

Laguna Beach Unified School District

Energy and Carbon Master Plan – Final Report

P2S ENG

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1. EXECUTIVE SUMMARY

1.1 Background and Scope

Laguna Beach Unified School District (LBUSD) is located in Laguna Beach, California. LBUSD has multiple campuses – Laguna Beach High School, Thurston Middle School, El Morro Elementary, Top of the World Elementary, District Office, and the Warehouse. The school district contains over 30 buildings with a mix of classroom buildings, lab and activity buildings, administrative buildings, athletic complexes, and kitchen/dining buildings.

P2S was contracted by LBUSD to conduct an energy audit on the six campuses. The goal of this report is to empower LBUSD to reduce energy consumption, reduce carbon emissions, and optimize operational costs across these campuses. This report details the summary of findings, analysis of existing conditions, and measures to meet the district's goals. Also included in this report is a summary of a simple payback cost analysis of recommended measures.

The campuses included in the scope of this report are:

Campus	Square Footage	Scope
District Office	6,355	ASHRAE 3
El Morro Elementary	47,916	ASHRAE 3
Laguna Beach High School	130,266	ASHRAE 3
Thurston Middle School	63,144	ASHRAE 3
Top of the World Elementary	51,840	ASHRAE 3
LBHS Stadium	118,220	Lighting
LBHS Theater	10,100	Lighting
Warehouse	9,445	EV

1.2 Methodology

The following methodology was adopted in preparing this report. Each of the stages adopted is described below:



Data Collection

The development of this report began with a clear understanding of the buildings' baseline energy and a comprehensive understanding of each building's operation. This was achieved via methodical data collection, site audits, and campus stakeholder engagement.

ASHRAE Level 3 Audits, analysis of energy usage based on detailed data and energy models, and analysis of building-specific equipment and operation conditions were performed for each of the buildings in this scope.

Data collection included building mechanical and plumbing systems, lighting counts and fixture types, and equipment condition assessments that contributed to energy consumption.

Data Analysis

Data collected was analyzed concerning 2023 energy usage. Energy models were developed in Trane TRACE 700 software for each campus to estimate overall energy consumption for each end-use. The models were calibrated using available utility meter data.

Recommendations

Once the data was collected and analyzed, energy conservation measures were developed. Building-specific Energy Conversation Measures (ECMs) were identified for each building. These measures include proposed HVAC and lighting systems upgrades and replacements. The measures include, but are not limited to, LED lighting upgrades, control upgrades and scheduling, PV and energy storage system and more.

These measures were then applied to the baseline energy model, and energy and cost savings results for any upgrades were captured. Table below is a summary of recommended measures throughout the district.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon (lbs)	Implementation Cost
Baseline	1,780,221	29,281	9,002,214	1,228,070	-
Scheduling Updates	1,655,017	29,281	8,575,017	1,022,196	N/A
Lighting Upgrades	1,366,321	29,281	7,589,986	1,022,196	$1,572,758.00
PV and BESS	-665,317	29,281	658,037	11,659	$6,709,662.00
EV Stations	-140,352	29,281	2,449,218	272,776	$356,500.00
HVAC Replacement	10,719	4,909	527,427	62,761	$10,591,554.28
DWH Replacement	123,089	0	419,978	61,224	$232,000.00
Total – By 2030	123,089	0	419,978	61,224	$19,462,474.28

The table below shows the high-level summary of energy and decarbonization plan through 2030. More information regarding each measure, and each campus is available in section 5.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon (lbs)	Implementation Cost
Baseline	1,780,221	29,281	9,002,214	1,228,070	-
Summer 2025	1,366,321	29,281	7,589,986	1,022,196	$1,572,758
Summer 2026	941,537	28,824	6,094,923	805,561	$3,284,273
Summer 2027	-136,963	28,824	2,415,081	269,115	$3,917,889
Summer 2028	-72,126	17,056	1,459,505	163,680	$6,055,164
Summer 2029	10,719	4,909	527,427	62,761	$4,400,391
Summer 2030	123,089	0	419,978	61,224	$232,000
Total	123,089	0	419,978	61,224	$19,462,474

2. EXISTING CONDITION

In this section, utility bills were gathered for both electricity and natural gas consumption during 2023. Where any months utility bills were not available, the energy consumption for that month was gathered from the historic information on the next month bill. These numbers are indicated in red in tables below. The cost for electricity during these months were then estimated based on the data available for the rest of the year.

The Energy Use Intensity (EUI) for each campus is then calculated based on electricity and natural gas energy usage. The annualized usage is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

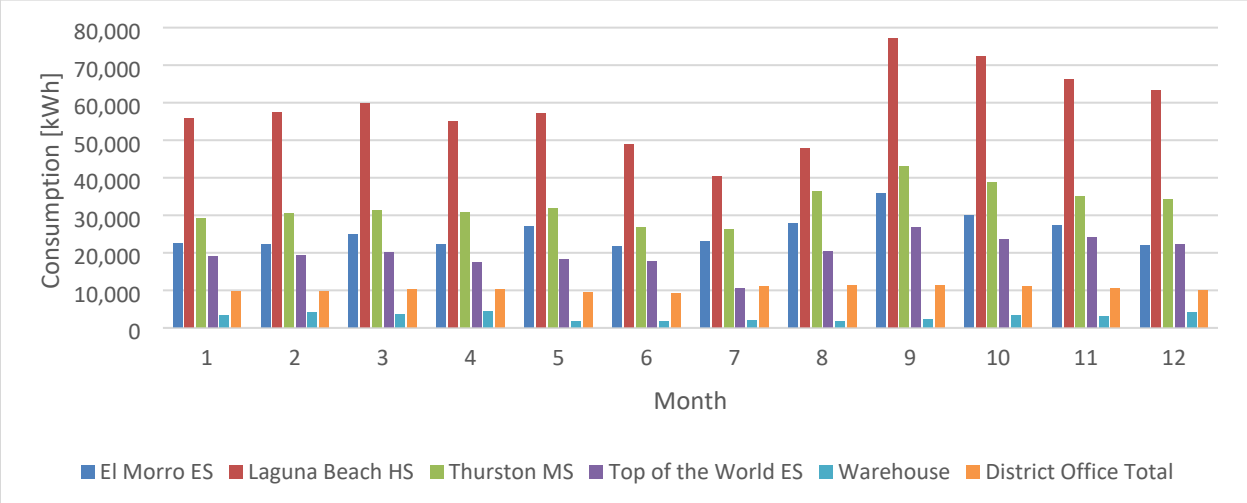
To calculate the total greenhouse gas emission the total annual consumption of electricity and natural gas was then multiplied by each energy source respective emission factor. Since SCE has not yet published their 2023 energy mix emission factor, the e-Grid website by U.S. Environmental Protection Agency was used to find electrical emission factor, e-CO_2 emissions factor of 497.4 lbs/MWh for electricity and 11.7 lbs/terms was used in calculations below.

2.1 District-wide Consumption

2.1.1 Energy, Carbon & Cost

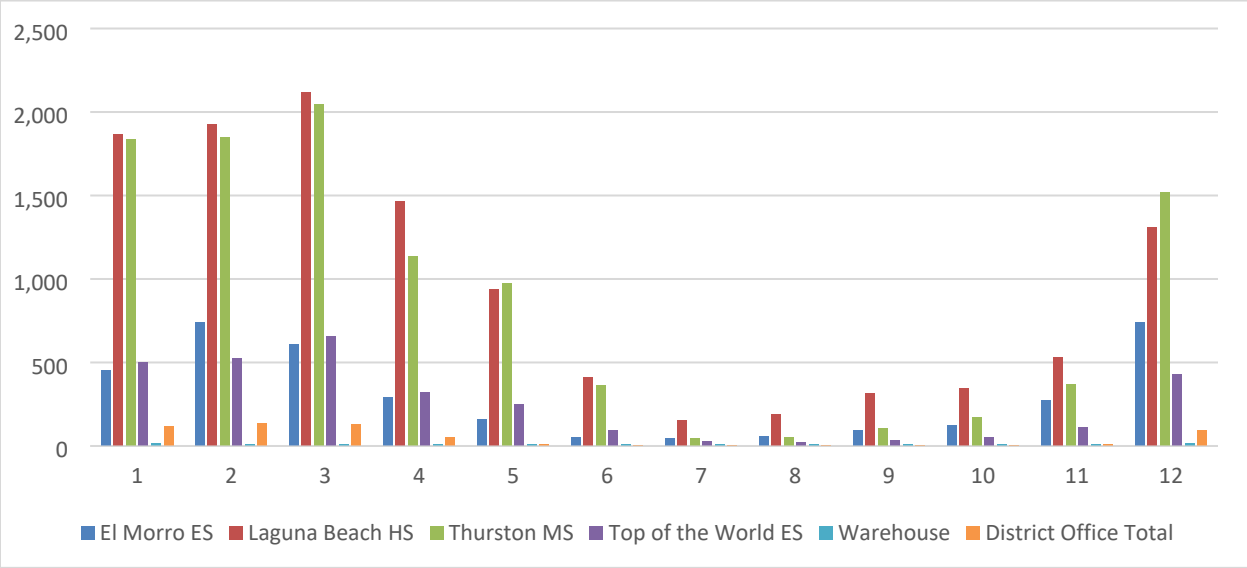
Electricity Consumption

The bar graph below shows the electricity consumption during 2023 collected from all meters throughout Laguna Beach Unified School District. Each campus individual consumption analysis is included in sections below.



Natural Gas Consumption

The bar graph below shows the Natural Gas consumption during 2023 collected from all meters throughout Laguna Beach Unified School District. Each campus individual consumption analysis is included in sections below.



Energy Use Intensity (EUI)

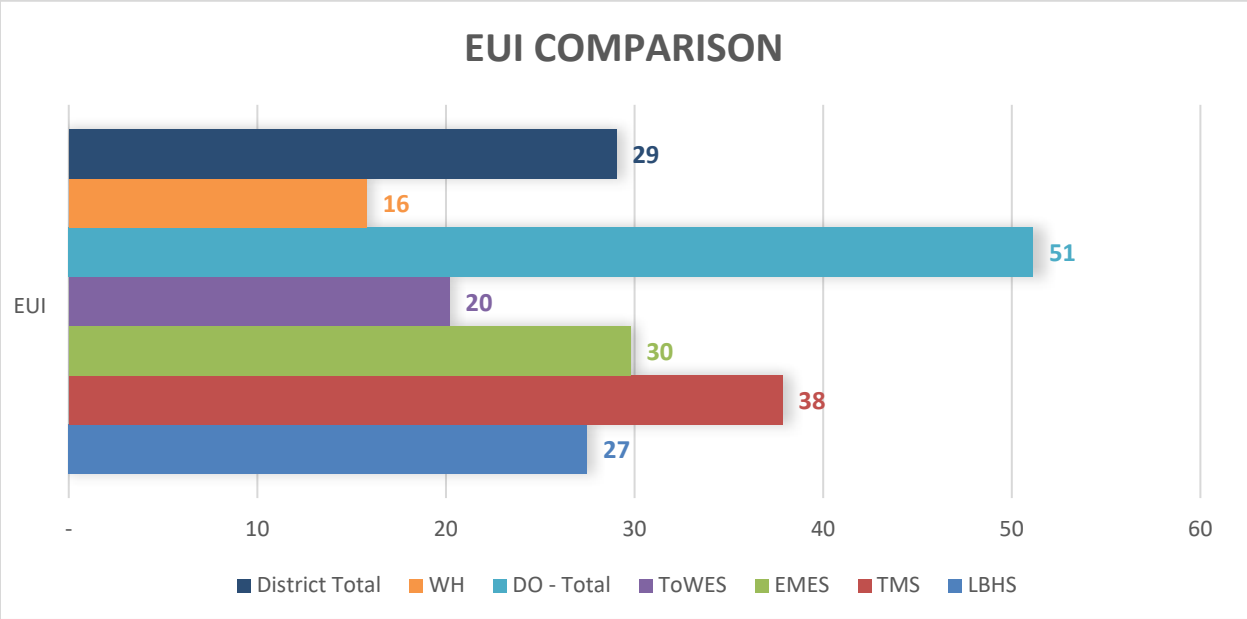
The annualized usage for both Natural Gas and Electriciry is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

Table1: Laguna Beach District Consumption and EUI

Energy Source	2023 Consumption	Consumption (kBtu/year)	Percent Total	EUI Contribution
Electricity (kwh)	1,800,900	6,144,671	68%	19
Natural Gas (Therms)	29,309	2,930,900	32%	9
Total	-	9,075,571	100%	29

The chart below shows the EUI of each site. EUIs are a useful tool to assess and compare energy consumption of a building. ASHRAE Standard 100-2024, Energy and Emission Building Performance Standard for Existing Buildings, provides a target value for each building type based on Climate zones. These values can be used to assess where each campus energy consumption falls compared to new standards. Table below shows a summary of building usage and ASHRAE 2024 standard EUI targets based on Laguna Beach Climate zone.

Building Type	EUI Target per ASHRAE
Office	25
Elementary and Middle School	26
High School	31

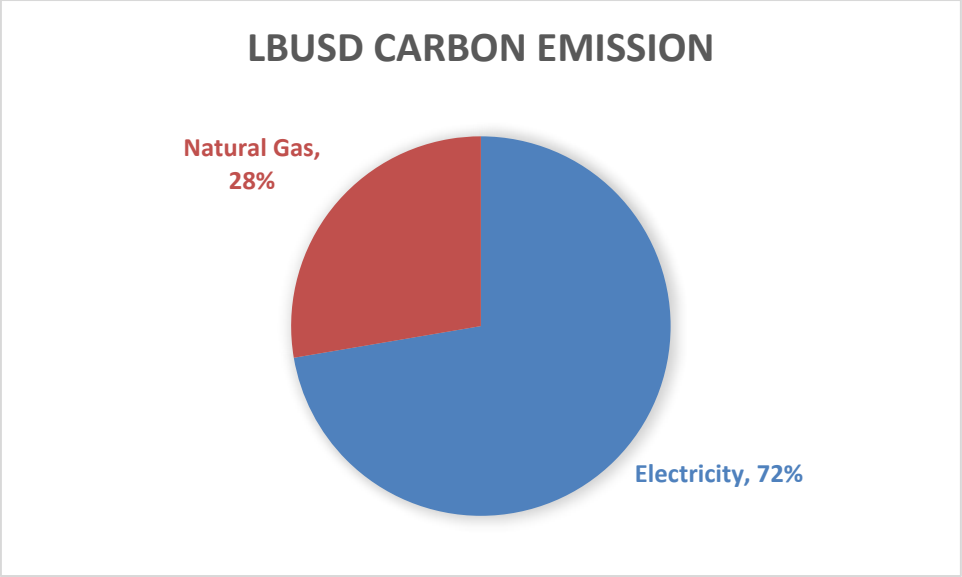


Greenhouse Gas Emissions

The table below summarizes the greenhouse gas emissions from Laguna Beach High School District energy consumption.

Table: Laguna Beach School District GHG Emissions

Energy Source	Annual Consumption, kBtu	Annual CO_2-eq Emission, lbs	Emission Contribution
Electricity	6,144,671	896,308	72%
Natural Gas	2,930,900	342,915	28%
Total	9,075,571	1,239,223	100%



2.2 District Office

The District Office consists of two office buildings - Building A (with Building C extension) and Building B. The buildings are one story above grade totaling approximately 6,355 sf. The buildings were originally constructed in 1967 and 1968. During the site survey, the P2S team surveyed these buildings.

The District Office also includes two residential buildings that are currently used for district operations (811 Manzanita Drive and 733 Saint Ann's Drive). These two buildings are not included in the full analysis of this report, but a summary of consumption for each of these buildings is presented below.

2.2.1 Energy, Carbon & Cost

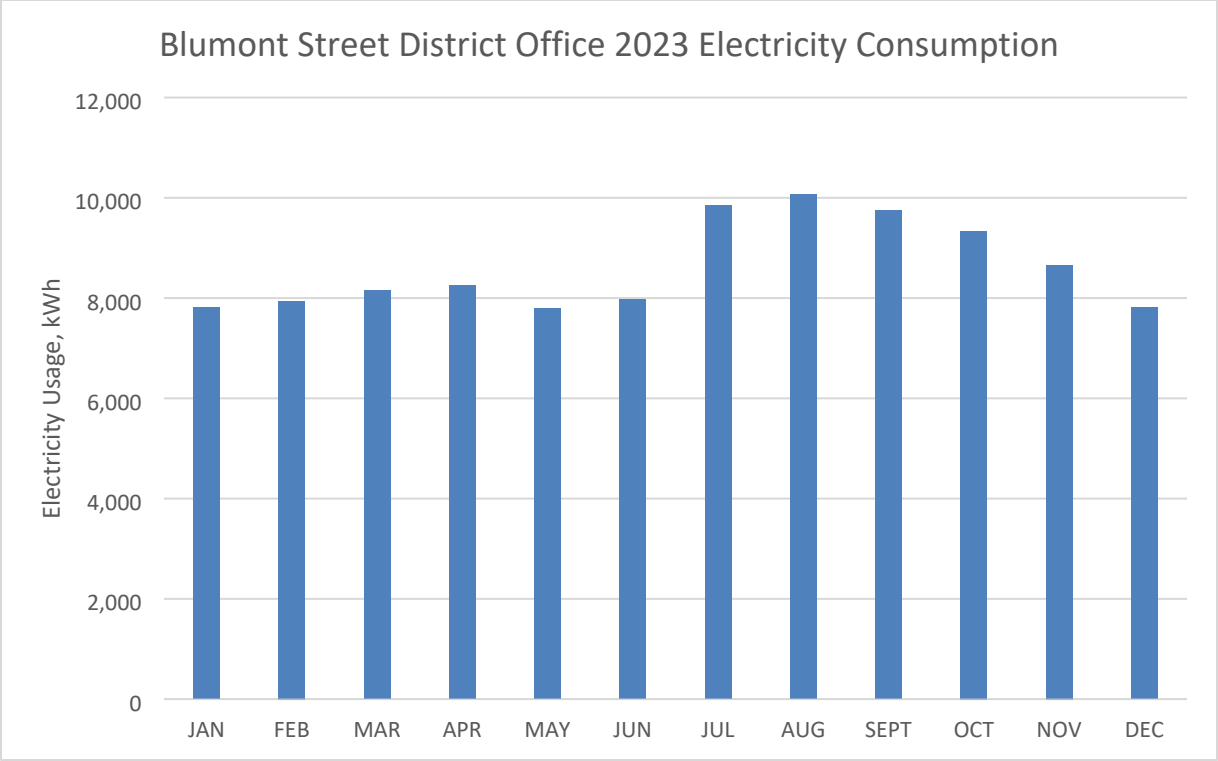
Electricity Consumption

The table and bar graph below show the electricity consumption during 2023 collected from metered data. All data was taken from the 550 Blumont Street meter. The costs for January, July, and December were not found in the electric utility bill.

