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September 28, 2018

VIA ELECTRONIC MAIL

Ms. Carlotta Stauffer, Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: *2018 TYSP Supplemental Data Request #4*

Dear Ms. Stauffer:

Please find attached for filing on behalf of Duke Energy Florida, LLC its response to questions 1-9 of the 2018 TYSP Supplemental Data Request #4 issued on September 11, 2018.

Thank you for your assistance in this matter. Please feel free to call me at (727) 820-4692 should you have any questions concerning this matter.

Respectfully,

/s/ Dianne M. Triplett

Dianne M. Triplett

DMT/cmk
Attachment

cc: Takira Thompson

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Duke Energy Florida, LLC's Response to Staff's
Supplemental Data Request #4 (Nos. 1-9)

1. With respect to the forecasting methodology, procedures, and models developed associated with Winter and Summer Peak Demand, please specify all the differences/ modifications/ improvements, if any, between what used in DEF's 2018 Ten-Year Site Plan (TYSP) and DEF's 2017 TYSP.

RESPONSE:
There were no significant changes in seasonal peak demand methodology, procedures and models between the 2017 and 2018 TYSPs. Each year, the 30-Year normal weather data is rolled by one year. The current data set thus added 2016 weather and dropped the 1986 weather year. Specific assumptions are also updated due to recent information on economic projections, large customer information, customer counts and added historical data.

2. For its 2018 TYSP, please identify and explain the measures and/or criteria, if any, DEF used to ensure the models of peak demand adequately explain historical volatility and to enhance the forecasting accuracy.

RESPONSE:
Monthly/seasonal peaks respond significantly to weather conditions at time of peak. For the derivation of retail load peaks, this requires testing of several derivations of weather variables to observe the measure resulting in the highest level of "explained variation", i.e. provides the highest correlation between the modeled values and the historical record. Other measures study the "day of week" for each monthly peak. Weekend peaks can occur under extreme weather conditions. If this were projected, Industrial and Governmental (school) loads would not be at normal levels. This may force the use of "indicator" variables to capture the "weekend" impact. Another detail DEF watches to explain historical volatility is any historic demand response (DR) impact on peak. Estimates of any reductions to peak from the activation of DR is always added back to recorded peaks to maintain the relationship between weather, other variables and the system retail peak.

DEF wholesale peaks are always analyzed separately from retail peaks to ensure that the contracted level of MW capacity is assumed to be reached at time of seasonal peak. New contracts are incorporated and terminated contracts get dropped from the forecast as necessary.

3. Please identify and explain the new measures, if any, DEF used to address the uncertainty inherent in the process of peak demand forecasting for its 2018 TYSP.

RESPONSE:

There were no new measures introduced between the 2017 and 2018 TYSPs. In general, DEF tries to minimize uncertainty by developing an average peaking weather condition. Use of a 30-year average degree day value by month and 30 year average Summer and Winter seasons ensures that we capture the appropriate seasonal weather condition no matter in which month it occurred. DEF does not address the probability of Hurricanes or "outages" that might occur throughout the forecast.

4. Please provide the Historical Forecast Accuracy associated with DEF's Winter Peak Demand for the period 2012/13 through 2016/17 and Summer Peak Demand for 2013 through 2017, respectively.

RESPONSE:

Table 1. Accuracy of Winter Peak Demand Forecasts

Forecast / Actual	Winter Peak Demand Forecast Error Rate (%) Forecasting Period Prior					Average
	5	4	3	2	1	
	2008 TYSP	2009 TYSP	2010 TYSP	2011 TYSP	2012 TYSP	–
2012/13	***-37.3***	***-34.8***	***-30.1***	***-27.5***	***-21.6***	***-30.3***
	2009 TYSP	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	–
2013/14	***-32.0***	***-24.9***	***-25.1***	***-16.3***	***-18.7***	***-23.4***
	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	2014 TYSP	–
2014/15	***-15.3***	***-15.7***	***-10.8***	***-13.0***	***-7.6***	***-12.5***
	2011 TYSP	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	–
2015/16	***-25.1***	***-21.1***	***-22.8***	***-19.0***	***-20.8***	***-21.8***
	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	2016 TYSP	–
2016/17	***-30.2***	***-32.3***	***-28.0***	***-29.6***	***-28.5***	***-29.8***

Table 2. Accuracy of Summer Peak Demand Forecasts

Forecast / Actual	Summer Peak Demand Forecast Error Rate (%) Forecasting Period Prior					Average
	5	4	3	2	1	
	2008 TYSP	2009 TYSP	2010 TYSP	2011 TYSP	2012 TYSP	–
2013	***-21.7***	***-20.1***	***-12.5***	***-10.1***	***-6.8***	***-14.2***
	2009 TYSP	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	–
2014	***-16.2***	***-7.0***	***-5.6***	***-2.6***	***-5.4***	***-7.4***
	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	2014 TYSP	–
2015	***-7.9***	***-6.4***	***-4.7***	***-7.0***	***-5.5***	***-6.3***
	2011 TYSP	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	–
2016	***-1.2***	***-0.6***	***-5.2***	***-2.2***	***-0.8***	***-2.0***
	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	2016 TYSP	–
2017	***-6.9***	***-9.6***	***-7.7***	***-6.9***	***-4.9***	***-7.2***

5. Please refer to the first three lines on page 2-40 of DEF's 2018 TYSP. What are the "utility-sponsored DR programs"?

RESPONSE:
These are the commission approved demand response programs mandated under the Florida Energy Efficiency and Conservation Act and detailed on pages 2-41 to 2-45 of DEF's 2018 TYSP. Specific tables are shown detailing MW reductions.

