



August 8, 2019

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

Dear Mr. Teitzman:

Attached is Gulf Power Company's 2018 Cost of Service Load Research Study results which is filed pursuant to Rule 25-6.0437(7).

Sincerely,

A handwritten signature in blue ink that reads 'C. Shane Boyett'.

C. Shane Boyett
Regulatory, Forecasting and Pricing Manager

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Attachments

cc: Gulf Power Company
Russell Badders, Esq., VP & Associate General Counsel

Results of the
2018 Cost of Service
Load Research Study

INTRODUCTION

The purpose of this document is to fulfill the filing requirements of the Cost of Service Load Research Rule (Rule 25-6.0437, F.A.C.), Docket No. 820491-EU, Order No. 13026, issued February 23, 1984, by the Florida Public Service Commission (FPSC). This rule was amended by the FPSC on January 6, 2004.

Rule 25-6.0437, F.A.C. requires the reporting of results of each load research study conducted in accordance with the specifications of this rule. The results contained herein are for load research studies conducted based on data collected between January 1, 2018, and December 31, 2018.

A rate data summary is provided on Tables 1A and 1B and provides a comparison of various significant variables among rate classes. The number of sample points for each rate class is provided in these tables, as well as the coincident system peak (CP) demand, summer and winter CP demands, and relative accuracies. Table 1C provides, for each rate class, load factors based on the average of the 12 CPKW and on each rate class NCPKW. Table 2 shows the sample sizes for all rates by strata.

TABLE 1A
Rate Data Summary
2018

Rate	<u>Year End Customers</u>	<u>Annual MWH</u>	<u>% of Total</u>	<u>System CP KW (2018)</u>	<u>% of Total</u>
RS	383,936	5,207,520	43.2%	1,508,331	53.9%
RSVP	19,798	318,623	2.6%	93,057	3.3%
GS	32,783	322,641	2.7%	80,005	2.9%
GSD/GSDT/GS-TOU	15,961	2,545,851	21.1%	421,424	15.1%
LP	120	323,674	2.7%	43,144	1.5%
LPT	83	511,817	4.3%	63,334	2.3%
RTP	123	1,266,695	10.5%	183,405	6.6%
PXT	1	131,002	1.1%	13,950	0.5%
SBS	3	12,949	0.1%	0	0.0%
Others (1)	<u>10,175</u>	<u>1,410,110</u>	<u>11.7%</u>	<u>394,264</u>	<u>14.1%</u>
Total	462,983	12,050,882	100.0%	2,800,914	100.0%

(1) Sales for Resale, Unbilled, Rates OS and CISR, Company Use and Losses.

TABLE 1B
Rate Data Summary
2018

<u>Rate</u>	<u>Sample Points</u>	<u>% of Total</u>	<u>Summer CPKW</u>	<u>Relative Accuracy (%)</u>	<u>Winter CPKW</u>	<u>Relative Accuracy (%)</u>
RS	225	15.3%	1,139,683	5.29%	1,508,331	6.55%
RSVP	225	15.3%	61,025	3.67%	93,057	6.30%
GS	256	17.4%	81,622	7.40%	80,005	13.68%
GSD/GSDT/GS-TOU	430	29.2%	491,705	3.57%	421,424	5.88%
LP	116	7.9%	56,077	0.25%	43,144	0.69%
LPT	81	5.5%	80,690	0.00%	63,334	0.00%
RTP	130	8.8%	215,084	0.00%	183,405	0.00%
PXT	1	0.1%	15,726	0.00%	13,950	0.00%
SBS	3	0.2%	0	0.00%	0	0.00%
Others (1)	<u>6</u>	0.4%	<u>341,122</u>	N/A	<u>394,264</u>	N/A
TOTAL	1473	100.0%	2,482,734	N/A	2,800,914	N/A

(1) Sales for Resale, Rates OS and CISR, Company Use and Losses.

