
ENERGY EXPENDITURE PLAN



Cabrillo Elementary School

30237 Morning View Drive

Malibu, CA 90265

P: (310) 457-0360

PREPARED FOR:

California Energy Commission
Energy Division
Local Assistance and Financing Office, MS-23
1516 Ninth Street
Sacramento, Ca 95814



PREPARED ON:
5/17/2017

Table of Contents

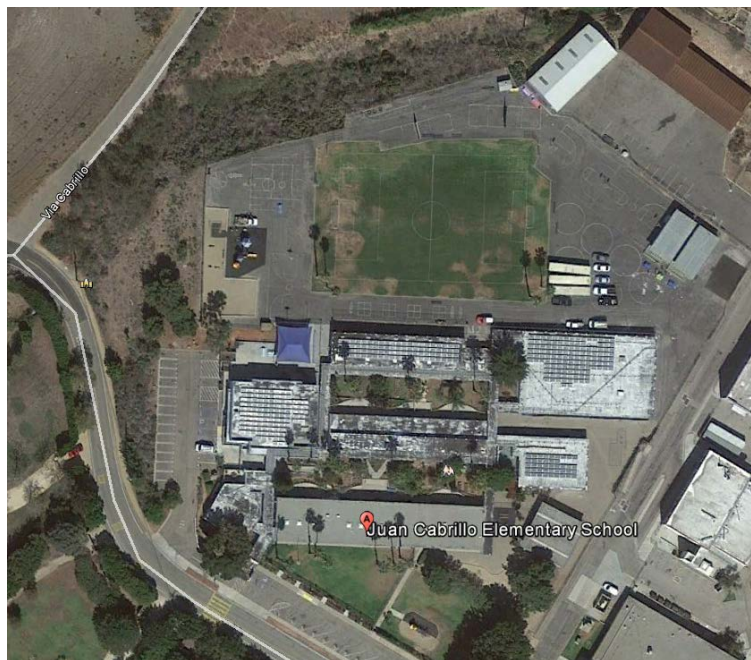
Section 1: Facility Background.....	3
Cabrillo Elementary School	3
Utility Costs and Rate Schedules	4
Benchmarking.....	5
Section 2: Energy Efficiency Measures (EEM) Summary.....	6
Lighting Systems Retrofit.....	7
Appendix – A.....	8
School Schedules and Maps	8
Daily Bell Schedule and Academic Calendar	9
Cabrillo Elementary School Map	11
Appendix – B.....	12
Energy Utilization Analysis	12
Appendix – C	15
Lighting Systems Audit.....	15

Section 1: Facility Background

Cabrillo Elementary School

Cabrillo Elementary School is located at 30237 Morning View Drive in Malibu, CA 90265. It is an elementary school serving approximately 195 students ranging from grades K-5 and provides instruction using 6 permanent buildings and 2 portable buildings. The total amount of occupied space is 39,773 SF. For a complete map of the campus, see Appendix A.

The campus operates on an academic calendar that begins in late August and ends in late June. Winter Break is a two week break that begins at the end of December and goes to the first week of January. Spring Break is a one week break that begins in early-April. School is in session beginning at 8:20 a.m. and continuing until 2:45 p.m., Monday through Friday. For a complete academic calendar and bell schedule, refer to Appendix A.



