forecast horizon.

Historically, winter firm peaks vary significantly due to very mild winters and an occasional cold winter. Winter firm peaks are expected to increase by an average of 52 MW (1.2%) a year over the forecast horizon.

Customer growth is the primary driver behind the growth in summer and winter firm peak demands.

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 Company's Summer/Winter Peak Energy Demand.

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.

16. **[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 57. 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 2021 TYSP, Chapter2, page 21 under "High and Low Scenario Forecast Assumptions".

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17. 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. 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 202**1** TYSP.

18. Please discuss 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.

A. The electric vehicle forecast process begins with an estimate of the number of 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. The demand and energy consumption associated with EV 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 EV models sold within the service area and the number of charges per year.

19. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet by providing estimates of the requested information within the Company's service territory for the current planning period. "Quick-charge" PEV charging stations are those that require a service drop greater than 240 volts and/or use three-phase power.

A. The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

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20. 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. All three selected high schools began offering the program in the 2019 school year.

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 very low until the EV market further matures, 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 April 2021, Tampa Electric also received Commission approval for a public EV charging pilot program. Through this pilot, Tampa Electric will deploy approximately 200 publicly accessible EV charging ports across the company service territory to collect valuable grid-related data that supports proper utility planning. Tampa Electric will contribute up to $5,000 per port towards the cost of equipment and installation, and the participating customer would be responsible for any costs exceeding that contribution. Hardware and installation costs for

government and income qualified locations will be 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.

a. Tampa Electric believes that any involvement the PEV market provides some level of customer education, if only through awareness, on the benefits of electricity as a transportation fuel. The 2017 enhancement to the Energy Education, Awareness and Agency Outreach DSM Program is specifically intended to educate future customers.

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

21. Please describe how the Company monitors the installation of PEV public charging stations in its service area.

A. Tampa Electric does not have a specific process capable of monitoring the installation of third-party PEV public charging stations. Relationships established with equipment installers and EV charging network operators provide reliable data on existing and planned public charging stations. Tampa Electric also leverages relationships with local developers for large projects where public charging may, or could be, included. For "quick-charge" electric vehicle stations requiring greater than 240-volt services, 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.

22. Please describe 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. Tampa Electric is not aware of any instances since January 1, 2020, in which electric vehicles were a contributing factor to upgrades required on the company's distribution system.

23. 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. Tampa Electric has not contracted research to determine demographic and regional factors that influence the adoption of PEVs applicable to its service territory. However, the company informally reviews published industry research and discusses EV trends and the reasonableness of assumptions with subject matter experts including renewable analysis and forecasting experts within the U.S. Energy Information Administration (EIA). Future penetration levels of EVs are based on assumptions used by the EIA for the South Atlantic region.

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

A. Tampa Electric does not have a process or technology in place that allows for company notification when a home EV charging stations has been installed.

25. [**FEECA Utilities Only**] For each source of demand response, please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet by providing 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, "Data Request #1 – Excel Tables.xls".

26. [**FEECA Utilities Only**] For each source of demand response, please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet by providing 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, "Data Request #1 – Excel Tables.xls".

27. [**FEECA Utilities Only**] For each source of demand response, please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet by providing 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, "Data Request #1 – Excel Tables.xls".

Generation & Transmission

28. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

29. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. a. The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

30. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

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31. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

a. Various, smaller demonstration projects are being planned in the community, including two solar projects at the Company's CEDC. These projects are expected to be in service in June and December 2021.

Engineering and design of Big Bend Floating solar is complete. Site work has begun, and project is expected to be in service by July 2021.

Engineering and design of Agrivoltaics solar is underway. Site work will begin in May 2021 and the project is expected to be in service by December 2021.

The engineering and design of Magnolia solar is complete. The company received the environmental resource permit in January 2021, and the county permit is expected in early April. Site work will begin immediately thereafter.

The engineering and design of Mountain View solar is complete. The company received the environmental resource permit, and the county permit is expected in April. Site work will begin immediately thereafter.