TABLE 1C
 Load Factors
 2018

Rate	<u>12 CPKW</u>	<u>Rate NCPKW</u>	<u>Annual MWH</u>	<u>12 CPKW Load Factor</u>	<u>Rate NCPKW Load Factor</u>
RS	1,017,837	1,530,863	5,207,520	0.584	0.388
RSVP	59,558	93,057	318,623	0.611	0.391
GS	64,217	84,690	322,641	0.574	0.435
GSD/GSDT/GS-TOU	390,857	515,052	2,545,851	0.744	0.564
LP	44,857	59,099	323,674	0.824	0.625
LPT	66,742	81,487	511,817	0.875	0.717
RTP	179,030	229,861	1,266,695	0.808	0.629
PXT	15,322	16,800	131,002	0.976	0.890
SBS	125	60,614	12,949	11.832	0.024

TABLE 2

GULF POWER COMPANY

2018 Cost of Service Load Research Rule Sample Size

<u>Rate</u>	<u>Strata Allocation</u>	<u>Sample Size</u>
RS	1) Multifamily	47
	2) Mobile Home	24
	3) SFD 0-1150 kWh	49
	4) SFD 1151-1950 kWh	50
	5) SFD over 1950 kWh	55
	Total	225
RSVP	1) SFD 0-900 kWh	52
	2) SFD 901-1300 kWh	64
	3) SFD 1301-1800 kWh	56
	4) SFD over 1800 kWh	53
	Total	225
GS	1) 0-500 kWh	35
	2) 501-1200 kWh	92
	3) 1201-2400 kWh	68
	4) Over 2400 kWh	30
	CENSUS *	31
Total	256	
GSD	1) 0-30.0 kW	66
	2) 30.1-60.0 kW	54
	3) 60.1-120.0 kW	48
	4) Over 120.0 kW	57
	GSTOU	45
	CENSUS *	160
Total	430	
LP	1) All customers (census)	116
LPT	1) All customers (census)	81
RTP	1) All customers (census)	130
PXT	1) All customers (census)	1
SBS	1) All customers (census)	3
CIS	1) All customers (census)	5
	Total	1472

DATA ANALYSIS METHODOLOGY

Load profiles for each rate schedule were estimated using the combined ratio technique. The equation used to calculate the demand estimate for each hour of the year is provided below. The definitions for the variables for these formulas are provided in Table 3.

$$\hat{T}_y = T_x * \frac{\sum_{h=1}^L W_h \bar{Y}_h}{\sum_{h=1}^L W_h \bar{X}_h} = T_x \hat{R}$$

The variance of each hourly demand is estimated as follows:

$$\hat{V}(\hat{T}_y) = \sum_{h=1}^L \left[N_h^2 \left(\frac{1 - n_h}{n_h} \right) \left(S_{yh}^2 + \left(\hat{R}^2 * S_{xh}^2 \right) - 2 \hat{R} r_h * S_{yh} * S_{xh} \right) \right]$$

The 90% confidence interval is:

$$CI = 1.645 \sqrt{\hat{V}(\hat{T}_y)}$$

$$\text{And relative accuracy} = \left(\frac{CI}{\hat{T}_y} \right) * 100\%$$

Load profiles were balanced to territorial input as follows:

$$\begin{aligned} &(\text{Input kW}) - (\text{Losses}) - (\text{Rate 1 kW}) - (\text{Rate 2 kW}) - \dots \\ &- (\text{Rate}_n \text{ kW}) = \text{Residual kW} \end{aligned}$$

This residual profile was distributed to the rate schedule profiles by allocating on the standard deviation(s) of the demand estimate, i.e.:

$$\text{Rate}_i \text{ kW} = \text{Rate}_i \text{ kW} + \text{Residual kW} \frac{S_i}{S_1 + S_2 + \dots + S_i + \dots + S_n}$$

The coincident and non-coincident demands shown in this report have been adjusted according to this balancing process. Confidence intervals and relative accuracies are based on unadjusted estimates of demand.

