SDG&E 2004-05 Express Efficiency Lighting Program Time of Use Study

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Final Report

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Introduction

This is the final report for the San Diego Gas & Electric Express Efficiency Lighting Time of Use Study. This study reports on annual operating hours of two general lighting technology groups across ten unique market segments. SDG&E provided the population data and number of sites to be sampled in each market segment. One hundred twenty two sites were metered for this effort. The annual operating hours is estimated using short term metering with data loggers at randomly selected sample points. The primary objective for this study is the short term metering results across each market segment.

Methodology

The study focuses on time of use of two lighting technology groups used in Express Efficiency retrofits: compact fluorescent and T8/T5/Hibay/MetalHalide lighting technologies. The basic approach was to measure operating time of use with data loggers for a three week monitoring period and estimate annual operating hours by extrapolating the monitored data. The results were then compared the results to customer reported operating hours. Seasonal peak period load shapes are also provided.

Before meter installation began, occupants were surveyed to determine lighting technology concentrations, occupant reported operating hours, as well as seasonal variation in occupant use. Data loggers were then installed where feasible for a period of no less than 21 days. Operating hours for each logger were calculated using logger software and spreadsheet tools. Individual data point operating hours were weighted to determine the site level averages. Seasonal variation and holiday schedules were considered when applicable and adjustment factors were used to calculate annual operation. Sample site averages were combined to determine the market segment averages of annual operating hours, weekday peak period annual operating hours, and weekend peak annual operating hours. Similar steps were used to generate the twenty-four hour load profiles.

Data Collection

Data were collected using three logger types Onset Hobo event data loggers, Dent Instruments TOU loggers, and Brand Electronics digital power meters. After all data retrieval was completed, the data were processed through a series of steps:

1. The logger files were downloaded and "trimmed" such that the file contained only information that was applicable to when the logger was installed during the monitoring period, i.e. pre and post installation data was deleted.

2. A quality control check was performed by viewing the data to determine if the data recorded during the monitoring period was valid. If less than three weeks of data were collected or the logger had been tampered with the data were not used. By using the logger analysis tool to review the data, RLW was easily able to perform quality control on the metered data.

3. Average weekend and weekday profiles were generated for each of the logger files using the appropriate software for the logger type.

4. The files were imported into a data logger analysis tool and annualized.

5. Average weekday peak and weekend peak profiles were generated for the periods under consideration.

6. Customer reported usage was gathered from survey responses that asked which specific schedules the lights were on, as well as holiday schedules and seasonal variation. The holiday schedules and seasonal variation were used to annualize the metered data

Terminology:

- **Reported Hours:** Annual operating hours estimated using customer reported schedule, holiday schedule, and seasonal variations in duration.

- **Measured Hours:** Annual operating hours estimated using annualized meter data

- **Program Tracking Hours:** Annual operating hours estimated using program tracking data

Sample

The sample consisted of 122 sites across 10 market segments. The sampled sites were randomly selected from a population of 318 Express Efficiency participant sites. SDG&E provided both the population documentation and the desired sample size for this study. RLW Analytics recruited the participants and performed on-site logger installations.

Bldg Type	Sample	Population
All Others	20	64
Grocery	10	19
Health Care/Hospital	3	5
Hotel/Motel	12	84
Office	20	45
Process Industrial	4	4
Restaurant	1	4
Retail	30	46
School	15	40
Warehouse	7	7
Overall	**122**	**318**

Table 1: Population and Sample

A total of 281 meters were used to measure operating hours of compact fluorescent technologies and 431 meters were used to measure T8/T5/Hibay Metal Halide technologies.

Meter Distribution Across Lighting Technologies				
Bldg Type	**# Sites**	**CFL Meters**	**# Sites**	**T8/T5/HiBay/Metal Halide Meters**
Overall	62	281	78	431
All Others	16	62	5	27
Grocery	1	2	10	51
Health Care/Hospital	1	2	2	5
Hotel/Motel	12	105	2	11
Office	9	20	14	104
Process Industrial	0	0	4	23
Restaurant	1	2	1	1
Retail	16	49	19	70
School	5	37	15	114
Warehouse	1	2	6	25

Table 2: Summary of the Meter Distribution Across Lighting Technologies For Each Market Segment

Results

The measured annual hours were compared to the reported annual hours for compact fluorescent and T8/T5/HiBay/MetalHalide lighting technology groups. Sixty-two of the sites in our sample had compact fluorescent technologies and seventy-eight had T8/T5/HiBay/MetalHalide. Tables 3 & 4 provide annual averages for each of the lighting technology types across all market segments in the study and both lighting technologies. The measured average annual operating hours for each technology is 3,878 Hrs for CFLs and 4,075 Hrs for T8/T5/Hi Bay/ Metal Halide. The average ratio of measured to reported hours is 104% for CFLs and 96% for T8/T5/Hi Bay/ Metal Halide. The average ratio of measured to program tracking hours is 63% for CFLs and 69% for T8/T5/HiBay/MetalHalide.

| | Compact Fluorescent Lighting Technologies | | | | | | | | | |
	Overall	All Other	Grocery	Health Care	Hotel	Office	Restaurant	Retail	School	Warehouse
# Sites	**62**	16	1	1	12	9	1	16	5	1
Program Tracking Average Hours	**6,191**	6,193	6,102	6,102	6,283	6,223	6,102	6,146	6,464	6,102
Average Reported Hours	**3,723**	3,841	5,807	2,550	n/a	3,625	4,368	5,283	2,235	2,072
Average Measured Hours	**3,878**	2,633	6,538	3,265	2,692	4,813	4,397	4,851	1,950	3,761
Ratio of Measured to Reported Hours	**104%**	69%	113%	128%	n/a	133%	101%	92%	87%	182%
Ratio of Measured to Program Tracking Hours	**63%**	43%	107%	54%	43%	77%	72%	79%	30%	62%

Table 3: Summary of Results by Building Type for CFL Technologies

| | T8/T5/HiBay/MetalHalide Lighting Technologies | | | | | | | | | | |
	Overall	All Others	Grocery	Health Care	Hotel	Office	Process	Restaurant	Retail	School	Warehouse
# Sites	**78**	5	10	2	2	14	4	1	19	15	6
Program Tracking Average Hours	**5,698**	5,628	5,813	5,805	5,822	5,617	5,734	5,818	5,541	5,708	5,495
Average Reported Hours	**4,075**	3,575	6,287	2,204	n/a	3,588	6,135	4,368	5,319	1,964	3,233
Average Measured Hours	**3,925**	3,667	6,390	2,689	2,307	3,792	5,512	4,450	5,435	1,795	3,211
Ratio of Measured to Reported Hours	**96%**	103%	102%	122%	n/a	106%	90%	102%	102%	91%	99%
Ratio of Measured to Program Tracking Hours	**69%**	65%	110%	46%	40%	68%	96%	76%	98%	31%	58%

Table 4: Summary of Results by Building Type Of T8/T5/HiBay/Metal Halide Technologies

Seasonal Weekday Peak Period Hours: Weekday peak periods differ by summer and winter seasons. The summer period is May1-Sept 30 and the winter period Oct1-April 30. Summer peak period hours are from 11:00 AM to 6:00 PM and winter peak period hours are from 5:00 PM to 8:00 PM. The measured data collected for each of the market segments shows the measured summer average weekday peak period operating hours to be 487 hours for CFL technologies and 510 hours for T8/T5/Hi Bay/Metal Halide technologies. The measured winter average weekday peak period operating hours are 259 hours for CFL technologies and 236 hours for T8/T5/Hi Bay/Metal Halide technologies.

CFL Summer Weekday Peak Hours (11-6pm)				CFL Winter Weekday Peak Hours (5-8pm)			
	Avg Measured Hrs	Potential Summer Peak Hours	%Potential Peak		Avg Measured Hrs	Potential Winter Peak Hours	%Potential Peak
Overall	**487**	770	63%	**Overall**	**259**	450	58%
All Others	256	770	33%	All Others	168	450	37%
Grocery	575	770	75%	Grocery	336	450	75%
Health Care	768	770	99.8%	Health Care	337	450	75%
Hotel/Motel	235	770	31%	Hotel/Motel	139	450	31%
Office	501	770	65%	Office	263	450	58%
Restaurant	745	770	97%	Restaurant	432	450	96%
Retail	614	770	80%	Retail	304	450	68%
School	274	770	36%	School	174	450	39%
Warehouse	418	770	54%	Warehouse	180	450	40%

Table 5: Summary of Average Summer And Winter Weekday Peak Hours For CFL Technologies By Market Segment

T8/T5/HiBay/Metal Halide Summer Wkday Peak Hrs (11-6pm)				T8/T5/HiBay/Metal Halide Winter Wkday Peak Hrs (5-8pm)			
	Avg Measured Hrs	Potential Summer Peak Hours	%Potential Peak		Avg Measured Hrs	Potential Winter Peak Hours	%Potential Peak
Overall	**510**	770	66%	**Overall**	**236**	450	53%
All Others	637	770	83%	All Others	176	450	39%
Grocery	689	770	89%	Grocery	387	450	86%
Health Care	618	770	80%	Health Care	235	450	52%
Hotel/Motel	222	770	29%	Hotel/Motel	140	450	31%
Office	601	770	78%	Office	230	450	51%
Process	626	770	81%	Process	271	450	60%
Restaurant	744	770	97%	Restaurant	432	450	96%
Retail	680	770	88%	Retail	387	450	86%
School	284	770	37%	School	105	450	23%
Warehouse	0	770	0%	Warehouse	0	450	0%

Table 6: Summary of Average Summer and Winter Weekday Peak Hours For T8/T5/Hibay/Metal Halide Technologies By Market Segment

Figures

The following figures 1-4 illustrate the seasonal weekday peak period load profiles for each market segment.

Figure 1 illustrates the summer weekday 11-6pm peak period percent of hour on for Compact fluorescent technologies.

Figure 1: CFL Summer Weekday Peak Period Percent On

Figure 2 illustrates the winter weekday 5-8pm peak period percent of hour on for Compact fluorescent technologies.
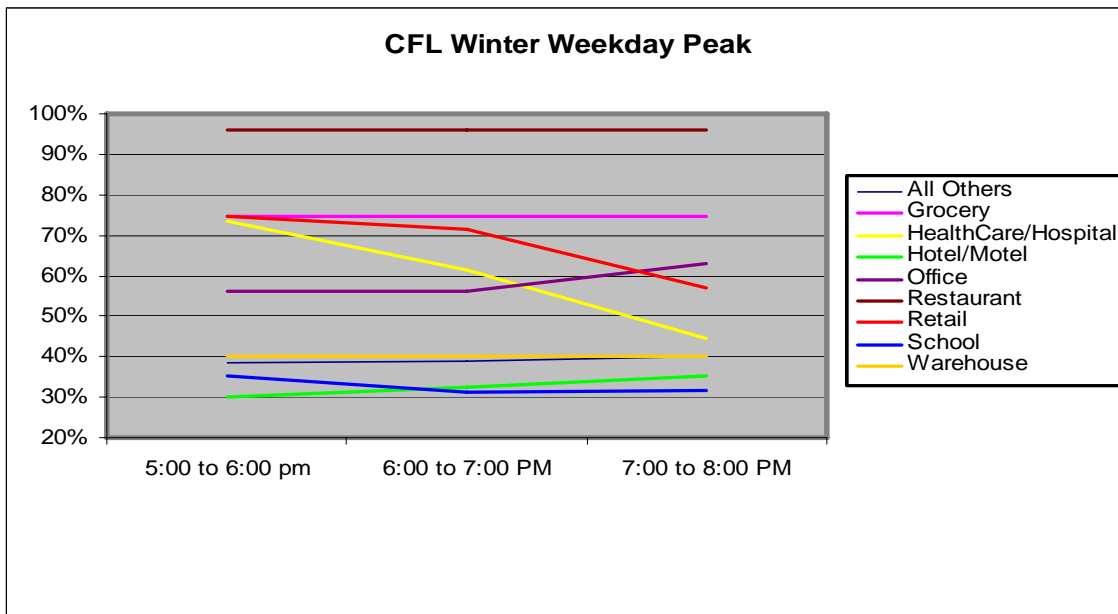
Figure 2: CFL Winter Weekday Peak Period Percent On

Figure 3 illustrates the summer weekday 11-6pm peak period percent of hour on for T8/T5/Hi Bay/Metal Halide technologies.