Table: Blumont Street District Office 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	7,816	252	-
FEB	28	7,941	284	$1,885.86
MAR	31	8,145	263	$1,917.63
APR	30	8,252	275	$1,931.13
MAY	31	7,791	251	$1,800.16
JUN	30	7,975	266	$2,446.74
JUL	31	9,852	318	-
AUG	31	10,064	325	$3,500.26
SEP	30	9,740	325	$3,439.75
OCT	31	9,338	301	$2,579.41
NOV	30	8,659	289	$2,117.90
DEC	31	7,805	252	-
TOTAL:	**365**	**103,378**		**$21,618.84**

Average	$0.28	$/kWh
	283	kWh/day
	$78.60	$/day



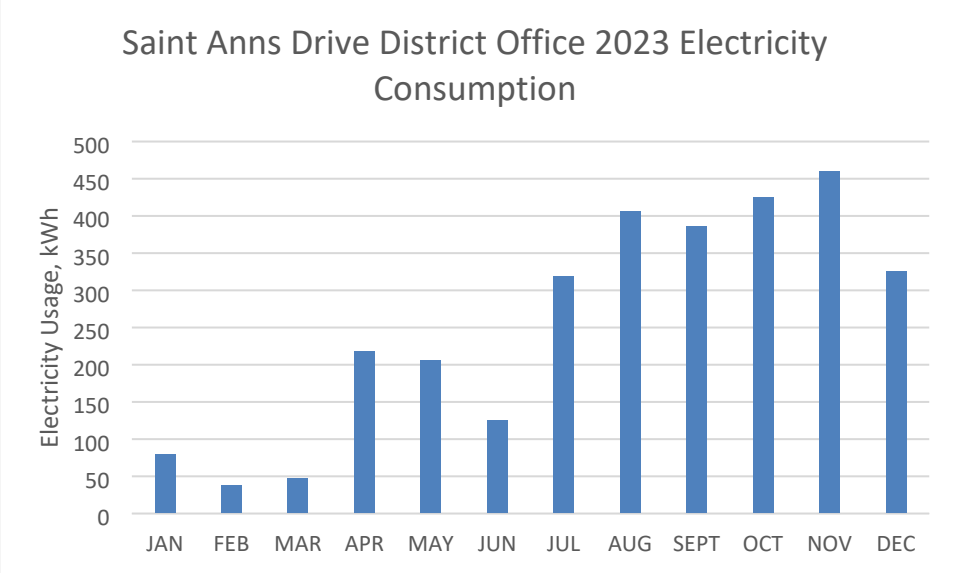
The variation of the electrical energy consumption for different months are not as usually anticipated. The overall electrical energy consumption stays between 80%-100% of the monthly maximum consumption in September throughout the year.

The table and bar graph below show the electricity consumption during 2023 collected from metered data. All data was taken from the 733 Saint Anns Drive meter.

Table: Saint Anns Drive District Office 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	80	3	-
FEB	28	38	1	$21.95
MAR	31	48	2	-
APR	30	218	7	$66.04
MAY	31	206	7	$66.93
JUN	30	126	4	$48.65
JUL	31	319	10	-
AUG	31	407	13	$143.18
SEP	30	387	13	$123.49
OCT	31	425	14	$51.90
NOV	30	460	15	$128.04
DEC	31	326	11	-
TOTAL:	**365**	**3,040**	**-**	**$650.18**

Average	$0.29	$/kWh
	8	kWh/day
	$2.39	$/day

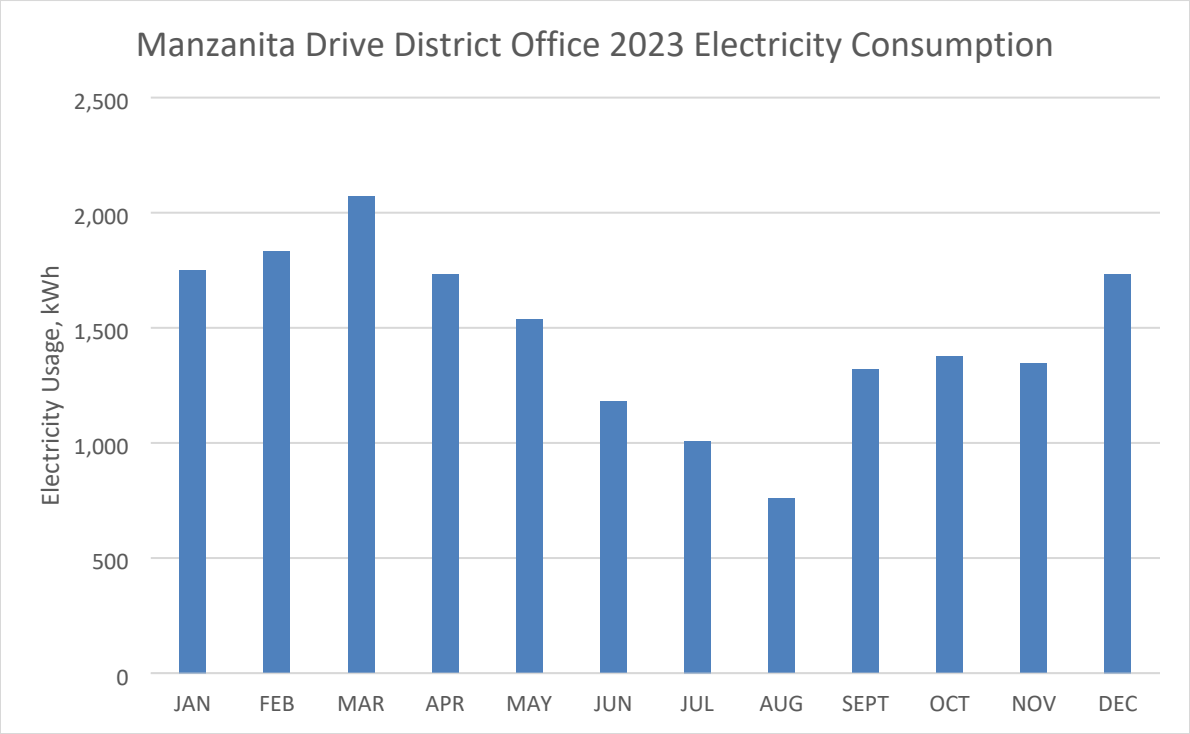


The table and bar graph below show the electricity consumption during 2023 collected from metered data. All data was taken from the 811 Manzanita Drive meter.

Table: Manzanita Drive District Office 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	1,751	56	-
FEB	28	1,831	65	$450.62
MAR	31	2,069	67	$440.19
APR	30	1,733	58	$420.89
MAY	31	1,537	50	$374.34
JUN	30	1,180	39	$333.38
JUL	31	1,008	33	-
AUG	31	758	24	$261.16
SEP	30	1,318	44	$434.33
OCT	31	1,376	44	$310.30
NOV	30	1,344	45	$343.61
DEC	31	1,734	56	-
TOTAL:	**365**	**17,639**	**-**	**$3,368.82**

Average	$0.26	$/kWh
	48	kWh/day
	$12.38	$/day

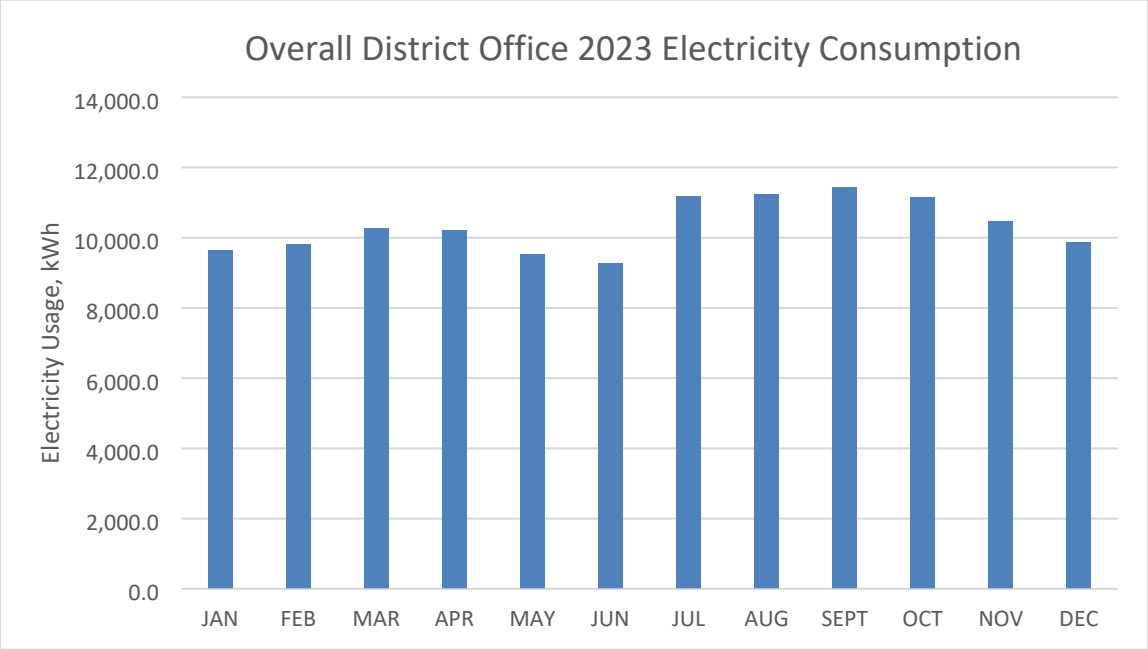


The table below shows the sum of all the electrical energy consumption for all three locations of the District Office.

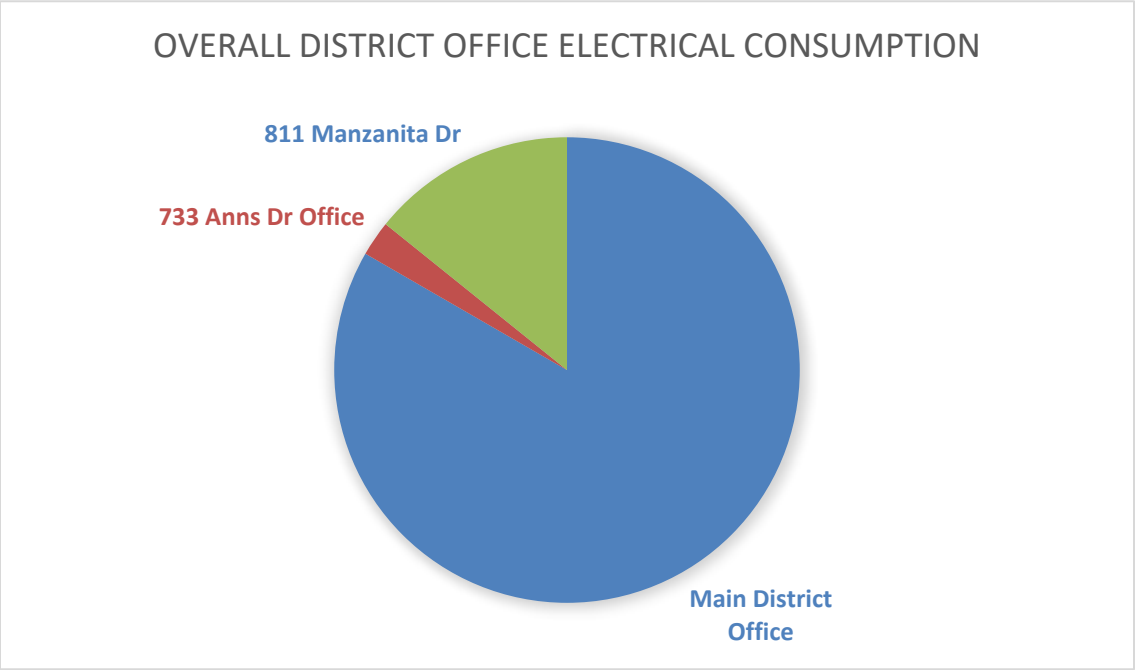
Table: Overall District Office 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	9,647	311	-
FEB	28	9,810	350	2,358.4
MAR	31	10,262	331	2,357.8
APR	30	10,203	340	2,418.1
MAY	31	9,534	307	2,241.4
JUN	30	9,281	309	2,828.8
JUL	31	11,179	360	-
AUG	31	11,229	362	3,904.6
SEP	30	11,445	381	3,997.6
OCT	31	11,139	359	2,941.6
NOV	30	10,463	348	2,589.6
DEC	31	9,865	318	-
TOTAL:	**365**	**124,057**	**-**	**25,637.8**

Average	$0.27	$/kWh
	340	kWh/day
	$93.33	$/day



The chart below indicates the proportion of energy usage for each District Office location. We concentrated on the main District Office location at 550 Blumont Street, and this report's analysis is only based on this location.


OVERALL DISTRICT OFFICE ELECTRICAL CONSUMPTION
811 Manzanita Dr
733 Anns Dr Office
Main District Office

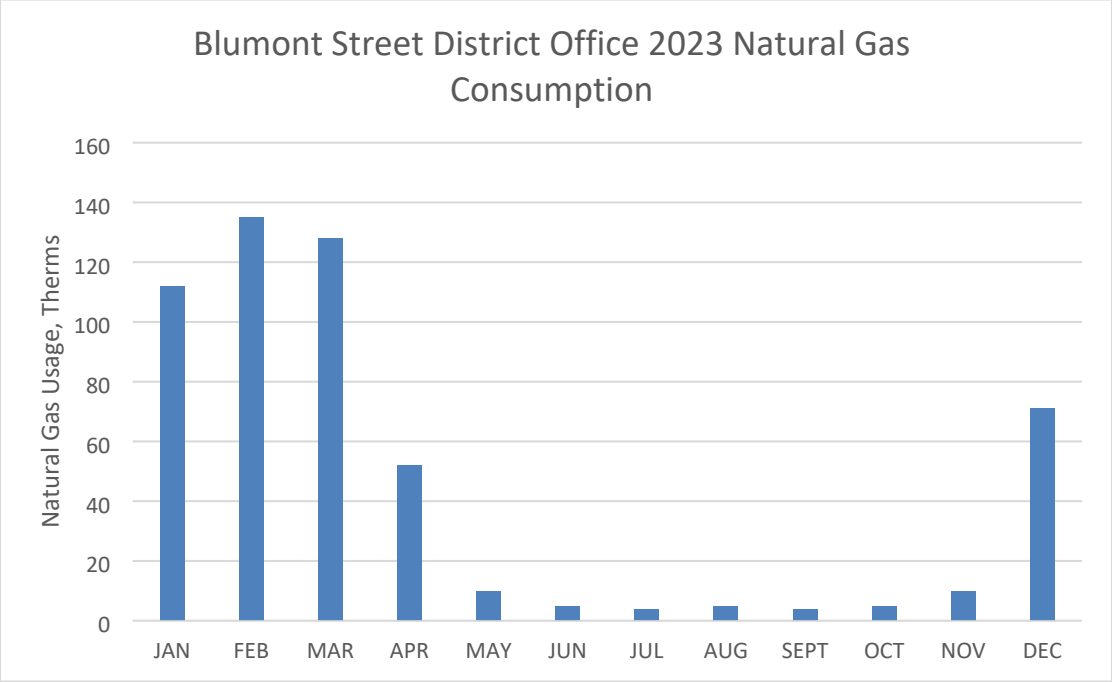
Natural Gas Consumption

The table below shows the gas consumption for the 550 Blumont Street District Office. Two separate gas meters serve this address. The numbers below show the sum of the two meters.

Table: Blumont Street District Office 2023 Gas Consumption

Month	Days	Therms	Therms/Day	Cost
JAN	31	112	4	$583.47
FEB	28	135	5	-
MAR	31	128	4	$259.37
APR	30	52	2	-
MAY	31	10	0	$45.45
JUN	30	5	0	$36.65
JUL	31	4	0	$38.26
AUG	31	5	0	$37.57
SEP	30	4	0	$37.40
OCT	31	5	0	$38.56
NOV	30	10	0	$49.34
DEC	31	71	2	-
TOTAL:	**365**	**541**	**-**	**$1,126.07**

Average	$3.98	$/therm
	1	therms/day
	$5.90	$/day

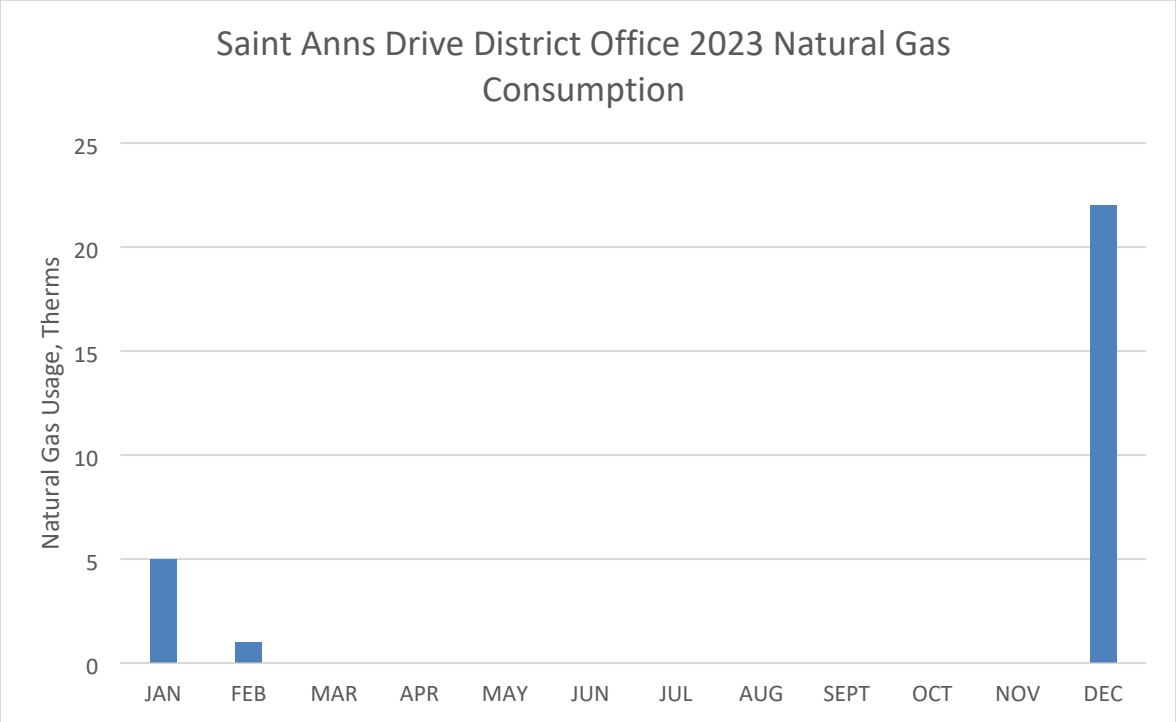


The table below shows the gas consumption for 733 Saint Anns Drive District Office.

Table: Saint Anns District Office 2023 Gas Consumption

Month	Days	Therms	Therms/Day	Cost
JAN	31	5	0	$37.29
FEB	28	1	0	-
MAR	31	0	0	$14.30
APR	30	0	0	-
MAY	31	0	0	$14.79
JUN	30	0	0	$14.30
JUL	31	0	0	$15.78
AUG	31	0	0	$14.30
SEP	30	0	0	$15.29
OCT	31	0	0	$15.29
NOV	30	0	0	$15.29
DEC	31	22	1	-
TOTAL:	**365**	**28**	**-**	**$156.63**

Average	-	$/therm
	0	therms/day
	$2.40	$/day



Energy Use Intensity (EUI)

The Energy Usage Intensity (EUI) is expressed as energy consumption per square foot per year. It is calculated by dividing the total energy consumed by the building in one year (measured in kBtu) by the total gross floor area of the buildings.

For the District Office, the energy usage is from electricity and natural gas. The annualized usage is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

Table: District Office Consumption and EUI

Office Address	Electricity (kWh)	Natural Gas (Therms)	EUI (kBtu/SF-year)	EUI Contribution
550 Belmount	103,378	541	51	Electricity 87%, Gas 13%
733 Anns Dr	3,040	28	3	Electricity 79%, Gas 21%
793 Manzanita Dr	17,639	0	17	Electricity 100%
Total District	124,057	569	21	Electricity 88%, Gas 12%

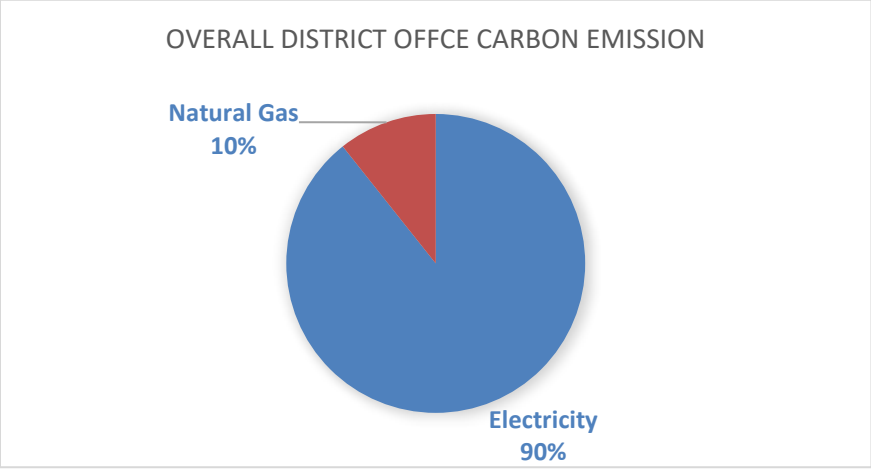
Greenhouse Gas Emissions

The table below summarizes the greenhouse gas emissions from District Office energy consumption. It should be noted that since the breakdown of refrigerant fills per building was not available during this study, the effect of refrigerant leak into the atmosphere is not included in the campus report.