The engineering and design of Big Bend II solar is complete. The environmental resource permit is expected mid-April, and a county permit is not required. Site work will begin upon receipt of the environmental resource permit.

The engineering and design of Jamison solar is complete. The company received the environmental resource permit in March, and the county permit in February 2021. Site work will begin April 2021.

The engineering and design of Laurel Oaks solar is underway. The environmental resource permit is expected in May 2021 and the county permit is expected in June 2021. Site work will begin first quarter of 2022.

The engineering and design of Riverside solar will begin in the second quarter of 2021. Tampa Electric expects to submit permit applications during the second quarter of 2021. Site work will begin first quarter of 2022.

The engineering and design of Big Bend III solar will begin in the second quarter of 2021. The company will submit permit applications during the second quarter of 2021. Site work will begin first quarter of 2022.

The engineering and design of Palm River Dairy solar will begin once the land purchase has been finalized. Tampa Electric expects to submit permit applications in the second quarter of 2021. Site work will begin first quarter of 2022.

Tampa Electric expects the Alafia solar engineering and design to begin during the third quarter of 2021, and permit applications will be submitted thereafter. Site work will begin during the first quarter of 2023.

Tampa Electric will begin engineering and design of the Wheeler solar project after the site is purchased. Permit applications will be submitted thereafter, and site work will begin first quarter of 2023.

The Dover solar project engineering and design will begin in the fourth quarter of 2021. Permit applications also will be submitted in the fourth quarter of 2021. Site work will begin first quarter of 2023.

32. 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. The addition of solar at the Museum of Science and Industry was reduced in scope to 3.6 KW DC instead of 7.2 KW DC. Instead of a ground mount PV system, two striking solar trees were installed.

The Epperson Ranch solar light project is still on hold due to engineering design of the panel racks on the street lights, but is expected to be completed in 2021.

Tampa Electric will remove the existing 3.4 KW AC PV system at Walker Middle School. The 2004 system has failed and this school is no longer a storm shelter, which was the reason why solar plus battery was installed here. Additionally, there is not a teacher supporting a solar curriculum. Tampa Electric will install solar picnic tables at local schools which have a robust STEM curriculum and add additional solar curriculum to enhance the on-site PV plus battery structures.

33. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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 had four (4) purchased power agreements still in effect to serve customers as of December 31, 2020 that remained in effect to serve customers during a portion of the current planning period. Those purchases are from Duke Energy Florida (DEF), the Florida Municipal Power Agency (FMPA), Florida Power & Light (FPL), and the Orlando Utilities Commission (OUC).

The DEF purchase is a non-firm energy product with a monthly schedule of up to 360 MW. Prior to 2021, the DEF purchase had a February 2021 end date, but in 2021 TEC extended the transaction through November 2021. The other three (3) are system firm, peaking call options that were in effect December 2020 through February 2021: FMPA (150 MW), FPL (160 MW), and OUC (100 MW).

The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

34. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. a. Tampa Electric has seven (7) purchased power agreements available to serve customers during the current planning period, four (4) of which were also in effect during 2020 and are mentioned in Response No. 33. The other three (3) began during the year 2021 and are a single purchase from the Orlando Utilities Commission (OUC) and a pair of purchases from Florida Power & Light (FPL). The OUC purchase was a 200 MW system firm, peaking call option for January 2021 only. The FPL products are both non-firm, must-take energy products for 150 MW each. One FPL purchase has a term of March through November 2021, and the other purchase is April through October 2021.

The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

35. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. Tampa Electric had no purchased power agreements with renewable generators during 2020.

The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls"

36. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. a. Tampa Electric has one (1) purchased power agreement with a renewable generator for the potential delivery of renewable energy to the company during the current planning period. In January 2021, the company entered into an agreement with Lee County regarding energy deliveries to Tampa Electric from the Lee County Resource Recovery Facility, which is an up to 40 MW net waste-to-energy facility located in southwest Florida. The agreement is pursuant to Tampa Electric's retail tariff Rate Schedule COG-1 and is for the delivery of non-firm energy to the company at Lee County's option. The agreement is for one year with an annual renewal cycle. Presently, the Lee County facility is a qualifying facility (QF) under the FERC Public Utility Regulatory Policies Act of 1978 (PURPA).