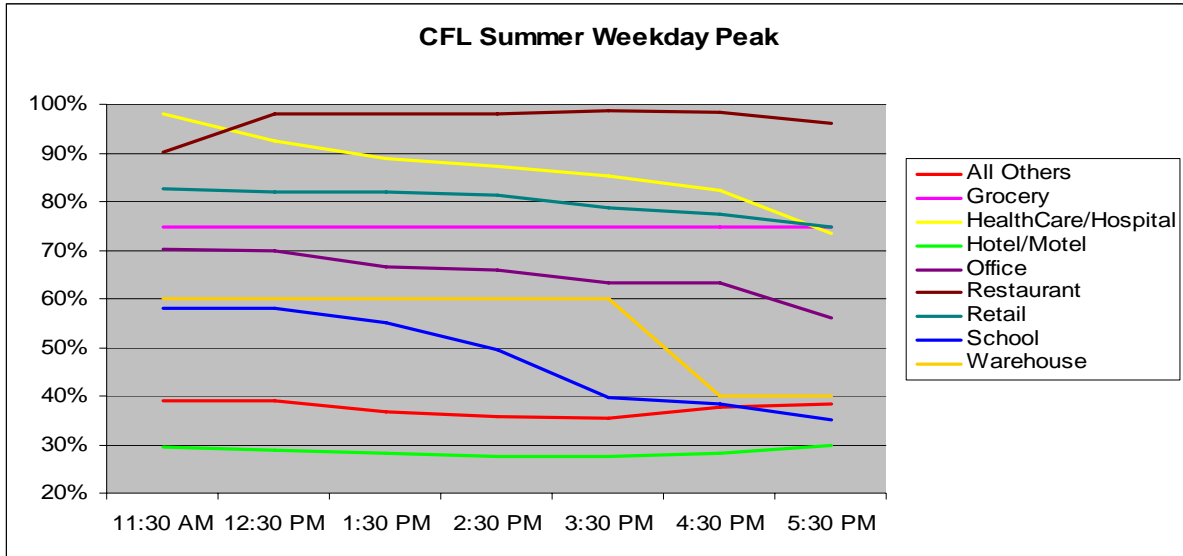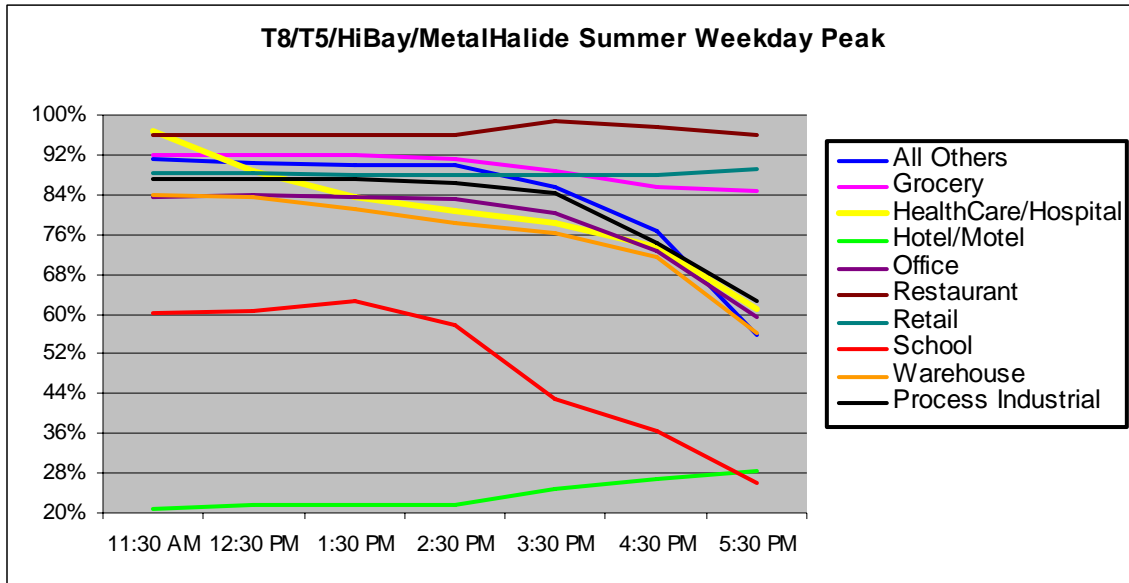**Figure 3: T8/T5/HiBay/Metal Halide Summer Weekday Peak Period Percent On**

Figure 4 illustrates the winter weekday 5-8pm peak period percent of hour on for T8/T5/Hi Bay/Metal Halide technologies.
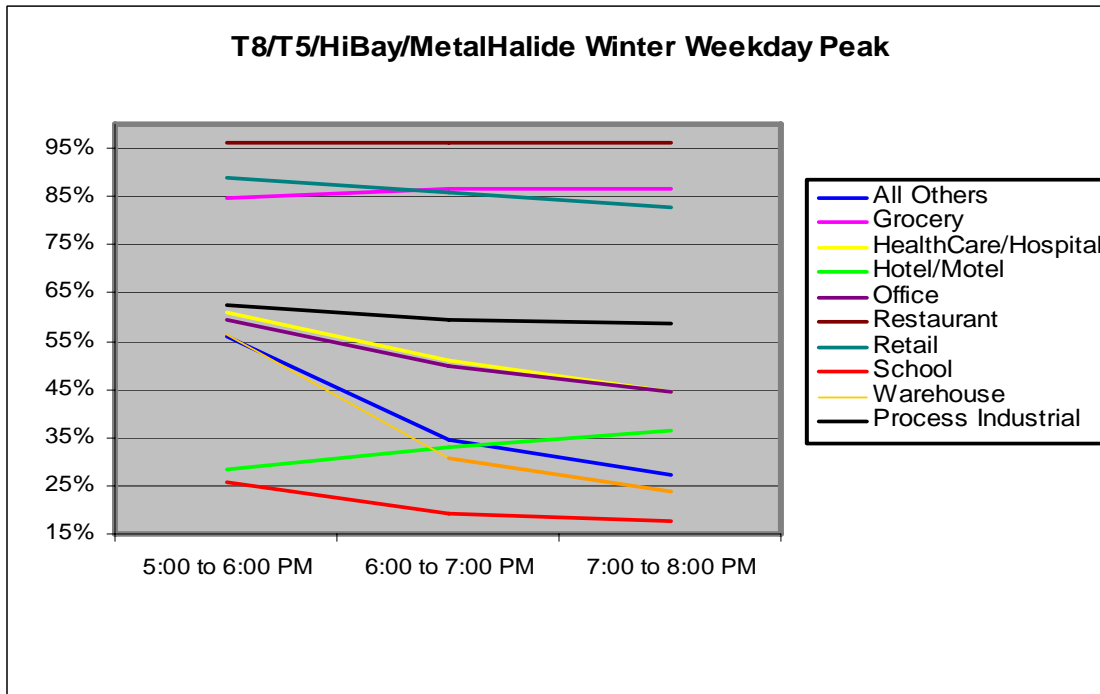
Figure 4: T8/T5/HiBay/MetalHalide Winter Weekday Peak Period Percent On

The following figures 5-8 represent the annual weekday and weekend 24 hour load profiles for each market segment

Figure 5 illustrates the measured weekday annual 24 Hour load shape for CFL technologies.
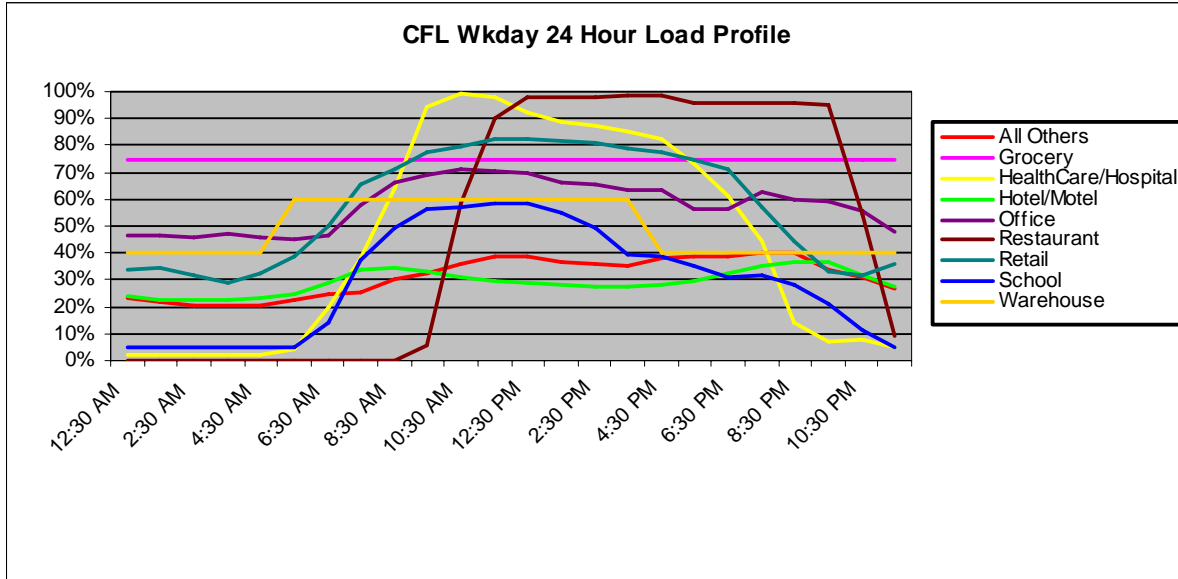
Figure 5: CFL Average Weekday Annual 24 Hr Load Shape

