

Los Angeles County Internal Services Department
2002-03 Energy Efficiency Program #156-02
Supplemental EM&V Report – Demand Reduction

Introduction

Demand savings were not calculated in the final EM&V report for the 2002-03 energy efficiency program of the Los Angeles County Internal Services Department. The following brief report estimates the *ex-ante* and *ex-post* demand reduction for the program.

The following table provides the program-wide demand reduction estimates and calculations.

Total Demand Reduction Estimates from All Measures	
Original Program Plan	1,246 kW
Revised Program Plan	866 kW
Ex-Ante Evaluation	890 kW
Aloha Ex-Post Measured Evaluation	825 kW

The original project as submitted to the CPUC had a total budget of \$6,020,205. When the CPUC approved the non-utility programs in D.02-05-046, the budget was reduced to \$3,333,333 and the commission required the county to reduce its program goals accordingly. In response to this approval with reduced budget, the county filed its revised program goals on May 24, 2002. The following table is excerpted directly from that filing, showing a total proposed demand reduction of 1,246 kW:

Description	No. Measures	Budget	Savings kWh/Yr	Cost Savings	KW Saved
HID	760	\$ 262,500	475,800	\$ 47,580	112.5
Exit Light	160	\$ 15,000	59,130	\$ 5,913	6.8
Retrofit T-12	7500	\$ 25,000	1,965,600	\$ 196,560	630.0
Incandescent	100	\$ 4,000	14,664	\$ 1,466	4.7
Bldg Wide Ltg Controls	7 sites	\$ 30,121	1,886,285	\$ 188,629	-
Time Clocks	20	\$ 3,000	261,660	\$ 26,166	-
Variable Freq. Drives	20	\$ 100,000	321,690	\$ 32,169	-
Chillers	1@1200 T	\$ 1,260,000	1,023,360	\$ 102,336	492.0
Totals =		\$ 3,119,621	6,008,189	\$ 600,819	1,246.0

Based upon comprehensive audits conducted on many of the sites, the county revised its plan and formally applied for a revision. This revision was submitted to the CPUC by Southern California Edison and the county on April 21, 2003, and was approved by Energy Division staff. The following table is taken from Attachment C of that revision application. The revised plan increased the proposed annual savings by approximately 1.2 GWh while maintaining the same overall budget. However, it decreased the estimated demand reduction to 866 kW.

REVISED PLAN							
			Quantity of Measures	BUDGET	SAVINGS kWh/YR	ANNUAL COST SAVINGS	ANNUAL kW Savings (Net)
HID*			64	\$22,702	197,100	\$19,710	36.00
EXIT SIGNS			134	\$27,180	48,360	\$4,836	5.00
T-12 TO T-8			7,114	\$598,424	1,228,083	\$122,808	283.00
INCANDESCENT			530	\$29,222	83,663	\$8,366	26.00
BLDG CONTROLS sq ft			2,013,425	\$933,897	2,640,295	\$264,030	N/A
TIME CLOCKS			20	\$2,700	261,600	\$26,160	N/A
VFD RETROFIT			8	\$166,751	947,661	\$94,766	N/A
CHILLER RETROFIT			1	\$560,591	954,267	\$95,427	339.00
*NEW ADDITIONAL MEASURE (SUBSTITUTE FOR HID RETROFIT)							
INSTALLATION OF T-5			970	\$466,191	806,187	\$80,619	177.00
Subcontractors Administration Costs				\$311,962			
TOTAL				\$3,119,620	7,167,216	\$716,722	866.00

The following table presents the per-unit demand reduction estimates for each of the measures installed in the program.

Ex-Ante Per Unit Values			
Measure	Total kW	Units Proposed	kW per Unit
HID	36	64 Fixtures	0.5625
Exit Light	5	134 Fixtures	0.0373
Retrofit T-12	283	7114 Fixtures	0.0398
Incandescent	26	530 CFLs	0.0491
Bldg Wide Ltg Controls	0	2,013,425 sq feet	0.0000
Time Clocks	0	20 Time Clocks	0.0000
Variable Freq. Drives	0	8 Drives	0.0000
Chillers	339	1 1200-ton	339.0000
T-5 Lights	177	970 Fixtures	0.1825
Total	866		

Ex-Ante Demand Reduction Calculations

The *ex-ante* concept of measurement accepts the per-unit value as a “stipulated” average value and verifies that the quantities of measures were actually installed.

Ex-Ante Savings Calculations				
Measure	Proposed Units	Proposed kWh/yr	Units Installed	Ex-Ante kWh/yr
HID Fixtures	64	36	88	49.5
Exit Light Fixtures	134	5	149	5.6
Retrofit T-12 Fixt	7,114	283	7,231	287.7
Incandescent to CFL	530	26	590	28.9
Ltg Controls Sq Ft.	2,013,425	0	2,013,425	0.0
Time Clocks	20	0	20	0.0
Variable Freq. Drive	8	0	8	0.0
Chillers (1200T)	1	339	1	339.0
T-5 Light Fixtures	970	177	984	179.6
Total		866		890.3

Ex-Post Demand Reduction of Individual Sites

During the course of the evaluation project, we verified equipment installations and created load profiles for many of the measures installed. Coincident peak demand reductions can be ascertained from the load profiles. The following table presents the connected load reductions and coincident demand reductions. The connected load reduction is often greater than the coincident demand reduction because it includes devices such as night lights that never operate during the summer on-peak period.

