LAKELAND ELECTRIC
POWERED FOR LIFE

Ms. Takira Thompson
Division of Engineering
Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Oct 10, 2018

Dear Ms. Thompson,

Re: Response on "Supplemental Data Request #4 - TYSP 2018 Lakeland Electric"

As per your Supplemental Data Request (**Reference # 20180000-OT)** dated Sep 11, 2018, here is a copy of the responses we have prepared. Please let me know if you have any questions or comments.

Thank you for your support.

Sincerely,

Shankar Karki

Engineer IV, SMIEEE
Energy Production – Power Resources
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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 Lakeland's 2017 and 2018 Ten-Year Site Plans (TYSP).

There are no differences in overall peak forecasting methodology between Lakeland's 2017 and 2018 Ten Year Site Plans.

A regression model is estimated in MetrixND (the statistical forecast modeling software we use) to forecast monthly peaks. The model is developed using Itron's Statistically Adjusted End-Use (SAE) modeling approach to ensure that end-use appliance saturations and efficiencies that may affect peak are being accounted for. The models are driven by monthly energy coefficients and normal peak-producing weather conditions. Each year, the date range is changed to include the most recent data through December year end. The appliance saturation and efficiencies are updated as well to reflect the most recent U.S. Energy Information Administration Annual Energy Outlook projections calibrated to the Lakeland Service area.

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

In MetrixND, a large number of statistics are available to assess our models. Among those we consider are: Adjusted R-Square, Bayesian Information Criteria (BIC), Mean Absolute Percentage Error (MAPE) and Durbin-Watson statistic.

We worked with Itron consultants to perform several types of model assessments and sanity checks.

For the 2018 TYSP, we started by carefully reviewing how well the 2017 forecast performed compared to actual. We weather normalized our results to determine how much of the variance was due to weather and to assess underlying peak growth rate.

Since the 2017 peak model performed well, we did not make adjustments to the key variables in our 2018 peak model. When developing the new model, we tested out different date ranges to see how they would affect our model fit. Out of sample testing was performed. As another sanity check, we compared the energy growth rate with the peak growth rate.

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

No new measures were used in 2018 TYSP.

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

Table 1. Accuracy of Lakeland's 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	-22.9%	-20.9%	-24.9%	-24.6%	-20.5%	-22.7%
	2009 TYSP	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	–
2013/14	-17.9%	-22.1%	-21.8%	-17.2%	-14.2%	-18.6%
	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	2014 TYSP	–
2014/15	-12.6%	-12.2%	-6.7%	-4.0%	-4.8%	-8.1%
	2011 TYSP	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	–
2015/16	-22.0%	-16.8%	-15.3%	-16.1%	-14.5%	-16.9%
	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	2016 TYSP	–
2016/17	-24.4%	-23.3%	-24.0%	-22.4%	-20.6%	-23.0%

Table 2. Accuracy of Lakeland's 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	-11.7%	-9.7%	-9.7%	-9.5%	-9.1%	-10.0%
	2009 TYSP	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	–
2014	-7.1%	-7.1%	-6.6%	-6.3%	0.8%	-5.3%
	2010 TYSP	2011 TYSP	2012 TYSP	2013TYSP	2014 TYSP	–
2015	-7.6%	-6.9%	-6.7%	0.2%	-0.3%	-4.3%
	2011 TYSP	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	–
2016	-5.4%	-5.3%	1.1%	0.6%	-0.9%	-2.0%
	2012 TYSP	2013 TYSP	2014 TYSP	2015 TYSP	2016 TYSP	–
2017	-6.5%	-0.6%	-0.8%	-2.4%	-0.8%	-2.2%