Utility Costs and Rate Schedules

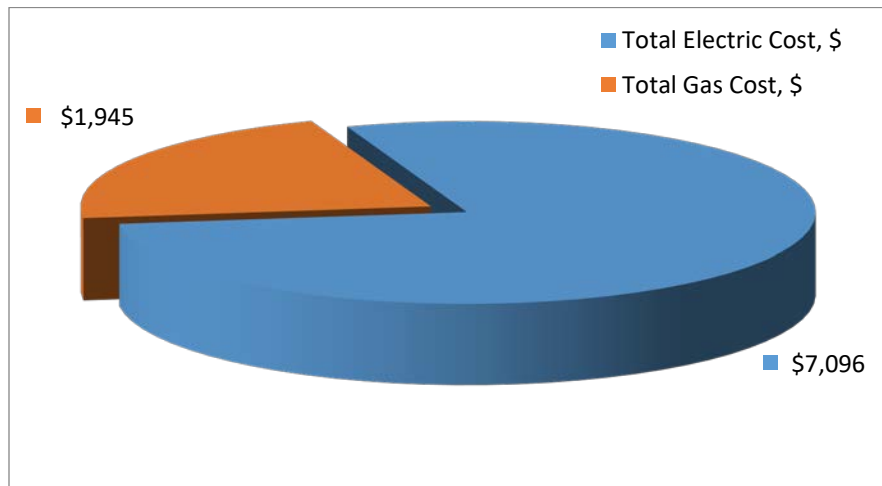
The Cabrillo Elementary School facilities receive electricity services from Southern California Edison (SCE) and gas services from . Monthly utility data is considered separately for each utility meter and each energy type (electricity, natural gas, propane, diesel, and water).

The following is a list of the meters associated with each energy type utilized at Cabrillo Elementary School:

Table 1: Electric Meter Numbers and Rate Schedules		
Account Number	Meter Number	Rate Schedule
3-005-1781-23	259000-073666	TOU-GS-2-R

Table 2: Gas or Propane Meter Numbers and Rate Schedules		
Account Number	Meter Number	Rate Schedule
183046700	144465685	GN-10

The utility data provided uses the data recovered from each of these meters during the period of July, 2015 to June, 2016. The cost comparison of Cabrillo Elementary School’s gas and electricity costs can be seen in the table below:



Benchmarking

As part of the site evaluation we determined the Energy Utilization Analysis (EUA) to provide important information about the energy usage of the school. Listed in the table below is the Benchmarking Report for Cabrillo Elementary School:

Energy Use Intensity Calculator					
Electricity		Natural Gas		Other Fuels	
0.91	<i>W/SF</i>	0.05	<i>Therms/SF</i>	0.00	<i>Gals/SF</i>
5.19	<i>kWh/SF</i>	\$ 0.05	<i>Cost/SF</i>	\$ 0.00	<i>Cost/SF</i>
\$ 0.18	<i>Cost/SF</i>				
Energy Costs/SF/Year		\$ 0.23	Energy Use(Kbtu)/SF/Year		60.89

The main purpose of this report is to assess the current energy usage of Cabrillo Elementary School. Energy consumption is analyzed compared to the site's actual weather data expressed in Cooling Degree Days (CDD) & Heating Degree Days (HDD). Graphs comparing the energy consumption to the CDD and HDD can be found in Appendix B.

The Baseline Energy Utilization Analysis (EUA) report compiles the monthly energy data from all meters on site. The EUA is useful in identifying critical energy consuming benchmarks like kWh/SF, kBtu/SF, and Cost/SF for each fuel type and individual school site. This report is a great resource to have for identifying the lowest energy performing schools. The report ranking will present the schools that consume the most energy when compared to others within the district or other comparable districts. The considered school is rated at 5.19 kWh/SF/yr.

The baseline EUA summary of all the meters for Cabrillo Elementary School can be found in Appendix B.

Section 2: Energy Efficiency Measures (EEM) Summary

Energy savings are based on the difference between annual energy use under existing conditions and annual energy use under proposed conditions. These annual energy savings, and the corresponding annual energy cost savings, are used to determine the cost-effectiveness of the projects. Demand savings are calculated as the different between the electricity demand of the existing equipment and electricity demand of proposed equipment. The table below shows the Energy Efficiency Measures proposed and the corresponding savings associated with them.

EEM Number	Energy Efficiency Measure	Demand Savings (kW)	Electricity Savings (kWH/yr)	Natural Gas or Fuel Savings (therms or gal/yr)	Annual Cost Savings (\$)	Rebates and Grants (\$)	Installed Measure Cost (\$)
Lighting	Lighting – Interior Fixture Retrofit	1	245		\$21.00	\$1,000.00	\$2,032.00
Lighting	Lighting – Exterior Fixture Retrofit	0	51		\$4.00	\$0.00	\$704.00
	Totals	1	296		\$25.00	\$1,000.00	\$2,736.00

Lighting Systems Retrofit

A significant portion of a facilities electrical costs comes from lighting, making lighting retrofits one of the quickest and simplest methods for reducing utility costs. In most cases the retrofits will result in improved light quality and reduced maintenance costs in addition to the estimated energy savings.