Figure 6 illustrates the CFL measured weekend annual 24 Hour load shape for compact fluorescent technologies.
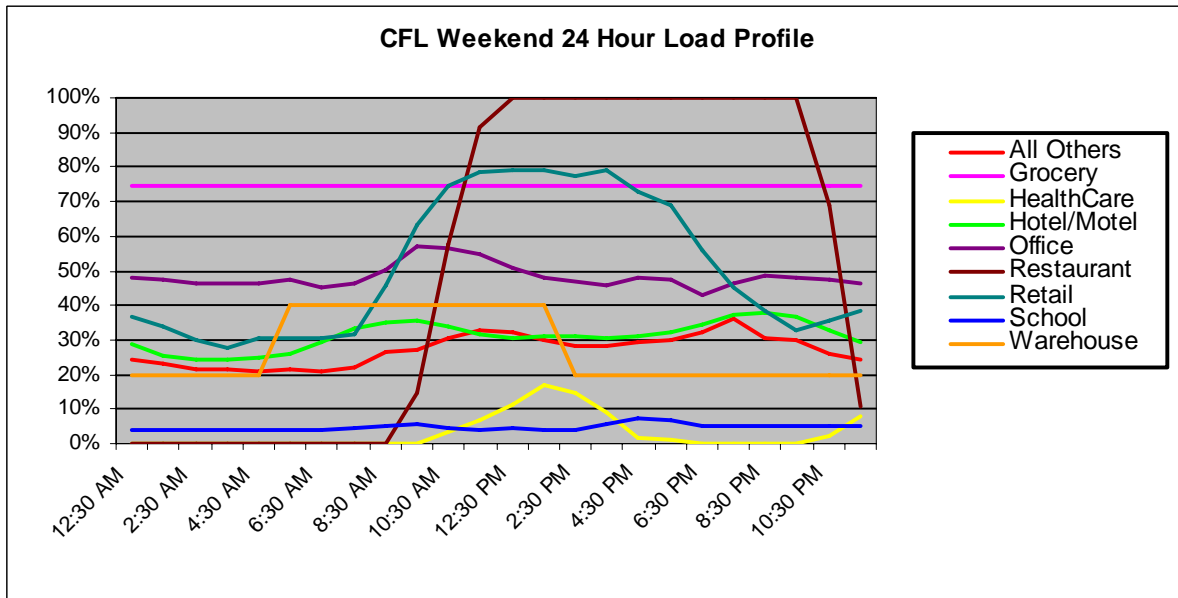
Figure 6: CFL Avg Weekend Annual 24 Hr Load Shape

Figure 7 illustrates the measured weekday annual 24 Hour load shape for T8/T5/Hi Bay/ Metal Halide technologies.
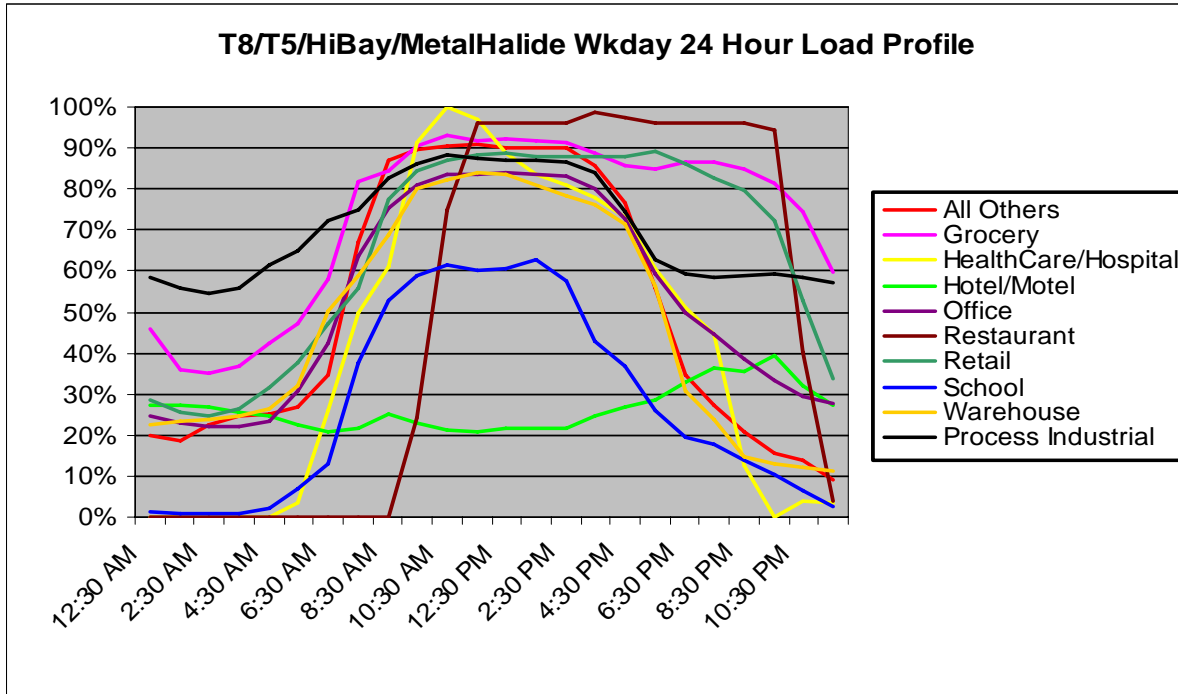
Figure 7: T8/T5/Hi Bay/Metal Halide measured Avg Weekday Annual 24 Hr Load Shape

Figure 8 illustrates the measured weekend annual 24 Hour load shape for T8/T5/Hi Bay/ MetalHalide technologies.

Figure 8: T8/T5/Hi Bay/Metal Halide Measured Avg WkEnd Annual 24 Hr Load Shape

Results Tables

The following tables represent the comparison of measured, reported, and tracking annual hours for all sites.

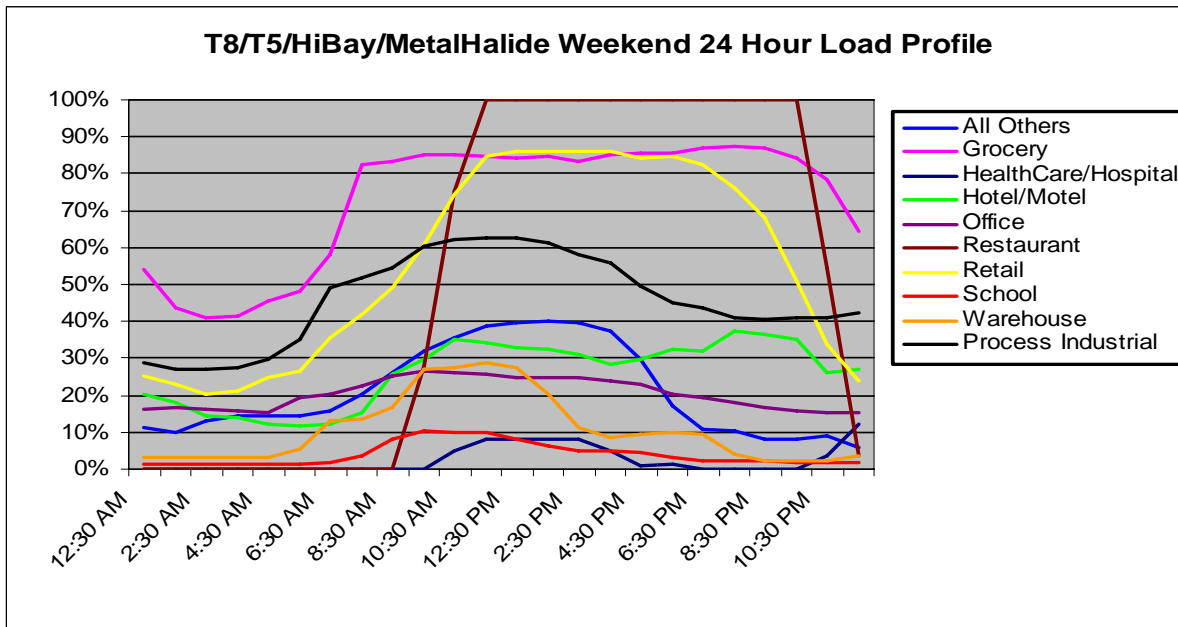| CFL Technologies Annual Hours						
Market Segment	Site ID	Measured Annual Hours	Reported Annual Hours	Tracking Annual Hours	Ratio of Measured to Reported Hours	Ratio of Measured to Program Tracking Hours
All Others	D41634	5,678	6,188	6,102	92%	93%
All Others	D41928	3,325	4,108	6,102	81%	54%
All Others	D42060	541	DK	6,102	n/a	9%
All Others	D42520	4,516	4,380	6,102	103%	74%
All Others	D42897	2,339	2,040	6,102	115%	38%
All Others	D42977	1,686	1,000	6,102	169%	28%
All Others	D43114	259	DK	6,102	n/a	4%
All Others	D43272	180	208	6,102	86%	3%
All Others	D43277	1,227	DK	6,102	n/a	20%
All Others	D43278	641	3,511	6,102	18%	10%
All Others	D43279	3,117	4,344	6,102	72%	51%
All Others	D43285	3,891	4,004	6,102	97%	64%
All Others	D50003	4,340	8,760	6,465	50%	67%
All Others	D50004	3,584	4,874	6,464	74%	55%
All Others	D50007	2,651	2,916	6,465	91%	41%
All Others	D50012	4,150	3,600	6,465	115%	64%
Overall All Others		**2,633**	**3,841**	**6,193**	**69%**	**43%**
Overall Grocery	D41641	**6,538**	**5,807**	**6,102**	**113%**	**107%**
Overall HealthCare	D42985	**3,265**	**2,550**	**6,102**	**128%**	**54%**
Hotel/Motel	D41720	1,193	n/a	6,283	n/a	19%
Hotel/Motel	D41739	678	n/a	6,283	n/a	11%
Hotel/Motel	D42296	856	n/a	6,283	n/a	14%
Hotel/Motel	D42394	1,122	n/a	6,283	n/a	18%
Hotel/Motel	D42434	937	n/a	6,283	n/a	15%
Hotel/Motel	D42556	1,738	n/a	6,283	n/a	28%
Hotel/Motel	D42489	3,585	n/a	6,283	n/a	57%
Hotel/Motel	D42719	1,544	n/a	6,283	n/a	25%
Hotel/Motel	D42945	8,760	n/a	6,283	n/a	139%
Hotel/Motel	D43012	593	n/a	6,283	n/a	9%
Hotel/Motel	D50028	8,188	n/a	6,283	n/a	130%
Hotel/Motel	D41916	3,108	n/a	6,283	n/a	49%
Overall Hotel/Motel		**2,692**	**n/a**	**6,283**	**n/a**	**43%**

CFL technologies continued:

