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June 9, 2016

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

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COMMISSION  
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Dear Ms. Stauffer:

Enclosed are an original and fifteen copies of Gulf Power Company's 2015 Cost of Service Load Research Study results which is filed pursuant to Rule 25-6.0437(7).

Sincerely,

Robert L. McGee, Jr.  
Regulatory and Pricing Manager

md

Enclosure

cc: Beggs and Lane  
Jeffrey A. Stone

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AFD \_\_\_\_\_  
APA \_\_\_\_\_  
ECO 14 \_\_\_\_\_  
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2015 Cost of Service  
Load Research Rule  
GULF POWER COMPANY  
June 2016  
Page 1 of 20

Results of the  
2015 Cost of Service  
Load Research Study

INTRODUCTION

The purpose of this document is to meet 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.

This rule requires the reporting of results of each load research study conducted in accordance with the specifications of this rule. The results reported here are for load research studies conducted based on data collected between January 1, 2015, and December 31, 2015.

A rate data summary is provided on Tables 1A and 1B and provides a comparison of various significant variables between 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  
 2015

Rate	<u>Year End Customers</u>	<u>Annual MWH</u>	<u>% of Total</u>	<u>System CP KW (2015)</u>	<u>% of Total</u>
RS	375,095	5,106,033	42.6%	1,423,311	57.2%
RSVP	16,247	257,479	2.2%	61,735	2.5%
GS	31,434	290,197	2.4%	49,319	2.0%
GSD/GSDT/GS-TOU	16,097	2,616,192	21.8%	362,326	14.6%
LP	126	327,193	2.7%	41,970	1.7%
LPT	81	544,202	4.5%	61,014	2.5%
RTP	126	1,674,053	14.0%	192,055	7.7%
SBS	3	5,853	0.1%	563	0.0%
Others (1)	<u>10,262</u>	<u>1,159,174</u>	<u>9.7%</u>	<u>295,605</u>	<u>11.9%</u>
Total	449,471	11,980,376	100.0%	2,487,898	100.0%

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

TABLE 1B

Rate Data Summary  
 2015

<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	200	15.0%	1,152,765	3.77%	1,423,311	7.04%
RSVP	200	15.0%	52,388	4.84%	61,735	8.47%
GS	220	16.5%	67,398	7.73%	49,319	14.29%
GSD/GSDT/GS-TOU	362	27.2%	511,972	4.85%	362,326	8.52%
LP	139	10.5%	57,725	1.13%	41,970	1.52%
LPT	86	6.5%	86,614	0.19%	61,014	0.52%
RTP	117	8.8%	257,477	0.00%	192,055	0.00%
SBS	3	0.2%	0	0.00%	563	0.00%
Others (1)	<u>3</u>	0.2%	<u>301,483</u>	N/A	<u>295,605</u>	N/A
TOTAL	1330	100.0%	2,487,823	N/A	2,487,898	N/A

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

TABLE 1C  
 Load Factors  
 2015

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	1,014,442	1,429,264	5,106,033	0.575	0.408
RSVP	45,601	63,160	257,479	0.645	0.465
GS	52,350	73,625	290,197	0.633	0.450
GSD/GSDT/GS-TOU	406,606	525,336	2,616,192	0.735	0.568
LP	47,426	59,252	327,193	0.788	0.630
LPT	72,737	87,907	544,202	0.854	0.707
RTP	223,291	267,760	1,674,053	0.856	0.714
SBS	140	65,183	5,853	4.763	0.010

TABLE 2  
 GULF POWER COMPANY  
 2015 Cost of Service Load Research Rule Sample Size

<u>Rate</u>	<u>Strata Allocation</u>	<u>Sample Size</u>
RS	1) Multifamily	45
	2) Mobile Home	13
	3) SFD 0-1150 kWh	37
	4) SFD 1150-1950 kWh	48
	5) SFD over 1950 kWh	57
	Total	200
RSVP	1) SFD 0-1150 kWh	43
	2) SFD 1150-1950 kWh	88
	3) SFD over 1950 kWh	69
	Total	200
GS	1) 0-600 kWh	53
	2) 600-1400 kWh	57
	3) 1400-2300 kWh	47
	4) Over 2300 kWh	43
	CENSUS *	20
	Total	220
GSD	1) 0-25.0 kW	25
	2) 25.1-50 kW	35
	3) 50.1-130 kW	43
	4) Over 130.1 kW	45
	GS-TOU	45
	CENSUS *	169
	Total	362
LP	1) All customers (census)	139
LPT	1) All customers (census)	86
RTP	1) All customers (census)	117
SBS	1) All customers (census)	3
CIS	1) All customers (census)	2
	TOTAL	1329

❖ These are industrial, primary or transmission voltage level customers

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:

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



The 90% confidence interval is:

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

$$\text{And relative accuracy} = \frac{CI}{T_y} * 100\%$$

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 per this balancing process. Confidence intervals and relative accuracies are based on unadjusted estimates of demand.