The method used for calculating energy savings is outlined below:

$$\underline{\text{Annual Saving, } \$ = (\text{Existing Watts} - \text{New Watts}) / 1000 \times \text{Hours/Year} \times \text{Utility Rate} \times N}$$

Where,

- Existing Watts* – Wattage rating for the existing (Baseline) light fixture
- New Watts* – New wattage rating for the existing light fixture
- Hours/Year* – Annual number of “burn-hours” (run hours for different areas; see detailed audit in Appendix C)
- Utility Rate* – Actual weighted composite utility rate, \$/kWh
- N* – Number of light fixtures of the particular type (see below & in Appendix C for the actual quantities).

The current interior lighting systems in the Cabrillo Elementary School buildings consist of a combination of LED and incandescent lamps and fixtures. Following examination of the data collected, a full retrofit of the lighting system with LED lamps and fixtures is recommended.

The current exterior lighting systems in the Cabrillo Elementary School buildings consist of compact fluorescent lamps and fixtures. Following examination of the data collected, a full retrofit of the lighting system with LED lamps and fixtures is recommended.

This retrofit will generate more saving, electrical demand reduction and better payback than other Energy Conservation Measures such as HVAC replacements. Upon installment of the new system, the campus will conserve 0.626 kW and 296 kWh per year. The cost savings per year will be approximately \$25.74. A full detailed audit of the current lighting system implemented in the entire campus can be found in Appendix C.

Appendix – A

School Schedules and Maps



Daily Bell Schedule and Academic Calendar

GRADES 1-5

Monday to Thursday

TIME	GRADE(S)	EVENT
8:10 AM	1-5	Line up bell
8:15-10:00 AM	1-5	Instructional Time
10:00-10:15 AM	1, 2, 3	Recess
10:15-10:30 AM	4, 5	Recess
11:45-12:45 PM	KN-5	Lunch and Recess
1:30-1:40 PM	1, 2, 3	Recess
2:45 PM	1-5	Dismissal

GRADES TK-K

Monday to Thursday

TIME	GRADE(S)	EVENT
8:10 AM	TK-K	Line up bell
8:15-9:45 AM	TK-K	Instructional Time
9:45-10:05 AM	TK-K	Movement/Snack
10:05-11:40 AM	TK-K	Instructional Time
11:40-12:00 PM	TK-K	Lunch
12:00-1:00 PM	TK-K	Instructional Time
1:00 PM	TK-K	Dismissal

SANTA MONICA-MALIBU UNIFIED SCHOOL DISTRICT
2016-2017 District Calendar

Approved by the Board of Education: 3/19/15

July 2016					August 2016					September 2016					
M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F	
	4	5	6	7	8	1	2	3	4	5	5	6	7	8	9
11	12	13	14	15	8	9	10	11	12	12	13	14	15	16	
18	19	20	21	22	15	16	17	18	19	19	20	21	22	23	
25	26	27	28	29	22	23	24	25	26	26	27	28	29	30	

October 2016					November 2016					December 2016				
M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F
	4	5	6	7	1	2	3	4	5	1	2	3	4	5
10	11	12	13	14	7	8	9	10	11	5	6	7	8	9
17	18	19	20	21	14	15	16	17	18	12	13	14	15	16
24	25	26	27	28	21	22	23	24	25	19	20	21	22	23
31					28	29	30			26	27	28	29	30

January 2017					February 2017					March 2017				
M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F
2	3	4	5	6	1	2	3	4	5	1	2	3	4	5
9	10	11	12	13	6	7	8	9	10	6	7	8	9	10
16	17	18	19	20	13	14	15	16	17	13	14	15	16	17
23	24	25	26	27	20	21	22	23	24	20	21	22	23	24
30	31				27	28				27	28	29	30	31