Throughout this report 498 lbs of CO2 emissions per MWh of electrical consumption is used to calculate the GHG emission due to electrical consumption. For Natural gas consumption emission calculation 11.7 lbs of CO2 per therm is used.

Table: District Office GHG Emissions

Office Address	Electricity CO_2-eq, lbs	Natural Gas CO_2-eq, lbs	Total CO_2-eq, lbs
550 Belmount	51,451	6,330	57,781
733 Anns Dr	1,513	328	1,841
793 Manzanita Dr	8,779	0	8,779
Total District	61,743	6,657	68,400



2.2.2 Building Summary

2.2.2.1 Buildings A, B, & C

HVAC Description

The District Office consists of Buildings A, B, & C which comprise of offices, conference rooms, and break rooms.

Building A & C is served by six split systems to serve the offices and support spaces. The split systems are combination of heat pumps and cooling only systems. The server room has four additional split system heat pumps with wall-mounted fan coils, two of which are used for backup. The server room is set at a setpoint of 72F.

Building B includes Instructional Services and Student Services and is served by two condensing units with ducted underfloor forced air units. One of the units is a heat pump, while the other unit has a condensing air conditioning system with gas furnace fan coil.

The District Office has ceiling exhaust fans to serve the restrooms.

Plumbing Description

No domestic water heaters were found for the District Office, but it is assumed there is a gas water heater based on the gas utility bills.

Lighting Description

Building A

Building A is illuminated with fluorescent fixtures that have been recently converted to LED lamps, 6" diameter LED fixtures, 8" circular fluorescent fixtures, and other accent lighting. These fixtures are used in hallways, restrooms, open offices, and private offices. The fixtures are all controlled using toggle switches with no occupancy sensors existing.



Multi-lamp Office Fixture



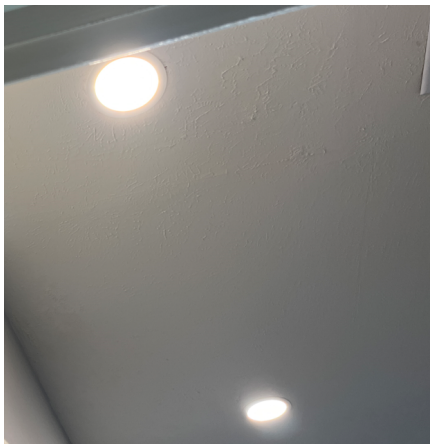
6" Diameter Downlight

Building B

Building B is illuminated with fluorescent fixtures that have been recently converted to LED lamps. Fixtures mainly used in this building include 1”x4’ surface mounted with prismatic lenses, pendant mounted 4’ direct/indirect fluorescent fixtures, and 3” diameter LED downlights. These fixtures are used in classrooms and hallways throughout the building. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building B but are using outdated sensors with a few that are not functioning, along with old fluorescent ballasts.



4’ Pendant Mounted Fixture



3” Diameter Downlight

Building C

Building C is an additional unit to Building A and is illuminated with all LED fixtures. Fixtures mainly used in this building include 2’x4’ LED Troffers, 4’ Linear surface mounted LEDs, and 2’x2’ LED Troffers. These fixtures are used in the open offices and the IT room. The fixtures are controlled using toggle switches, and occupancy sensors. There are working occupancy sensors in all the rooms in building C and are using up to date controls.



2’x4’ LED Troffer



4’ Linear Surface Mounted LED

2.3 Laguna Beach High School

Laguna Beach High School consists of 13 buildings. The buildings include classrooms, labs, offices, gymnasium, kitchen, and dining totaling approximately 130, 266 sf. The original construction was built in 1958. The energy consumption noted below includes both the stadium and the theater building, as well as the rest of this campus.

Laguna Beach High School also includes a pool, that is open to the city of Laguna beach. In previous years, the pool has been available to the city approximately 70% of the time, while it is available to the district 30% of the time. Currently the district is going through the process of redesigning the pool. At the time of this report, the pool redesign project is on preliminary stages, and enough information regarding future energy usage is not available. Districts is looking into engaging energy and sustainability consultants during early design stages of this project to ensure the new pool is aligned with District long team energy and decarbonization plan. The current plan does not include the energy consumption of the pool. As more information becomes available through later design stages this plan will include more information regarding the pool energy consumption and carbon emission.

2.3.1 Energy Carbon & Cost

Electricity Consumption

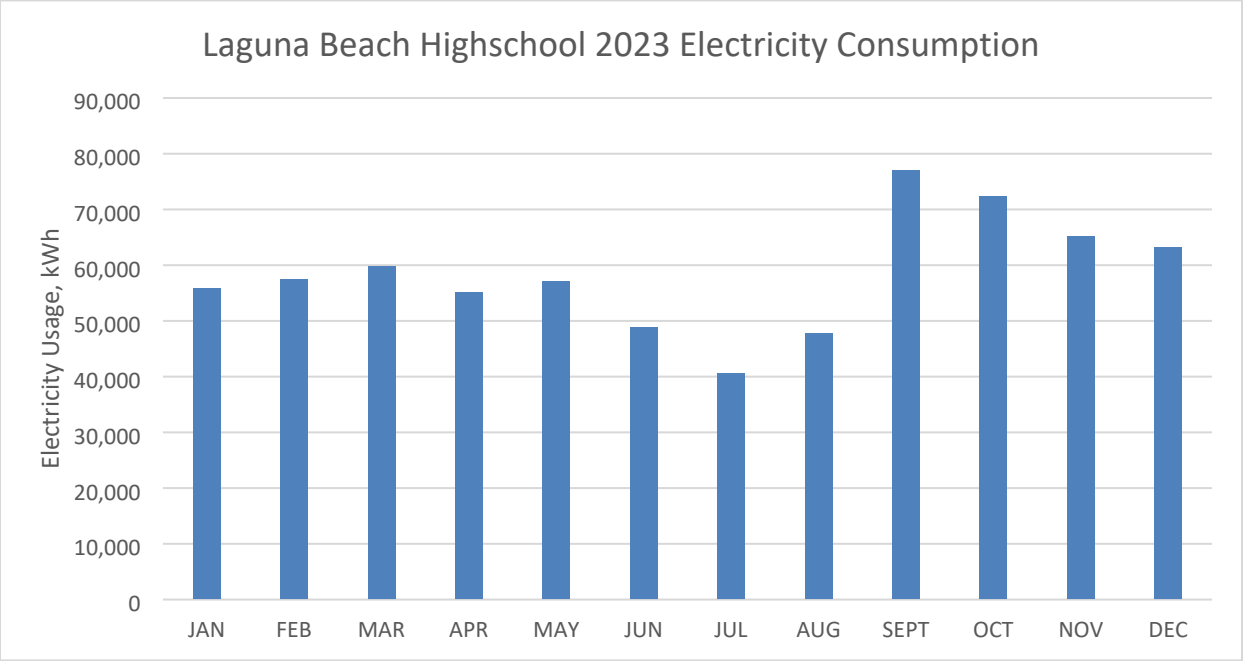
The table below shows the electricity consumption during 2023. The bar graph below shows the monthly electricity consumption for the campus during the same year gathered from metered trend data. Two electrical meters serves this campus. 625 Park Ave and 670 Park Ave meters. The numbers below show the sum of consumption based on the two meters.

Table: Laguna Beach High School 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	55,814	1,800	-
FEB	28	57,440	2,051	$13,618.88
MAR	31	59,818	1,930	$14,826.53
APR	30	55,092	1,836	$13,291.04
MAY	31	57,158	1,844	$12,911.42
JUN	30	48,850	1,628	$16,392.96
JUL	31	40,318	1,301	-
AUG	31	47,840	1,543	$19,800.35
SEP	30	77,143	2,571	$32,190.08
OCT	31	72,327	2,333	$21,067.22
NOV	30	66,175	2,206	$11,961.00
DEC	31	63,271	2,041	-
TOTAL:	**365**	**701,246**	**-**	**$156,059.48**

Average	$0.29	$/kWh
	1,921	kWh/day
	$553.34	$/day

Based on the 2023 district calendar, the school was mostly closed during June, July and August months, yet the electrical consumption for these months was 50%-60% of the maximum monthly consumption for the 2023 year. This large consumption could be due to lighting, equipment, or HVAC units remaining on during unoccupied periods.



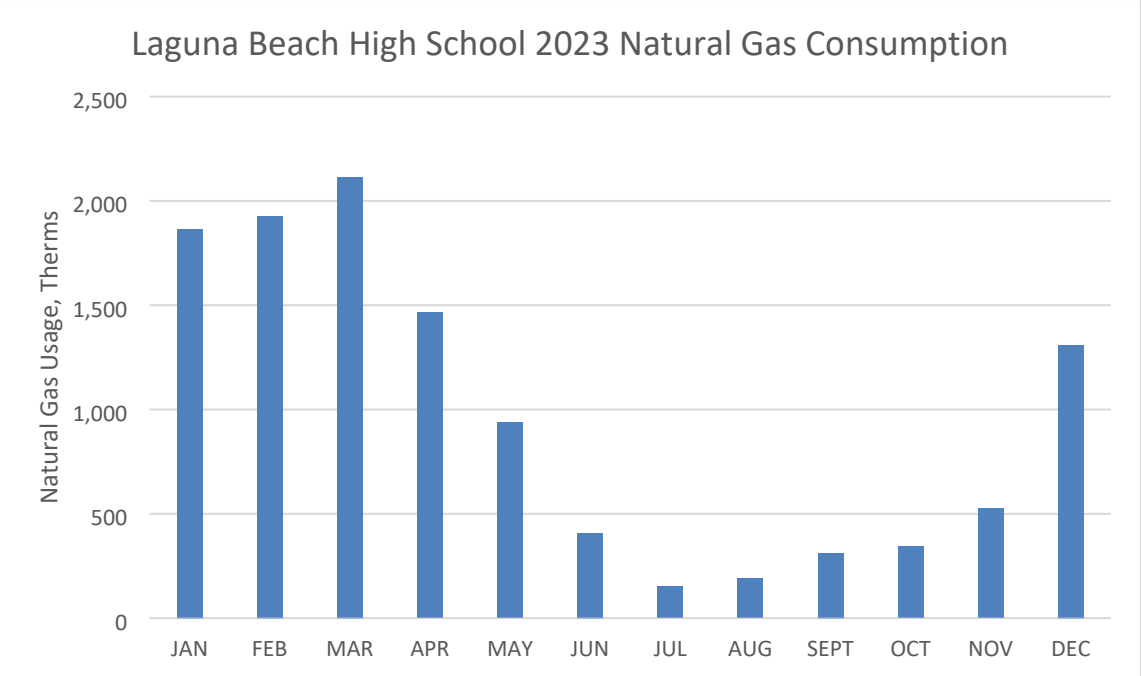
Natural Gas Consumption

The table below shows the gas consumption for 2023. The average cost of natural gas is calculated based on the 625 Park Ave Gym and Auditorium meters utility bill provided by the campus.

Table : Laguna Beach High School 2023 Gas Consumption

Month	Days	Therms	Therms/Day	Cost
JAN	31	1,865	60	$8,146.9
FEB	28	1,928	69	-
MAR	31	2,114	68	$3,086.3
APR	30	1,465	49	-
MAY	31	939	30	$1,315.2
JUN	30	408	14	$662.6
JUL	31	153	5	$287.7
AUG	31	189	6	$368.0
SEP	30	313	10	$563.6
OCT	31	342	11	$576.7
NOV	30	527	18	$1,006.6
DEC	31	1,306	42	-
TOTAL:	**365**	**11,549**	**-**	**$16,013.56**

Average	$2.34	$/therm
	32	therms/day
	$73.99	$/day



Energy Use Intensity

For Laguna Beach High School, the energy usage is from electricity and natural gas. The annualized usage is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

Table 2: Laguna Beach High School Consumption and EUI

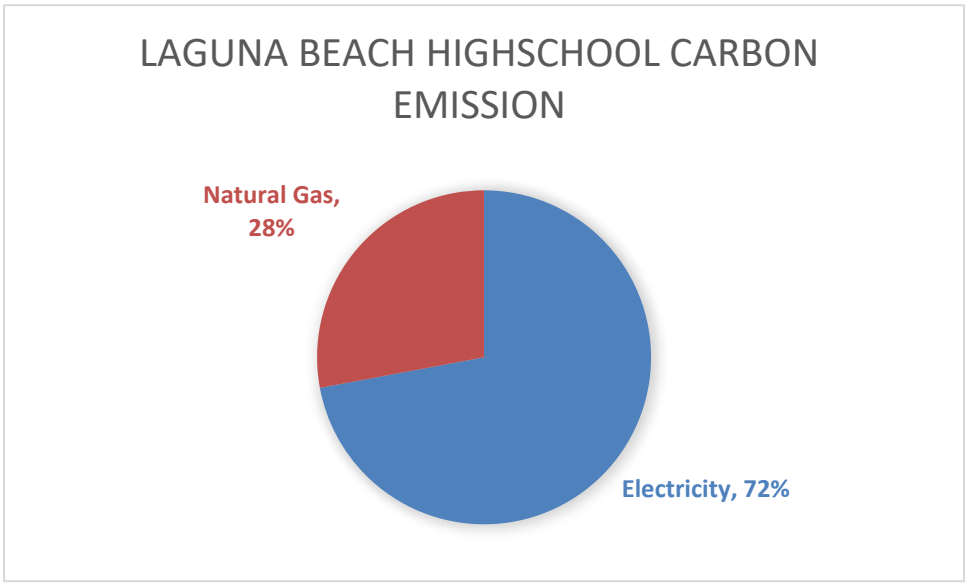
Energy Source	2023 Consumption	Consumption (kBtu/year)	Percent Total	EUI Contribution
Electricity (kwh)	701,246	2,392,651	67%	18
Natural Gas (Therms)	11,552	1,155,200	33%	9
Total	-	3,547,851	100%	27

Greenhouse Gas Emissions

The table below summarizes the greenhouse gas emissions from Laguna Beach High School energy consumption.

Table 3: Laguna Beach High School GHG Emissions

Energy Source	Annual Consumption, kBtu	Annual CO_2-eq Emission, lbs	Emission Contribution
Electricity	2,392,651	348,800	72%
Natural Gas	1,155,200	135,158	28%
Total	3,547,851	483,958	100%



2.3.2 Building Summary

2.3.2.1 Building A

HVAC Description

Building A is an administration building and consists of offices and conference rooms. The building is served by two packaged heat pump units located on the roof and four split system heat pumps with condensing units located on grade and wall-mounted fan coils in the offices.

Plumbing Description

There is one electric domestic water heater serving Building A located in the Mechanical room.

Lighting Description

Building A is illuminated with fluorescent fixtures that have been recently converted to LED lamps. Fixtures mainly used in this building include 9”x4’ surface mounted with prismatic lenses, 2’x4’ recessed troffer, and 3” diameter downlights. These fixtures are used in offices and conference rooms. The fixtures are controlled using toggle switches and occupancy sensors. There are occupancy sensors working in all the rooms in building A and are using up to date controls as the building has gone through a recent retrofit. However, the fluorescent ballast does not appear to be using the same controls.



2'x4' Recessed LED Troffer



9”x4’ Surface Mounted Fluorescent Fixture

2.3.2.2 Building B, E, H, & N

HVAC Description

Building B & E are classroom buildings primarily served by gas-electric packaged units.

Building B has five gas electric rooftop packaged units and 10 additional split systems for cooling with gas furnace. Classrooms have one dedicated unit per classroom. The building has exhaust fans serving the support areas.

Building E has 15 gas electric rooftop packaged units. Classrooms on the second floor have one dedicated unit serving each space. Classrooms on the first floor have two dedicated units serving each space. There are also four exhaust fans serving restrooms, the elevator room, and the dark room. This building also has one dust collector serving the Ceramics Classroom.

Building H is served by two gas electric packaged units, and three split system heat pumps. One of the condensing units is currently non-operational. There is one unit that serves both a classroom and offices. The other systems are 1-to-1.

Building N is served by five gas-electric packaged units and one heating and ventilating gas unit. There are also two exhaust fans serving restrooms and lockers.

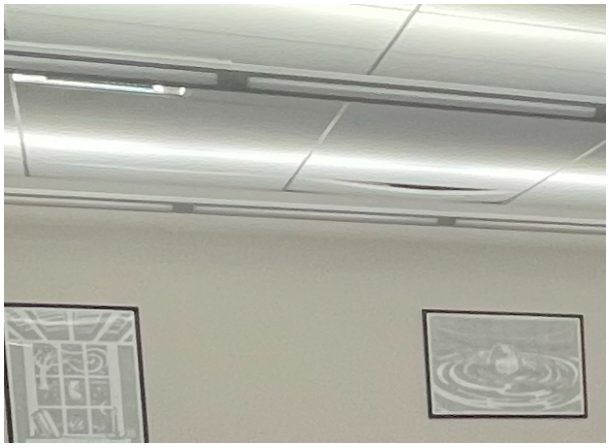
Plumbing Description

No domestic water heaters were found in these buildings.

Lighting Description

Building B

Building B is illuminated with fluorescent fixtures that have been recently converted to LED lamps. Fixtures mainly used in this building include 9"x4' surface mounted with prismatic lenses and pendant mounted 4' direct/indirect fluorescent fixtures. These fixtures are used in classrooms and hallways throughout the building. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in most of the rooms in building B but are using outdated sensors along with old fluorescent ballasts. There are occupancy sensors working in all the rooms in building B but are using outdated sensors with a few that are not working, along with old fluorescent ballasts.



Pendant 4' Direct/Indirect Fluorescent



9"x4' Surface Mounted Fluorescent Fixture

Building E

Building E is illuminated with fluorescent fixtures that have been recently converted to LED lamps. Fixtures mainly used in this building include 9"x4' surface mounted with prismatic lenses, pendant mounted 4' direct/indirect fluorescent fixtures, and high bay LED fixtures. These fixtures are used in classrooms, hallways, and dance rooms throughout the building. The fixtures are controlled using toggle switches,

occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building E but are using outdated sensors with a few that are not working, along with old fluorescent ballasts.



Pendant 4' Direct/Indirect Fluorescent



9"x4' Surface Mounted Fluorescent Fixture

Building H

Building H is illuminated with a combination of fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 2'x4' LED troffers and pendant mounted 4' direct/indirect fluorescent fixtures. These fixtures are used in classrooms and offices throughout the building. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building A and are using up to date controls as the building has gone through a recent retrofit. However, the fluorescent ballast does not appear to be using the same controls.