TABLE 3

Definitions for Formulas

$\hat{T}_y$

= Estimated Population Hourly kW

$T_x$  = Population Monthly kWh

$\hat{R}$

= Ratio Estimator

$\bar{Y}_h$

= Stratum Sample Average Hourly kWh

$\bar{X}_h$

= Stratum Sample Average Monthly kWh

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

= 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 2015. 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, and SBS are included. Provided also on Table 4 are the monthly coincident and non-coincident peak dates and times.

Table 4  
2015  
Coincident and Non-Coincident Peak Demand  
Days and Hours

MONTH	Coincident Peak	Non-Coincident Peaks									
		RS	RSVP	GS	GSD	LP	LPT	RTP	SBS		
JAN	08 0800	08 700	08 600	08 1000	08 1000	08 1100	08 1000	28 900	26 2000		
FEB	20 0700	20 700	18 600	18 900	19 1900	09 1200	19 1000	20 900	01 2400		
MAR	06 0800	06 700	06 600	06 900	17 1600	11 1300	20 1400	12 1300	05 1200		
APR	26 1600	26 1600	26 1600	08 1500	07 1400	10 1400	10 1300	14 1400	21 1500		
MAY	21 1600	31 1800	17 2100	13 1400	20 1400	18 1400	20 1400	13 1400	14 300		
JUN	22 1500	18 1800	16 1900	17 1300	17 1300	23 1400	23 1400	23 1200	08 200		
JUL	21 1600	11 1800	23 1900	29 1400	15 1500	21 1400	29 1300	29 1100	24 100		
AUG	03 1600	23 1800	03 1900	12 1500	13 1500	24 1400	12 1500	06 1100	07 200		
SEP	02 1600	20 1700	05 1400	08 1300	02 1200	10 1400	09 1400	02 1200	13 2000		
OCT	09 1600	10 1600	09 1900	29 1500	09 1400	09 1400	09 1400	09 1300	16 2400		
NOV	06 1500	06 1500	05 1800	05 1200	06 1300	06 1300	05 1500	06 1400	03 1200		
DEC	03 1900	20 800	19 800	10 1300	01 1400	01 1400	28 1100	01 1400	31 1900		

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE RS  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	1,429,264	57,926	6.67%	1,423,311	102,559	7.04%
FEB	1,223,500	51,675	6.95%	1,223,500	85,005	7.03%
MAR	1,040,431	54,998	8.70%	1,035,232	92,099	9.14%
APR	854,533	31,497	6.06%	854,533	51,812	5.95%
MAY	1,025,723	35,878	5.75%	932,847	53,242	5.61%
JUN	1,160,156	35,480	5.03%	1,117,378	49,483	4.32%
JUL	1,209,843	36,798	5.00%	1,152,765	43,655	3.77%
AUG	1,194,302	31,477	4.34%	1,147,144	59,394	5.01%
SEP	1,096,505	33,948	5.09%	1,031,292	44,844	4.31%
OCT	848,532	35,813	6.94%	825,060	58,848	6.91%
NOV	748,256	29,609	6.51%	748,256	48,707	6.52%
DEC	782,312	41,805	8.79%	681,983	70,406	10.62%
AVG				1,014,442	25,701	2.51%

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE RSVP  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	63,160	3,244	8.45%	61,735	5,382	8.47%
FEB	58,103	2,798	7.92%	51,937	3,992	7.78%
MAR	47,948	2,896	9.94%	44,332	3,707	8.58%
APR	42,593	1,700	6.57%	42,593	2,797	6.44%
MAY	51,407	2,220	7.10%	40,581	2,825	6.82%
JUN	62,451	1,983	5.22%	48,419	2,799	5.59%
JUL	62,195	2,084	5.51%	52,388	2,554	4.84%
AUG	62,908	2,105	5.50%	50,300	2,895	5.55%
SEP	56,399	2,130	6.21%	48,537	2,774	5.64%
OCT	45,964	2,123	7.60%	34,833	2,367	6.59%
NOV	39,866	1,853	7.64%	34,325	2,384	6.96%
DEC	50,012	2,816	9.26%	37,236	3,235	8.89%
AVG				45,601	1,655	3.59%

