

Matilda Sanders

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Sent: Tuesday, June 12, 2007 10:27 AM  
To: Filings@psc.state.fl.us  
Cc: jas@beggslane.com  
Subject: Gulf Power Company's 2006 Cost of Service Load Research Study  
Attachments: 2006 C-O-S Load Research Rule & ltr.pdf

**ORIGINAL**

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- B. 820491-EU
- C. Gulf Power Company
- D. Document consists of 23 pages.
- E. The attached document is a transmittal letter and Gulf Power Company's 2006 Cost of Service Load Research Study.

*Brame Holsinger*

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**ORIGINAL**



June 12, 2007

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

Dear Ms. Cole:

Enclosed for filing is Gulf Power Company's 2006 Cost of Service Load  
Research Study which is filed pursuant to Rule 25.6.0437(7).

Sincerely,

s/ Susan D. Ritenour

bh

Enclosure

cc: Beggs & Lane  
Jeffrey A. Stone, Esq.

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2006 Cost of Service  
Load Research Rule  
DOCKET NO. 820491-EU  
GULF POWER COMPANY  
June 12, 2007  
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Results of the  
2006 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, 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 between January 1, 2006, and December 31, 2006.

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 1A

Rate Data Summary  
 2006

<u>Rate</u>	<u>Year End Customers</u>	<u>Annual MWh</u>	<u>% of Total</u>	<u>System CP kW (2006)</u>	<u>% of Total</u>
RS	343,776	5,103,531	42.9%	1,141,759	46.0%
GS	29,551	318,677	2.7%	74,736	3.0%
GSD/GSDT/GS-TOU	15,970	2,575,139	21.7%	491,101	19.8%
LP	184	588,324	4.9%	89,642	3.6%
LPT	103	1,290,572	10.9%	188,299	7.6%
RTP	23	707,839	6.0%	68,648	2.8%
SBS	3	176,330	1.5%	156	0.0%
Others (1)	<u>29,282</u>	<u>1,133,450</u>	<u>9.5%</u>	<u>428,659</u>	<u>17.3%</u>
TOTAL	418,892	11,893,862	100.0%	2,483,000	100.0%

(1) Sales for Resale, Rates OS, RSVP, PX, PXT, FlatBill and CISR/CSA, unbilled, interdepartmental, company use, losses and SEPA allocation.

TABLE 1B  
 Rate Data Summary  
 2006

<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	27.6%	1,141,759	3.94	1,126,861	7.54
GS	300	36.8%	74,736	7.27	52,950	11.46
GSD/GSDT/GS-TOU	160	19.6%	491,101	3.49	344,372	7.02
LP	55	6.7%	89,642	3.14	63,046	6.33
LPT	53	6.5%	188,299	0.83	139,442	1.88
RTP	19	2.3%	68,648	0	111,955	0
SBS	3	0.4%	156	0	18,638	0
Others (1)	<u>1</u>	0.1%	<u>428,659</u>	N/A	<u>337,736</u>	N/A
TOTAL	816	100.0%	2,483,000	N/A	2,195,000	N/A

(1) Sales for Resale, Rates OS, RSVP, PX, PXT, FlatBill and CISR/CSA, unbilled, interdepartmental, company use, losses and SEPA allocation.

Table 1C  
 Load Factors  
 2006

<u>Rate</u>	<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	1,005,228	1,199,463	5,103,531	0.580	0.486
GS	56,949	79,439	318,677	0.639	0.458
GSD/GSDT/GS-TOU	385,759	512,334	2,575,139	0.762	0.574
LP	76,251	98,531	588,324	0.881	0.682
LPT	169,683	221,758	1,290,572	0.868	0.664
RTP	85,148	139,042	707,839	0.949	0.581
SBS	9,557	59,489	176,330	2.106	0.338

SAMPLE DESIGN METHODOLOGY

The Load Research Sampling Plan that was used in this study was approved by the Commission in 2005. The results of the 2003 load research study were utilized to determine estimates of variance for each rate class. These results provided a relatively accurate estimate of the variance, which was used in the sample design of the 2006 plan.

The combined ratio estimator methodology was used for the sample size estimates. The formulas for this plan are provided in Table 2. The definitions for the variables used in these formulas are provided in Table 3.