The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

37. 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 agreements with a renewable generator that has, within the past year, been cancelled, delayed, or reduced in scope.

38. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, 2020, Tampa Electric had one sale, and it is a sale of non-firm energy to Seminole Electric Cooperative. That is also Tampa Electric's only planned sale for the current planning period.

The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

39. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. a. As noted in the response to Request No. 38, the existing non-firm energy to Seminole Electric Cooperative is Tampa Electric's only planned sale for the current planning period. This transaction has been in place since 1991.

The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

40. Please list and discuss any long-term power sale agreements within the past year that were cancelled, expired, or modified.

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

41. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

42. [**Investor-Owned Utilities Only]** Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet by providing information on all of the Company's plant sites that are potential candidates for utility-scale (>2 MW) solar installations.

A. The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

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43. 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, renewable alternatives, such as solar, become more attractive to our customers. Between January 2020 and December 2020, with tax incentives and the incentive provided by the FPSC's net metering rule, over 2,500 customers installed solar panels on their homes or businesses, indicating the increasing acceptance of customer owned renewable generation. Through December 2020, more than 7,700 customers installed PV systems on their homes or businesses, accounting for more than 89 MWAC of net metered, distributed solar generation interconnected on Tampa Electric's grid. Tampa Electric customers and contractors continue to experience the streamlined online interconnection application process that was implemented in 2018.

For over 14 years, Tampa Electric's Renewable Energy Program has offered residential and commercial/industrial customers the opportunity to purchase 200 kWh renewable energy "blocks" for their home or business. The program also allows residential and commercial/industrial customers the opportunity to purchase renewable energy to power a specific event. This program enables a family, business, or 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 2020, Tampa Electric's Renewable Energy Program has 1,232 customers purchasing over 2,106 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"), Walker Middle and 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, and solar trees that provide solar powered charging stations for small electronics (cell phones, tablets) at MOSI.

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.

In 2021, the Renewable Energy Program, marketed as Sun to Go, is currently installing several solar trees at several locations within the company's service area. The first location is at a low-income area community farm near downtown Tampa. This striking structure has solar PV integrated with a battery, with several charging ports to provide charging for smaller electronic devices. Also projected in 2021 is the installation of several solar PV integrated with a battery, picnic tables at STEM schools throughout the company's service area. Each of these solar topped structures has 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 is installing several solar trees near the company's Manatee Viewing Center which will further the encouragement of renewable energy by offering device charging for visitors.

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 planning on enhancing the company's website to provide more information to help customers make decisions on renewable energy to encourage its further adoption.

In February 2021, Tampa Electric partnered with Sports and Visitor Groups and Venues at the Super Bowl LV to engage customers and visitors. Solar energy education and promotion, including sustainability, was one of the activities the company facilitated at the pop-up education stations at the events leading up to the game.

In mid-2019, Tampa Electric launched a 17.5 MWAC 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 Lake Hancock Solar, of which 17.5 MW was specifically built to support the new shared solar program.

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On January 1, 2021, Tampa Electric completed the construction of 600 MWAC of utility solar at ten new sites, which is enough electricity to power more than 100,000 homes. Now that these projects are complete, Tampa Electric generates 827 watts per customer of solar capacity and over 7 percent of Tampa Electric's generation comes from the sun. The first two project sites went into service in September 2018 with the ability to generate 144.7 MWAC of clean, renewable energy for more than 22,000 homes. An additional 277.8 MWAC went into service at five more project sites that year. Two more 75 MWAC projects were completed in early 2020, and finally a 60 MWAC site was completed on January 1, 2021. The most recent solar additions, totaling more than 600 MWAC, significantly reduce Tampa Electric's carbon dioxide emissions and give customers the benefit of zero fuel-cost solar generation for years to come. These ten sites along with other solar generating facilities constructed at Legoland Florida, Tampa International Airport, Big Bend, and for the Company's shared solar program now total 655 MWAC of solar power.