April 2017					May 2017					June 2017				
M	T	W	Th	F	M	T	W	Th	F	M	T	W	Th	F
3	4	5	6	7	1	2	3	4	5	1	2	3	4	5
10	11	12	13	14	8	9	10	11	12	5	6	7	8	9
17	18	19	20	21	15	16	17	18	19	12	13	14	15	16
24	25	26	27	28	22	23	24	25	26	19	20	21	22	23
					29	30	31			26	27	28	29	30

- Legend:**
- = First/Last Day of School
 - = Legal Holiday
 - = Local Holiday (schools/offices closed)
 - = School Recess (classes not in session)
 - = Pupil Free Day (no school for students)
 - = Elem. Pupil Free Day (no school -elem students)
 - = Sec. Pupil Free Day (no school -sec students)
 - = Minimum Day for all students
 - = Certificated Staff Development Days

Employee Work Dates:
 Sept. 1, 2016-June 30, 2017: * Classified 11-Month
 *must work 22 days in July/August, 2016
 Aug. 8, 2016-June 21, 2017: Classified 10 +10
 Aug. 15, 2016-June 14, 2017: Classified 10-Month
 Aug. 17, 2016-June 9, 2017: Certificated/184 Days
 Aug. 18, 2016-June 9, 2017: Certif. CDS/183 Days
 Aug. 19, 2016-June 9, 2017: Classified School Year

Teacher Work Days: 184
 Student Days: 180

1st Semester: Aug. 22 - Dec. 23 (84 days)
 2nd Semester: Jan. 10 - June 9 (96 days)



First Day of Instruction:
 - Monday, August 22, 2016

Last Day of Instruction:
 - Friday, June 9, 2017

Certificated Staff Development Days:
 (No Students)
 - Wednesday, August 17, 2016
 - Thursday, August 18, 2016

HOLIDAYS:
 July 4: 4th of July Holiday
 Sept. 5: Labor Day Holiday
 Oct 3: Local Holiday
 Oct 12: Local Holiday
 Nov. 11: Veteran's Day Holiday
 Nov. 24: Thanksgiving Holiday
 Nov. 25: Legal Holiday (Admission's Day observed)
 Dec. 26, 27: Winter Holidays
 Dec. 30, Jan 2: New Years Holidays
 Jan 16: Martin Luther King, Jr. Holiday
 Feb. 20: Presidents' Day Holiday
 Apr. 7: Local Holiday
 Apr. 14: Legal Holiday (Lincoln's B'day observed)
 May 29: Memorial Day Holiday

SCHOOL RECESSES:
 Dec. 26 - Jan 6: Winter Recess
 Apr 3 - Apr 14: Spring Recess

PUPIL-FREE DAYS:
 Aug. 17: All Students
 Aug. 18: All Students
 Aug. 19: All Students
 Nov. 4: Elementary Students Only
 Jan. 9: Secondary Students Only

MINIMUM DAYS:
 TK/Kindergarten: Aug. 22, Aug. 23, 30, Nov. 7, 8, 9, 10, 23, Dec. 23, May 25, June 9
 Elementary: Aug. 22, 30, Sept. 6, Nov. 7, 8, 9, 10, 23, Dec. 23, May 25, June 9
 Malibu MS/HS: Sept. 8, 15, Nov. 23, Dec. 21, 22, 23, March 9, June 6, 7, 8 + 1 discretionary
 Samohi: Sept. 15, Dec. 20, 21, 22, 23, Mar. 9, June 5, 6, 7, 8
 Olympic HS: Sept. 20, Nov. 23, Dec. 23, May 2, June 1, 2, 5, 6, 7, 8, 9

Back to School Nights:
 Tues. Aug. 30 - Elem TK-2
 Tues. Sept. 6 - Elem 3-5
 Thurs. Sept. 8 - Middle School
 Thurs. Sept. 15 - High School
 Tues. Sept. 20 - Olympic HS

Open House Nights:
 Thurs. May 25 - Elementary
 Thurs. April 27 - SM Middle Schools
 Thurs. March 9 - Malibu MS/HS and Samohi
 Tues. May 2 - Olympic HS