CFL Technologies Annual Hours						
Market Segment	Site ID	Measured Annual Hours	Reported Annual Hours	Tracking Annual Hours	Ratio of Measured to Reported Hours	Ratio of Measured to Program Tracking Hours
Office	D41947	6,064	2,432	6,102	249%	99%
Office	D42059	1,962	2,268	6,102	86%	32%
Office	D42631	740	1,508	6,103	49%	12%
Office	D43170	8,760	8,760	6,102	100%	144%
Office	D43259	5,728	2,151	6,102	266%	94%
Office	D43269	6,524	2,268	6,102	288%	107%
Office	D50001	1,210	1,460	6,466	83%	19%
Office	D50023	8,760	8,760	6,465	100%	135%
Office	D50246	3,574	3,020	6,465	118%	55%
Overall Office		**4,813**	**3,625**	**6,223**	**133%**	**77%**
Overall Restaurant		**4,397**	**4,368**	**6,102**	**101%**	**72%**
Retail	D41023	1,362	2,056	6,102	66%	22%
Retail	D41548	4,516	8,760	6,090	52%	74%
Retail	D41549	3,981	8,714	6,092	46%	65%
Retail	D41550	8,760	8,760	6,100	100%	144%
Retail	D41694	6,143	6,057	6,102	101%	101%
Retail	D41701	7,778	4,376	6,102	178%	127%
Retail	D41705	3,357	3,892	6,102	86%	55%
Retail	D41771	3,512	4,376	6,102	80%	58%
Retail	D41775	4,820	4,424	6,102	109%	79%
Retail	D41777	4,832	5,054	6,102	96%	79%
Retail	D41778	4,577	4,436	6,102	103%	75%
Retail	D41780	3,848	3,996	6,102	96%	63%
Retail	D42890	5,847	5,102	6,102	115%	96%
Retail	D43113	3,526	3,172	6,102	111%	58%
Retail	D50000	1,996	2,589	6,465	77%	31%
Retail	D50023	8,760	8,760	6,464	100%	136%
Overall Retail		**4,851**	**5,283**	**6,146**	**92%**	**79%**
School	D50010	2,010	2,280	6,464	88%	31%
School	D50011	3,110	1,890	6,464	165%	48%
School	D50070	1,282	1,935	6,464	66%	20%
School	D50131	570	1,935	6,464	29%	9%
School	D50154	2,780	3,135	6,462	89%	43%
Overall School		**1,950**	**2,235**	**6,464**	**87%**	**30%**
Overall Warehouse	D42727	**3,761**	**2,072**	**6,102**	**182%**	**62%**

T8/T5/HiBay/MetalHalide Technologies Annual Hours						
Market Segment	Site ID	Measured Annual Hours	Reported Annual Hours	Tracking Annual Hours	Ratio of Measured to Reported Hours	Ratio of Measured to Program Tracking Hours
All Other	D42527	4,922	4,832	5,378	102%	92%
All Other	D42764	3,933	3,389	5,578	116%	71%
All Other	D42882	3,959	3,006	5,818	132%	68%
All Other	D50012	2,746	3,600	5,684	76%	48%
All Other	D50127	2,777	3,048	5,684	91%	49%
Overall All Other		**3,667**	**3,575**	**5,628**	**103%**	**65%**
Grocery	D41020	5,847	6,067	5,818	96%	101%
Grocery	D41021	7,186	5,445	5,818	132%	124%
Grocery	D41022	8,760	8,760	5,818	100%	151%
Grocery	D41024	6,451	5,807	5,818	111%	111%
Grocery	D41025	6,373	5,989	5,818	106%	110%
Grocery	D41028	5,897	5,808	5,818	102%	101%
Grocery	D41081	8,760	8,760	5,818	100%	151%
Grocery	D41641	6,093	5,807	5,818	105%	105%
Grocery	D50072	2,561	4,238	5,791	60%	44%
Grocery	D50208	5,971	6,188	5,791	96%	103%
Overall Grocery		**6,390**	**6,287**	**5,813**	**102%**	**110%**
HealthCare	D43287	1,719	1,372	5,818	125%	30%
HealthCare	D50037	3,659	3,036	5,791	121%	63%
Overall Healthcare		**2,689**	**2,204**	**5,805**	**122%**	**46%**
Hotel/Motel	D42945	2,756	n/a	5,822	n/a	47%
Hotel/Motel	D41720	1,857	n/a	5,822	n/a	32%
Overall Hotel/Motel		**2,307**	**n/a**	**5,822**	**n/a**	**40%**
Office	D41877	4,078	5,652	6,071	72%	67%
Office	D41976	3,445	3,340	5,818	103%	59%
Office	D42521	4,813	6,240	5,827	77%	83%
Office	D43020	3,023	2,286	5,378	132%	56%
Office	D43022	2,201	3,940	5,697	56%	39%
Office	D43208	3,374	3,024	5,818	112%	58%
Office	D43269	3,932	2,268	5,378	173%	73%
Office	D50022	6,894	3,224	5,791	214%	119%
Office	D50023	8,060	4,208	4,661	192%	173%
Office	D50125	2,801	4,393	5,791	64%	48%
Office	D50152	2,779	3,528	5,791	79%	48%
Office	D50158	2,042	2,268	5,821	90%	35%
Office	D50246	2,777	3,020	5,364	92%	52%
Office	D50247	2,868	2,843	5,436	101%	53%
Overall Office		**3,792**	**3,588**	**5,617**	**106%**	**68%**

T8/T5/HiBay/MetalHalide Technologies continued:

Market Segment	Site ID	Measured Annual Hours	Reported Annual Hours	Tracking Annual Hours	Ratio of Measured to Reported Hours	Ratio of Measured to Program Tracking Hours
T8/T5/HiBay/MetalHalide Technologies Annual Hours						
Process Industrial	D42500	3,339	2,736	5,946	122%	56%
Process Industrial	D50116	6,300	8,760	5,578	72%	113%
Process Industrial	D50151	6,816	8,760	5,791	78%	118%
Process Industrial	D50270	5,593	4,284	5,621	131%	100%
Overall Process Industrial		**5,512**	**6,135**	**5,734**	**90%**	**96%**
Overall Restaurant	D42888	**4,450**	**4,368**	**5,818**	**102%**	**76%**
Retail	D41201	5,930	5,636	5,578	105%	106%
Retail	D41462	5,264	4,024	5,446	131%	97%
Retail	D41548	7,546	8,760	5,411	86%	139%
Retail	D41549	5,527	8,714	5,411	63%	102%
Retail	D41550	8,760	8,760	5,445	100%	161%
Retail	D41849	4,846	4,643	5,578	104%	87%
Retail	D41851	5,795	6,227	5,578	93%	104%
Retail	D41852	5,744	5,726	5,578	100%	103%
Retail	D41855	5,198	5,726	5,578	91%	93%
Retail	D41856	5,736	4,690	5,578	122%	103%
Retail	D41887	5,000	3,139	5,698	159%	88%
Retail	D42199	3,598	3,024	5,698	119%	63%
Retail	D42603	6,882	5,460	5,578	126%	123%
Retail	D42809	7,383	7,326	5,698	101%	130%
Retail	D42866	4,977	4,433	5,578	112%	89%
Retail	D42875	3,377	3,600	5,818	94%	58%
Retail	D42997	4,692	4,433	5,578	106%	84%
Retail	D50023	4,651	4,225	4,661	110%	100%
Retail	D50117	2,370	2,520	5,791	94%	41%
Overall Retail		**5,435**	**5,319**	**5,541**	**102%**	**98%**

T8/T5/HiBay/MetalHalide Technologies continued:

						Ratio of

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<table>
<tr><td colspan="7">T8/T5/HiBay/MetalHalide Technologies Annual Hours</td></tr>
<tr>
<td rowspan="2">Market Segment</td>
<td rowspan="2">Site ID</td>
<td rowspan="2">Measured Annual Hours</td>
<td rowspan="2">Reported Annual Hours</td>
<td rowspan="2">Tracking Annual Hours</td>
<td>Ratio of Measured to Reported Hours</td>
<td>Ratio of Measured to Program Tracking Hours</td>
</tr>
<tr></tr>
<tr><td>School</td><td>D43079</td><td>1,795</td><td>1,710</td><td>5,818</td><td>105%</td><td>31%</td></tr>
<tr><td>School</td><td>D43083</td><td>1,098</td><td>1,710</td><td>5,818</td><td>64%</td><td>19%</td></tr>
<tr><td>School</td><td>D43085</td><td>1,785</td><td>1,935</td><td>5,818</td><td>92%</td><td>31%</td></tr>
<tr><td>School</td><td>D43086</td><td>1,958</td><td>1,935</td><td>5,818</td><td>101%</td><td>34%</td></tr>
<tr><td>School</td><td>D43087</td><td>1,204</td><td>1,935</td><td>5,818</td><td>62%</td><td>21%</td></tr>
<tr><td>School</td><td>D43090</td><td>1,883</td><td>1,935</td><td>5,818</td><td>97%</td><td>32%</td></tr>
<tr><td>School</td><td>D43095</td><td>2,328</td><td>1,710</td><td>5,818</td><td>136%</td><td>40%</td></tr>
<tr><td>School</td><td>D43097</td><td>722</td><td>1,710</td><td>5,819</td><td>42%</td><td>12%</td></tr>
<tr><td>School</td><td>D43098</td><td>2,075</td><td>1,710</td><td>5,818</td><td>121%</td><td>36%</td></tr>
<tr><td>School</td><td>D50010</td><td>2,674</td><td>2,280</td><td>5,354</td><td>117%</td><td>50%</td></tr>
<tr><td>School</td><td>D50011</td><td>2,547</td><td>1,890</td><td>5,813</td><td>135%</td><td>44%</td></tr>
<tr><td>School</td><td>D50070</td><td>2,266</td><td>1,935</td><td>5,436</td><td>117%</td><td>42%</td></tr>
<tr><td>School</td><td>D50131</td><td>1,688</td><td>1,935</td><td>5,434</td><td>87%</td><td>31%</td></tr>
<tr><td>School</td><td>D50154</td><td>1,669</td><td>3,135</td><td>5,436</td><td>53%</td><td>31%</td></tr>
<tr><td>School</td><td>D50157</td><td>1,232</td><td>2,000</td><td>5,791</td><td>62%</td><td>21%</td></tr>
<tr><td>Overall School</td><td></td><td>1,795</td><td>1,964</td><td>5,708</td><td>91%</td><td>31%</td></tr>
<tr><td>Warehouse</td><td>D41887</td><td>4,842</td><td>5,852</td><td>5,698</td><td>83%</td><td>85%</td></tr>
<tr><td>Warehouse</td><td>D43056</td><td>4,040</td><td>2,540</td><td>5,578</td><td>159%</td><td>72%</td></tr>
<tr><td>Warehouse</td><td>D43288</td><td>2,116</td><td>2,286</td><td>5,698</td><td>93%</td><td>37%</td></tr>
<tr><td>Warehouse</td><td>D50019</td><td>2,072</td><td>2,110</td><td>4,522</td><td>98%</td><td>46%</td></tr>
<tr><td>Warehouse</td><td>D50095</td><td>2,887</td><td>2,304</td><td>5,791</td><td>125%</td><td>50%</td></tr>
<tr><td>Warehouse</td><td>D50202</td><td>3,311</td><td>4,308</td><td>5,684</td><td>77%</td><td>58%</td></tr>
<tr><td>Overall Warehouse</td><td></td><td>3,211</td><td>3,233</td><td>5,495</td><td>99%</td><td>58%</td></tr>
</table>

Appendix A– Hotel/Motel Market Segment stand alone report

Introduction

This is the Hotel/Motel market segment report for the San Diego Gas & Electric Express Efficiency Lighting Program Time of Use Study. This effort reports on annual operating hours of two general lighting technology groups. Twelve Hotel/Motel program participants were sampled from a program population of 84 Hotel/Motels. SDG&E provided the retrofit population and number of sites to be sampled in each market segment. The annual operating hours are calculated using short term metering data loggers at randomly selected sample points. This report will focus on the Hotel/Motel market segment comprised of twelve randomly selected sites.