At the time of this filing, Tampa Electric has petitioned for a rate increase with the Florida Public Service Commission. As part of this proceeding, the company is planning to build another 600 MW of future solar in three tranches. The first solar tranche, as part of this future solar expansion, is approximately 225 MW and would be placed in service in 2021, the next solar tranche of approximately 225 MW would be placed in service in 2022, and the final solar tranche of approximately 150 MW would be placed in service in 2023. With the addition of these utility solar projects, 14 percent of the company's energy will be provided by solar, enough to supply the energy for 200,000 homes on an annual basis and furthers the encouragement of the production of renewable energy within Tampa Electric service area.

44. [**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 received offers from 2 companies in 2020 proposing to construct new renewable energy resources. One company proposed two ground mounted solar facilities and one company proposed a battery storage project. The potential size for solar was 74.5 MWAC each at two facilities.

45. 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 2021 TYSP, TEC used 38 percent for summer reserve margin at the fixed PV sites at Legoland and TIA and 56 percent for summer reserve margin at the single axis tracking sites at Big Bend Solar and approved SoBRA sites and 0.0 percent during the winter. For future tracking PV, TEC estimates 56 percent as firm generating capacity for TEC's summer reserve margin and 0.0 percent during the winter. These capacity values are calculated using hourly projections from vendor data and will be updated once TEC has gathered enough historical data.

46. Please identify whether a declining trend in costs of energy storage technologies has been observed by the Company.

A. Yes, multiple industry forecasts show a declining cost trend through 2030.

47. Briefly discuss any progress in the development and commercialization of non-lithium 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 liquid air 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.

48. 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. 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. Co-locating energy storage with solar can take advantage of available Investment Tax Credits as long as at least 75% of the energy comes from solar. In addition, the availability of land to place energy storage in densely developed areas remains a consideration.

49. Please explain whether ratepayers have expressed interest in energy storage technologies. If so, how have their interests been addressed?

A. In March 2018, Tampa Electric began interconnecting customer-owned battery systems through the Standard Interconnection Agreement for Interconnected Customer-Owned Battery Subsystems of 1 kW or More. As of December 31, 2020, 195 residential customers have one to eight interconnected batteries with a total MW capacity of 2.7 MW. Of the 195 residential customers with battery storage: eight installations are battery-only, 140 installations were installed at the same time in tandem with a solar PV system, and 47 installations were installed for use with an existing solar PV system.

Account Management continues to have on-going discussions with Key Accounts on battery technology. Many accounts have been asked to be considered if any pilot opportunities arise that would allow both parties to learn more about the technology.

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50. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

51. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

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52. 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. As part of the company's petition to establish the 2020-2029 Demand Side Management Plan to meet the DSM goals recently prescribed by the Commission in Docket No. 20190021-EG, 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 integrated renewable energy system will include an 862.5 kW photovoltaic array, five-58 kW batteries, and several electric vehicle charging systems to charge electric vehicles, industrial vehicles and auxiliary industrial vehicle batteries. The pilot program will have two main purposes. The first main purpose is to evaluate the capability to perform demand response from the main batteries and each vehicle battery and to determine the preferred operating characteristics of a fully integrated renewable and energy storage system to leverage DSM opportunities. The second main purpose is 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. The company will provide updates on the pilot program through the annual filings of the Energy Conservation Cost Recovery Clause (ECCR) docket.