4' Direct/Indirect Pendant



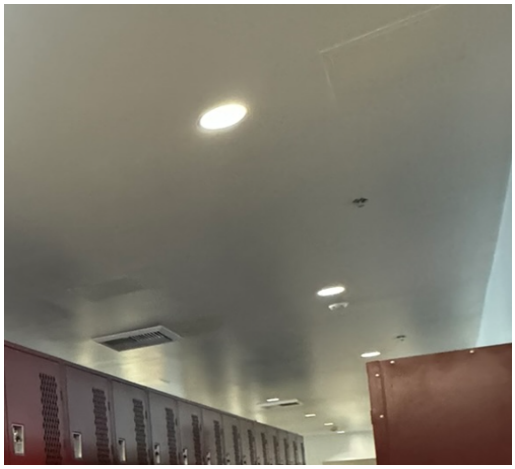
2'x4' Recessed Troffer

Building N

Building N is illuminated with a combination of fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 2'x4' LED troffers, undercounter restroom cove lighting, 3" downlights, and high bay LED fixtures. These fixtures are used in offices, locker rooms, and dance studios throughout the building. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building N and are using up to date controls as the building has gone through a recent retrofit. However, the fluorescent ballast does not appear to be using the same controls.



High Bay LED



3" Diameter Downlight

2.3.2.3 Building C

HVAC Description

Building C is a performing arts theatre building consisting of an auditorium and offices. The auditorium is served by one gas electric unit located in the mechanical room. The building has five heat pump split systems serving the lobby, offices, and support areas. There is also an electric unit heater serving the scene shop.

Plumbing Description

No domestic water heaters were found in Building C.

Lighting Description

Building C is illuminated with a combination of fluorescent fixtures. Currently at the time of survey, the theatre building is going under a lighting renovation plan unrelated to this study and plans have been requested from the campus. The plans show that only the interior of the theatre shall all be replaced, not the rest of building C. The rest of the building is using are however using a mixture of LED fixtures and fluorescent fixtures that have had their lamps swapped for LED lamps. The main fixtures used in this area of the building are 1'x4' surface mounted fluorescent fixtures and 10" circular downlights. The 1'x4' surface mounted fixtures are mainly used in the storage areas and industrial areas. The 10" circular downlights are used in the theatre hallway entrances. Currently these are only controlled by toggle switches.



1’x4’ Surface Mounted Fixture



10" Circular Downlight

2.3.2.4 Building D

HVAC Description

Building D is a classroom building, some of which have fume hoods. The building is served by seven gas electric split systems. The vertical fan coil units with gas heat are located in the mechanical closets. There is one dedicated unit for each classroom. There are also several split systems serving support spaces and six rooftop exhaust fans.

Plumbing Description

No domestic water heaters were found in Building D.

Lighting Description

Building D is illuminated with a combination of fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 2’x4’ LED troffers, pendant mounted 4’ direct/indirect fluorescent fixtures, and 1’x4’ linear strip lights. These fixtures are used in offices, office areas, classrooms, and mechanical rooms throughout the building. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building D and are using up to date controls as the building has gone through a recent retrofit.



2'x4' Recessed Troffer



4' Linear Strip Light

2.3.2.5 Buildings F & G

HVAC Description

Buildings F & G are athletic buildings with locker rooms. These buildings are primarily served by heating and ventilating gas units.

Building F's gas unit serves the locker rooms, restrooms, and vestibule. There are also exhaust fans serving the restrooms and locker rooms. The gymnasium does not have an HVAC system and uses natural ventilation.

Building G's gas unit serves the training room, locker rooms, restrooms, and vestibule. There are six electric unit heaters and 10 exhaust fans serving the gym. The building also has additional gas electric split systems to serve the weight room and support spaces.

Plumbing Description

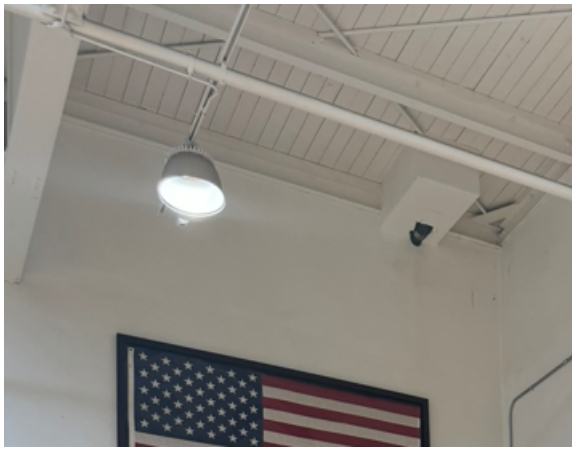
Building F is served by a natural gas domestic water heater.

Building G is served by an electric water heater.

Lighting Description

Building F

Building F is illuminated with a combination of fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 9"x4' surface mounted fluorescent fixtures, 3" fluorescent downlights, and high bay LED fixtures. These fixtures are used in storage rooms, office spaces, and the gym. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in most of the rooms in building F but are using outdated sensors with a few that are not working, along with old fluorescent ballasts. The open gym area is controlled by a keyed switch controlling the high bay LED's.



HIGH BAY LED



9”x4' Surface Mounted Fluorescent

Building G

Building G is illuminated with a combination of fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 9”x4’ surface mounted fluorescent fixtures, 2’x4’ LED troffers, and high bay LED fixtures. These fixtures are used in storage rooms, office spaces, and the gym. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in most of the rooms in building G but are using outdated sensors with a few that are not working, along with old fluorescent ballasts.



2'x4' Recessed Troffer



9”x4' Surface Mounted Fluorescent

2.3.2.6 Building K

HVAC Description

Building K is comprised of classrooms, a kitchen, and a dining area. The classrooms are served by 11 split system heat pumps with three condensing units on the roof and eight located outside on the exterior of the buildings. There are also two gas units serving the kitchen. There are seven ceiling bathroom exhaust fans serving the restrooms and storage. The kitchen is served by a make-up air unit and an exhaust fan.

Plumbing Description

Building K is served by a natural gas domestic water heater.

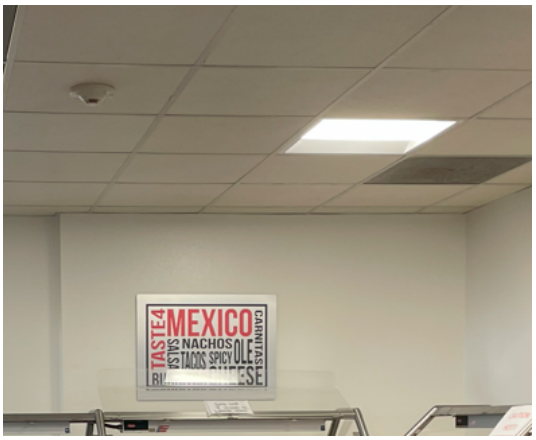
Lighting Description

Building K

Building K is illuminated with a combination of fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 9”x4’ surface mounted fluorescent fixtures, 2’x4’ LED troffers, 2’x2’ LED troffers, and 3” LED downlights. These fixtures are used in kitchen preparation rooms, classrooms, restrooms, and storage rooms. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building K and are using up to date controls.



2'x4' Recessed LED Troffer



2'x2' Recessed LED Troffer

2.3.2.7 Buildings L, M, & Baseball

HVAC Description

Buildings L, M, & Baseball are concession/storage buildings.

Building L is served by four exterior wall-mounted exhaust fans. One of the exhaust fans serving Storage Room 236 is not operational.

Building M does not have any HVAC equipment serving the building.

The baseball building is served by two split system heat pumps with one system serving Concessions and one serving Coach’s Office. There are also two rooftop exhaust fans serving this building.

Plumbing Description

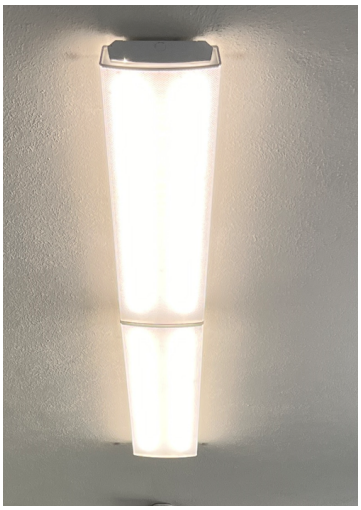
The Baseball Building is served by an electric domestic water heater.

Buildings L & M do not have any domestic water heaters.

Lighting Description

Building L

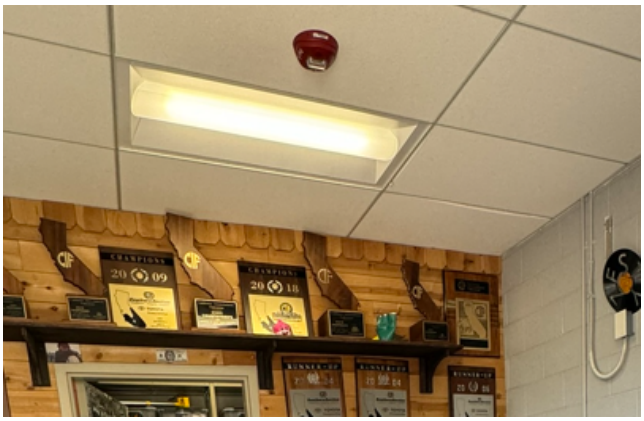
Building L is illuminated with fluorescent fixtures that have been recently converted to LED lamps. Fixtures mainly used in this building include 9”x4’ surface mounted fluorescent fixtures. They are used in all spaces of the building and the announcer booth. The fixtures are controlled using toggle switches and keyed switches. The existing fixtures and controls are outdated and currently do not have any occupancy sensors.



9”x4' Surface Mounted Fluorescent

Building M

Building L is illuminated with LED fixtures only. Fixtures used in this building area are all 2’x4’ LED troffers. This is a small building with minimal spaces and the fixtures are used in all spaces within the building. The fixtures are controlled using toggle switches and occupancy sensors. There are occupancy sensors working in all the rooms in building M and are using up to date controls as the fixtures are the most up to date LED’s.



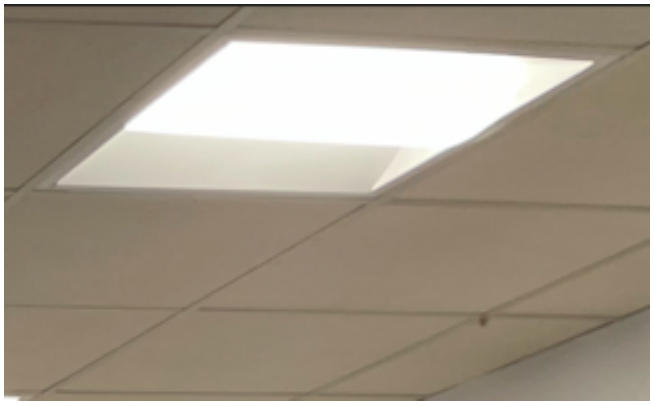
2'x4' Recessed Troffer

Baseball Building

The Baseball Building is illuminated with fluorescent fixtures that have been recently converted to LED lamps and LED fixtures. Fixtures mainly used in this building include 9”x4’ surface mounted fluorescent fixtures and 2’x2’ LED troffers. The LED troffers are mainly used in the offices and booths while the fluorescent fixtures are mainly used in the storage units. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in the office rooms in the baseball building and are using up to date controls as the building has gone through a recent retrofit. However, the fluorescent ballast does not appear to be using the same controls.



9”x4' Surface Mounted Fluorescent



2'x2' Recessed Light Troffer

2.4 LBHS Theater

The Laguna Beach High School Theater is part of the Laguna Beach High School constructed in 1958. The Theater consists of a sound booth, stage, seating, and costume storage. The theater was constructed in 1958 and has undergone minor interior renovations since.

2.4.1 Building Summary

Lighting Description

The theatre building is illuminated mostly with fluorescent fixtures that have gone through LED lamp swaps along with existing tungsten theatre fixtures. The fixtures mainly used in this building are 1'x4' surface mounted fixtures and tungsten theatre fixtures. The surface mounted fixtures are used throughout the space in the catwalks, mechanical unit rooms, and any other space that isn't the main theatre. The tungsten lights are used on the stage and in the main audience area. The fixtures in the building are all controlled by toggle switches. There are no occupancy sensors in the building currently.



Tungsten Theatre Fixture



1'x4' Surface Mounted Fixture

2.5 LBHS Stadium

The Laguna Beach High School Stadium is part of the Laguna Beach High School constructed in 1958. This stadium consists of a track, field, and bleachers. The original construction of the stadium was in 1958 and has been remodeled since.

2.5.1 Building Summary

Lighting Description

The existing lighting of the Laguna Beach High School Stadium are eight 40-foot poles each containing 5-8 of Musco's previous halide bulbs. Each of these bulbs use 1500 watts coming out to a 68.8kW for the entire system. The system is meant to light the Laguna Beach Highschool field during the night and are currently controlled with an astronomical timer.



Halide Musco Sports Lighting Fixtures

2.6 Thurston Middle School

Thurston Middle School consists of nine buildings including standard classroom buildings, a gymnasium, a kitchen/library building, and a theater art building totaling approximately 63,000 sf. The original campus construction started in 1966.

2.6.1 Energy, Carbon & Cost

Electricity Consumption

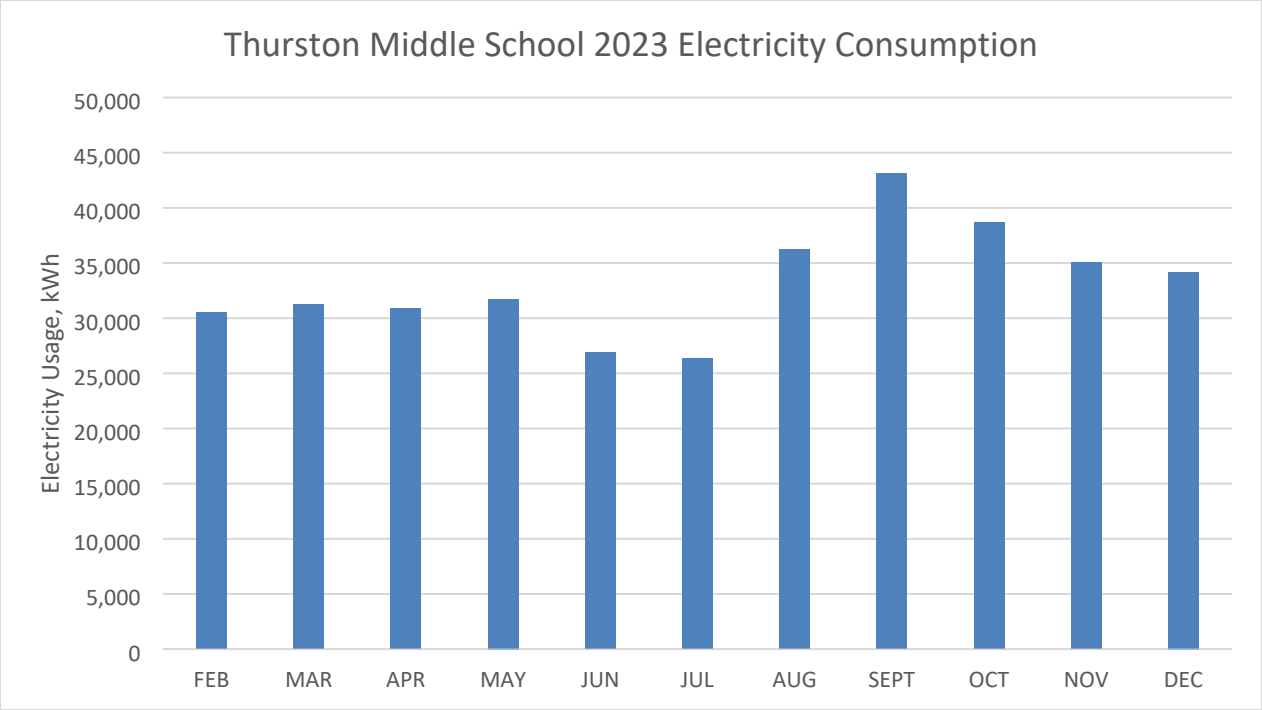
The table below shows the electricity consumption during 2023. All data was taken from the 2100 Park Ave meter.

Table: Thurston Middle School 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	29,148	940	-
FEB	28	30,536	1,091	$7,392.93
MAR	31	31,252	1,008	$6,845.84
APR	30	30,872	1,029	$7,912.76
MAY	31	31,748	1,024	$7,696.57
JUN	30	26,877	896	$7,749.48
JUL	31	26,338	850	-
AUG	31	36,260	1,170	$13,255.02
SEP	30	43,085	1,436	$17,268.62
OCT	31	38,693	1,248	$10,867.19
NOV	30	35,046	1,168	$9,838.95
DEC	31	34,197	1,103	-
TOTAL:	**365**	**394,052**	**-**	**$88,827.36**

Average	$0.29	$/kWh
	1,080	kWh/day
	$315.07	$/day

Based on the 2023 district calendar, the school was mostly closed during June, July and August months, yet the electrical consumption for these months was 60%-80% of the maximum monthly consumption for the 2023 year. This large consumption could be due to lighting, equipment, or HVAC units remaining on during unoccupied periods.


Thurston Middle School 2023 Electricity Consumption
Electricity Usage, kWh
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEPT
OCT
NOV
DEC

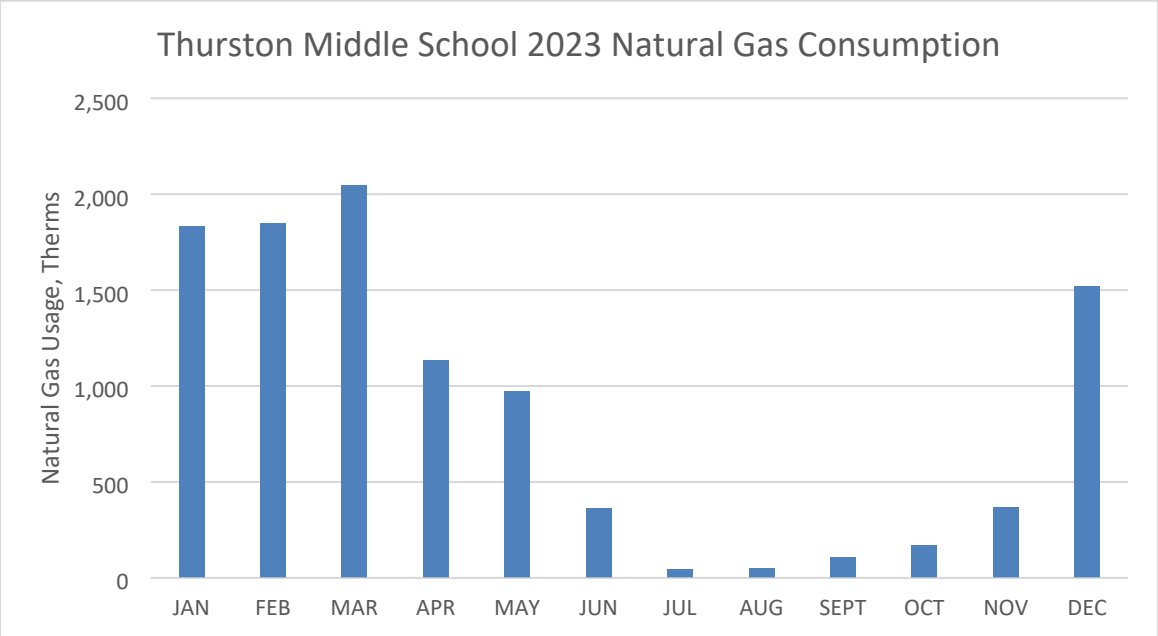
Natural Gas Consumption

The table below shows the gas consumption and cost based on the information gathered from utility bills for 2100 Park Ave gas meter. It should be noted that the gas consumption for Thurston middle school is comparable to LBHS, which has approximately twice the square footage of Thurston.