Methodology Overview

The metering study was performed through primary data collection, and processing and analysis of the collected data. Our sample consisted of 12 Hotel/Motels that were randomly selected from the population of   that was provided by SDG&E. RLW Analytics recruited the participants via telephone and performed on-site logger installations. Before meter installation began occupants were surveyed to determine lighting technology concentrations as well as variation in occupant use. Data loggers were then installed where feasible for a period of 21 days or longer. Operating hours for each logger were calculated using logger software. Seasonal variation and holiday schedules were considered when applicable to generate annual estimates of operating hours. Individual data point operating hours were averaged together to determine the site averages. Sampled site averages were combined to determine the market segment average for annual operating hours. The same steps were used to generate the twenty-four hour load profiles.

Data Processing

Data were collected using three logger types Onset Hobo event data loggers, Dent Instruments TOU loggers, and Brand Electronics digital power meters (a pass-through plug in meter). After all data retrieval was completed, the data were processed through a series of steps:

1. The logger files were downloaded and "trimmed" such that the file contained only information that was applicable to when the logger was installed during the monitoring period, i.e. pre and post installation data was deleted.

2. A quality control check was performed by viewing the data to determine if the data recorded during the monitoring period was valid. If less than three weeks of data were collected or the logger had been tampered with the data were not used. By using the logger analysis

tool to review the data, RLW was easily able to perform quality control on the metered data.

3. Average weekend and weekday profiles were generated for each of the logger files using the appropriate software for the logger type.

4. The files were imported into a data logger analysis tool and annualized.

5. Average weekday peak and weekend peak profiles were generated for the periods under consideration.

6. Customer reported usage was gathered from survey responses that asked which specific schedules the lights were on, as well as holiday schedules and seasonal variation. These same holiday schedules and seasonal variation were used to annualize to the metered data

Results

There were twelve Hotel/Motel sites in the sample. Ten of the sites in our sample had compact fluorescent technologies exclusively. Our analysis of the data collected for each of the lighting technology types shows the measured average annual operating hours for each technology to be 2,692 hours for CFLs and 2,307 hours for T8/T5/Hi Bay/ Metal Halide. Of the twelve sites in our sample, only two had both technologies in use. The ratio of measured to program tracking hours is 43% for CFLs and 40% for T8/T5/Hi Bay/ Metal Halide.

Building Type	Lighting Type	Measured Avg Run Hours	Program Tracking Gross Avg Run Hours	Ratio of Measured Hours to Program Tracking
Hotel/Motel	CFL	2,692	6,283	43%
Hotel/Motel	T8/T5/Hi Bay/Metal Halide	2,307	5,822	40%

Table 1 measured average annual hours vs. program tracking average annual hours

Measured run time for CFL technologies is broken out by functional use area. The two functional use areas in this market segment are guest rooms and common areas. Common areas include hallways, lobbies, and hotel support areas. The average measured run time for common areas is considerably higher then guest rooms. Of the common areas measured two sites had CFL technologies operating on a 24/7 schedule, yielding longer hours.

	Compact Fluorescent Technology	
	Measured Hours Guest Rooms	Measured Hours Common Areas
Overall Avg	**1,414**	**8,569**
D42489	2,553	8,760
D42945		8,760
D50028		8,188
D42556	1,737	
D42719	1,544	
D42434	593	
D41916	3,108	
D41720	1,193	
D41739	678	
D42296	856	
D42394	937	
D42434	937	

Table 2: Measured Hours By Functional Use Area

For Each Site.

T8/T5/Metal Halide/HiBay Technologies	
	Measured Hours
Overall Avg	**2,307**
D42945	2,756
D41720	1,857

Table 3: Measured Hours By Site.

Meter Distribution Across Lighting Technologies				
RLW ID	**Building Type**	**CFL Meters**	**T8/T5/Metal Halide/HiBay Meters**	**Total Meters Installed**
D50028	Hotel/Motel	**8**	0	8
D41739	Hotel/Motel	**9**	0	9
D41720	Hotel/Motel	**9**	**3**	12
D41916	Hotel/Motel	**15**	0	15
D42394	Hotel/Motel	**11**	0	11
D42434	Hotel/Motel	**5**	0	5
D42296	Hotel/Motel	**6**	0	6
D42719	Hotel/Motel	**11**	0	11
D42556	Hotel/Motel	**9**	0	9
D42489	Hotel/Motel	**8**	0	8
D42945	Hotel/Motel	**1**	**8**	9
D43012	Hotel/Motel	**13**	0	13
				116

Table 4: Meter Distribution Across Lighting Technology Types By Site

Figure 1 illustrates CFL annual operating hours by sampled site. D42945 had the highest operating hours 8760 and D43012 had the lowest operating hours 593
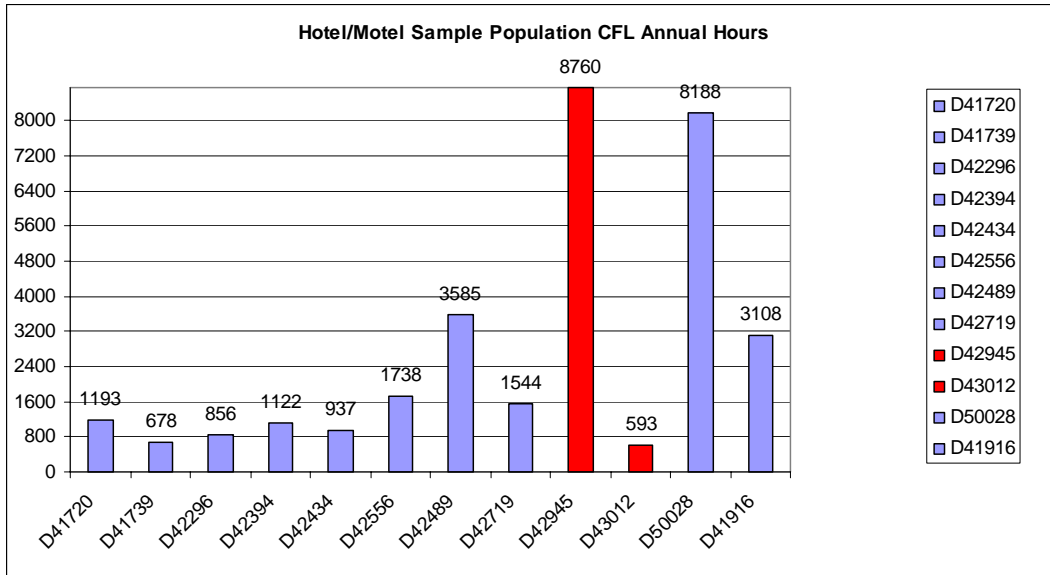

Figure 1: CFL Annual Hours Across The Sample Population

Figure 2 illustrates T8/T5/Hi Bay/ Metal Halide annual operating hours by sampled site.
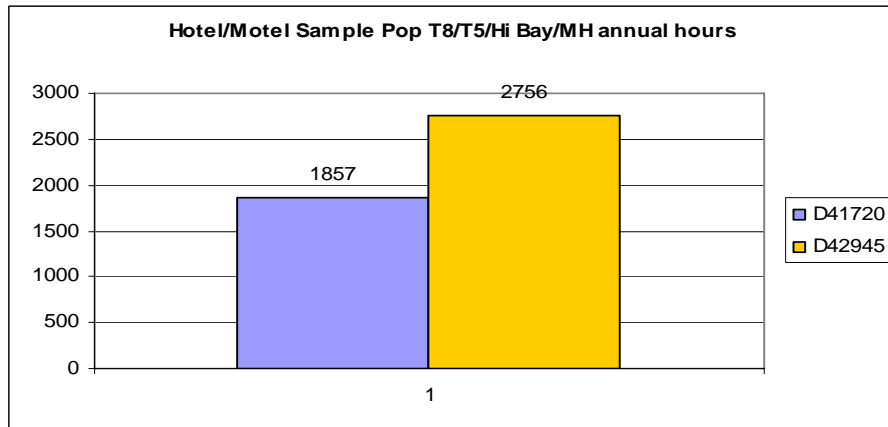

Figure 2: T8/T5/HiBay/Metal Halide Annual Hours Across The Sample Population

Seasonal Weekday Peak Period Hours: Weekday peak periods differ by summer and winter seasons. The summer period is May1-Sept 30 and the winter period Oct1-April 30. Summer peak period hours are from 11:00 AM to 6:00 PM and winter peak period hours are from 5:00 PM to 8:00 PM. The measured data collected for each of the lighting technology types shows the measured summer average weekday peak period operating hours to be 235 hours for CFL technologies and 222 hours for T8/T5/Hi Bay/Metal Halide technologies. The measured winter average weekday peak period operating hours are 284 hours for CFL technologies and 264 hours for T8/T5/Hi Bay/Metal Halide technologies.

CFL Summer Weekday Peak Hours (11-6pm)				CFL Winter Weekday Peak Hours (5-8pm)			
Site #	Avg Measured Hrs	Potential Summer Peak Hours	%Potential Peak	Site #	Avg Measured Hrs	Potential Winter Peak Hours	%Potential Peak
Overall	235	770	31%	Overall	139	450	31%
D41720	95	770	12%	D41720	80	450	18%
D41739	43	770	6%	D41739	39	450	9%
D42296	34	770	4%	D42296	20	450	5%
D42394	125	770	16%	D42394	69	450	15%
D42434	55	770	7%	D42434	71	450	16%
D42556	126	770	16%	D42556	124	450	28%
D42489	241	770	31%	D42489	143	450	32%
D42719	128	770	17%	D42719	66	450	15%
D42945	770	770	100%	D42945	450	450	100%
D43012	61	770	8%	D43012	7	450	2%
D50028	770	770	100%	D50028	450	450	100%
D41916	377	770	49%	D41916	146	450	32%
T8/T5/Metal Halide/HiBay Summer Weekday Peak Hrs				**T8/T5/Metal Halide/HiBay Winter Weekday Peak Hrs**			
Overall	222	770	29%	Overall	140	450	31%
D41720	109	770	14%	D41720	135	450	30%
D42945	334	770	43%	D42945	146	450	32%

The following figures 3-6 illustrate the seasonal weekday and weekend peak period load profiles for each lighting technology.