Stratified random sampling was used within each rate class design to achieve better accuracy with fewer sample points. The actual calculations for each rate class, which provide sample size determinations for both summer and winter peaks, are provided within the Cost of Service Load Research Plan submitted to the Commission for approval. Provided in Table 4 are the strata allocation and sample design for each rate class.



TABLE 2

Formula for Sample Plan

I. Sample Size Estimates Using Combined Ratio Estimator:

$$n = \frac{\left[ \sum_{h=1}^L W_h \sqrt{F_h} \right]^2}{\left[ \frac{D \left( \frac{\hat{T}_y}{N} \right)}{1.65} \right]^2 + \frac{1}{N} \sum_{h=1}^L W_h F_h}$$

$$F_h = S_{yh}^2 + \left( \hat{R}^2 * S_{xh}^2 \right) - 2\hat{R}r_h * S_{yh} * S_{xh}$$

$$\hat{T}_y = \hat{R} * T_x$$

$$\hat{R} = \frac{\sum_{h=1}^L W_h \bar{y}_h}{\sum_{h=1}^L W_h \bar{x}_h}$$

II. Neyman Allocation of Sample Points to Strata

$$n_h = \frac{W_h S_{yh}}{\sum_{h=1}^L W_h S_{yh}} * n$$

TABLE 3

Definitions for Formulas

- $n$  = Sample Size Estimate
- $n_h$  = Stratum Sample Size
- $W_h$  = Stratum Weight
- $D$  = Percent Relative Accuracy (0.1)
- $\hat{T}_y$  = Estimated Population CPKW
- $N$  = Population Number of Customers
- $R$  = Ratio Estimator
- $T_x$  = Population kWh
- $\bar{Y}_h$  = Stratum Average CPKW
- $S_{yh}$  = Stratum Standard Deviation of CPKW
- $\bar{X}_h$  = Stratum average monthly kWh
- $S_{xh}$  = Stratum standard deviation of monthly kWh
- $r_h$  = Stratum correlation coefficient between CPKW & Monthly kWh
- $\mu_y$  = Population mean for CPKW

Subscripts

- $h$  = Stratum number
- $y$  = CPKW variable
- $x$  = Monthly kWh variable

TABLE 4  
**GULF POWER COMPANY**  
**2006 Cost of Service Load Research Rule Sample Size**

<u>Rate</u>	<u>Strata Allocation</u>	<u>Sample Size</u>	
RS	1) MF-GT900	20	
	2) MF-LE900	21	
	3) MOBILE	33	
	4) SF-925*1675	53	
	5) SF-GE1676	49	
	6) SF-LE925	49	
	TOTAL	225	
GS	1) 0- 300	80	
	2) 301-1075	76	
	3) 1076-1875	73	
	4) 1876- UP	71	
	TOTAL	300	
GSD	1) 0 - 20 kW	31	
	2) 20.1- 50 kW	32	
	3) 50.1-130 kW	52	
	4) 130.1 kW- UP	45	
	TOTAL	160	
LP	1) Less than 800 kW	30	
	2) 800 kW and greater	25	(census)
	TOTAL	55	
LPT	1) Less than 1000 kW	20	
	2) 1000 kW and greater	33	(census)
	TOTAL	53	
RTP	1) All customers	19	(census)
CISR/CSA	1) All customers	1	(census)
SBS	1) All customers	3	(census)
	TOTAL	816	

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 as follows. The definitions for the variables for these formulas are provided in Table 5.

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 and residential load profile shown in this report have been adjusted per this balancing process. Confidence intervals and relative accuracies are based on unadjusted estimates of demand. The average of the estimated peak demand, confidence intervals, and relative accuracies are also based on unadjusted estimates of demand.

