City of Tallahassee
Your Own Utilities℠

ENERGY SMART PLUS℠
SAVE ENERGY SAVE WATER SAVE MONEY

Electric Utility | 400 E. Van Buren St. Tallahassee, FL 32301 | 850.891.4YOU (4968)

FILED 8/28/2018
DOCUMENT NO. 05640-2018
FPSC - COMMISSION CLERK

August 28, 2018

Office of Commission Clerk
State of Florida Public Service Commission
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

Dear Sir/Madam:

Attached please find the City of Tallahassee's (TAL) response to the Florida Public Service Commission's second request for supplemental information regarding TAL's 2018 Ten Year Site Plan report provided pursuant to Section 366.05(7), F.S., Docket Number 20180000-OT. If you should have any questions regarding this information, please feel free to contact me at (850) 891-3130 or paul.clark@talgov.com. Thank you.

Sincerely,

Paul D. Clark, II
Principal Engineer

Attachment

1. Please provide a comparison of Tallahassee's 2017 and 2018 Ten-Year Site Plans, identifying any notable differences.

   Please see "Summary Comparison of 2018 vs. 2017 Ten Year Site Plans" on the following pages.

2. Please refer to Tallahassee's responses to staff's Supplemental Data Request #1, No. 36. Please indicate whether or not Tallahassee plans to pursue any of these projects. If so, please identify which and provide the status of these proposed projects.

   The City of Tallahassee, Electric Utility ("TAL") has no plans to pursue any of these projects at this time.

3. Please indicate whether or not Tallahassee accounts for solar degradation. If so, please explain how Tallahassee calculates solar degradation, discuss whether or not Tallahassee accounts for solar degradation in cost-effectiveness evaluations, and identify the possible causes of solar degradation. If not, please explain.

   TAL applies an annual degradation factor of 0.005 (0.5%) to each year subsequent to the first full year of utility-scale solar photovoltaic (PV) array operation. For example, the maximum output of the 20 MW_{ac} PPA placed into service in December 2017 is assumed to be 20 MW_{ac} through the 2018 in-service anniversary date, then 20 X 0.995 = 19.9 MW_{ac} through the 2019 in-service anniversary date, and so on.

   TAL's existing and planned solar PPAs were not subjected to formal cost-effectiveness evaluations. These PPAs were executed to support TAL's commitment to provide its customers access to renewable power supplies. The output of the 20 MW_{ac} PPA placed into service in December 2017 has been fully subscribed to and purchased by TAL's customers. The cost of the PPA is passed directly on to those subscribing customers. Customers will be provided an opportunity to purchase the output of the 40 MW_{ac} PPA in the months prior the expected January 2020 in-service date.

   According to the National Renewable Energy Laboratory (NREL) the output of solar PV arrays can degrade due to:

   - *Internal resistance of the cell can increase due to infiltration of contaminants (usually water vapor) when the encapsulating material cracks due to long-term UV exposure or temperature cycling.*
   - *The shunt resistance (resistance of the path to ground) can decrease when metal ions migrate (diffuse) through the cell. This happens naturally, with the rate depending on temperature and the type of cell. In general, higher temperatures lead to faster diffusion, and amorphous silicon has higher diffusion rates.*
   - *The anti-reflective coating can deteriorate. Anti-reflective coatings can be made of lots of different types of materials, but in general, heat, UV exposure, and exposure to contaminants are what cause them to degrade.*

Summary Comparison of 2018 vs. 2017 Ten Year Site Plans

The following paragraphs and the table on the last page summarize the major differences between the Electric Utility's 2018 and 2017 Ten Year Site Plan (TYSP) reports.

Load and Energy Forecasts

The 2018 base forecasts reflect virtually no change in expected annual retail sales, and modest decreases in forecast summer and winter peak demand versus the corresponding 2017 forecasts. The changes in the forecasts can be attributed to changes in the projections of the variables that serve as inputs to these forecasts – Leon/Florida population, temperature, heating/cooling degree days, large customer incremental additions and econometric variables – as well as to impacts from changes in the federal appliance/equipment efficiency standards and state building efficiency code.

Demand-Side Management

The projections of expected demand and energy savings attributable to the City's DSM efforts have been updated versus those reported in the City's 2017 TYSP. These revisions were driven mainly by a slower than expected implementation of DSM measures and technology issues with the demand response/direct load control (DR/DLC) measures. The revised projections reflect a slower growth in expected demand and energy savings that is consistent with historical experience.

There is uncertainty regarding the actual versus projected performance of the DSM program going forward. The expected growth in customers and energy use has varied as a result of the economic conditions observed during and following the 2008-2009 recession as well as due to changes in the federal appliance/equipment efficiency standards and state building efficiency code. It appears that many customers have taken steps on their own to reduce their energy use and costs in response to the changing economy - without taking advantage of the incentives provided through the City's DSM program – as well as in response to the aforementioned standards and code changes. This reduces potential participation in the DSM program in the future and brings into question whether customer energy use reductions will persist beyond the economic recovery.

Power Supply Resources

Currently the City has a net summer power supply capacity of 700 MW all of which is provided by generation at Hopkins and Purdom. Because generation from the C. H. Corn hydroelectric facility is intermittent (dependent upon rainfall, reservoir and downstream conditions), these generating units are considered "energy only" and not dependable capacity resources. The 2018 projection includes purchase power agreements (PPA) from a 20 MW_{ac} (in service late 2017) and 40 MW_{ac} (expected in service late 2019/early 2020) solar photovoltaic (PV) facilities to be located within the City's service territory adjacent

to City-owned facilities. Due to the intermittent nature of solar PV these PPAs will be for energy only and will not be considered firm capacity.