Figure 3 illustrates the summer weekday 11-6pm peak period percent of hour on for Compact fluorescent technologies.
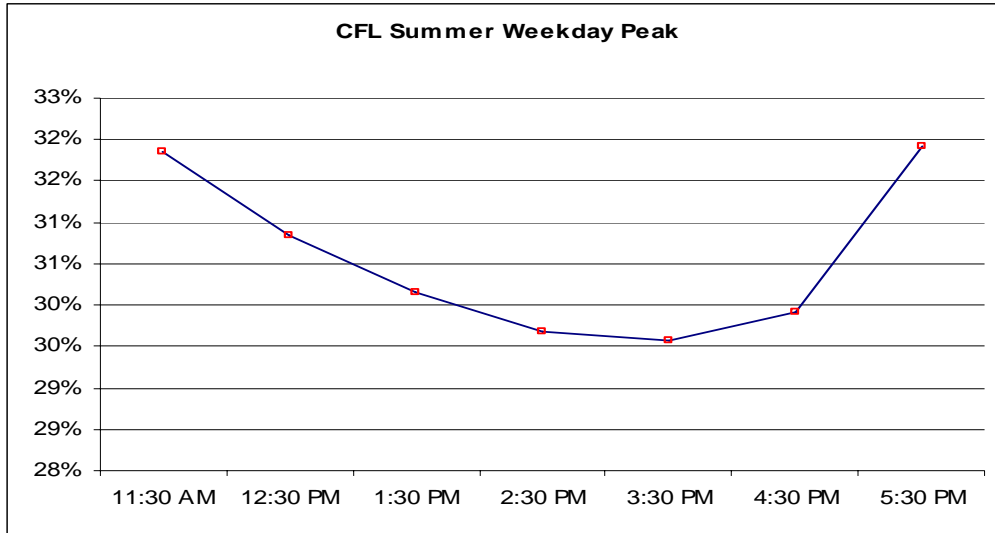

Figure 3: CFL Summer Weekday Peak Period Percent On

Figure 4 illustrates the winter weekday 5-8pm peak period percent of hour on for Compact fluorescent technologies.

Figure 4: CFL Winter Weekday Peak Period Percent On

Figure 5 illustrates the summer weekday 11-6pm peak period percent of hour on for T8/T5/Hi Bay/Metal Halide technologies.
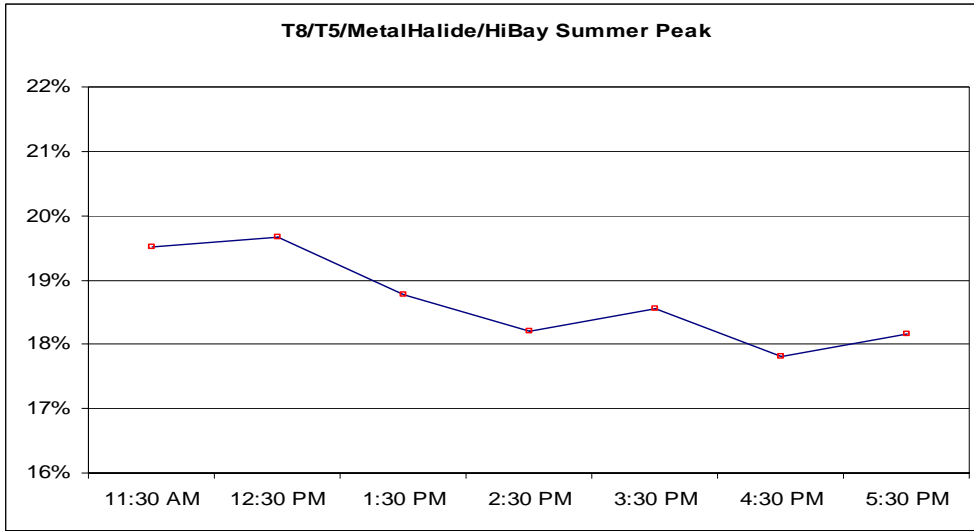
Figure 5 T8/T5/HiBay/Metal Halide Summer Wkday Peak Period Percent On

Figure 6 illustrates the winter weekday 5-8pm peak period percent of hour on for T8/T5/Hi Bay/Metal Halide technologies.
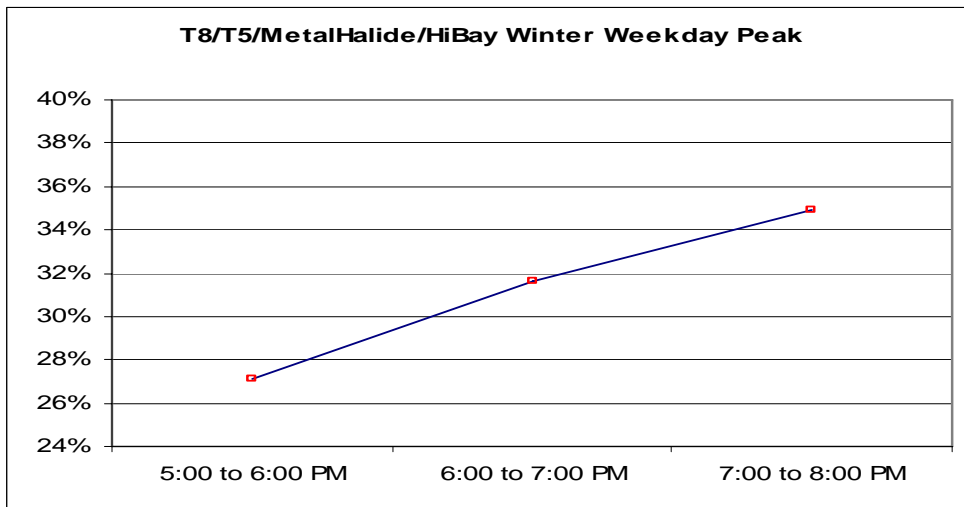
Figure 6: T8/T5/HiBay/MetalHalide Winter Weekday Peak Period Percent On

Figure 7 illustrates the annual weekday 11-6pm peak period percent of hour on for Compact fluorescent technologies.
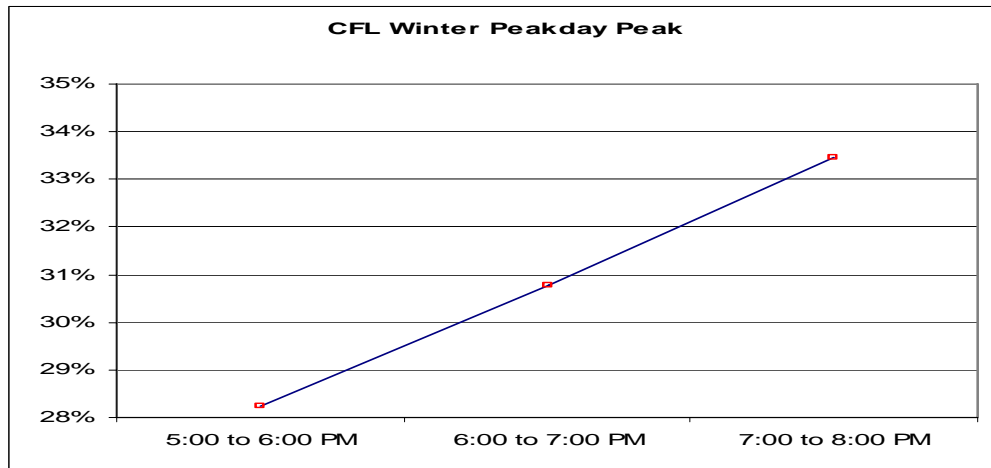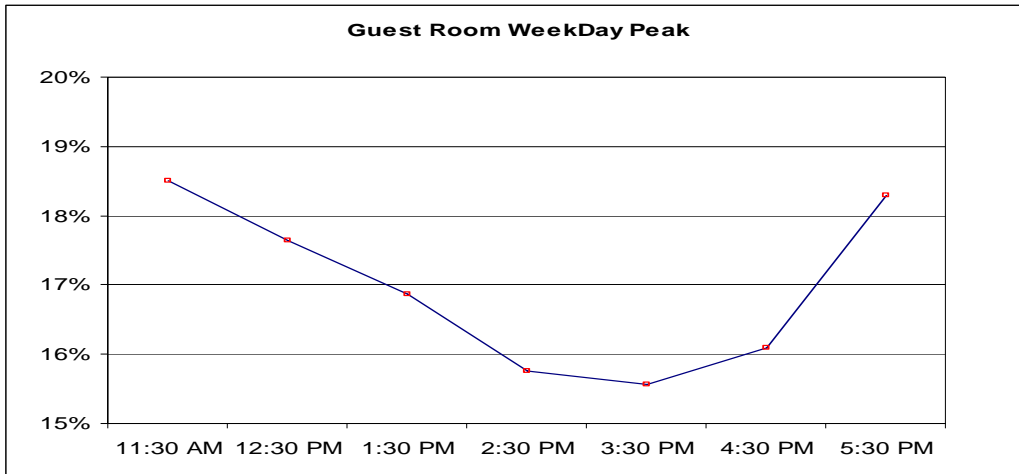

Figure 7: CFL Weekday Peak Period Percent On

Figure 8 illustrates the guest room measured weekday annual 24 hour load shape for compact fluorescent technologies. As expected in the Hotel/Motel market segment the peak usage times are in the morning and evening hours.
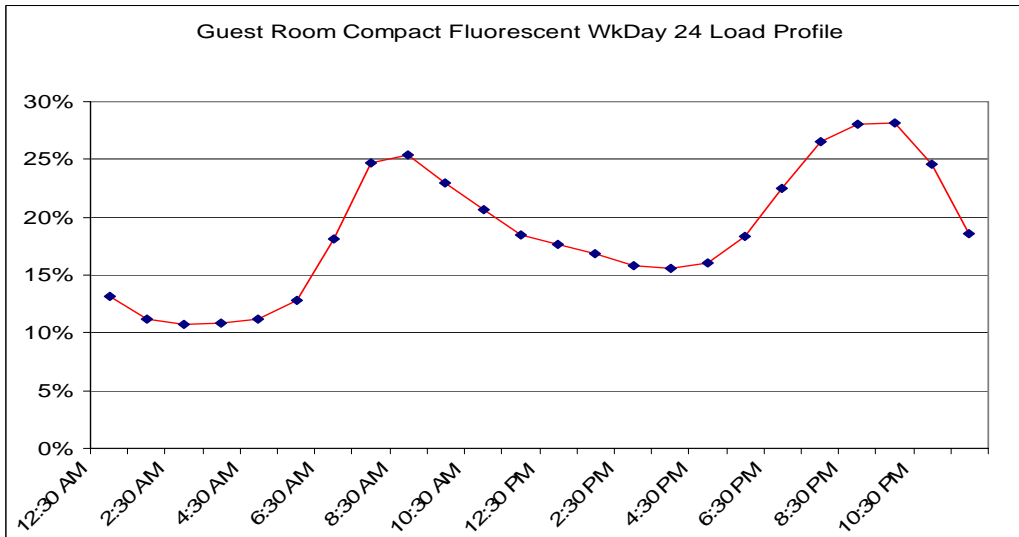
Figure 8: CFL Avg Weakday annual 24 Hr Load Shape