TABLE 5

Definitions for Formulas

^

$T_y$  = Estimated Population Hourly kW

^

$T_x$  = Population Monthly kWh

^

R = Ratio Estimator

$W_h$  = Stratum Weight

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

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

^ ^

^

$V(T_y)$  = Estimated Variance of  $T_y$

$n_h$  = Stratum Number of Good Sample Points

$N_h = W_h N_h$  ; N = Population Number of Customers

$S_{yh}$  = Stratum Sample Standard Deviation of kW

$S_{xh}$  = Stratum Sample Standard Deviation of kWh

$r_h$  = Stratum Correlation Coefficient Between kW & kWh

^ ^ ^ ^ ^  
 $S = \sqrt{V(T_y)}$  = Estimated Standard Deviation of  $T_y$

Subscripts

h = Stratum number

v = kW variable

L = Total Number of Strata

x = kWh variable

STUDY RESULTS

Provided on the following tables are the rate class estimated non-coincident and coincident peak kW demands for each month of the year 2006. The relative accuracy and the confidence interval at the 90% confidence level are also provided. Results for rate classes RS, GS, GSD/GSDT/GS-TOU, LP, LPT, SBS, and RTP are included. Provided also on Table 6 are the monthly coincident and non-coincident peak demands, dates and times.



TABLE 6  
2006  
Coincident and Non-Coincident Peak Demand  
Days and Hours

MONTH	Coincident Peak		Non-Coincident Peaks													
			RS	GS		GSD		LP		LPT		RTP		SBS		
JAN	7	0800	7	0800	26	1000	23	1300	23	1300	13	1100	24	1300	2	2000
FEB	13	0700	13	0700	13	1100	13	1100	22	1400	22	1400	8	1100	1	1200
MAR	13	1900	27	0700	21	1400	10	1400	13	1300	13	1500	14	0700	21	1200
APR	20	1700	23	1800	20	1400	25	1400	19	1400	19	1400	21	1000	1	0900
MAY	31	1700	31	1800	30	1600	30	1400	24	1400	31	1400	25	1100	2	2000
JUN	22	1600	11	1600	15	1500	22	1400	22	1200	15	1500	20	2400	17	2400
JUL	28	1600	21	1800	27	1500	28	1500	19	1400	27	1400	6	1100	3	0600
AUG	15	1600	12	1700	15	1500	8	1300	7	1300	28	1500	10	1100	10	1200
SEP	4	1600	4	1700	5	1400	5	1400	5	1200	5	1500	18	1000	1	2300
OCT	2	1600	2	1600	2	1500	3	1500	3	1400	3	1400	3	1700	5	0200
NOV	21	0700	21	0700	21	1000	1	1400	1	1400	15	1200	1	1000	30	2400
DEC	8	0800	8	0700	8	1000	8	1000	13	1400	18	1400	13	1300	18	1200

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GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE RS  
 January 2006 to December 2006

2006	Estimated	90%	Relative	Estimated	90%	Relative
	NonCoincident Peak (KW)	Confidence Interval (KW)		Accuracy %	Coincident Peak (KW)	
JAN	1035188	85574	8.18	1035188	85574	8.18
FEB	1131287	84425	6.98	1131287	84425	6.98
MAR	742730	88152	12.83	662616	59185	8.82
APR	852925	69755	8.10	851429	54343	6.48
MAY	1058150	63538	5.87	1041779	55747	5.25
JUN	1152129	54662	4.68	1105314	53816	4.82
JUL	1185016	51951	4.25	1141759	47088	3.94
AUG	1199463	52734	4.13	1071167	39386	3.53
SEP	1087656	67950	5.91	1057505	60260	5.54
OCT	981642	54697	5.52	951475	53349	5.31
NOV	886356	72384	7.75	886356	72384	7.75
DEC	1143707	91872	7.89	1126861	88466	7.54
AVG				1005228	29946	2.88

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE GS  
 January 2006 to December 2006

2006	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	50658	6453	12.96	43799	4718	10.63
FEB	60195	7354	11.90	42726	4332	9.26
MAR	60593	7102	12.51	30127	2388	7.84
APR	71861	8154	11.57	68356	8091	12.18
MAY	73413	4931	6.71	68424	5038	7.17
JUN	73399	5066	6.81	72913	4819	6.52
JUL	79439	5721	7.10	74736	5924	7.27
AUG	74980	4437	5.69	73435	4803	6.09
SEP	65683	4977	6.96	49947	6967	13.01
OCT	69189	4487	6.53	66060	4472	6.33
NOV	53501	7570	12.99	39913	4429	10.34
DEC	63608	5751	8.83	52950	6457	11.46
AVG				56949	2370	3.97