Table: Thurston Middle School 2023 Gas Consumption

Month	Days	Therms	Therms/Day	Cost
JAN	31	1,834	59	$7,885.26
FEB	28	1847	66	-
MAR	31	2,047	66	$2,865.83
APR	30	1136	38	-
MAY	31	973	31	$1,221.86
JUN	30	364	12	$546.68
JUL	31	42	1	$86.08
AUG	31	48	2	$100.50
SEP	30	107	4	$197.49
OCT	31	168	5	$283.56
NOV	30	366	12	$647.62
DEC	31	1520	49	-
TOTAL:	**365**	**10,452**	**-**	**$13,834.88**

Average	$2.33	$/therm
	29	therms/day
	$66.59	$/day



Energy Use Intensity

For Thurston Middle School, the energy usage is from electricity and natural gas. The annualized usage is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

Table: Thurston Middle School Consumption and EUI

Energy Source	2023 Consumption	Consumption (kBtu/year)	Percent Total	EUI Contribution
Electricity (kwh)	394,052	1,344,505	56%	21
Natural Gas (Therms)	10,452	1,045,200	44%	17
Total	-	2,389,705	100%	38

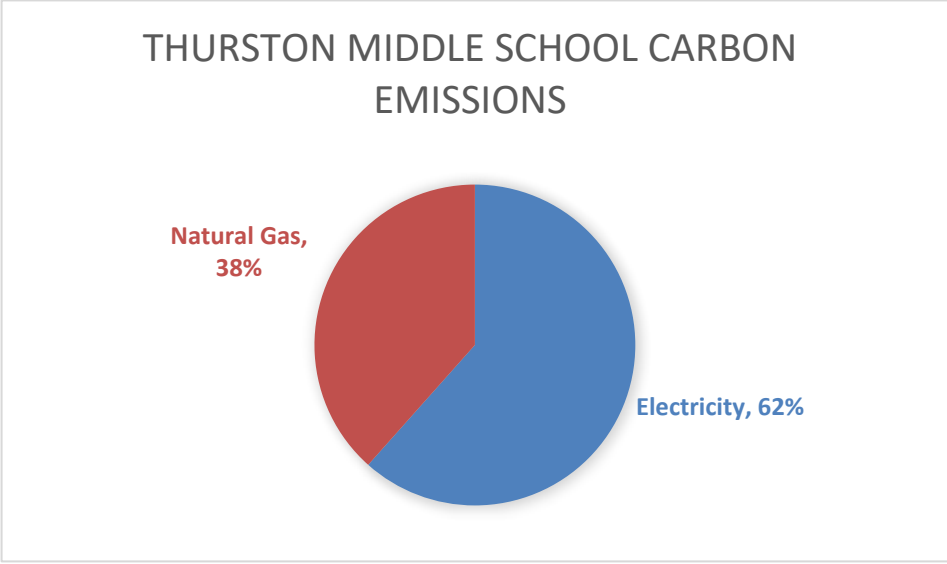
It should be noted that the natural gas contribution to Thurston middle school overall energy consumption is higher than anticipated for milder climate.

Greenhouse Gas Emissions

The table below summarizes the operational greenhouse gas emissions from Thurston Middle School. Using the e-Grid website by U.S. Environmental Protection Agency, e-CO_2 emissions factor of 497.4 lbs/MWh and 11.7 lbs/therms was used in calculations below.

Table: Thurston Middle School GHG Emissions

Energy Source	Annual Consumption, kBtu	Annual CO_2-eq Emission, lbs	Emission Contribution
Electricity	1,344,505	196,001	62%
Natural Gas	1,045,200	122,288	38%
Total	2,389,705	318,290	100%



2.6.2 Building Summary

2.6.2.1 Building A

HVAC Description

Building A is the administration building which consists of offices and conference rooms. It is served by one rooftop packaged gas-electric unit and one split system heat pump. There are also two exhaust fans for general exhaust of support spaces.

Plumbing Description

There are no domestic water heaters for this building.

Lighting Description

Building A is illuminated mostly with LED fixtures. The fixtures mainly used in this building are 2'x4' LED troffers and 3" LED downlights. The LED troffers are mainly used in group spaces and office, while the 3" LED downlights are mainly used in the hallways. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are occupancy sensors working in all the rooms in building A and are using up to date controls.



2'x4' LED Troffer



3" LED Downlight

2.6.2.2 Buildings B, C, & D

HVAC Description

Buildings B, C, & D are classroom buildings. All are served by split system gas DX units. The condensing units are located on the roof and the vertical units are located in mechanical closets. Ventilation is provided at the fan coil. There is one system for every classroom. There are also exhaust fans serving the spaces.

Plumbing Description

Buildings B and C are each served by one electric domestic water heater.

No domestic water heater was found for Building D.

Lighting Description

Building B

Building B is illuminated mostly with LED fixtures. The fixtures mainly used in this building are 2'x4' LED troffers and 4' pendant mounted fluorescent fixtures. The LED troffers are mainly used in group spaces and offices, while the 3" LED downlights are mainly used in the hallways. The fixtures are controlled using toggle switches and keyed switches. There are functioning occupancy sensors working in most of the rooms in building B but are using outdated sensors along with old fluorescent ballasts.



4' Pendant Mounted Fixture



2'x4' LED Troffer

Building C

Building C is illuminated mostly with LED fixtures. The fixtures mainly used in this building are 2'x4' LED troffers and 4' pendant mounted fluorescent fixtures. The LED troffers are mainly used in group spaces and offices, while the 3" LED downlights are mainly used in the hallways. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are functioning occupancy sensors working in most of the rooms in building C but are using outdated sensors along with old fluorescent ballasts.



4’ Pendant Mounted Fixture



2’x4’ LED Troffer

Building D

Building D is illuminated mostly with LED fixtures. The fixtures mainly used in this building are 4’ LED pendant fixtures and 3” LED downlights. The 4’ LED fixtures are mainly used in group spaces and classrooms, while the 3” LED downlights are the entrances and around the rooms. The fixtures are controlled using toggle switches and occupancy sensors. There are occupancy sensors working in all the rooms in building D and are using up to date controls.



4’ LED Pendant Fixture



3” LED Downlight

2.6.2.3 Buildings E & F

HVAC Description

Buildings E & F are classroom buildings served by rooftop packaged gas-electric units.

Building E is served by two packaged units, one to serve each classroom.

Building F classrooms are served by seven packaged units and the electric room is served by one split system.

Plumbing Description

No domestic water heaters were found to serve Buildings E & F.

Lighting Description

Building E

Building E is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs. The fixtures mainly used in this building are 1'x4' surface mounted fluorescents and 4' pendant mounted fluorescents. The 1'x4' surface mounted fixtures are used in storage spaces and electrical rooms, while the 4' pendants are used in the classrooms. The fixtures are controlled using toggle switches and keyed switches. There are functioning occupancy sensors in most of the rooms in building E but are using outdated sensors along with old fluorescent ballasts.



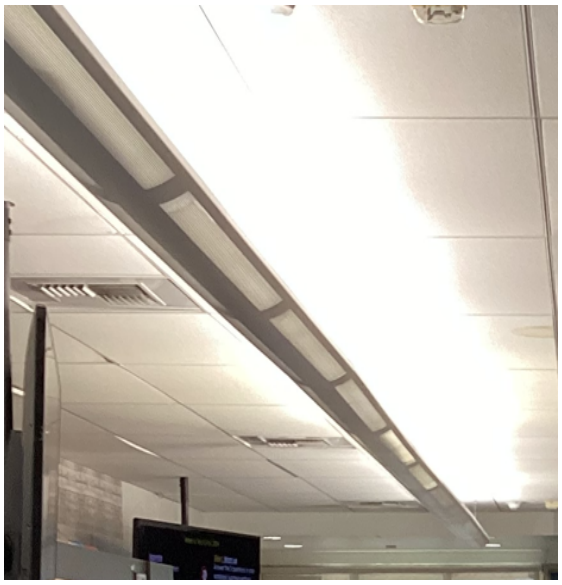
4' Pendant Mounted Fixture



2'x4' LED Troffer

Building F

Building F is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 3" LED Downlights and 4' pendant mounted fluorescents. The 4' pendants are used in the classrooms and the 3" diameter downlights are used in the interior around the room. The fixtures are controlled using toggle switches. There are functioning occupancy sensors working in most of the rooms in building F but are using outdated sensors along with old fluorescent ballasts.



4’ Pendant Mounted Fixture



3” Diameter Downlight

2.6.2.4 Building G

HVAC Description

Building G is an athletic building consisting of a gymnasium and locker rooms. The building is served by a make-up air unit, a packaged gas-electric unit, and several split systems. There are also two exhaust fans to serve the locker rooms.

Plumbing Description

Building G is served by one natural gas domestic water heater.

Lighting Description

Building G is illuminated with many different light fixtures that are fully LED and fluorescent fixtures that have been converted to LED lamps. The fixtures mainly used in this building are Highbay LED light fixtures surface mounted 1’x4’ Fluorescent fixtures, and 2’x4’ LED Troffers. The Highbay fixtures are used in the gym for court lighting, the 2’x4’ LED Troffers are used in the offices and the 1’x4’ surface mounted fixtures are used in the storage and wet locations. The fixtures are controlled using toggle switches and keyed switches. There are functioning and non-functioning occupancy sensors in most of the rooms in building G but are using outdated sensors along with old fluorescent ballasts.



Highbay LED Fixture



1'x4' Surface Mounted Fixture

2.6.2.5 Building H

HVAC Description

Building H is a theater arts building consisting of a music room, drama room, and offices. The building is served by four rooftop gas-electric units and one exhaust fan.

Plumbing Description

Building H is served by one electric domestic water heater.

Lighting Description

Building H is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 1'x4' surface mounted fluorescents and 4' pendant mounted fluorescents. The 4' pendants are used in the music room and the 1'x4' surface mounted fluorescents are used in the theatre room. The fixtures are controlled using toggle switches. There are functioning and non-functioning occupancy sensors working in most of the rooms in building H but are using outdated sensors along with old fluorescent ballasts.



4’ Pendant Mounted Fixture



1’x4’ Surface Mounted Fixture

2.6.2.6 Building I

HVAC Description

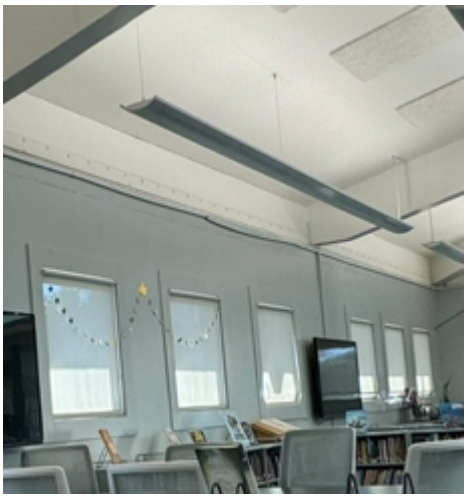
Building I consist of a kitchen, library, and computer lab. This building is served by three rooftop packaged gas electric units. There is one split system to serve the café. There are several air curtains above the kitchen doors.

Plumbing Description

Building I is served by an 80-gal natural gas domestic water heater.

Lighting Description

Building I is illuminated mostly with LED fixtures and a few fluorescent fixtures. The fixtures mainly used in this building are 2’x4’ LED troffers and 4’ pendant mounted fluorescent fixtures. The LED troffers are used in the kitchen, while the 4’ pendant-mounted fluorescent fixtures are library and computer classroom. The fixtures are controlled using toggle switches, occupancy sensors, and keyed switches. There are functioning occupancy sensors working in some of the rooms in building F but are using outdated sensors along with old fluorescent ballasts.



4’ Pendant Mounted Fixture



2’x4’ LED Troffer

2.7 Top of the World Elementary

Top of the World Elementary consists of eight buildings which are comprised of classrooms and kitchen totaling approximately 52,000 sf. The original construction was built in 1966. The portable classrooms are not included in this report since they are intended to be temporary structures.

2.7.1 Energy, Carbon & Cost

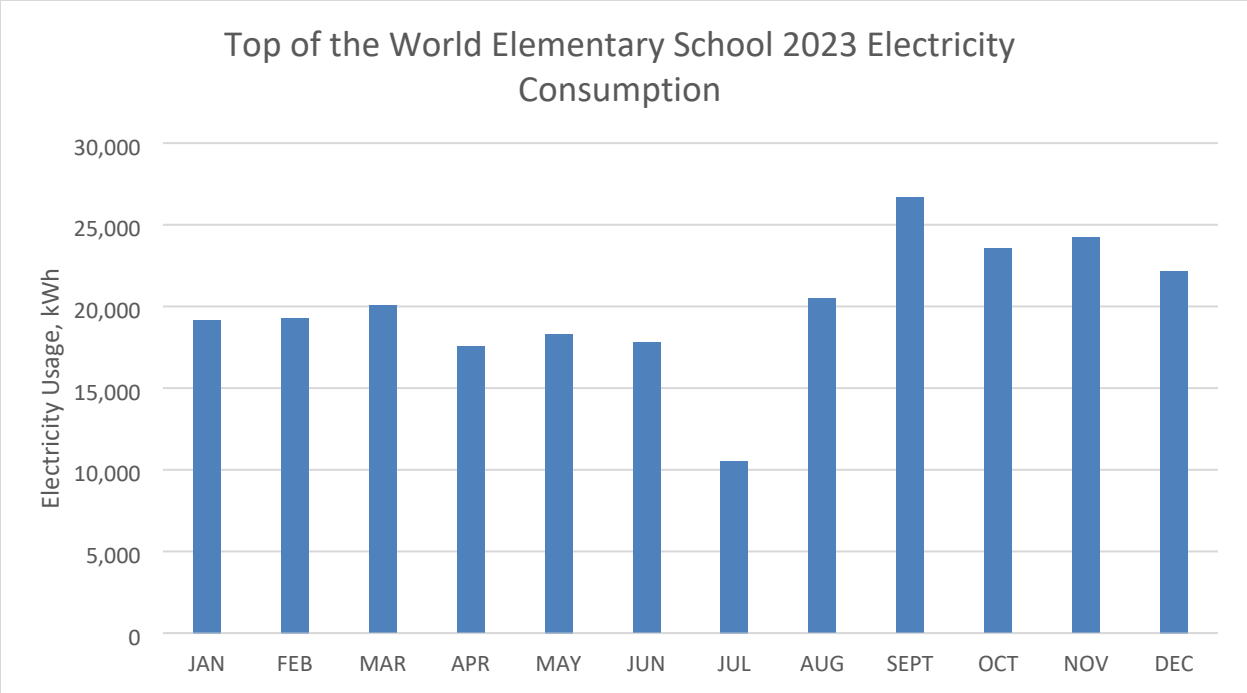
Electricity Consumption

The table below shows the electricity consumption during 2023. All data was taken from the 21606 Treetop Lane meter.

Table: Top of the World Elementary 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	19,171	618	-
FEB	28	19,292	689	-
MAR	31	20,051	647	-
APR	30	17,546	585	-
MAY	31	18,308	591	$3,859.24
JUN	30	17,777	593	$6,210.71
JUL	31	10,542	340	$3,464.92
AUG	31	20,499	661	$6,927.67
SEP	30	26,684	889	$10,020.49
OCT	31	23,530	759	$5,846.23
NOV	30	24212	807	$4,990.81
DEC	31	22176	715	$3,859.24
TOTAL:	**365**	**239,788**	**-**	**$41,320.07**

Average	$0.28	$/kWh
	657	kWh/day
	$181.28	$/day


Top of the World Elementary School 2023 Electricity Consumption
Electricity Usage, kWh
30,000
25,000
20,000
15,000
10,000
5,000
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEPT
OCT
NOV
DEC

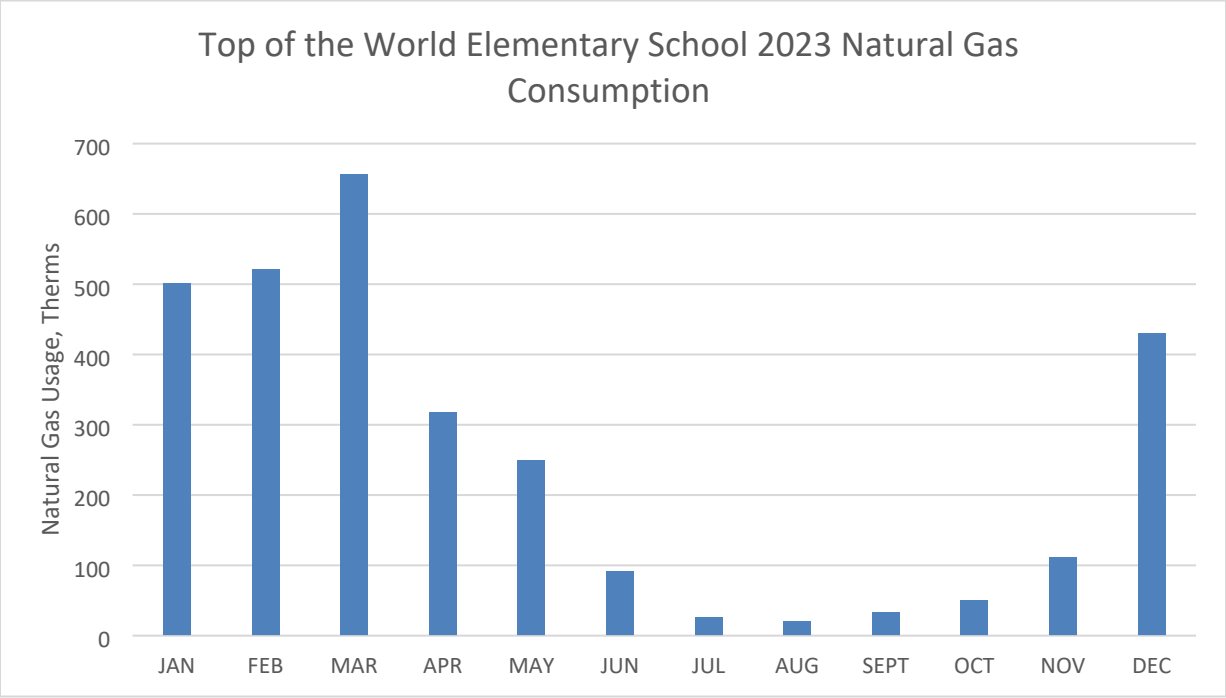
Natural Gas Consumption

The table below shows the gas consumption and cost based on the information gathered from utility bills for 2100 Park Ave gas meter.

Table: Top of the World Elementary 2023 Gas Consumption

Month	Days	Therms	Therms/Day	Cost
JAN	31	502	16	$2,253.14
FEB	28	521	19	-
MAR	31	657	21	$1,008.76
APR	30	318	11	-
MAY	31	249	8	$410.06
JUN	30	92	3	$162.32
JUL	31	27	1	$60.98
AUG	31	21	1	$52.01
SEP	30	33	1	$71.49
OCT	31	50	2	$95.14
NOV	30	111	4	$223.53
DEC	31	431	14	-
TOTAL:	**365**	**3,012**	**-**	**$4,337.43**

Average	$2.49	$/therm
	8	therms/day
	$20.55	$/day



Energy Use Intensity

For Top of the World Elementary School, the energy usage is from electricity and natural gas. The annualized usage is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

Table: Top of the World Elementary School Consumption and EUI

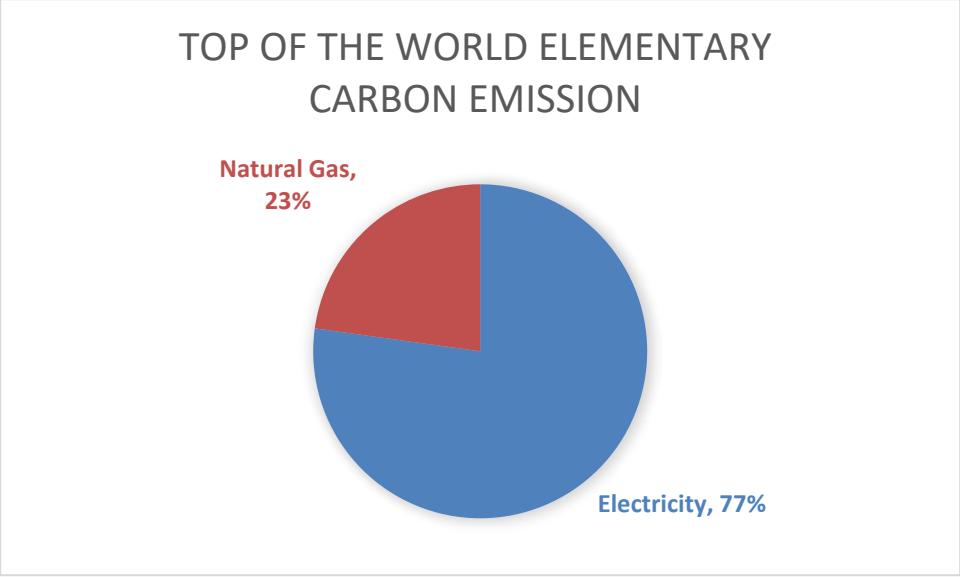
Energy Source	2023 Consumption	Consumption (kBtu/year)	Percent Total	EUI Contribution
Electricity (kwh)	239,788	818,157	73%	16
Natural Gas (Therms)	3,012	301,200	27%	6
Total	-	1,119,357	100%	22

Greenhouse Gas Emissions

The table below summarizes the greenhouse gas emissions from Top of the World Elementary School energy consumption.