Tampa Electric's objective is to identify the most promising applications for batteries within our system and to gain experience with battery installation and operation. This enables the company to take advantage of battery storage for the benefit of our customers as the economics of the technology continue to improve.

a. Although not a PSC approved pilot program, the Big Bend Battery Energy Storage facility was placed in service in December of 2019. The benefits of this project include the experience gained with battery installation, operation, degradation, economic life, and various grid support cases. The battery can be utilized to shift energy generation to off-peak times (energy arbitrage and peak shaving), for voltage support and frequency regulation, firming of solar output, and to contribute to contingency reserves. As part of the battery storage placed in service at Big Bend, TEC is learning about the opportunities and operational limitations provided by battery storage systems.

b. Energy storage technology is expected to continue its advances over the next 10 years. Declining costs and improving technology may enable more and larger batteries to be deployed and reduce the operating costs associated with cycling of the batteries. As intermittent renewables become a larger part of our portfolios, batteries can play a larger role in balancing our system and may allow for increased deployment of solar.

c. Large utility scale battery storage projects will be reported to the Commission through the 10-Year Site Plan process, however additional reporting desired by the Commission would be provided as requested.

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53. 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 used to charge energy storage earlier in the day in order to provide a capacity benefit to serve system peak later in the day or early the next morning. Thus, battery storage offers the opportunity to complement solar generation. This is one of the key benefits of the Big Bend Energy Storage facility at the Big Bend Solar site.

54. 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. For 14 years, Tampa Electric has offered a Renewable Energy Program option to customers. Customers can purchase blocks of renewable energy produced at or purchased from clean, renewable energy sources. This tariffed program, dubbed Sun to Go, incudes an additional bill cost of $5.00 per 200 kWh block purchased. The money collected under this program, in major part, goes toward the development and installation of new photovoltaic resources at public places including schools, which serves to both increase solar generation with the Tampa Electric system and educate the public and students on the benefits and operations of solar power generation and battery storage technology. The Shared Solar program, known as Sun Select was approved and offered to residential and commercial/industrial customers in 2019. The Company added 17.5 MW of solar capacity specifically for this program.

a. An additional 14 MW installed in 2020 and commissioned in 2021 will be used to serve the Sun Select program.

55. Please identify and discuss the Company's role in the research and development of utility power technologies. 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. Tampa Electric does not currently have any dedicated R&D programs. Outside of the Conservation R&D program, the company does not actively pursue R&D projects.

56. [**Investor-Owned Utilities Only**] Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

57. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

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58. 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 600 MWAC of solar being installed through 2023 identified in Tampa Electric's Ten-Year Site Plan has already procured major pieces of equipment and several of the sites are already under construction. These utility-scale solar projects are planned and would receive regulatory approval for cost recovery through a future base rate case. There are multiple projects, each less than 75 MW in capacity, planned. The construction of projects totaling 226.5, 224, and 149.5 MW began construction in 2020, and will continue through 2023. The projects are expected to be in service in December 2021, December 2022 and December 2023, respectively. These projects do not require Power Plant Siting Act or Need Determination approvals.

The BB 1 Modernization (BB Mod) has received regulatory approval and passed its final decision point. The Big Bend Unit 1 modernization includes Big Bend CT 5, Big Bend CT 6, and Big Bend ST 1 and is already significantly underway, including site certification, permitting, engineering, procurement of major equipment, and construction. The combustion turbines and generators have been received at the site and placed on their foundations. The underground installation is complete and pipe rack and HRSG installation is well underway. In addition, the necessary dismantlement scope of the original BB 1 is complete and past the point of returning unit 1 to operation in its previous configuration.

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.

Tampa Electric estimates a final decision point for procuring and constructing a typical battery energy storage system (BESS) to be approximately 15 months prior to the expected in-service date. The 15 months is comprised of 12 months for engineering, procurement, and permitting, which could vary depending on the site

location, and 9 months for construction. The 15-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Tampa Electric estimates a final decision point for procuring and constructing a typical solar facility to be approximately 15 months prior to the expected in-service date. The 15 months is comprised of 12 months for engineering, procurement, and permitting, which could vary depending on the site location, and 9 months for construction. The 15-month time estimate may be improved or extended based upon major equipment availability and site permitting.