TABLE 3

Definitions for Formulas

\hat{T}_y

\hat{T}_y = Estimated Population Hourly kW

T_x = Population Monthly kWh

R

R = Ratio Estimator

\bar{Y}_h

\bar{Y}_h = Stratum Sample Average Hourly kWh

\bar{X}_h

\bar{X}_h = Stratum Sample Average Monthly kWh

$\hat{V}(\hat{T}_y)$

$\hat{V}(\hat{T}_y)$ = Estimated Variance of \hat{T}_y

n_h = Number of Good Sample Points in Stratum h

N_h = Population Number of Customers in stratum h

S_{yh} = Stratum Sample Standard Deviation of kW

S_{xh} = Stratum Sample Standard Deviation of kWh

r_h = Stratum Correlation Coefficient Between kW & kWh

Subscripts

h = Stratum number

v = kW variable

L = Total Number of Strata

x = kWh variable

STUDY RESULTS

Provided on the following pages are the rate class estimated non-coincident and coincident peak kW demands for each month of the year 2018. The relative accuracy and the confidence interval at the 90% confidence level are also provided. Results for rate classes RS, RSVP, GS, GSD/GSDT/GS-TOU, LP, LPT, RTP, PXT, and SBS are included. Provided also on Table 4 are the monthly coincident and non-coincident peak dates and times.

Table 4
 2018
 Coincident and Non-Coincident Peak Demand
 Days and Hours

MONTH	Coincident Peak	Non-Coincident Peaks												
		RS	RSVP	GS	GSD	LP	LPT	RTP	PXT	SBS				
JAN	18 0800	18 07	18 08	18 09	18 09	18 09	18 09	18 09	04	08	03	19	28	18
FEB	03 0800	03 08	03 08	22 12	22 12	21 13	21 13	21 13	21	14	12	12	02	03
MAR	15 0800	15 08	09 07	01 15	01 14	01 13	01 13	01 13	01	14	01	14	24	04
APR	03 1700	29 18	29 18	03 15	03 15	03 14	03 14	03 14	03	14	02	16	27	04
MAY	24 1600	19 17	19 17	31 16	31 13	17 13	31 14	31 14	24	13	02	15	02	04
JUN	28 1600	28 18	24 18	28 15	20 14	25 13	28 14	28 14	21	14	29	15	12	04
JUL	12 1700	21 17	12 19	11 16	16 13	18 14	26 14	26 14	26	14	03	04	22	23
AUG	06 1600	12 17	12 16	06 14	13 14	13 14	27 15	27 15	14	14	01	18	01	01
SEP	15 1700	15 17	16 16	20 16	20 14	17 11	18 12	18 12	26	15	21	13	29	22
OCT	02 1600	06 17	04 19	01 16	02 14	01 14	02 15	02 15	03	14	31	14	16	12
NOV	28 0700	28 07	28 08	05 15	07 12	07 14	07 14	07 14	07	14	07	13	26	20
DEC	12 0700	12 07	12 06	12 09	14 11	14 11	14 12	14 12	11	10	22	05	01	16

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
 August 2019
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE RS
 Residential Service
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	1,530,863	54,752	5.88%	1,508,331	102,373	6.55%
FEB	914,335	46,893	8.44%	914,335	77,139	8.66%
MAR	779,782	50,353	10.62%	779,782	82,830	11.11%
APR	749,369	40,859	8.97%	678,457	59,237	8.94%
MAY	994,044	32,728	5.42%	919,629	61,750	6.77%
JUN	1,173,939	36,135	5.06%	1,139,683	63,269	5.29%
JUL	1,154,236	37,017	5.28%	1,116,876	52,921	4.54%
AUG	1,152,638	37,162	5.30%	1,077,087	48,370	4.55%
SEP	1,159,977	35,746	5.07%	1,159,977	58,802	5.12%
OCT	1,030,309	45,380	7.25%	939,217	50,724	5.58%
NOV	968,101	53,717	9.13%	968,101	88,364	9.22%
DEC	1,013,019	56,935	9.25%	1,012,570	93,658	9.19%
AVG				1,017,837	33,860	3.32%