Promotions/Graduations:
 Wed. June 7 - Elementary
 Fri. June 9 - Middle School
 Thurs. June 8 - MMS 2:00 pm
 - Samohi 5:30 pm
 Wed. May 31 - Olympic HS 5:30 pm

Parent Conference Days (TK-SI):
 Nov. 4 - Nov. 10, 2016

Testing Dates: expected, not confirmed
 AP Testing: May 1- May 12, 2017
 STAR: April 20 - May 18, 2017
 SBAC: April 20 - May 29, 2017

TK/Kindergarten Readiness:
 Jan. 30 - Feb. 10, 2017

Final Exams:
 Malibu MS/HS: Dec. 21-23, 2016
 June 6-8, 2017
 Samohi: Dec. 20-23, 2016
 June 5-8, 2017

Summer School:
 ISS: June 19-July 14, 2017
 Credit Recovery: June 19-Jul 21, 2017
 ESY: June 19-July 14, 2017

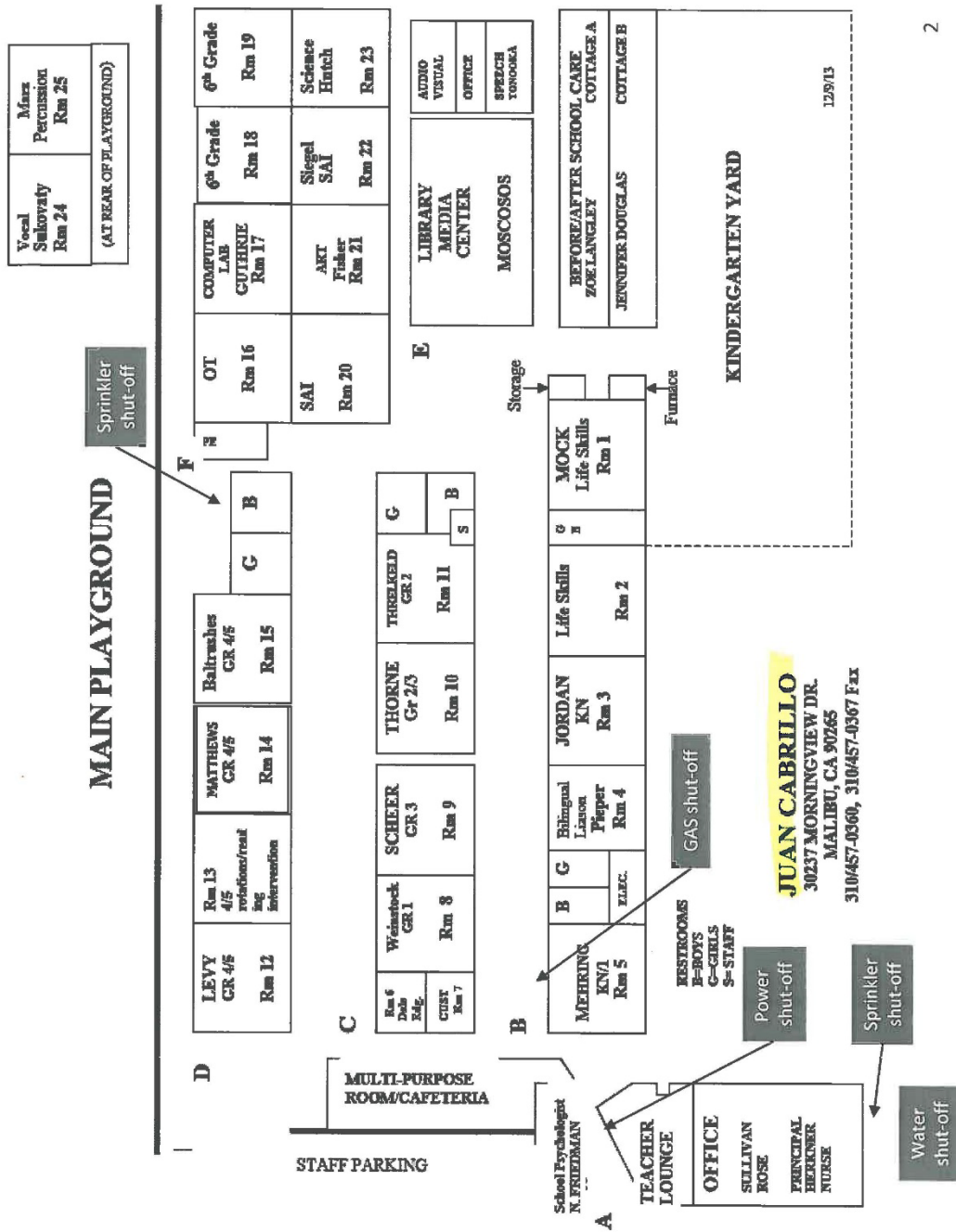
TK-5 Grading Periods:
 Conference: Nov. 4, 2016
 Winter Grading: Feb. 10, 2017
 Spring Grading: June 9, 2017