Future solar projects that are identified in Tampa Electric Company's 2021 Ten-Year Site Plan have already procured or will be procuring (in 2021) major pieces of equipment, including solar modules, inverters and tracker components. The procurement of equipment in 2021 will allow the projects to safe harbor the 26%Investment Tax Credit (ITC) to reduce the cost to our customers. The planned solar projects began construction and/or development in 2020 to provide enough time to ensure safety, sufficient work force and account for schedule disruptions due to weather.

59. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

60. [**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. Please refer to the 2021 TYSP, Chapter 1, Schedule 1. Currently, the company is depreciating its existing units in accordance with the remaining depreciable life approved in its 2011 Depreciation Study. Additionally, Tampa Electric filed its 2020 Depreciation and Dismantlement Study on December 30, 2020 which contains proposed retirement dates.

61. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

62. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

63. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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. 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. The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

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Environmental

64. 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 2020, Tampa Electric (TEC) did not experience significant impacts from environmental regulations relating to air emissions and does not anticipate any 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 of the National Ambient Air Quality Standards (NAAQS) statewide.

Tampa Electric is uniquely positioned to be able to meet the Mercury Air Toxics (MATS standards (MATS) without considerable impacts. All of Tampa Electric's conventional coal-fired units are already equipped with electrostatic precipitators, scrubbers and SCRs, 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.

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:

The Company continued to comply with the operating requirements of the federal CCR Rule throughout the year. Additionally, two CCR closure projects were continuing in 2020. The West Slag Disposal Pond (WSDP) closure project was completed in December 2020. Also, the Economizer Ash and Pyrites Pond System (EAPPS) Closure Project continued throughout the year and is ongoing in 2021. However, neither of these projects nor any other waste issues related to existing environmental regulations affected dispatch, curtailments or retirements during 2020.

65. 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? Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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 will involve the repowering of Unit 1 with a highly efficient, state of the art, natural gas-fired, combined cycle generating unit. The new units will be designed to comply with the referenced standards.

c. The new units are planned to be in commercial operation in 2023.

d. All regulatory approvals have been received.

e. Tampa Electric does not anticipate asking for cost recovery for any expenses relating to this rule. The requested data is provided in the Excel Tables Spreadsheet, "Data Request #1 – Excel Tables.xls".

f. Not applicable.

66. 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.

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

A. a. None.

b. None.

c. Effects on reliability related to compliance with this rule will depend on the compliance option implemented at each facility. 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. None.

g. None.

67. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

68. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

69. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

70. 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. Tampa Electric has not received approval for any costs for environmental compliance investments required to comply with recently finalized or proposed EPA regulations.

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Fuel Supply & Transportation

71. Please complete and return, in Microsoft Excel format, the table associated with this question found in the Excel Tables Spreadsheet 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, "Data Request #1 – Excel Tables.xls".

72. 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 Scenario Planning Service Annual Guidebook (originally produced by PIRA Energy Group), S&P Global Market Intelligence, IHS Markit, Argus Coal Daily and Platt's Oilgram. 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 Scenario Planning Service Annual Guidebook for reasonableness.

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73. 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. **COAL**:

As with other energy commodities, coal experienced a drastic demand decline from the COVID-19 pandemic as well as pandemic-related supply chain disruptions but is rebounding in 2021 as the global economic recovery continues. The coal industry is expected to continue in a state of much uncertainty and reduced production and demand during the 2021 through 2030 period. The demand for coal in the U.S. is declining due to coal unit retirements and shifts in generation to natural gas or renewables, low natural gas prices, evolving environmental regulations and slowed energy consumption. The availability and cost of coal is also uncertain due to resource constraints in labor, land access, land use, and production costs. The reduced demand and rising production cost are causing financial stress for many participants in the coal industry. The financial health of existing and potential coal producers is monitored closely by Tampa Electric. The U.S. continues to be a net exporter of coal with international demand expected to drive more price and production uncertainty. China accounts for over half of global coal demand and any changes to renewable energy targets or policy in China could have a significant impact on global coal demand and pricing. In the U.S., with many coal producers focused on longer term contracts for financial stability, Tampa Electric's reduced coal needs could be impacted by shorter term price volatility, contracting challenges and the need to maintain higher coal inventory to mitigate supply chain disruptions. Tampa Electric's coal consumption as a percentage of system fuel mix is expected to be minimal over the current planning period.