Table : Top of the World Elementary School GHG Emissions

Energy Source	Annual Consumption, kBtu	Annual CO_2-eq Emission, lbs	Emission Contribution
Electricity	818,157	119,271	77%
Natural Gas	301,200	35,240	23%
Total	1,119,357	154,511	100%



2.7.2 Building Summary

2.7.2.1 Administration & MPR Building

HVAC Description

The Administration & MPR building is comprised of offices, conference rooms, a library, a multi-purpose room, and a kitchen.

The Administration wing is served by three packaged units located on the roof. There is one unit dedicated to the library, one dedicated to the east wing offices, and one dedicated to the middle section of offices and a conference room.

The MPR is served by four packaged heat pump units. There are two units located in two mechanical yards on the exterior of the space. The units are ducted to wall-mounted registers. The supply and return registers are positioned next to each other, causing the airflow to short-circuit and not properly condition the space.

The Kitchen is served by a wall-mounted heat pump unit located on the exterior of the room.

There are also exhaust fans to support these areas.

Plumbing Description

No domestic water heaters were found, but it is assumed there is one natural gas heater serving the kitchen.

Lighting Description

Building A

Building A is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED Troffers. The fixtures mainly used in this building are 4' pendant mounted fluorescents and 2'x4' LED Troffers. The 4' pendants are used in the open areas and the 2'x4' LED fixtures are used in open offices and smaller offices. The fixtures are controlled using toggle switches. There are existing occupancy sensors; however, they are not working properly.



4’ Pendant Mounted Fixture



2’x4’ LED Troffer

Building MPR

Building MPR is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED Troffers. The fixtures mainly used in this building are 1’x4’ LED Troffers, 2’x4’ LED Troffers, and LED downlights. The 1’x4’ LED Troffers are used in the cafeteria, the 2’x4’ LED Troffers are used in the office spaces, and the LED downlights are used in the hallways. The fixtures are controlled using toggle switches.



LED Downlights



1’x4’ LED Troffer

2.7.2.2 Buildings B, C & E

HVAC Description

Buildings B, C, & E are classroom buildings all of which are primarily served by split system gas/DX units. The exterior classrooms have vertical fan coils located in mechanical closets. The interior classrooms have fan coils located above the ceiling. All condensing units are located on the roof. There is one system per classroom.

Building B has an additional packaged heat pump unit serving the Classroom B3 addition. The unit is located on grade in a mechanical yard and ducted into the room.

There are also several split systems and general exhaust fans to serve the support areas.

Plumbing Description

There is one electric domestic water heater at Building C.

No domestic water heaters were found at Buildings B & E.

Lighting Description

Building B

Building B is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 1'x4' surface mounted fluorescent fixtures and 4' pendant mounted fluorescents. The 4' pendants are used in the open areas and the 1'x4' surface mounted fluorescent are storage units/compact spaces. The fixtures are controlled using toggle switches. There are existing occupancy sensors, however they are not working properly.



4' Pendant Mounted Fixture



1'x4' Surface Mounted Fixture

Building C

Building C is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 2'x4' LED Troffers, 4' pendant mounted

fluorescents and 6" LED Downlights. The 4' pendants are used in the open areas and the 2'x4' troffers are used in the smaller spaces. The fixtures are controlled using toggle switches.



4' Pendant Mounted Fixture



2'x4' LED Troffer

Building E

Building E uses the same layout and light fixtures as Building C, which is illuminated mostly with fluorescent fixtures converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 2'x4' LED Troffers, 4' pendant mounted fluorescents and 6" LED Downlights. The 4' pendants are used in the open areas and the 2'x4' troffers are used in the smaller spaces. The fixtures are controlled using toggle switches.



4' Pendant Mounted Fixture



2'x4' LED Troffer

Solar Description

The existing Solar on the roof of building B and E currently have 200 solar panels. P2S was not able to confirm the solar panel units and an assumption of 400 watts per panel was used. With that assumption the total rating of the existing system would be 80kW-DC and 69.9kW-AC. The allows the 200 panels to produce roughly 125,00kWh annually. This savings has already been applied to the existing conditions of Top of the World Elementary and further solar will be needed to offset more power.



2.7.2.3 Building D

HVAC Description

Building D is a building with a kiln room and electrical room. There are several general exhaust fans to serve these rooms.

Plumbing Description

There is one electric domestic water heater serving Building D.

Lighting Description

Building D is illuminated with two different types of surface-mounted fluorescent fixtures converted with LED bulbs. The fixtures used in this building are two 1'x4' surface mounted fluorescents. The first type of 1'x'4' surface mounted fixtures are used in more open spaces, while the second type are used in the smaller spaces such as storage. The fixtures are controlled using toggle switches.



1'x4' Surface Mounted Fluorescent Type 1



1'x4' Surface Mounted Fluorescent Type 2

2.7.2.4 Building F

HVAC Description

Building F is a classroom building served by eight rooftop packaged gas-electric units. There is one dedicated unit to serve each classroom.

Plumbing Description

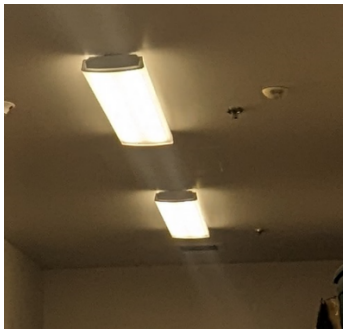
No domestic water heaters were found to serve this building.

Lighting Description

Building F is illuminated mostly with LED fixtures and a few fluorescent fixtures. The fixtures mainly used in this building are 4' pendant mounted fluorescent fixtures, surface mounted 1'x'4' Fluorescent fixtures with LED bulbs, and various sizes of LED downlights. The 4' pendant mounted fluorescent fixtures are used in the central areas of the classrooms, the surface mounted 1'x'4' fixtures are used in restrooms and storage rooms, while the LED downlights are used everywhere else. The fixtures are controlled using toggle switches and occupancy sensors. There are existing occupancy sensors, however they are outdated, and a few are not working properly.



4' Pendant Mounted Fixture



1'x4' Surface Mounted Fixture

2.7.2.5 Building G

HVAC Description

Building G is a classroom building served by wall-mounted heat pump units. There is one heat pump per classroom located in a closet. There are also a few ceiling exhaust fans serving the restrooms.

Plumbing Description

No domestic water heaters were found in Building G.

Lighting Description

Building G is illuminated mostly with LED fixtures and a few fluorescent fixtures. The fixtures mainly used in this building are 2'x4' LED troffers and 2'x4' Fluorescent Troffers with LED bulbs. The LED troffers are used in main classrooms, while the 2'x4' Fluorescent troffers with LED bulbs are used in the back office/storage rooms. The fixtures are controlled using toggle switches and occupancy sensors. There are existing occupancy sensors, however they are a few outdated sensors that are controlling the fluorescent fixtures.



2'x4' Fluorescent Troffer



2'x4' LED Troffer

2.8 El Morro Elementary School

El Morro was originally constructed in 1952 and consists of nine buildings comprised of office, classroom, kitchen, and auditorium buildings. The portable classrooms are not included in this report since they are intended to be temporary.

2.8.1 Energy, Carbon & Cost

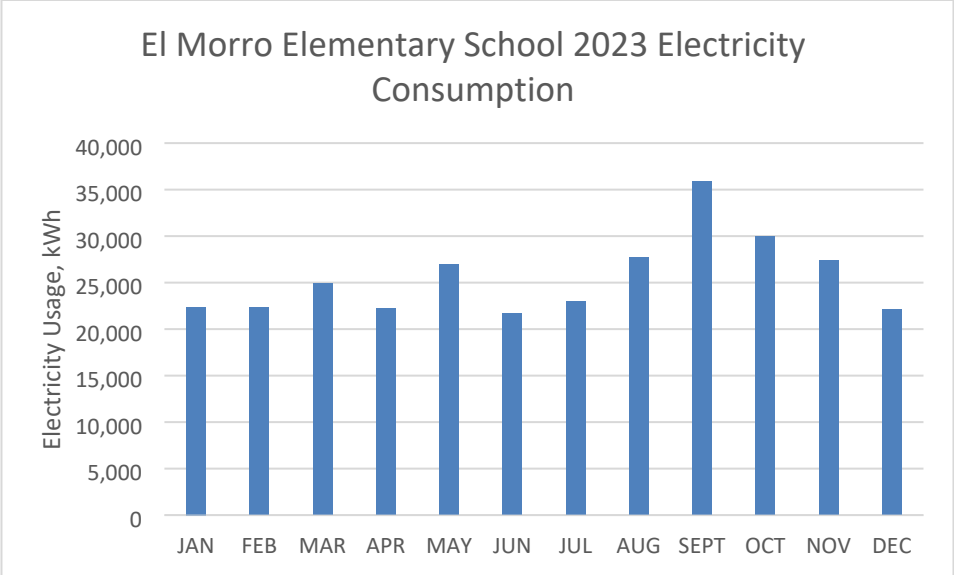
Electricity Consumption

The table below shows the electricity consumption during 2023. All data was taken from the 8681 N Coast Hwy meter.

Table: El Morro Elementary School 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	22,390	722	$4,448.09
FEB	28	22,305	797	$4,469.54
MAR	31	24,905	803	-
APR	30	22,205	740	$4,471.17
MAY	31	26,919	868	$5,220.97
JUN	30	21,688	723	$8,189.40
JUL	31	22,982	741	$8,774.56
AUG	31	27,734	895	$11,166.87
SEP	30	35,862	1195	$13,240.88
OCT	31	29,992	967	$6,384.87
NOV	30	27,415	914	$5,791.78
DEC	31	22,104	713	-
TOTAL:	**365**	**306,501**	**-**	**$72,158.13**

Average	$0.28	$/kWh
	840	kWh/day
	$233.51	$/day


El Morro Elementary School 2023 Electricity Consumption
Electricity Usage, kWh
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEPT
OCT
NOV
DEC

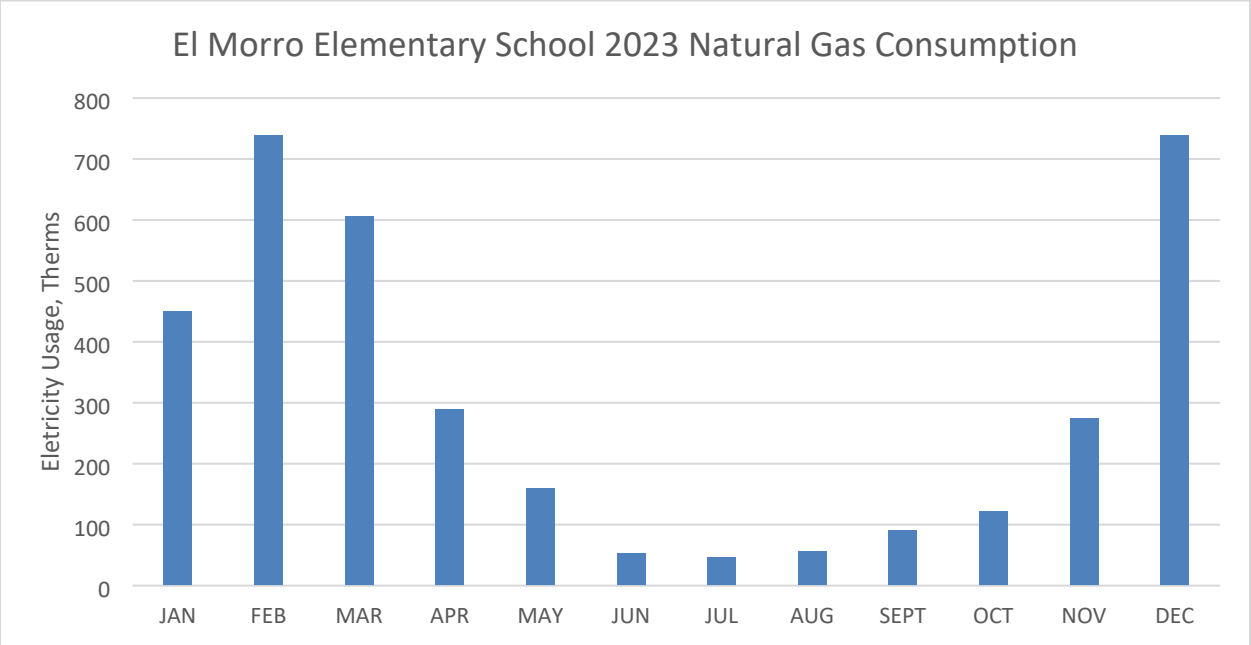
Natural Gas Consumption

Table: El Morro Elementary School 2023 Gas Consumption

The table below shows the gas consumption and cost based on the information gathered from utility bills for 8681 N Coast Hwy gas meter.

Month	Days	Therms	Therms/Day	Cost
JAN	31	450	15	-
FEB	28	739	26	-
MAR	31	607	20	$903.84
APR	30	290	10	-
MAY	31	160	5	-
JUN	30	53	2	-
JUL	31	46	1	$93.11
AUG	31	56	2	$113.87
SEP	30	91	3	$167.22
OCT	31	122	4	$219.89
NOV	30	275	9	$511.70
DEC	31	740	24	-
TOTAL:	**365**	3,629	-	$2,009.63

Average	$1.68	$/therm
	10	therms/day
	$16.69	$/day



Energy Use Intensity

For El Morro Elementary School, the energy usage is from electricity and natural gas. The annualized usage is converted to kBtu and divided by the total building area to determine the building's EUI. The tables below list the energy consumption from each energy source and the EUI for the campus.

Table: El Morro Elementary Consumption and EUI

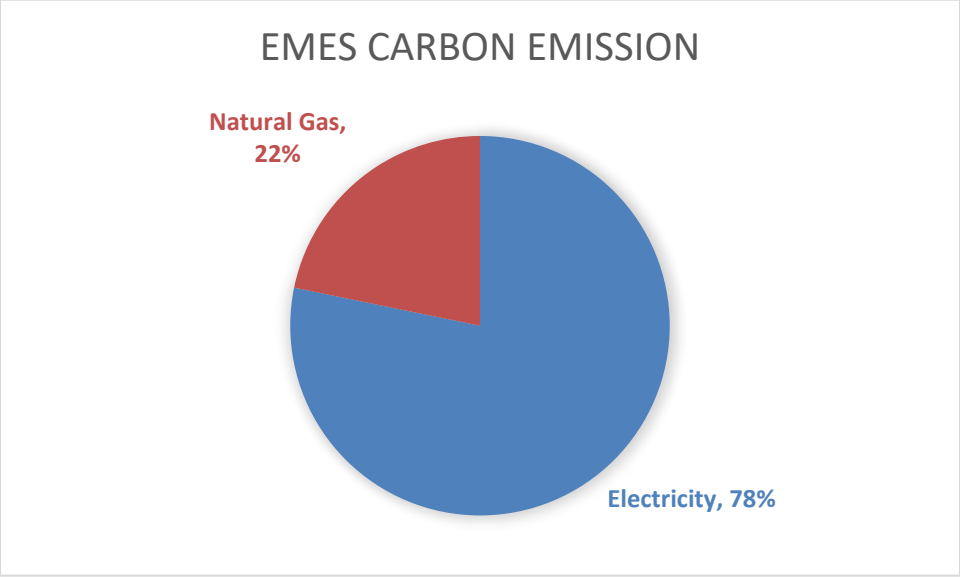
Energy Source	2023 Consumption	Consumption (kBut/year)	Percent Total	EUI Contribution
Electricity (kwh)	306,501	1,045,781	74%	22
Natural Gas (Therms)	3,629	362,900	26%	8
Total	-	1,408,681	100%	29

Greenhouse Gas Emissions

The table below summarizes the greenhouse gas emissions from El Morro Elementary School energy consumption. It should be noted that since the breakdown of refrigerant fills per building was not available during this study, the effect of refrigerant leak into the atmosphere is not included in the campus report.

Table: El Morro Elementary School GHG Emissions

Energy Source	Annual Consumption, kBtu	Annual CO_2-eq Emission, lbs	Emission Contribution
Electricity	1,045,781	152,454	78%
Natural Gas	362,900	42,459	22%
Total	1,408,681	194,913	100%



2.8.2 Building Summary

2.8.2.1 Administration & MPR Building

HVAC Description

The Administration and MPR & building consist of offices, conference rooms, a multi-purpose room, and a kitchen.

The Admin wing is served by one packaged gas-electric unit and several split systems.

The MPR wing is served by a packaged gas-electric unit. There is also a make-up air unit for the kitchen. Additionally, there is one supply fan and one exhaust fan serving the kitchen hood.

The building also has exhaust fans for general exhaust.

Plumbing Description

The Admin wing is served by one electric domestic water heater.

The MPR wing is served by a natural gas domestic water heater.

Lighting Description

The Admin building is illuminated with fluorescent fixtures that have been converted to LED bulbs and LED fixtures. The fixtures mainly used in this building are 2'x4' LED troffers, 4' LED downlights, and 3" LED downlights. The LED troffers and pendant mounted fixtures are used mainly in the office areas, while the 3" LED downlights are mainly used in the hallways. The fixtures are controlled using toggle switches.



4' Pendant Mounted Fixture



2'x'4' LED Troffer

2.8.2.2 Buildings A, B, C, & E

HVAC Description

Buildings A, B, C, & E are classroom buildings and are served by split system heat pumps. The vertical fan coils are located in mechanical closets and the condensing units are located on the roof. There is one system for each classroom.

Classroom 55 in Building E is served by a wall-mounted heat pump.

The buildings also have exhaust fans for the restrooms and electrical rooms.

Plumbing Description

Buildings B and C are served by electric domestic water heaters.

No domestic water heaters were found for Buildings A & E.

Lighting Description

Building A

Building A is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 2'x4' LED Troffers and 4' pendant mounted fluorescents. The 4' pendants are used in the classrooms along with the 2'x4' LED troffers. The fixtures in the building are all controlled by toggle switches.



4' Pendant Mounted Fixture



2'x4' LED Troffer

Building B

Building B is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs. The fixtures mainly used in this building are 1'x4' fluorescent surface mounted fixtures and 4' pendant mounted fluorescents. The 4' pendants are used in the classrooms along with the 1'x4' fixtures are used in wet locations and storage. The fixtures in the building are all controlled by toggle switches.



4’ Pendant Mounted Fixture



1’x4’ Surface Mounted Fixture

Building C

Building C is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs. The fixtures mainly used in this building are 1’x4’ fluorescent surface mounted fixtures and 4’ pendant mounted fluorescents. The 4’ pendants are used in the classrooms along with the 1’x4’ fixtures are used in wet locations and storage. The fixtures in the building are all controlled by toggle switches.