Figure 9 illustrates the guest room measured weekend annual 24 hour load shape for compact fluorescent technologies.
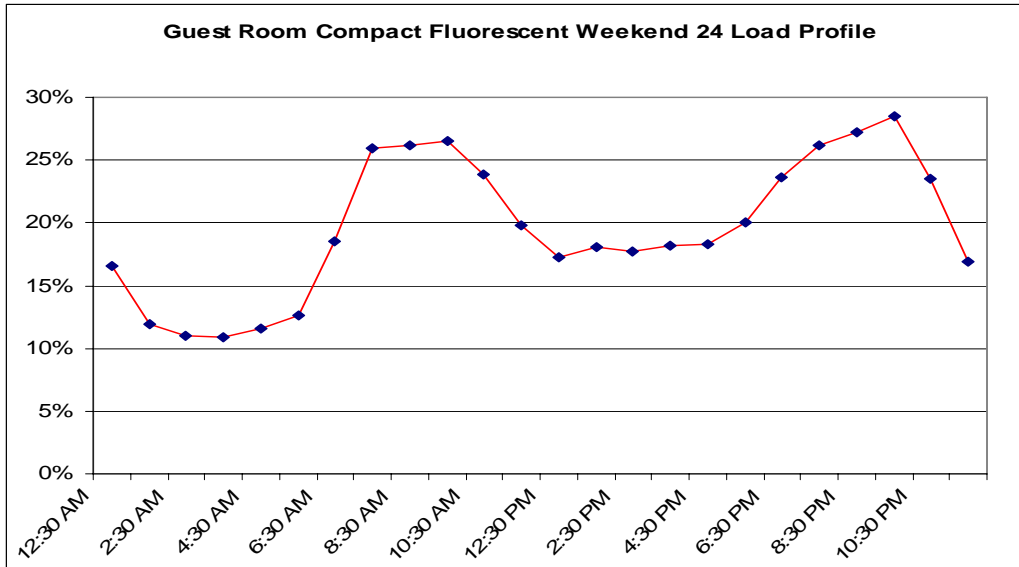
Figure 9: CFL Avg Weekend annual 24 Hr Load Shape

Figure 10 illustrates the measured weekday annual 24 hour load shape for T8/T5/Hi Bay/ Metal Halide technologies.
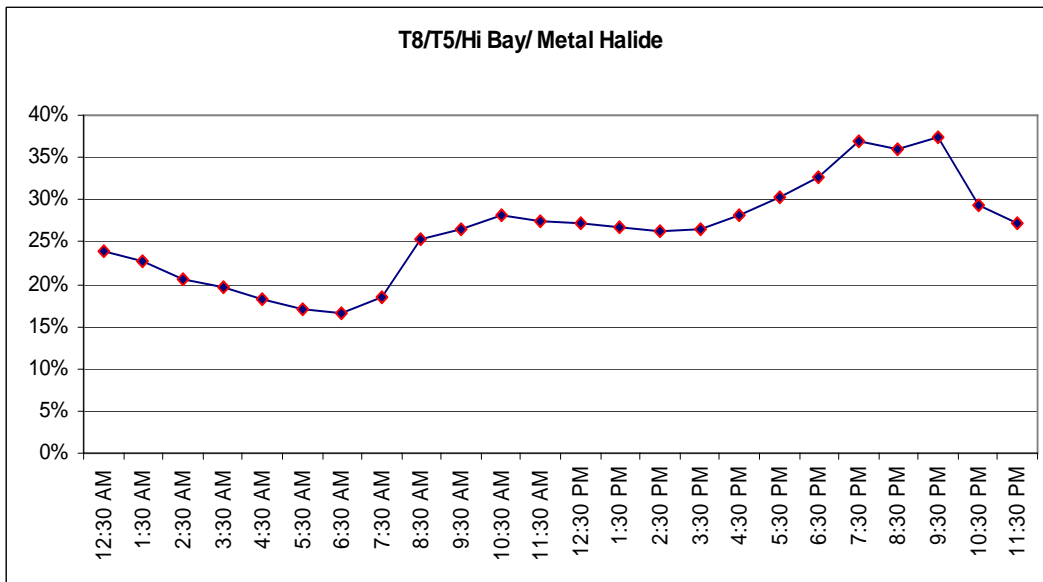
Figure 10: T8/T5/Hi Bay/Metal Halide Measured Avg WkDay Annual 24 Hr Load Shape

Figure 11 illustrates the measured weekend annual 24 hour load shape for T8/T5/Hi Bay/ Metal Halide technologies.
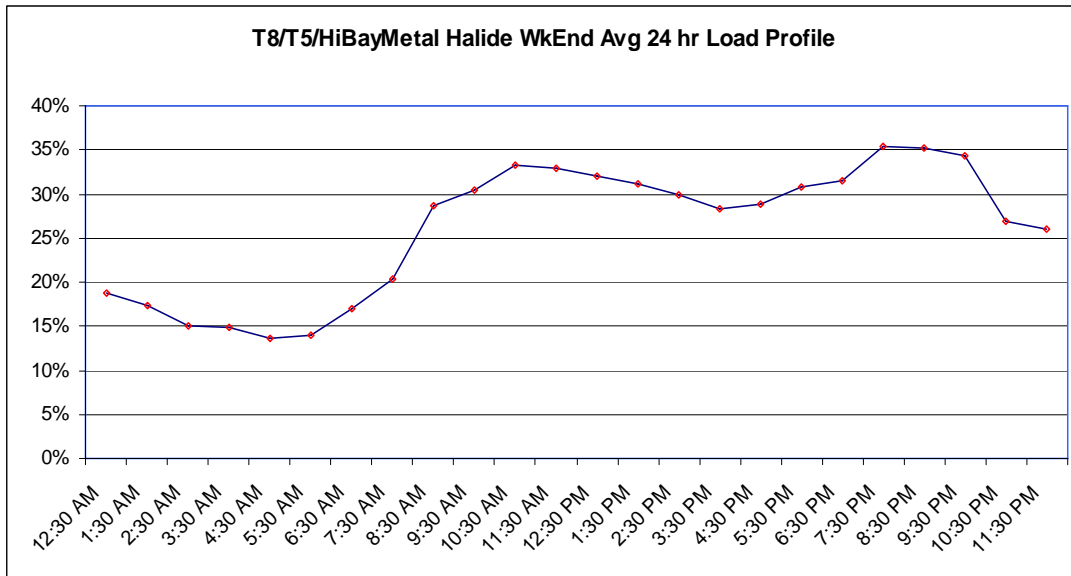
Figure 11: T8/T5/Hi Bay/Metal Halide measured Avg WkEnd Annual 24 Hr Load Shape

TABLES

The following logger data tables represent the annual week day and weekend 24 hour load shapes for each functional use area. The values are expressed as a percentage of each hour.

CFL Technologies

| Hr Ending | Guest Room CFL Sample Population Week Day Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | D42489 | D42556 | D42719 | D43012 | D41916 | D41720 | D41739 | D42296 | D42394 | D42434 | Overall Avg |
| 1:00 AM | 25% | 12% | 8% | 3% | 43% | 3% | 9% | 5% | 10% | 13% | 13% |
| 2:00 AM | 23% | 10% | 3% | 3% | 42% | 2% | 7% | 5% | 9% | 8% | 11% |
| 3:00 AM | 21% | 12% | 2% | 3% | 41% | 1% | 7% | 5% | 9% | 6% | 11% |
| 4:00 AM | 20% | 12% | 5% | 3% | 40% | 1% | 7% | 5% | 9% | 6% | 11% |
| 5:00 AM | 20% | 7% | 11% | 4% | 40% | 2% | 7% | 6% | 9% | 7% | 11% |
| 6:00 AM | 26% | 5% | 10% | 4% | 41% | 6% | 9% | 5% | 14% | 7% | 13% |
| 7:00 AM | 33% | 9% | 18% | 7% | 42% | 14% | 16% | 9% | 18% | 15% | 18% |
| 8:00 AM | 44% | 19% | 24% | 10% | 47% | 20% | 20% | 13% | 17% | 33% | 25% |
| 9:00 AM | 40% | 22% | 25% | 13% | 50% | 21% | 17% | 11% | 18% | 37% | 25% |
| 10:00 AM | 34% | 21% | 24% | 12% | 49% | 21% | 16% | 9% | 18% | 27% | 23% |
| 11:00 AM | 34% | 18% | 23% | 12% | 47% | 15% | 15% | 8% | 18% | 16% | 21% |
| 12:00 PM | 31% | 13% | 18% | 14% | 46% | 12% | 13% | 7% | 17% | 13% | 19% |
| 1:00 PM | 30% | 13% | 17% | 14% | 48% | 12% | 10% | 7% | 16% | 9% | 18% |
| 2:00 PM | 32% | 14% | 17% | 12% | 47% | 8% | 10% | 5% | 17% | 7% | 17% |
| 3:00 PM | 29% | 15% | 15% | 8% | 46% | 9% | 10% | 5% | 16% | 5% | 16% |
| 4:00 PM | 29% | 14% | 16% | 6% | 46% | 11% | 12% | 2% | 15% | 6% | 16% |
| 5:00 PM | 31% | 14% | 16% | 3% | 47% | 11% | 10% | 2% | 16% | 10% | 16% |
| 6:00 PM | 34% | 19% | 16% | 2% | 49% | 15% | 11% | 3% | 18% | 15% | 18% |
| 7:00 PM | 40% | 29% | 18% | 2% | 53% | 17% | 17% | 4% | 20% | 25% | 22% |
| 8:00 PM | 46% | 38% | 20% | 2% | 58% | 21% | 19% | 7% | 21% | 34% | 26% |
| 9:00 PM | 52% | 40% | 22% | 4% | 58% | 24% | 22% | 7% | 19% | 32% | 28% |
| 10:00 PM | 49% | 40% | 21% | 6% | 54% | 27% | 20% | 13% | 16% | 37% | 28% |
| 11:00 PM | 40% | 33% | 17% | 7% | 52% | 20% | 17% | 12% | 13% | 35% | 25% |
| 12:00 AM | 33% | 23% | 13% | 5% | 45% | 12% | 13% | 5% | 10% | 29% | 19% |

Hr Ending					Guest Room CFL Sample Population Weekend Average						Overall Avg
	D42489	D42556	D42719	D43012	D41916	D41720	D41739	D42296	D42394	D42434	
1:00 AM	9%	17%	18%	11%	42%	15%	12%	17%	7%	19%	**17%**
2:00 AM	0%	9%	11%	11%	40%	6%	12%	13%	6%	11%	**12%**
3:00 AM	0%	7%	9%	13%	38%	2%	12%	13%	5%	11%	**11%**
4:00 AM	0%	7%	10%	12%	37%	1%	12%	14%	6%	11%	**11%**
5:00 AM	0%	7%	14%	13%	36%	2%	12%	14%	5%	11%	**12%**
6:00 AM	11%	6%	12%	12%	35%	1%	13%	17%	7%	11%	**13%**
7:00 AM	37%	17%	16%	15%	40%	5%	15%	19%	11%	11%	**19%**
8:00 AM	67%	26%	16%	21%	49%	8%	18%	26%	16%	11%	**26%**
9:00 AM	52%	28%	21%	31%	47%	12%	18%	22%	20%	11%	**26%**
10:00 AM	47%	37%	19%	33%	45%	19%	15%	21%	17%	11%	**26%**
11:00 AM	48%	30%	23%	22%	44%	15%	10%	17%	19%	11%	**24%**
12:00 PM	20%	19%	24%	20%	45%	14%	8%	17%	18%	12%	**20%**
1:00 PM	7%	12%	25%	15%	44%	14%	10%	19%	16%	11%	**17%**
2:00 PM	0%	17%	24%	12%	43%	18%	11%	21%	18%	17%	**18%**
3:00 PM	0%	22%	22%	11%	43%	17%	12%	18%	22%	11%	**18%**
4:00 PM	8%	21%	23%	10%	42%	14%	15%	19%	19%	11%	**18%**
5:00 PM	17%	18%	20%	7%	43%	14%	17%	20%	20%	7%	**18%**
6:00 PM	37%	21%	20%	7%	43%	19%	19%	19%	16%	0%	**20%**
7:00 PM	50%	24%	20%	7%	45%	30%	25%	18%	17%	0%	**24%**
8:00 PM	44%	34%	22%	9%	49%	35%	29%	24%	17%	0%	**26%**
9:00 PM	50%	35%	20%	9%	49%	35%	28%	23%	17%	6%	**27%**
10:00 PM	51%	34%	25%	6%	56%	34%	26%	23%	18%	11%	**28%**
11:00 PM	34%	26%	24%	8%	55%	25%	21%	17%	13%	11%	**24%**
12:00 AM	21%	16%	21%	4%	48%	16%	17%	17%	10%	0%	**17%**