6. On page 2-4 of its 2018 TYSP, DEF states "[f]irst, a calculation of twenty-eight years of historical variation for economic driver variables selected in the base case energy sales model."

a. Please explain what the calculation is and what function it serves.

RESPONSE:
Using twenty-eight years of class-related relevant annual economic (1989-2016) data showing twenty-seven years of annual year-over-year growth rates (1990-2016), the MEAN and STANDARD DEVIATION is calculated using MS EXCEL functions. Then, using the "NORMINV" function set to a probability of .333 (Low case) and .667 (High case) is determined, again using the 27 years of annual growth rates for each economic series. By subtracting the economic series' MEAN from the two resulting NORMINV values, High and Low "constant" values result that generate a 66.7% high case and 33.3% low case when applied to the economic series' last historical data point and then to the previous projected year in each scenario. These Excel functions calculate a level of "historical variation" demonstrated by the economic or weather variable itself and applies a probability of outcome (33%/67%) deemed reasonable for a High/Low planning scenario.

b. Please explain why specifically twenty-eight years variation was used, given that DEF indicated in its DEF's 2017 TYSP, page 2-41, that "a measurement of twenty-year historical variation for economic driver variables deemed best to correlate with DEF class energy sales."

RESPONSE:
This period of record was selected based on a determination by the Load Forecaster that the 1990-2016 time period provided a "uniquely wide range of economic variability" without going back to years that can be considered "overly stale" in terms of how newer technologies and newer regulatory policies might weigh on future years.

7. Please refer to DEF's 2018 and 2017 TYSPs, page 2-13, Schedule 3.1.1 Summer Peak Demand, Base Case Forecast, for the following questions.

a. Referring to DEF's 2018 TYSP, Column (1), Total (MW), please explain why the 2017 actual value is significantly lower than DEF's 2017 TYSP projection (10,220 vs. 10,537).

b. Referring to DEF's 2018 TYSP, Column (5), Interruptible (MW), please explain why DEF projected that starting in 2022, the amount would maintain at a same level rather than decrease in trend as what had been projected in DEF's 2017 TYSP.

RESPONSE:

a. The 2017 actual value in the 2018 TYSP is an actual value representing the load resulting from 2017's milder weather condition compared to the 30-year average value projected for 2017 in the 2017 TYSP.

b. The values in this column are very sensitive to the behavior of a limited number of large industrial customers, especially phosphate customers. Col 5 in the 2018 TYSP reflects the return of some interruptible phosphate mining load which had previously declined due to market conditions. This explains the increase in load between 2017 and 2021. The assumption in the TYSP 2017 projection showed a longer "ramp up" in the return of phosphate load to 2022. The longer term drop off involved an assumption that some phosphate load may drop off slightly afterwards. Updated information from the two large accounts in this industry led us to maintain a static level at this time.

8. Please refer to DEF's 2018 and 2017 TYSPs, page 2-16, Schedule 3.2.1 Winter Peak Demand, Base Case Forecast, for the following questions.

a. Referring to DEF's 2018 TYSP, Column (1), Total (MW), please explain why the actual peak demand level for winter 2016/17 is significantly lower than DEF's 2017 TYSP projection (8,739 MW vs, 11,338 MW).

b. Given that the actual peak demand for winter 2016/17 in DEF's 2018 TYSP is significantly lower than what was projected in DEF's 2017 TYSP, please explain why DEF's Winter Peak Demand forecast is unchanged in its 2018 TYSP.

c. Referring to DEF's 2018 TYSP, Column (5), Interruptible (MW), please explain why DEF projected that the winter 2021/22 demand amount would not materially change through the winter 2026/27 rather than decrease in trend as projected in DEF's 2017 TYSP.

RESPONSE:

a. As discussed in the response to Q7.a., the value for the 2016/17 winter peak demand is an actual value which represents the mild actual weather in that period. The projected Winter Peak is particularly dependent upon a significantly cold Winter weather condition that is typically not reached every year. Winter weather is much more variable than Summer weather. As with the retail, the projected wholesale peak is much more dependent on a significant period of cold temperatures which results in the constraint of available generating capacity available for purchase in the open market.

b. In order to safely meet DEF customer peak requirements, every DEF projection applies a thirty year average weather condition. The 2018 TYSP projected value incorporates a much colder temperature than what occurred during the 2017 actual Winter peak.

c. Please see response to Q7.b.

9. Please refer to DEF's 2018 TYSP, page 2-16, Schedule 3.2.1, Winter Peak Demand Base Case, Column (4) Retail.

a. Please specify to what forecasting period the forecasted 9,072 (MW) applies, if any.

b. Please verify whether each of the forecasted amount of Retail Winter Peak Demand presented on page 2-16 is correctly associated with its corresponding forecast year.

RESPONSE:

a. The value of 9,072 does not refer to any forecasting period and was a working draft error that did not get removed in the editing process.

b. DEF attests that the stated column has the correct values listed for the year directly to the left.