4’ Pendant Mounted Fixture



1’x4’ Surface Mounted Fixture

Building E

Building E is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 2’x4’ LED Troffers and 4’ pendant mounted fluorescents. The 4’ pendants are used in the classrooms along with the 2’x4’ LED troffers. The fixtures in the building are all controlled by toggle switches and occupancy switches. There are existing occupancy sensors, however there are a few outdated sensors that are controlling the fluorescent fixtures.



4’ Pendant Mounted Fixture



2’x4’ LED Troffer

2.8.2.3 Building H

HVAC Description

Building H is a media building with a library which is served by a rooftop packaged gas unit. There is also one centrifugal exhaust fan located on the roof for general exhaust.

Plumbing Description

No domestic water heaters were found to serve Building H.

Lighting Description

Building H is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 2’x4’ LED Troffers and 4’ pendant mounted fluorescents. The 4’ pendants are used in the classrooms along with the 2’x4’ LED troffers. The fixtures in the building are all controlled by toggle switches. There are existing occupancy sensors, however there are a few outdated sensors that are controlling the fluorescent fixtures.



4’ Pendant Mounted Fixture



2’x4’ LED Troffer

2.8.2.4 Building J

HVAC Description

Building J is a two-story classroom building. The building is served by split systems with ducted ceiling fan coil units. The condensing units are located on the roof. There is one system per classroom.

Plumbing Description

No domestic water heaters were found to serve Building J.

Lighting Description

Building H is illuminated mostly with fluorescent fixtures that have been converted with LED bulbs and LED fixtures. The fixtures mainly used in this building are 1’x4’ fluorescent surface mounted fixtures, 4’ pendant mounted fluorescents and 2’x4’ LED Troffers. The 4’ pendants are used in the classrooms along with the 1’x4’ fixtures are used in wet locations and storage. The fixtures in the building are all controlled by toggle switches.



4’ Pendant Mounted Fixture



1’x4’ Surface Mounted Fixture

2.9 Warehouse

The Warehouse building was originally built in 1963 and is comprised of mostly storage rooms. There are also break rooms, restrooms, and office spaces.

2.9.1 Energy & Carbon & Cost

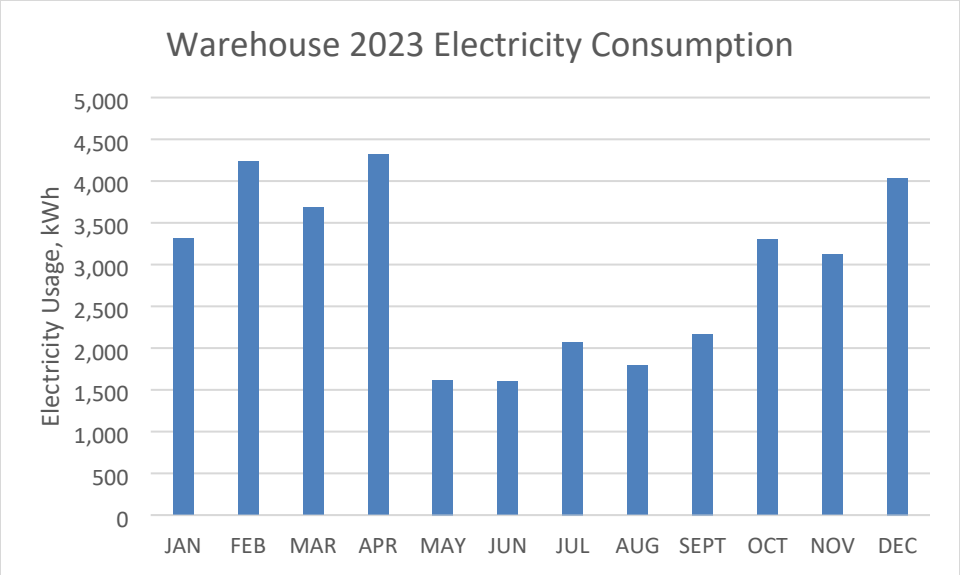
Electricity Consumption

The table below shows the electricity consumption during 2023. All data was taken from the 2003 Laguna Canyon meter.

Table: Warehouse 2023 Electrical Consumption

Month	Days	kWh	kWh/Day	Cost
JAN	31	3,315	107	-
FEB	28	4,231	151	$1,131.13
MAR	31	3,685	119	$874.31
APR	30	4,315	144	$1,112.53
MAY	31	1,617	52	$554.84
JUN	30	1,600	53	$793.42
JUL	31	2,073	67	-
AUG	31	1,795	58	$917.30
SEP	30	2,169	72	$1,189.55
OCT	31	3,301	106	$1,046.18
NOV	30	3,119	104	$980.46
DEC	31	4,036	130	-
TOTAL:	**365**	**35,256**		**$8,599.72**

Average	$0.33	$/kWh
	97	kWh/day
	$32.16	$/day


Warehouse 2023 Electricity Consumption
Electricity Usage, kWh
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEPT
OCT
NOV
DEC

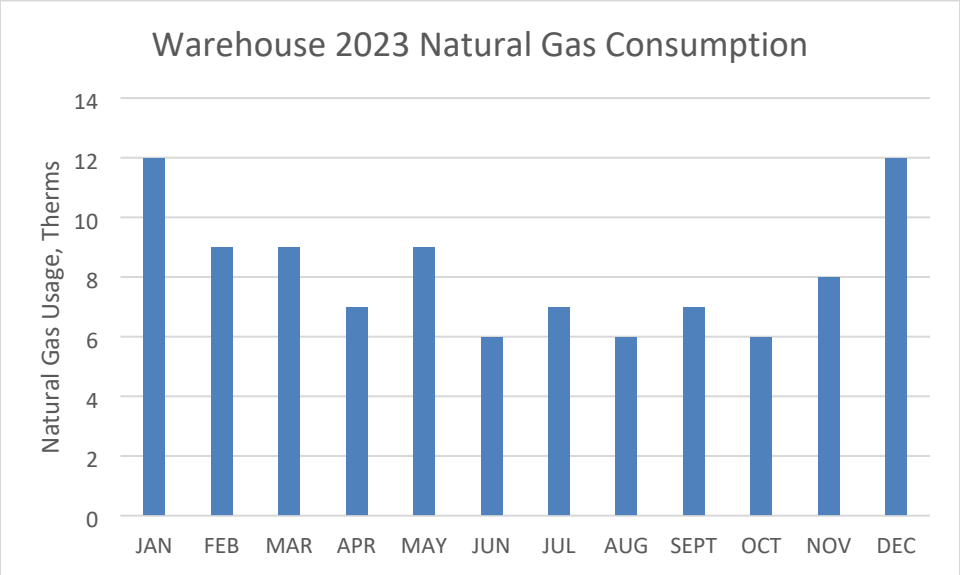
Natural Gas Consumption

The table below shows the gas consumption and cost based on the information gathered from utility bills for 2003 Laguna Canyon Rd gas meter.

Table: Warehouse 2023 Gas Consumption

Month	Days	Therms	Therms/Day	Cost
JAN	31	12	0	$69.15
FEB	28	9	0	$29.09
MAR	31	9	0	$31.38
APR	30	7	0	$28.12
MAY	31	9	0	$29.09
JUN	30	6	0	$23.95
JUL	31	7	0	$27.53
AUG	31	6	0	$25.07
SEP	30	7	0	$28.12
OCT	31	6	0	$23.85
NOV	30	8	0	$29.23
DEC	31	12	0	-
TOTAL:	**365**	98		$344.58

Average	$4.20	$/therm
	0	therms/day
	$1.13	$/day



2.9.2 Building Summary

Lighting Description

The Warehouse building is illuminated mostly with fluorescent fixtures with a few fixtures that have gone through LED lamp swaps. The fixtures mainly used in this building are 1'x4' surface mounted fixtures and 1'x4' pendant mounted fixtures. The pendant mounted fixtures are mainly used in the bus parking area, while the surface mounted are used mainly inside the building. The fixtures in the building are all controlled by toggle switches. There are no occupancy sensors in the building currently.



1'x4' Pendant Mounted Fixture



1'x4' Surface Mounted Fixture

3. BASELINE ENERGY MODELS

Site audit of the existing mechanical, lighting, and plumbing systems was conducted and each of these systems were identified and documented. Based on information gathered on existing systems, an energy model of existing buildings was undertaken using Trace 700 software and Energy end use breakdown for each campus was provided. Below is summery of assumptions made for our baseline energy models.

3.1 Energy Model Assumptions

The energy model for all campuses was created in Trane Trace 700. The overall energy consumption of the building was then calibrated based on the actual energy consumption during the year 2023. The following are some assumptions used to create the energy model.

Building Occupancy Schedule

For the District Office, it is assumed that people start occupying the building at 6:45 am and start leaving at 4:00 pm. On weekends and holidays, buildings are assumed to be unoccupied throughout the day.

For Laguna Beach High School, Thurston Middle School, El Morro Elementary School, and Top of the World Elementary School buildings, it is assumed that during regular school weekdays, students and staff start occupying at 7:00 am and begin leaving at 3:30 pm. On weekends, holidays, and district-closed days, buildings are assumed to be to be unoccupied.

The district 2023 calendar was used to schedule the seasonal schedule of school.

For the Warehouse, it is assumed to be on the same occupancy schedule as the schools.

Building Equipment Schedule

It is assumed that the equipment schedule follows the occupancy schedule for all campuses. This includes all plug loads such as monitors, computers, printers, coffee makers, etc.

Refrigerators and freezers are assumed to operate 24/7.

Building Lighting Schedule

It is assumed that the lighting schedule follows the occupancy schedule for all campuses.

Space Temperature Set Point

The setpoint for all the spaces is 73 degrees F for cooling and 69 for heating, based on observation during site investigation.

Construction Types

Construction types were based on existing documents. In cases with inadequate information on as-builts, assumptions were made based on the site investigation and similar buildings on site.

District Office

Building	Wall Type	Wall U-Value	Roof Type	Roof U-Value
A	Wood Frame	0.492	Wood Frame	0.081
B	Wood Frame	0.492	Wood Frame	0.081
C	Wood Frame w/ R11	0.098	Wood Frame w/ R19	0.061

Laguna Beach High School

Building	Wall Type	Wall U-Value	Roof Type	Roof U-Value
A	10" Concrete	0.629	Wood Frame w/ R11	0.081
B	8" Concrete	0.694	Wood Frame w/ R11	0.081
C	8" Concrete	0.694	Wood Frame w/ R11	0.081
D	Wood Frame w/ R15	0.089	Wood Frame w/ R11	0.081
E	10" Brick/Masonry 10" Concrete	0.326 0.629	Wood Frame w/ R11	0.081
F	12" Concrete	0.575	Wood Frame w/ R11	0.081
G	10" Concrete	0.629	Wood Frame w/ R11	0.081
H	8" CMU	0.379	Wood Frame w/ R11	0.081
K	8" CMU	0.379	Wood Frame w/ R11	0.081
L	10" Concrete	0.629	Wood Frame w/ R11	0.081
M	12" Concrete 8" Concrete	0.575 0.694	Wood Frame w/ R11	0.081
N	Wood Frame w/ R15	0.089	Wood Frame w/ R11	0.081
Stadium Bldg.	CMU w/ Metal Stud	0.080	Metal Deck	0.166

Thurston Middle School

Building	Wall Type	Wall U-Value	Roof Type	Roof U-Value
A	6" Concrete	0.402	Wood Frame w/ R11	0.081
B	Wood Frame w/ R30	0.064	Built-up roofing over Plywood	0.035
C	Wood Frame w/ R30	0.064	Built-up roofing over Concrete	0.032
D	6" Concrete	0.620	Wood Frame w/ R11	0.081
E	6" Concrete	0.620	Built-up roofing over Plywood	0.035
F	6" Concrete	0.620	Built-up roofing over Plywood	0.035
G	6" CMU	0.402	Built-up roofing over Plywood	0.035
H	6" CMU	0.402	Built-up roofing over Plywood	0.035
I	6" Concrete	0.620	Built-up roofing over Plywood	0.035

Top of the World Elementary School

Building	Wall Type	Wall U-Value	Roof Type	Roof U-Value
Admin	Wood Frame	0.225	Wood Frame w/ R6	0.135
B	Wood Frame	0.225	Wood Frame w/ R6	0.135
C	Wood Frame	0.225	Wood Roof w/ R5.9	0.114
D	Wood Frame	0.225	Wood Frame w/ R6	0.120
E	Wood Frame	0.225	Wood Roof w/ R5.9	0.114
F	Wood Frame w/ R11	0.107	Wood Frame w/ R19	0.035
G	Wood Frame w/ R11	0.107	Wood Frame w/ R19	0.035

El Morro Elementary School

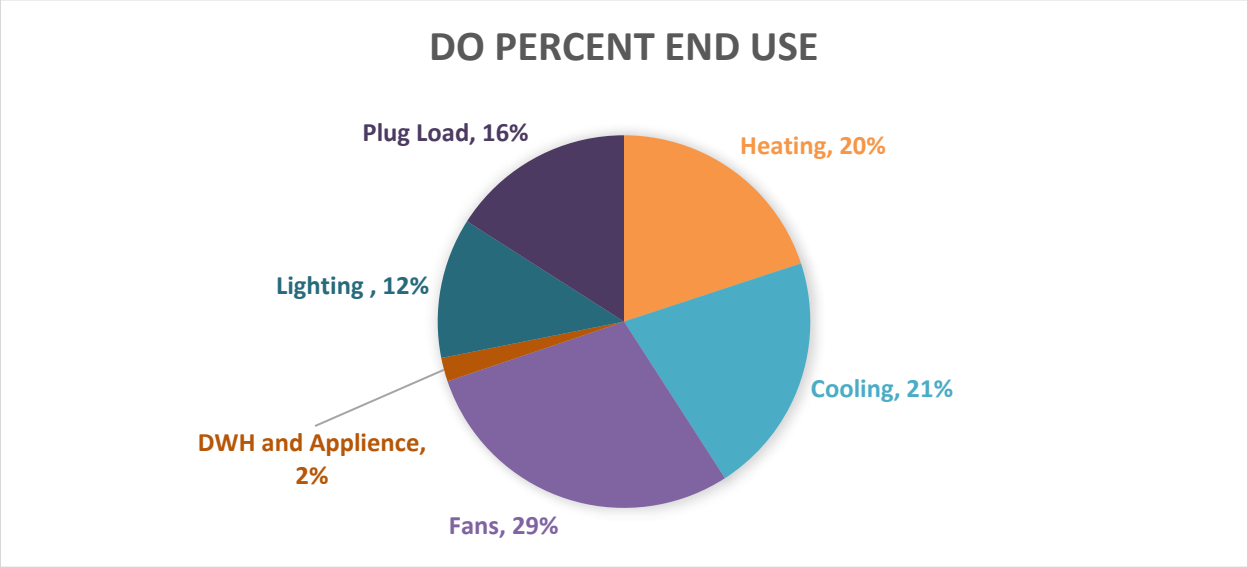
Building	Wall Type	Wall U-Value	Roof Type	Roof U-Value
A	Wood Frame	0.313	Wood Frame w/ Gravel or Seam	0.363
B	Wood Frame	0.313	Wood Frame w/ Gravel or Seam	0.363
C	Wood Frame	0.313	Wood Frame w/ Gravel or Seam	0.363
E	Wood Frame	0.313	Wood Frame w/ Gravel or Seam	0.363
G	Wood Frame w/ R6 8" CMU	0.123 0.579	Wood Frame w/ R6	0.109
H	Wood Frame w/ R6 8" CMU	0.123 0.579	Wood Frame w/ R6	0.109
J	Wood Frame w/ R6 8" CMU	0.123 0.579	Wood Frame w/ R6	0.109

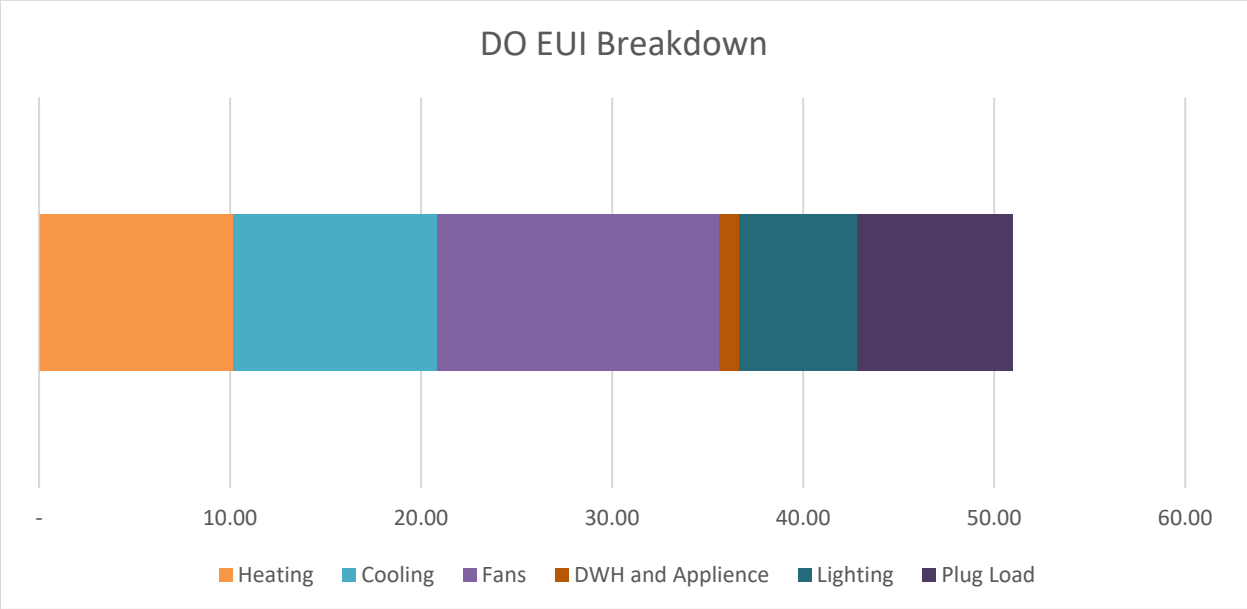
The existing windows are assumed to be single-pane glass with a U-value of 1.19 and SHGC of 0.68 for tint or 0.83 for clear.

3.2 Energy End Use Breakdown

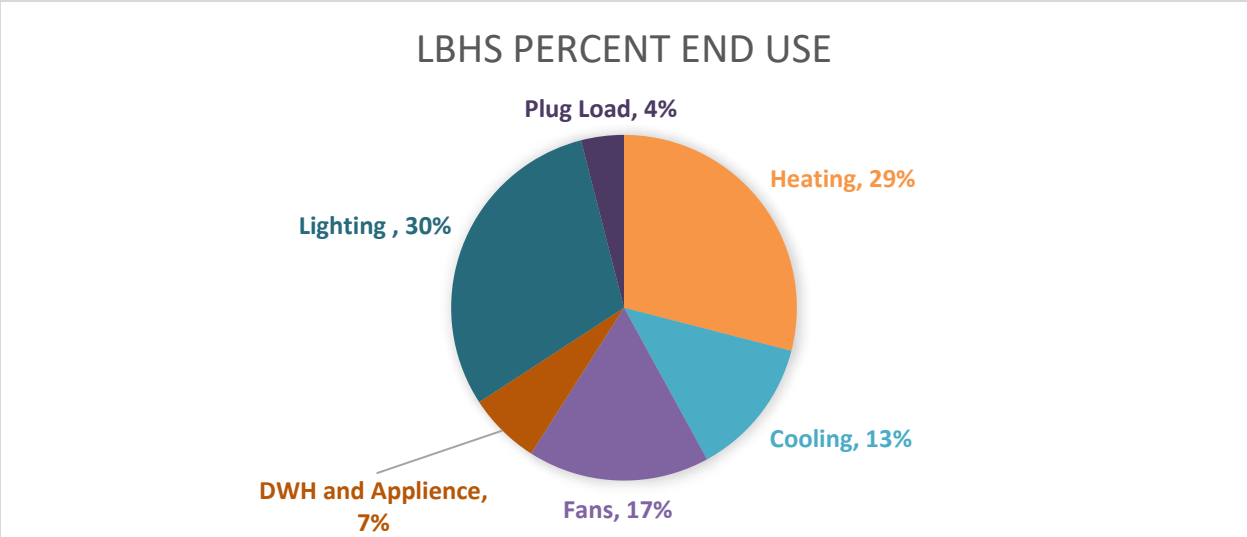
In this section, combination of Energy models and analysis of the utility data was used to find the energy end use breakdown for each campus. There are two graphs shown for each campus, one with percent of energy consumed per end use, and one the contribution of each consumption category to the total campus EUI.