6-12 Grading Periods
 Aug. 22 - Sept. 30, 2016
 Oct. 4 - Nov. 10, 2016
 Nov. 14 - Dec. 23, 2016
 Jan. 9 - Feb. 24, 2017
 Feb. 27 - April 28, 2017
 May 1 - June 9, 2017

Revised 3/5/15



Cabrillo Elementary School Map



Appendix – B

Energy Utilization Analysis

Customer Name: **Santa Monica-Malibu USD**

Facility Name: **Juan Cabrillo Elementary**

Elec Utility Name: SCE			Natural Gas Utility Name: SCG		
Account #	Meter #	Rate Schedule	Account #	Meter #	Rate Schedule
2-35-574-7452	259000-073666	TOU-GS-2-R	6307342052	144465685	GN-10-NON-RESIDENTIAL
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

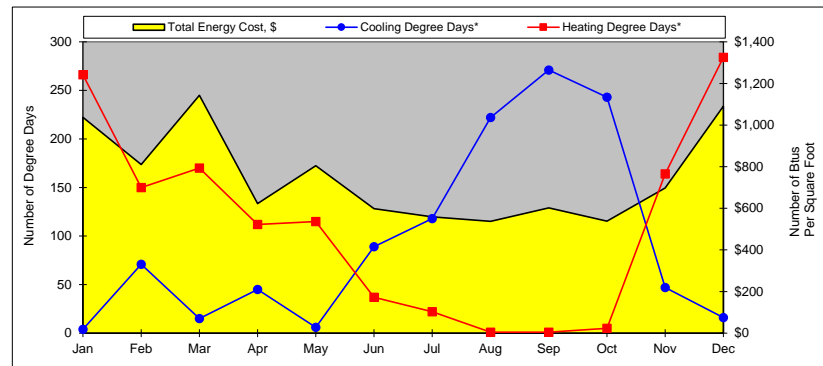
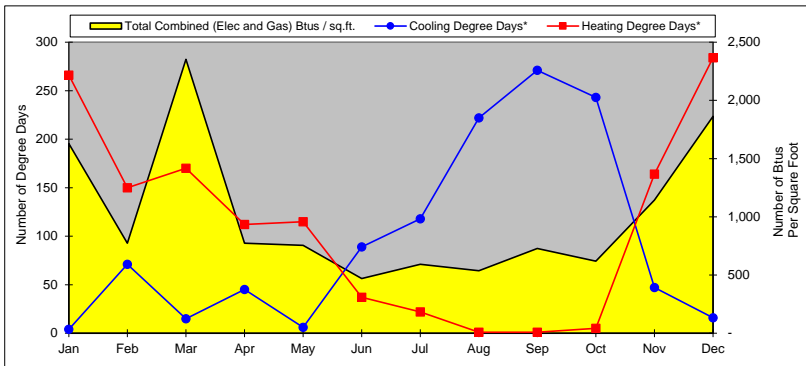
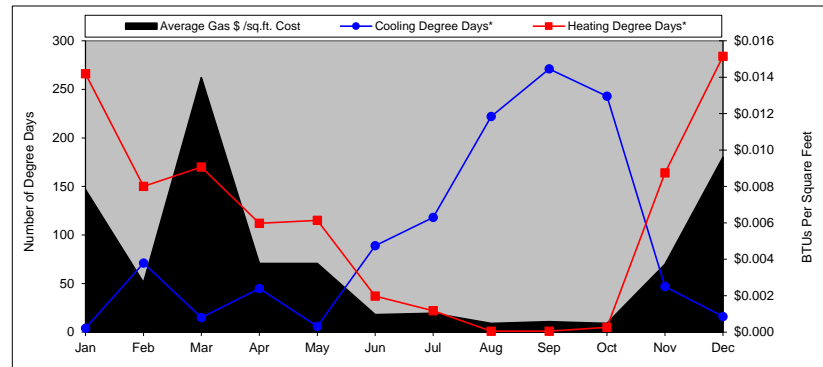
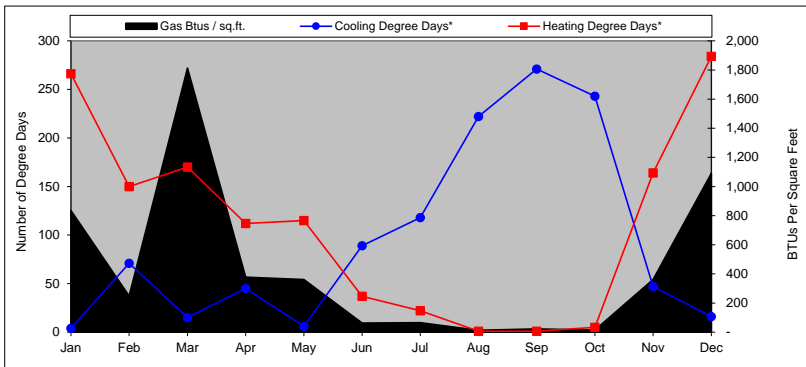
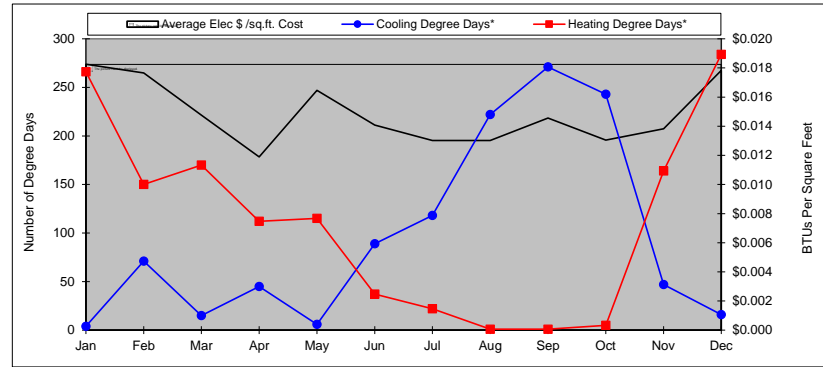
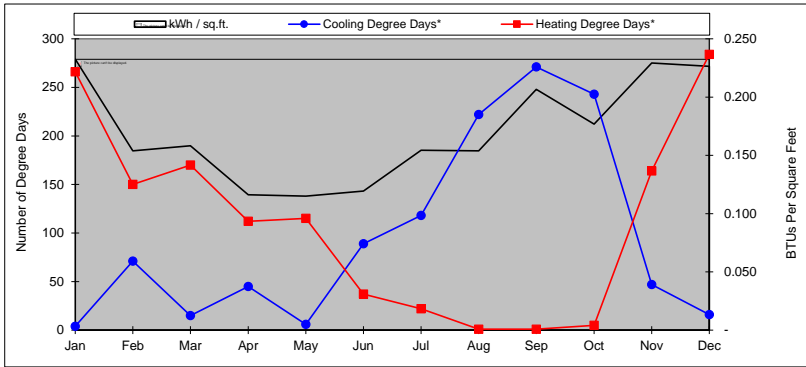
Facility Location: 30237 Morning View Drive, Malibu, CA
 Sq. Ft. (conditioned space): 39,773
 Billing Period
 FROM: Jul-15
 TO: Jun-16