The chiller’s demand reduction varies with load. One of the existing 1200-ton Trane chillers was removed and replaced with a new 1200-ton Trane CentraVac chiller. The new chiller’s full-load rated efficiency is 0.611 kW/ton, for a rated full-load demand of 733 kW. The old 1200-ton chiller had a full-load rating of 1,005 kW. This would produce a 272 kW demand reduction if both chillers were running at full load. This is perhaps a high estimate of demand reduction, because the chillers seldom if ever ran at the full 1200-ton capacity, although they often ran near capacity. (We actually did not have instantaneous operational data, but rather daily consumption and run-hour data for three years.) It is not known with certainty that the hospital’s cooling load is fully coincident with the electric system peak, although this assumption is at least near the truth. The largest demand reduction estimated based on the daily data available was 235 kW. We believe this is a lower limit to the peak demand reduction. Our estimate of 255 kW peak load reduction is half-way between these two logical boundary points for the actual peak demand reduction on a very hot summer afternoon.

Individual Demand Reduction Estimates					
Site No.	Location	<i>Ex-Ante</i> CPUC Spreadsheet Savings (kWh)	Aloha Measured Savings (kWh)	Connected Load Reduction (kW)	Coincident Peak Demand Reduction (kW)
1	DA Warehouse	94,567	68,897	21.2	20.9
2	Warm Springs Rehabilitation	55,762	35,026	11.4	10.2
3	Bellflower Parking	35,907	52,717	3.3	0.00
4	Superior Court Warehouse	44,163	14,030	9.7	5.6
5	Willowbrook Senior Center	44,650	27,507	10.4	9.7
6	Willowbrook Child Care	29,021	27,642	6.5	4.5
7	DCSS Florence/ Firestone	47,086	50,710	12.1	11.6
8	ISD Dist 3 Facilities	52,978	98,475	21.6	21.4
9	Sheriff Field Operations II	43,320	68,759	22.4	21.3
10	Monrovia Auto Shop	56,692	39,086	25.0	11.5
11	Sheriff Comm Center	133,636	169,584	28.6	28.6
12	Biscailuz Center	139,586	209,722	52.0	44.0
13	Animal Control #6	76,382	39,186	9.0	2.3
14	DPSS GAIN	79,773	65,840	23.4	20.6
15	Claremont Library	82,776	60,078	19.5	19.3
16	West Covina Library	139,801	153,753	46.5	38.0
17	Brakensiek Library	99,387	70,957	25.6	25.1
18	North Services Agency	55,656	100,133	40.0	26.0
19	Rio Hondo Parking	21,820	37,126	4.9	4.9
19A	Montebello Library	128,556	94,076	28.3	25.0

Individual Demand Reduction Estimates					
Site No.	Location	<i>Ex-Ante</i> CPUC Spreadsheet Savings (kWh)	Aloha Measured Savings (kWh)		
25	ISD Parking	203,260	178,841	40.9	0.0
26	ISD HID-to-T5	817,822	811,932	219.2	219.2
LTG TOT	Lighting Retrofit Total	2,484,023	2,474,077	681.5	569.7
20	DPSS South Family	174,409	19,604 (a)	N/A	0.0
21	Southwest DPSS	201,811	290,535 (b)	N/A	0.0
22	Downey Administration	468,599	325,201 (c)	N/A	0.0
23	ISD 1100 Complex	733,301	28,191 (d)	N/A	0.0
24	Sheriff's STAR Center	359,074	32,241 (e)	N/A	0.0
24A	Public Works	703,101	80,999 (f)	N/A	0.0
CONT TOT	Lighting Controls Total	2,640,295	776,771*	N/A	0.0
TC TOT	Library Chiller Time Clocks	261,600	261,366	N/A	0.0
VFD TOT	Downey Admin VFDs	947,661	851,687	N/A	0.0
CHLR TOT	Harbor Med Chiller Retrofit	954,267	1,356,177	N/A	255.0
Grand Total		7,287,846	5,720,078	N/A	824.7

Conclusions

The *ex-ante* demand reduction value (890 kW) exceeds the proposed value (866 kW) slightly because more lighting measures were installed than were actually proposed. The *ex-post* demand reduction value (825 kW) is less than the proposed value because the new chiller does not reduce operational demand quite as much as estimated. The *ex-post* estimate of lighting demand reduction (570 kW) actually exceeds the proposed demand reduction from the lighting measures (527 kW).