Hr Ending	Common Area CFL Sample Population Week Day Average				Hr Ending	Common Area CFL Sample Population Weekend Average			
	D50028	D42945	D42489	Overall Avg		D50028	D42945	D42489	Overall Avg
1:00 AM	82%	100%	100%	94%	1:00 AM	83%	100%	100%	94%
2:00 AM	82%	100%	100%	94%	2:00 AM	83%	100%	100%	94%
3:00 AM	82%	100%	100%	94%	3:00 AM	83%	100%	100%	94%
4:00 AM	82%	100%	100%	94%	4:00 AM	83%	100%	100%	94%
5:00 AM	82%	100%	100%	94%	5:00 AM	83%	100%	100%	94%
6:00 AM	83%	100%	100%	94%	6:00 AM	83%	100%	100%	94%
7:00 AM	89%	100%	100%	96%	7:00 AM	89%	100%	100%	96%
8:00 AM	100%	100%	100%	100%	8:00 AM	100%	100%	100%	100%
9:00 AM	100%	100%	100%	100%	9:00 AM	100%	100%	100%	100%
10:00 AM	100%	100%	100%	100%	10:00 AM	100%	100%	100%	100%
11:00 AM	100%	100%	100%	100%	11:00 AM	100%	100%	100%	100%
12:00 PM	100%	100%	100%	100%	12:00 PM	100%	100%	100%	100%
1:00 PM	100%	100%	100%	100%	1:00 PM	100%	100%	100%	100%
2:00 PM	100%	100%	100%	100%	2:00 PM	100%	100%	100%	100%
3:00 PM	100%	100%	100%	100%	3:00 PM	100%	100%	100%	100%
4:00 PM	100%	100%	100%	100%	4:00 PM	100%	100%	100%	100%
5:00 PM	100%	100%	100%	100%	5:00 PM	99%	100%	100%	100%
6:00 PM	100%	100%	100%	100%	6:00 PM	97%	100%	100%	99%
7:00 PM	100%	100%	100%	100%	7:00 PM	97%	100%	100%	99%
8:00 PM	100%	100%	100%	100%	8:00 PM	97%	100%	100%	99%
9:00 PM	100%	100%	100%	100%	9:00 PM	95%	100%	100%	98%
10:00 PM	97%	100%	100%	99%	10:00 PM	92%	100%	100%	97%
11:00 PM	84%	100%	100%	95%	11:00 PM	81%	100%	100%	94%
12:00 AM	0%	100%	100%	67%	12:00 AM	81%	100%	100%	94%

T8/T5/Hi Bay/Metal Halide Technologies

T5/T8/HiBay/Metal Halide Sample Pop Site Avg						
	D41720		D42945			
Hr End	WK Day	WK END	WK Day	WK END	Overall WK Day	Overall WK END
1:00 AM	35%	4%	19%	33%	27%	19%
2:00 AM	35%	4%	18%	30%	27%	17%
3:00 AM	34%	4%	18%	23%	26%	15%
4:00 AM	31%	4%	19%	21%	25%	15%
5:00 AM	29%	1%	19%	22%	24%	14%
6:00 AM	23%	0%	21%	21%	22%	14%
7:00 AM	11%	1%	28%	21%	20%	17%
8:00 AM	8%	6%	32%	22%	20%	20%
9:00 AM	10%	22%	37%	27%	24%	29%
10:00 AM	9%	25%	34%	32%	21%	30%
11:00 AM	7%	32%	33%	35%	20%	33%
12:00 PM	6%	33%	33%	32%	20%	33%
1:00 PM	7%	32%	33%	30%	20%	32%
2:00 PM	9%	27%	32%	34%	20%	31%
3:00 PM	10%	26%	31%	33%	20%	30%
4:00 PM	16%	24%	31%	30%	23%	28%
5:00 PM	21%	25%	30%	32%	25%	29%
6:00 PM	24%	30%	30%	33%	27%	31%
7:00 PM	31%	31%	33%	30%	32%	31%
8:00 PM	35%	38%	34%	34%	35%	35%
9:00 PM	33%	38%	35%	33%	34%	35%
10:00 PM	40%	31%	36%	36%	38%	34%
11:00 PM	31%	17%	31%	33%	31%	27%
12:00 AM	26%	27%	26%	25%	26%	26%

Appendix B– Recruitment Survey Instrument

SDG&E Express Efficiency 2006 Recruiting Survey

Project Info		Contact Info	
Site ID:		Business Name:	
Install Date:		Address:	
Bldg Type:		Zip:	
Measure 1:		Phone:	
Measure 2:		Contact Person:	
Measure 3:		Contact Email:	

Contact Log

						Comments

Num of Calls _____*Num of Contacts:* _____

Scheduled Yes/No   Survey Completed Yes/No

Hello, my name is_____ with RLW Analytics and I am calling on behalf of SDG&E. I would like to speak with <<contact person>> regarding participation in SDG&E's Retrofit Program, Express Efficiency.

Q1. Are you the owner or the owner's representative for the building at <<Address>>?

01   Yes
02   No (Get contact info)   Name:_____
98   DK (Get contact info)   Phone:_____
REFUSED (THANK AND TERMINATE)

Hello, this is_____calling on behalf of SDG&E with regard to <<your retrofit>>

I am contacting you today regarding your past participation in SDG&E'S Express Efficiency Retrofit program. Our records show that you received a rebate for installing high performance lighting in your building. We are in the process of determining how many hours per day the new lighting is in operation. To do this we are asking your permission to do on-site monitoring of your lighting for a period of three weeks. After the three-week period, we will return and remove the meters.

Q2. Do you recall participating in **SDG&E's** Express Efficiency program?

    01   Yes
    02   No (Confirm Building Address, ask for someone else, Thank and Terminate)
    98   DK (Get contact info)
    99   Refused (Thank and Terminate)

Name: _____

Phone: _____

As a valued participant in the Express Efficiency program, we are hoping you will assist us in our efforts to improve this program. The information we are collecting is strictly confidential and will not effect the incentive you were already paid.

The purpose of the on-site visit is to collect information and data that is required to determine the annual hours of operation, which in turn allows us to estimate the energy savings for each type of building in the program.

The on-site survey usually begins with a 30-minute meeting between our engineer/surveyor and your facility manager. During this meeting, information such as building schedules and control schemes will be discussed and documented. The on-site visit is non-intrusive and normally takes between 1 and 2 hours, depending upon the building size and complexity of the lighting. Other than the introductory meeting, our surveyor does should not need any further assistance, other than access to the lighting systems.

The on-site visit can be scheduled at your convenience, when would be a good time for you?

Appointment Date and Time: _____

Screener

Before we finish I would like to ask you just a few question about the building.

Q1. Our information shows that this building is a<< market segment>> , is this correct?

Yes or No

 (If no, Ask what type of building and primary occupancy type)

Q1a. If mixed Occupancy please describe:
_____

Q2. Do you know the approximate square footage of the area that was retrofitted?

_____

Q3. Where in the building was the retrofit? (Describe)

_____

Q4. Who should our surveyor ask for when they get to the site?

_____

Thank You and we will see you on _____ at _____.

                                   (date)   (time)

The surveyor will be _____

Appendix C On-site Survey Instrument

SDG&E Express Efficiency Lighting TOU Study

Project Info	Contact Info
Site ID:	Business Name:
Install Date:	Address:
Bldg Type:	Zip:
On site Contact Person:	On site Contact Phone
Notes:	Surveyor:

The purpose of this metering study is to determine the annual hours of operation for energy efficient lighting technologies. In order to measure the hours of operation we need to sample areas of the building based on differences in the way the building is operated. Between 5-25 lighting loggers will be used to determine annual hours of operation at any given site. The number of loggers deployed at each site is based on judgment. Judgment is mainly based on the number of different functional use areas (FUAs) and their share of the total measure energy use.

	M	T	W	Th	F	Sat	Sun
Business Hours							

Holidays Observed:(check all that apply)

New Years Day	Labor Day	Other
Presidents Day	Veterans Day	Other
Memorial Day	Thanksgiving Days	Other
Independence Day	Christmas Days	Other

In this section you will ask the customer about each unique measure. For each measure define functional use areas served by that measure and estimate the percentage of the measure that area represents. Ask the customer to estimate the time of use of each measure during weekday and weekends for each FUA.

Measure# ____	Measure Description:					
				Estimated TOU		Logger QTY
FUA #	FUA Description		% Measure	WD	WEH	
1						
2						
3						
4						
5						
6						
7						
			Total = 100%			

Measure# ___	Measure Description:					
					Estimated TOU	Logger QTY
FUA #	FUA Description		% Measure	WD	WEH	
1						
2						
3						
4						
5						
6						
7						
			Total = 100%			

Notes:_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

In this section we want to ask the customer about seasonal differences in lighting use. Indicate which months use is more or less then the normal month where 100% is normal. In some cases customer use will be the same all year. Use your best judgment to determine operating differences.

Measure # _____   Measure # _____
FUA   _____   FUA   _____

	% Normal
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

	% Normal
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

SDG&E Express Efficiency Lighting TOU Study

RLW ID

Measures

Measure 1:	Qty:	
Measure 2:	Qty:	
Measure 3:	Qty:	
Measure 4:	Qty:	
Measure 5:	Qty:	
Measure 6:	Qty:	
Measure 7:	Qty:	
Measure 8:	Qty:	
Measure 9:	Qty:	
Measure 10:	Qty:	
Measure 11:	Qty:	
Measure 12:	Qty:	
Measure 13:	Qty:	

Data Logger Install Form

<div align="center">

SDG&E
Express Efficiency Lighting Time-Of-Use Study
Lighting Logger Installation Form

</div>

Site ID   _____

Site Name   _____

Installer   _____

Remover   _____

LOGGER NUMBER	M#	FUA #	LIGHT FIXTURE DESCRIPTION AND LOCATION	INSTALLED		REMOVED	
				DATE:		DATE:	
				TIME:		TIME:	
Notes:							
				DATE:		DATE:	
				TIME:		TIME:	
Notes:							
				DATE:		DATE:	
				TIME:		TIME:	
Notes:							
				DATE:		DATE:	
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Notes:							
				DATE:		DATE:	
				TIME:		TIME:	
Notes:							
Begin with logger type code: New Dent (D) Hobo (H) PS&T (T) Brand (B)							