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL ANNUAL (Purchased from SCE)	TOTAL ANNUAL (Purchased from SCE and Solar Production)
Cooling Degree Days*	4	71	15	45	6	89	118	222	271	243	47	16	1,147	
Heating Degree Days*	266	150	170	112	115	37	22	1	1	5	164	284	1,327	
Days in Billing Period														
electric	30	30	32	29	29	32	32	29	30	32	29	33	367	
natural gas	30	30	31	28	31	29	32	29	30	28	34	33	365	
Electric Usage														
kWh per Billing Cycle	9,249	6,116	6,290	4,623	4,573	4,744	6,136	6,116	8,216	7,034	9,118	9,002	81,217	206,439
\$ for kWh Billed	\$726	\$702	\$587	\$473	\$655	\$560	\$518	\$518	\$579	\$519	\$550	\$709	\$7,096	
Max kW Billed	45	42	32	22	38	29	32	32	38	32	35	51	36	
\$ for kW Billed	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Total Electric Cost, \$	\$726	\$702	\$587	\$473	\$655	\$560	\$518	\$518	\$579	\$519	\$550	\$709	\$7,096	
Ave. Daily Electric Cost, \$	\$24	\$23	\$18	\$16	\$23	\$18	\$16	\$18	\$19	\$16	\$19	\$21	\$19	
Average \$/kWh Cost	\$0.078	\$0.115	\$0.093	\$0.102	\$0.143	\$0.118	\$0.084	\$0.085	\$0.070	\$0.074	\$0.060	\$0.079	\$0.087	
Average Elec \$ /sq.ft. Cost	\$0.018	\$0.018	\$0.015	\$0.012	\$0.016	\$0.014	\$0.013	\$0.013	\$0.015	\$0.013	\$0.014	\$0.018	\$0.178	
kWh / sq.ft.	0.233	0.154	0.158	0.116	0.115	0.119	0.154	0.154	0.207	0.177	0.229	0.226	2.04	5.19
Natural Gas Usage														
Therms per Billing Cycle	332	99	721	150	144	25	26	5	9	6	144	434	2,095	
Total Gas Cost, \$	\$311	\$108	\$556	\$150	\$150	\$38	\$41	\$19	\$23	\$19	\$148	\$382	\$1,945	
Ave. Daily Gas Cost, \$	\$10	\$4	\$18	\$5	\$5	\$1	\$1	\$1	\$1	\$1	\$4	\$12	\$5	
Average \$/therm Cost	\$0.937	\$1.091	\$0.771	\$1.000	\$1.042	\$1.520	\$1.577	\$3.800	\$2.556	\$3.167	\$1.028	\$0.880	\$0.928	
Average Gas \$ /sq.ft. Cost	\$0.008	\$0.003	\$0.014	\$0.004	\$0.004	\$0.001	\$0.001	\$0.000	\$0.001	\$0.000	\$0.004	\$0.010	\$0.049	
Gas Btus / sq.ft.	835	249	1,813	377	362	63	65	13	23	15	362	1,091	5,267	
Total Energy Usage														
ombined (Elec and Gas) Btus / sq.ft.	1,628	774	2,353	774	754	470	592	537	728	619	1,144	1,864	12,237	
Total Energy Cost, \$	\$1,037	\$810	\$1,143	\$623	\$805	\$598	\$559	\$537	\$602	\$538	\$698	\$1,091	\$9,041	
Ave. Energy \$/sq.ft./period	\$0.03	\$0.02	\$0.03	\$0.02	\$0.02	\$0.02	\$0.01	\$0.01	\$0.02	\$0.01	\$0.02	\$0.03	\$0.23	

* Notes:
 1) Heating degree days and cooling degree days are based on 65 F.
 2) Heating degree days and cooling degree days are based on Santa Monica weather data.

Customer: Santa Monica-Malibu USD
Building: Juan Cabrillo Elementary

Energy Used from: Jul-15
to: Jun-16



Appendix – C

Lighting Systems Audit