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE GS  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	61,645	6,099	16.27%	49,319	7,400	14.29%
FEB	61,254	4,323	11.61%	53,847	6,411	12.14%
MAR	57,303	5,629	16.16%	45,454	7,156	16.52%
APR	53,305	3,270	10.09%	32,710	4,574	13.42%
MAY	66,839	8,845	21.77%	57,439	5,080	8.62%
JUN	72,661	3,354	7.59%	65,841	5,129	7.45%
JUL	73,625	3,936	8.79%	67,398	5,261	7.73%
AUG	70,992	3,475	8.05%	65,637	5,160	7.48%
SEP	71,324	8,092	18.66%	65,226	5,100	7.68%
OCT	54,644	2,838	8.54%	47,219	5,026	10.16%
NOV	52,578	2,945	9.21%	45,531	4,798	10.57%
DEC	48,798	9,437	31.81%	32,578	3,269	10.31%
AVG				52,350	3,405	6.31%



GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE GSD  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	395,459	19,053	7.93%	362,326	31,758	8.52%
FEB	387,066	21,576	9.17%	321,830	23,714	7.46%
MAR	386,629	15,758	6.70%	296,427	24,596	8.51%
APR	426,638	17,630	6.80%	330,345	20,561	6.11%
MAY	482,157	17,779	6.07%	450,647	24,672	5.39%
JUN	512,089	16,370	5.26%	506,322	27,931	5.34%
JUL	525,336	17,006	5.33%	511,972	25,003	4.85%
AUG	511,652	19,293	6.20%	490,944	31,120	6.09%
SEP	504,062	16,818	5.49%	483,230	27,237	5.57%
OCT	438,718	19,278	7.23%	405,897	27,820	6.65%
NOV	426,225	16,081	6.21%	409,941	23,133	5.65%
DEC	371,682	14,341	6.35%	309,388	30,108	9.99%
AVG				406,606	16,668	4.16%

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE LP  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	45,658	422	1.52%	41,970	637	1.52%
FEB	44,647	442	1.63%	37,721	660	1.75%
MAR	48,973	505	1.70%	38,861	553	1.42%
APR	51,901	485	1.54%	37,562	557	1.48%
MAY	57,310	516	1.48%	53,293	663	1.24%
JUN	57,360	449	1.29%	56,313	708	1.26%
JUL	59,066	428	1.19%	57,725	651	1.13%
AUG	59,252	571	1.59%	55,745	606	1.09%
SEP	57,169	673	1.94%	54,130	885	1.64%
OCT	51,555	579	1.85%	49,923	886	1.77%
NOV	53,848	815	2.49%	52,542	1,260	2.40%
DEC	47,466	610	2.12%	33,332	548	1.64%
AVG				47,426	493	1.04%

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE LPT  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	65,095	181	0.46%	61,014	318	0.52%
FEB	65,145	86	0.22%	60,680	185	0.30%
MAR	71,367	91	0.21%	61,138	262	0.43%
APR	76,384	98	0.21%	68,963	201	0.29%
MAY	81,473	74	0.15%	78,926	688	0.87%
JUN	86,109	114	0.22%	84,326	219	0.26%
JUL	87,907	86	0.16%	86,614	161	0.19%
AUG	86,398	117	0.22%	82,835	196	0.24%
SEP	83,437	270	0.53%	81,237	714	0.88%
OCT	75,148	313	0.68%	74,903	464	0.62%
NOV	77,707	103	0.22%	76,303	177	0.23%
DEC	69,435	126	0.30%	55,904	197	0.35%
AVG				72,737	284	0.39%

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE RTP  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	198,235	0	0.00%	192,055	0	0%
FEB	218,791	0	0.00%	215,012	0	0%
MAR	219,091	0	0.00%	197,838	0	0%
APR	238,630	0	0.00%	190,697	0	0%
MAY	262,606	0	0.00%	254,999	0	0%
JUN	258,570	0	0.00%	251,725	0	0%
JUL	265,063	0	0.00%	257,477	0	0%
AUG	259,262	0	0.00%	214,645	0	0%
SEP	267,760	0	0.00%	259,560	0	0%
OCT	242,040	0	0.00%	236,034	0	0%
NOV	247,629	0	0.00%	247,456	0	0%
DEC	207,970	0	0.00%	161,993	0	0%
AVG				223,291	0	0%

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE SBS  
 January 2015 to December 2015

2015	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	2,453	0	0.00%	563	0	0.00%
FEB	2,527	0	0.00%	0	0	0.00%
MAR	1,850	0	0.00%	0	0	0.00%
APR	55,169	0	0.00%	440	0	0.00%
MAY	2,481	0	0.00%	0	0	0.00%
JUN	1,810	0	0.00%	0	0	0.00%
JUL	65,183	0	0.00%	0	0	0.00%
AUG	1,900	0	0.00%	0	0	0.00%
SEP	2,163	0	0.00%	450	0	0.00%
OCT	1,870	0	0.00%	0	0	0.00%
NOV	1,850	0	0.00%	0	0	0.00%
DEC	1,820	0	0.00%	230	0	0.00%
AVG				140	0	0%