b. **NATURAL GAS:**

The natural gas industry will continue to be influenced by the growth in unconventional gas production (i.e., shale gas) in North America, associated gas from shale oil production, changes in pipeline flows and projects to connect new supply to changing load centers, exports to Mexico and the global demand for LNG. Although domestic natural gas production was curtailed as a result of COVID-19 demand destruction in 2020, natural gas production has rebounded quickly and steady growth is expected over the planning period. Demand growth is expected to slow during the planning period as industry economics and emissions targets and policies are increasingly in favor of a transition to renewable generation.

Expectations for continued natural gas production growth and increased renewable penetration in electric generation keeps the forecasted price for natural gas relatively low in the foreseeable future. This low price is also encouraging exports of LNG from the U.S. and is virtually the only fuel being selected for future electric generation in the U.S. However, there are some upside price risks to consider, including restrictions on fracking and infrastructure, slowed growth in both mid-term and long-term shale production and increased global LNG demand. As witnessed during the summer of 2020, the global demand for LNG can cause short term price volatility in natural gas prices as Gulf Coast LNG tankers can be cancelled and then reinstated quickly. Extreme weather events such as Storm Uri can also drive short term price volatility and we expect those uncertain weather events to continue throughout the planning period. Tampa Electric is affected by the evolving shale gas market since much of its gas supply is coming from Appalachia, Mid-continent and Permian, instead of the Gulf of Mexico. Tampa Electric is continually evaluating and enhancing 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. **NUCLEAR FUEL:**

Tampa Electric does not have nuclear generation facilities.

d. **OIL:**

The COVID-19 pandemic and its impact to oil demand is significant as most long-term demand forecasts have been reduced due to impacts in the transport sector, specifically business travel and commuting. Although oil

demand should see a rebound over the next few years as global economies recover from the pandemic, oil demand may peak towards the end of the planning period as demand growth slows. This trend could result in downward pressure on oil prices during the planning period but expect short term pricing volatility to continue. Global tensions, OPEC decisions, global economics and policies, weather-related supply disruptions and aging refining capacity may cause the price of crude and its related products to change dramatically. These risk factors underpin the expectation of continued price volatility. Other supply and demand drivers are electric vehicle penetration, petrochemical growth, shale oil production and other behavioral changes from the pandemic. Since Tampa Electric has a small quantity of oil-capable units and uses oil solely as a back-up fuel, its projected use of distillate oil for energy production is less than one percent. Thus, oil price volatility will have limited impact on the company.

e. Non-Applicable.

74. 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, low cost gas from the supply area directly to our generating facilities. In 2021, Tampa Electric procured upstream capacity on the Sabal Trail pipeline to meet the growing gas requirements of the portfolio as the company continues its transition away from coal to solar and natural gas. Other areas of focus include evaluating opportunities for 1) additional market area pipeline capacity or storage to meet growing gas requirements, 2) increased pipeline reliability at generating facilities, and 3) enhancing the portfolio of fuel assets to mitigate supply or transport interruptions as well as meeting extreme peak demand requirements.