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE GSD  
 January 2006 to December 2006

2006	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	342220	19850	5.88	269099	20655	7.60
FEB	368528	27198	7.26	287606	24573	7.91
MAR	370524	18571	5.17	302271	15303	5.03
APR	438380	19450	4.46	404065	16862	4.21
MAY	466088	19079	4.04	438281	18693	4.20
JUN	504338	20663	4.07	492224	19015	3.83
JUL	507076	19332	3.78	491101	17860	3.49
AUG	512334	21218	4.11	479872	21062	4.18
SEP	462543	18480	3.90	395951	17224	4.25
OCT	466625	21307	4.41	435135	18770	4.13
NOV	377401	21883	5.67	289126	21594	7.12
DEC	396588	24083	5.98	344372	25115	7.02
AVG				385759	10165	2.56

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE LP  
 January 2006 to December 2006

2006	Estimated NonCoincident			Estimated Coincident		
	Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	74969	4454	6.09	53227	2758	5.15
FEB	80997	3944	4.95	57957	3007	4.95
MAR	82252	3961	4.96	73953	3499	4.70
APR	90751	5616	6.36	81131	4156	5.19
MAY	87018	3766	4.41	82322	3161	3.79
JUN	98136	3022	3.11	95275	2726	2.84
JUL	96884	3957	4.11	89642	2915	3.14
AUG	98531	3337	3.32	95198	2808	2.85
SEP	91482	3867	4.13	78471	3400	4.24
OCT	92993	4970	5.45	84461	3393	3.86
NOV	82637	4810	5.70	60334	2951	4.74
DEC	74890	4524	6.20	63046	4127	6.33
AVG				76251	1884	2.42

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE LPT  
 January 2006 to December 2006

2006	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	151331	2054	1.37	120833	1547	1.28
FEB	169093	1627	0.97	150739	1680	1.10
MAR	149071	1585	1.07	140238	1245	0.89
APR	180314	1787	1.00	167411	2060	1.23
MAY	190905	1416	0.74	182164	1330	0.73
JUN	202896	1574	0.77	199890	1452	0.73
JUL	196795	1633	0.83	188299	1574	0.83
AUG	215687	2685	1.23	210028	2154	1.01
SEP	221785	2689	1.20	191725	1979	1.03
OCT	194276	2858	1.45	188305	3062	1.60
NOV	195382	3213	1.64	157118	2951	1.85
DEC	153447	3507	2.31	139442	2652	1.88
AVG				169683	1328	0.78

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE RTP  
 January 2006 to December 2006

2006	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	86793	0	0.00	67630	0	0.00
FEB	92937	0	0.00	59154	0	0.00
MAR	91994	0	0.00	84739	0	0.00
APR	95310	0	0.00	88359	0	0.00
MAY	97905	0	0.00	77407	0	0.00
JUN	99844	0	0.00	69708	0	0.00
JUL	101564	0	0.00	68648	0	0.00
AUG	95757	0	0.00	69115	0	0.00
SEP	122346	0	0.00	92852	0	0.00
OCT	139042	0	0.00	130991	0	0.00
NOV	127646	0	0.00	101220	0	0.00
DEC	124822	0	0.00	111955	0	0.00
AVG				85148	0	0.00

GULF POWER COMPANY  
 LOAD RESEARCH DATA  
 RATE SCHEDULE SBS  
 January 2006 to December 2006

2006	Estimated NonCoincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %	Estimated Coincident Peak (KW)	90% Confidence Interval (KW)	Relative Accuracy %
JAN	42382	0	0.00	106	0	0.00
FEB	33648	0	0.00	115	0	0.00
MAR	30161	0	0.00	18338	0	0.00
APR	57719	0	0.00	111	0	0.00
MAY	56968	0	0.00	166	0	0.00
JUN	35882	0	0.00	129	0	0.00
JUL	36275	0	0.00	156	0	0.00
AUG	59489	0	0.00	35250	0	0.00
SEP	37891	0	0.00	34437	0	0.00
OCT	31387	0	0.00	119	0	0.00
NOV	51082	0	0.00	7113	0	0.00
DEC	52230	0	0.00	18638	0	0.00
AVG				9557	0	0.00