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE RSVP
 Residential Service Variable Pricing
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	93,057	3,685	6.51%	93,057	6,062	6.30%
FEB	56,685	2,508	7.28%	56,685	4,126	7.44%
MAR	48,604	3,044	10.30%	45,416	4,288	9.83%
APR	49,263	1,717	5.73%	39,139	2,811	7.32%
MAY	68,567	1,901	4.56%	49,134	2,450	5.02%
JUN	75,335	1,629	3.56%	61,025	2,319	3.67%
JUL	75,854	1,875	4.07%	61,083	2,506	3.95%
AUG	73,048	2,013	4.53%	64,007	2,747	4.34%
SEP	75,512	1,744	3.80%	73,121	2,928	4.04%
OCT	65,652	3,962	9.93%	55,108	2,632	4.91%
NOV	57,604	3,369	9.62%	54,909	4,803	8.83%
DEC	62,406	3,006	7.92%	62,011	5,499	8.82%
AVG				59,558	1,747	2.93%

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
 August 2019
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE GS
 General Service
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	84,690	6,267	12.17%	80,005	11,803	13.68%
FEB	56,690	3,160	9.17%	42,085	5,004	12.34%
MAR	59,917	3,075	8.44%	43,632	5,903	14.33%
APR	62,040	3,497	9.27%	54,389	5,321	10.05%
MAY	73,367	4,095	9.18%	72,994	6,908	9.58%
JUN	84,074	3,154	6.17%	81,622	6,466	7.40%
JUL	82,037	3,809	7.64%	70,422	4,494	6.03%
AUG	83,036	3,171	6.28%	82,806	4,765	5.85%
SEP	80,564	3,267	6.67%	64,440	4,811	7.58%
OCT	76,735	3,598	7.71%	74,126	5,518	7.78%
NOV	55,127	3,114	9.29%	48,876	8,480	17.69%
DEC	59,021	3,954	11.02%	55,204	7,427	13.33%
AVG				64,217	3,870	5.99%

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE GSD/GSDT/GS-TOU
 General Service Demand / Time-Of-Use
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	436,566	15,272	5.75%	421,424	25,561	5.88%
FEB	392,978	10,090	4.22%	247,227	13,499	5.55%
MAR	396,424	10,178	4.22%	293,331	17,052	5.96%
APR	392,314	10,464	4.39%	354,369	14,990	4.28%
MAY	458,252	10,080	3.62%	435,073	15,097	3.49%
JUN	515,052	14,166	4.52%	491,705	18,126	3.57%
JUL	496,798	10,128	3.35%	473,574	19,643	4.00%
AUG	508,150	11,455	3.71%	495,614	17,099	3.48%
SEP	497,262	11,696	3.87%	432,648	17,544	4.09%
OCT	475,745	12,030	4.16%	448,661	18,043	4.12%
NOV	384,933	11,301	4.83%	288,227	16,470	5.75%
DEC	328,763	30,478	15.25%	308,431	16,431	5.31%
AVG				390,857	10,313	2.64%

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
 August 2019
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE LP
 Large Power Service
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	45,028	170	0.62%	43,144	296	0.69%
FEB	49,535	115	0.38%	31,251	148	0.47%
MAR	49,916	122	0.40%	36,384	145	0.40%
APR	49,217	0	0.00%	44,806	0	0.00%
MAY	54,381	0	0.00%	52,286	0	0.00%
JUN	57,256	98	0.28%	56,077	140	0.25%
JUL	55,287	0	0.00%	52,236	0	0.00%
AUG	57,818	0	0.00%	55,931	0	0.00%
SEP	59,099	0	0.00%	46,633	0	0.00%
OCT	54,908	0	0.00%	51,720	247	0.48%
NOV	48,363	160	0.54%	33,177	321	0.97%
DEC	40,425	105	0.43%	34,636	214	0.62%
AVG				44,857	119	0.27%

GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE LPT
 Large Power Service Time-Of-Use
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	64,493	0	0.00%	63,334	0	0.00%
FEB	68,555	0	0.00%	51,333	0	0.00%
MAR	68,506	0	0.00%	55,434	0	0.00%
APR	67,407	0	0.00%	65,282	0	0.00%
MAY	76,454	0	0.00%	73,545	0	0.00%
JUN	81,487	0	0.00%	80,690	0	0.00%
JUL	80,264	0	0.00%	77,815	0	0.00%
AUG	80,118	0	0.00%	77,651	0	0.00%
SEP	79,729	0	0.00%	73,097	0	0.00%
OCT	75,952	0	0.00%	74,829	0	0.00%
NOV	69,631	84	0.20%	53,100	0	0.00%
DEC	60,193	0	0.00%	54,798	0	0.00%
AVG				66,742	0	0.00%

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE RTP
 Real-Time Pricing
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	195,300	0	0.00%	183,405	0	0.00%
FEB	161,792	0	0.00%	110,374	0	0.00%
MAR	185,621	0	0.00%	162,780	0	0.00%
APR	187,249	0	0.00%	176,867	0	0.00%
MAY	213,132	0	0.00%	204,145	0	0.00%
JUN	226,946	0	0.00%	215,084	0	0.00%
JUL	226,123	0	0.00%	204,696	0	0.00%
AUG	211,438	0	0.00%	207,548	0	0.00%
SEP	229,861	0	0.00%	178,733	0	0.00%
OCT	213,566	0	0.00%	204,707	0	0.00%
NOV	188,827	300	0.26%	133,920	1,273	0.95%
DEC	169,465	66	0.06%	166,100	2,036	1.23%
AVG				179,030	383	0.21%

2018 Cost of Service
 Load Research Rule
 GULF POWER COMPANY
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GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE PXT
 Large High Load Factor Power Service Time-Of-Use
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	15,723	0	0.00%	13,950	0	0.00%
FEB	15,975	0	0.00%	15,264	0	0.00%
MAR	15,713	0	0.00%	15,153	0	0.00%
APR	15,660	0	0.00%	15,541	0	0.00%
MAY	15,658	0	0.00%	15,336	0	0.00%
JUN	16,656	0	0.00%	15,726	0	0.00%
JUL	16,446	0	0.00%	16,175	0	0.00%
AUG	16,132	0	0.00%	12,795	0	0.00%
SEP	16,681	0	0.00%	16,604	0	0.00%
OCT	16,800	0	0.00%	16,450	0	0.00%
NOV	16,797	0	0.00%	14,948	0	0.00%
DEC	16,342	0	0.00%	15,919	0	0.00%
AVG				15,322	0	0.00%

GULF POWER COMPANY
 LOAD RESEARCH DATA
 RATE SCHEDULE SBS
 Standby and Supplementary Service
 January 2018 to December 2018

2018	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	60,614	0	0.00%	0	0	0.00%
FEB	58,813	0	0.00%	0	0	0.00%
MAR	1,934	0	0.00%	0	0	0.00%
APR	2,151	0	0.00%	0	0	0.00%
MAY	1,718	0	0.00%	0	0	0.00%
JUN	1,855	0	0.00%	0	0	0.00%
JUL	1,340	0	0.00%	0	0	0.00%
AUG	0	0	0.00%	0	0	0.00%
SEP	1,720	0	0.00%	0	0	0.00%
OCT	50,857	0	0.00%	0	0	0.00%
NOV	2,231	0	0.00%	368	0	0.00%
DEC	45,302	0	0.00%	1,132	0	0.00%
AVG				125	0	0.00%