The 2018 forecast reflects the retirement of several older, less efficient generating units. As a result of these retirements the City would face a reserve shortfall in the summer of 2019. To address this expected shortfall generation projects are under construction at the City's Substation 12 and Hopkins Plant sites. These project will provide about 92 MW (18 MW at Substation 12 and 74 MW at Hopkins) in the form of natural gas fueled reciprocating internal combustion engines (RICE or IC). The Substation 12 ICs will provide the additional benefit of backing up the critical loads from this substation (TMH, TPD). Combined, the Substation 12 and Hopkins IC additions will satisfy the projected load and reserve requirements through the winter of 2024/25.

Based on the City's 17% reserve margin criterion additional generating capacity will be needed by the summer of 2025. For the purposes of the 2018 TYSP City staff has identified the installation of a fifth 18 MW IC unit at Hopkins as the means for addressing this need. The timing, site, type and size of this new power supply resource may vary as the nature of the need becomes better defined. Alternatively, a power supply resource addition could be a generator(s) of a different type/size at the same or different location or a peak season purchase.

The suitability of this resource plan is dependent on the effectiveness of the DSM portfolio and the City's projected transmission import capability. If only 50% of the DSM target is achieved, the City would require about 20 MW of power supply resources (in addition to that already planned) to meet its 17% planning reserve requirement through the horizon year of 2027.

Summary of Changes - 2018 vs. 2017 Ten Year Site Plan

2017 Ten Year Site Plan (2017-2026)									2018 Ten Year Site Plan (2018-2027)									
	Demand-Side			Supply-Side						Demand-Side			Supply-Side					
Year	Peak Load (MW)	DSM (MW)	Net Peak Load (MW)	Renewable Supply Description	Renewable Supply (MW)	Other Supply Description	Other Supply (MW)	Total Summer Net Supply (MW)	Reserve Margin (%)	Year	Peak Load (MW)	DSM[1] (MW)	Net Peak Load (MW)	Renewable Supply[2] Description	Renewable Supply[2] (MW)	Other Supply Description	Other Supply (MW)	Total Summer Net Supply (MW)	Reserve Margin (%)
2017	609	4	604			Hopkins CTs 1 and 2 Retire (Apr 2017)[3]		710	17										
2018	619	14	604					710	18	2018	598	5	593					700	18
2019	627	24	603			Hopkins 1 and Purdom CTs 1 & 2 (Oct 2018) Retire, Substation 12 ICs (Jul 2018) and Hopkins ICs 1-4 (Oct 2018) Added [4]	(4)	706	17	2019	611	13	598			Hopkins 1 and Purdom CT 2 (Oct 2018) Retire, Substation 12 ICs (Sep 2018) and Hopkins ICs 1-4 (Dec 2018) Added [4]	6	706	18
2020	634	32	602					706	17	2020	617	22	596					706	19
2021	640	39	601					706	17	2021	623	29	593					706	19
2022	647	44	602					706	17	2022	627	32	595					706	19
2023	653	48	604					706	17	2023	634	35	599					706	18
2024	658	51	607			Hopkins IC 5 Added[5] (Jun 2024)	18	725	19	2024	639	37	602					706	17
2025	664	53	611					725	19	2025	644	40	604			Hopkins IC 5 Added[5] (Jun 2025)	18	725	20
2026	669	56	613					725	18	2026	649	42	607					725	19
										2027	654	44	610					725	19

[1] For 2018 TYSP, though the trajectory of expected DSM impacts is slightly lower than those reflected in the 2017 TYSP, when coupled with a lower base peak load forecast, the 2018 net peak load forecast is slightly lower than the 2017 net peak load forecast.

[2] For the 2017 and 2018 TYSP reports there are no planned firm renewable supply additions. However, the energy associated with 20 MW (in-service late 2017) and 40 MW (expected in-service late 2019/early 2020) non-firm purchases from solar PV facilities is separately reflected in the energy accounting. Customer-owned PV installations (reflected as decreased load) continue to increase.

[3] The retirement of Hopkins CT 2 was advanced to April 2017 to (1) facilitate construction of Hopkins reciprocating internal combustion engine (RICE or IC) generators on the site of existing generators Hopkins CTs 1 and 2, and (2) make the existing units' transformers available for relocation/reuse with the new Substation 12 RICE units. Purdom CT 1 was retired in November 2017 due to a turbine blade failure after which it was not cost-effective to return it to service.

[4] Because the City's summer peak demand can occur as early as June, the planned addition of two (2) 9 MW reciprocating internal combustion engines (RICE or IC) at Substation 12 in September 2018 are not counted toward summer 2018 capacity. The retirements of Hopkins 1 and Purdom CT 2 will not occur until October 2018 so their capacity will be available for the 2018 summer peak season. Conversely, the addition of Hopkins ICs 1-4 will not occur until late 2018 so their capacity will not be available for the 2018 summer peak season.

[5] Due to the slightly lower 2018 net peak demand forecast the need for additional capacity to meet load and reserve requirements slips to 2025. For the purposes of the 2018 report staff has identified the prospective addition of a fifth 18 MW IC at the existing Hopkins Plant site in June 2025. The timing, site, type and size of this new power supply resource may vary as the nature of the need becomes better defined. Alternatively, this proposed addition could be a generator(s) of a different type/size at the same or different location or a peak season purchase.