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75. 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. These are the primary projects that directly impact the Florida market and Tampa Electric Company:

- Alabama - Gulfstream Natural Gas Pipeline System Phase VI expansion (2022)
- Alabama - Transco's Hillabee Expansion Phase III project; part of the Southeast Market Pipelines project (2021)
- Louisiana - Multiple gulf coast pipeline projects feeding LNG exports and other Gulf Coast markets (various phases)
- Texas - Multiple pipeline projects from the Permian and other shale basins to Carthage or the Gulf Coast (various phases)

76. 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. There are currently six operational LNG projects in the U.S. exporting significant amounts of LNG to world markets with four more under construction as well as expansions planned at several existing facilities. The projects that have been approved and constructed have had little impact on Tampa Electric's natural gas supply portfolio but have impacted the short-term price of natural gas. U.S. LNG cargo cancellations during the summer of 2020, driven by the lack of global demand from COVID-19, drove natural gas prices to historic lows under $1.50/MMBtu. By the fall of 2020, global demand and U.S. LNG exports recovered at a faster rate than U.S. gas production pushing gas prices to $3.00/MMBtu. LNG feed gas demand is expected to double toward the end of the current planning period from existing levels. Considering domestic natural gas production is projected to remain strong through the current planning period, LNG exports should continue to impact natural gas prices more than the availability of supply and global demand could have a significant impact on short term natural gas pricing.

77. 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 at two facilities. High-deliverable salt dome storage is a key component of Tampa Electric's natural gas supply 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 on a daily basis. Tampa Electric attempts to keep its storage levels close to full at around 80%. 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 our generating facilities. The amount of required storage capacity in the portfolio is continuously evaluated based on market conditions and weather events.

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78. 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. Rail transportation and inland river barge transportation are evolving rapidly as retirements of domestic coal-fired generation units cut demand. For instance, rail and barge transporters seek new opportunities to keep their transportation assets active in the marketplace. These new opportunities include transporting other commodities. Such opportunities change the flow of energy commodities by rail and river barge. Ocean transportation is experiencing similar dynamics. However, because of the multiple coal-fired generation retirements, the Jones Act fleet, while aging, can meet the declining demand for coal.

The coal supply chain continues to experience significant financial stress as reflected in several industry bankruptcy filings. The domestic and global coal supply markets continue to be over-supplied due to low natural gas prices, increased governmental regulations, renewables growth and limited electric load growth. These factors affect all legs of the transportation chain. The demands for inland barging, terminals and ocean transportation have all decreased rather significantly causing inordinate financial stress for these companies. Tampa Electric strives to maintain bi-modal transportation agreements to encourage market liquidity and increased reliability of supply should one source experience interruption. Due to its reduction in the amount of generation fueled by coal, Tampa Electric is currently purchasing limited amounts of delivered waterborne coal as well as utilizing its rail transportation agreements as needed.

79. 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. The company is modernizing Big Bend Unit 1 and has declared the retirement of Unit 2 and Unit 3 at Big Bend Station. These changes result in a reduction of solid fuel throughput and the solid fuel material handling equipment will be optimized for the new operating condition. The solid fuel optimization scope includes the dismantlement of multiple conveyors, blending bins and reduces the footprint of the solid fuel storage area; thus, simplifying and right sizing the solid fuel handling infrastructure and process for Unit 4.

80. 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.

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

A. Non-Applicable.

Weatherization

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

A. Tampa Electric Company maintains Freeze Protection Plans for each generating station. These plans are reviewed and updated annually prior to the winter season. To assure adequate fuel supply, Tampa Electric maintains a diverse portfolio of natural gas supply receipt points, has 2 billion cubic feet of salt dome storage capacity, natural gas transportation from multiple pipelines to its plants, maintains adequate coal inventory onsite, added natural gas capability to all of its solid fuel generation units, and maintains and regularly tests dual fuel capability at Polk Units 2 and 3.

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

A. Tampa Electric Company is evaluating the generating, transmission, substation, and fuel supply system impacts of an extreme cold weather event. These evaluations are ongoing, and the company expects to have a better understanding of our existing freeze protection plans, understand any gaps and or vulnerabilities, and develop an action plan that addresses the identified gaps and vulnerabilities. One area of particular focus is backup fuel. Tampa Electric is in the process of evaluating and considering other fuel diversity options to its generation station to increase the system's resiliency to natural gas supply disruptions.