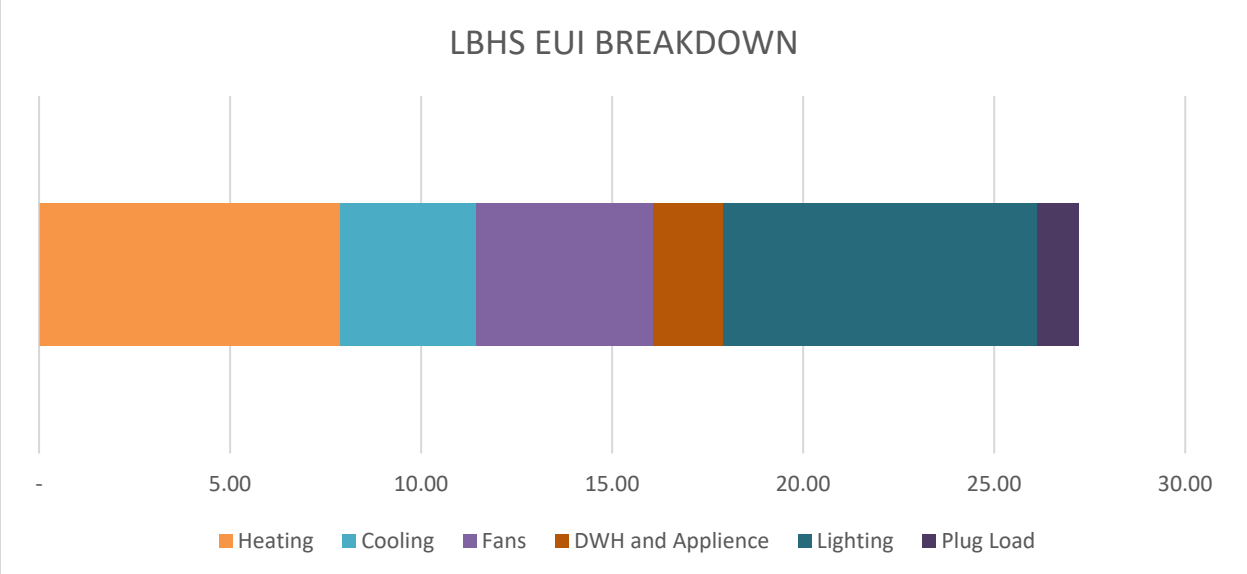
District Office



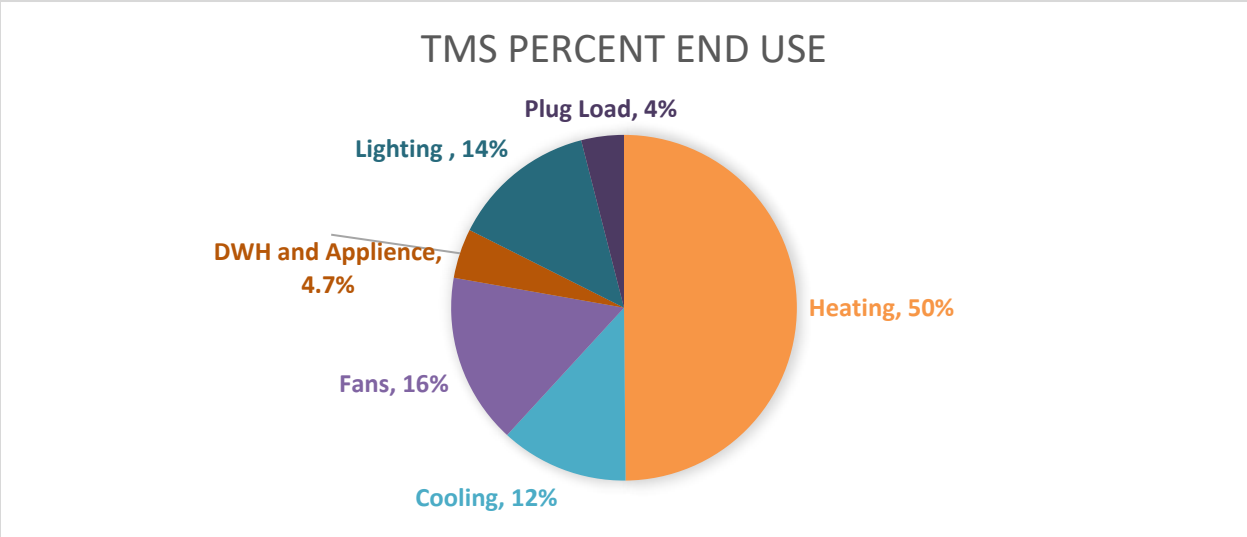


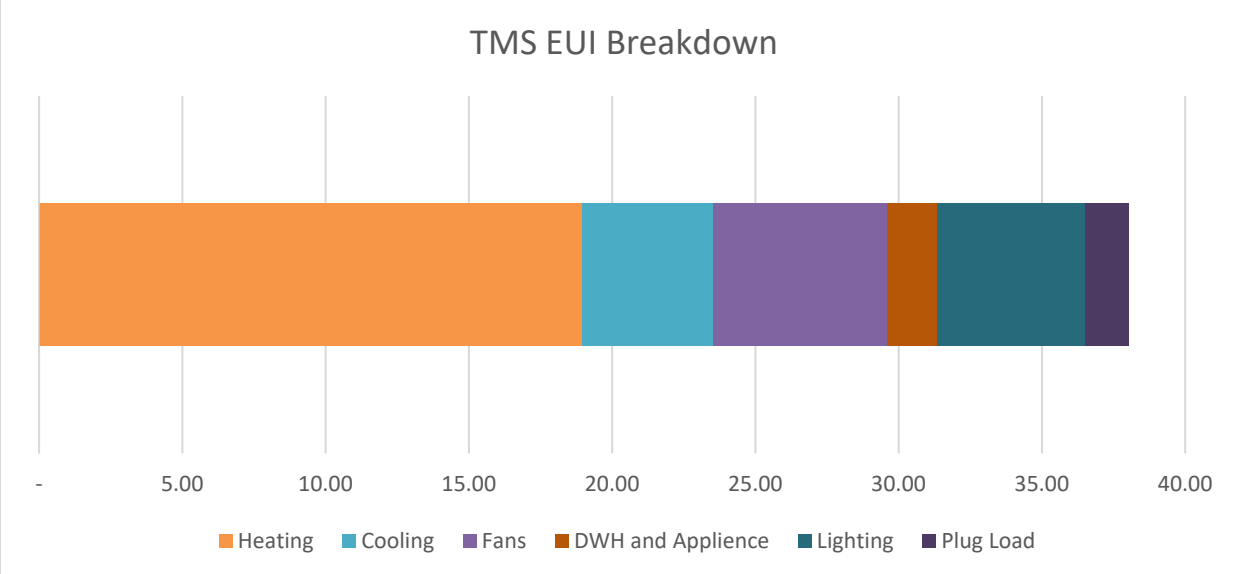
Laguna Beach High School



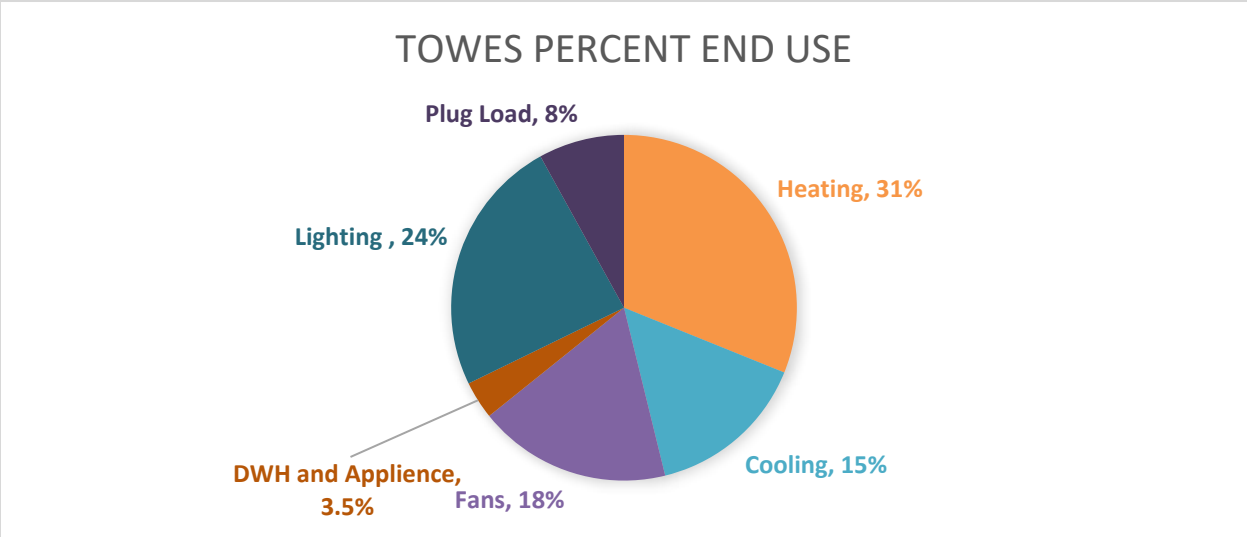


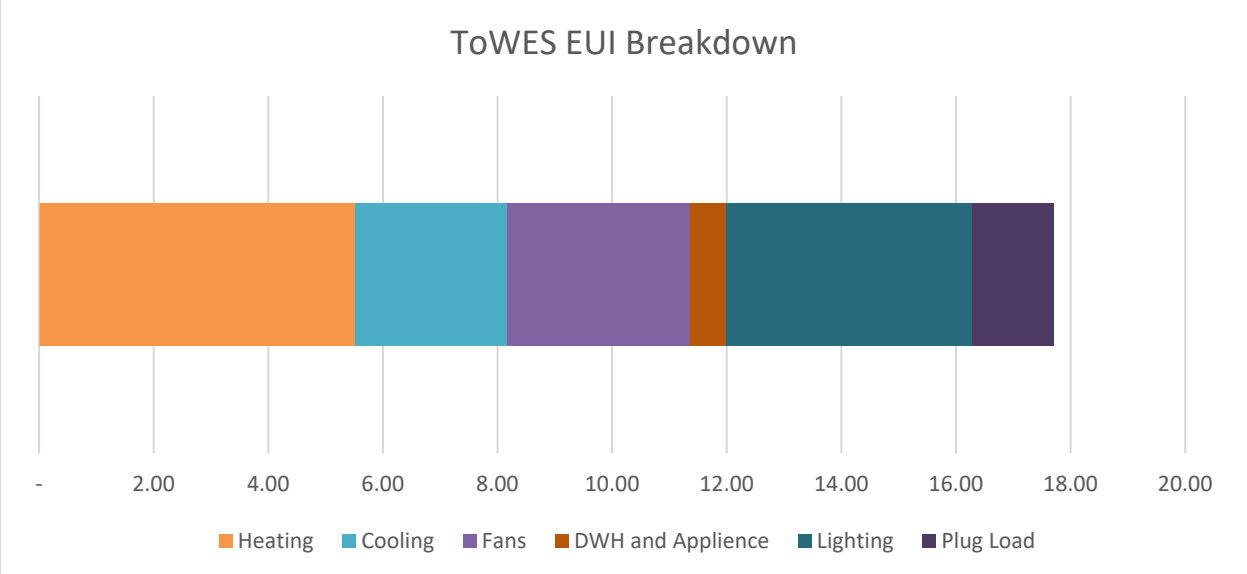
Thurston Middle School



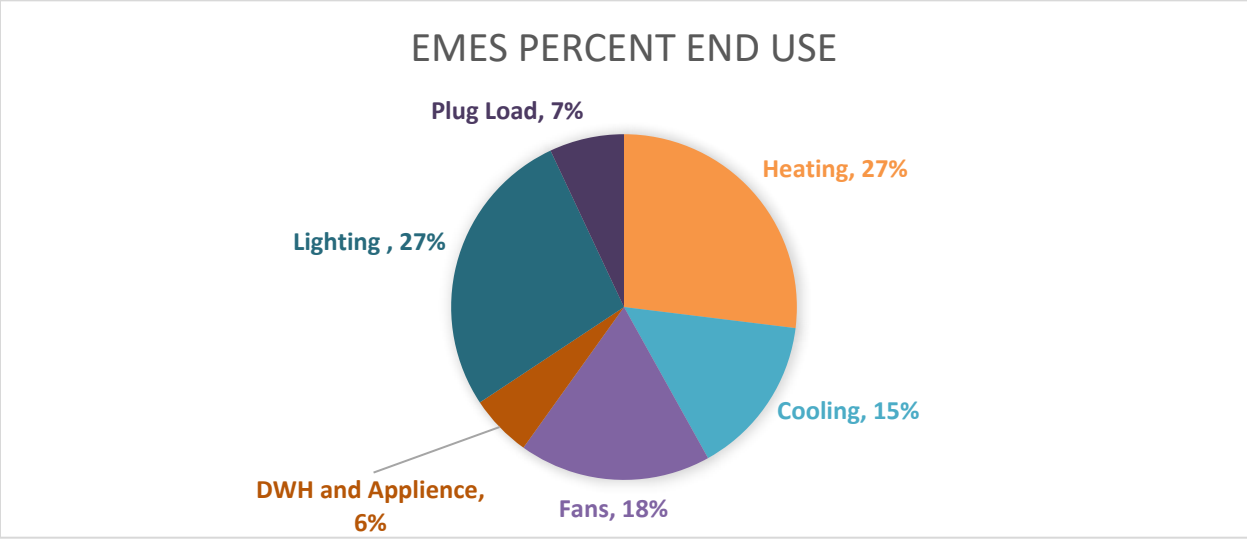


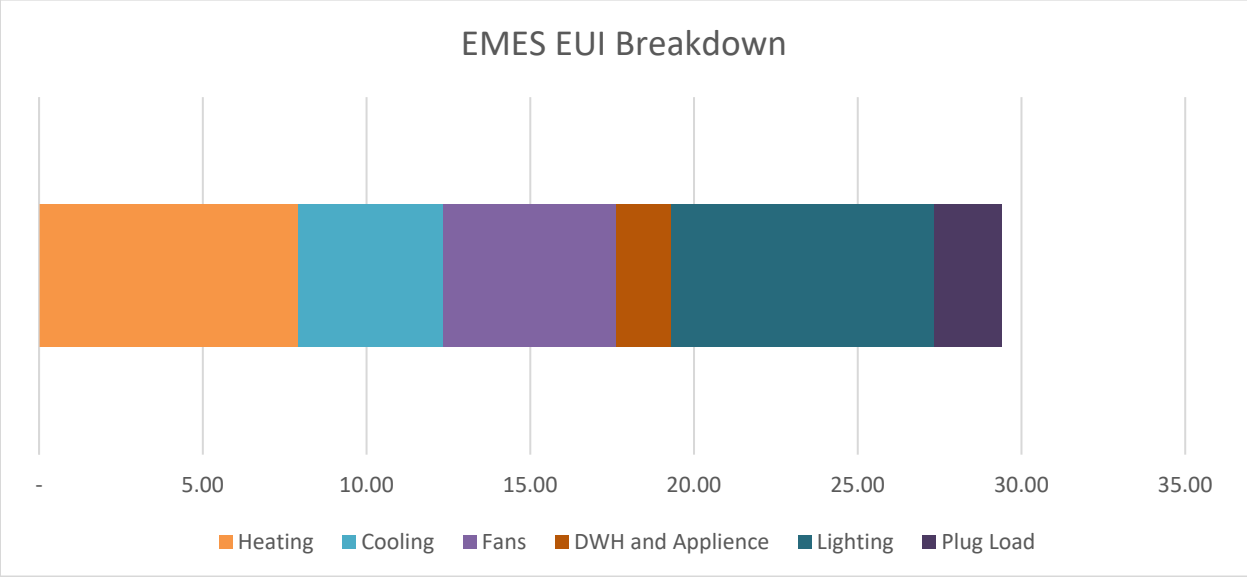
Top of the World Elementary





El Moro Elementary School





4. ENERGY CONSERVATION MEASURES

ECM 01 iAIRE Solar

This measure provides solar HVAC to packaged units and split systems. iAIRE Solar or similar products uses a solar panel to capture the sun's energy to add heat to the refrigerant during refrigeration cycle, in order to reduce the work done by the compressor. As the solar panel adds more heat to the system, the VFD slows down the speed of the compressor to keep the system at its normal operating pressure. As the compressor runs slower, the system uses less electricity to operate.

Through the Investment Tax Credit, the government offers a federal tax credit of 30% of the installed cost of a solar system and an additional 10% more for American-made Solar Panels

This measure requires adding a solar panel and a VFD to the compressor and modifying the control logic to refrigerant units that are either existing or new systems. The solar panel can be mounted on top of the unit on grade or the roof, within 100 ft of the unit.

Although this measure is not recommended in this report, P2S recommends that campus engage iAIRE for a pilot program in which the manufacturer will install the iAIRE solar panels on two identical units serving similar type spaces. Based on the units available, we recommend that the pilot program takes place in Thurston Middles School Building F. This pilot program is free of charge. During this program the energy consumption of two units is closely measured and compared. If the energy savings after the measurement period is below the advertised number, or if the client is not happy with the savings, the manufacturer will remove the panels. If energy savings are satisfactory, the District can then decide to move forward with adding these solar panels to new or existing equipment.

ECM 02 Controls and Scheduling

P2S recommends evaluating and re-scheduling HVAC operating schedules to align with the occupancy schedules. It has been observed that some campuses are intermittently hosting classes during summer months and most buildings are unoccupied. However, several buildings are being conditioned and not in setback mode. It is worthwhile to identify the spaces that are not scheduled to be occupied based on conversation with end users and modify the temperature setpoint for those spaces.

The analysis in later sections estimates the energy and cost savings for this measure using the assumption that the summer occupancy rate is the same for all campuses and matches the data we gathered from Top of the World. This assumption may not reflect every campus and every year, depending on the timing and location of the summer classes. However, it gives a fair approximation of the savings based on the information we have. The savings may differ depending on the occupancy schedules and the temperature setpoints of each building.

ECM 03 HVAC Replacement with Heat Pump

P2S recommends replacing existing gas-fired package units with heat pumps. Heat pumps have a considerably higher coefficient of performance (COP) than gas-fired systems. This means that the unit can provide more cooling/heating output with the same amount of energy input. Heat pumps remove natural gas combustion, which in turn reduces overall carbon emissions. This upgrade should also meet or exceed T20 and T24 minimum efficiency requirement by 20%.

Another added benefit, moving away from R410A refrigerant that is phasing out in California. Refrigerant R410A has a higher global warming potential than the newer refrigerants. It is recommended to install the same or similar heat pumps throughout the campus to allow easy maintenance and charge refrigerant.

This measure also includes introducing a modulating economizer to the unit that will allow the unit to operate in 100% economizer mode, this is particularly useful in California where the weather is moderate. This measure requires curb adapters, and barometric relief to be installed along with the unit (wherever necessary).

For this measure, the replacement of existing heat pump units with more efficient heat pump was not included.

ECM 04 Domestic Water Heater Replacement

To reduce the building's overall gas consumption, this measure recommends removing and replacing all domestic gas-fired water heaters with electric water heaters. These water heaters are more efficient than gas-fired heaters and tend to last longer. This can also allow the energy generated on-site to be used for heating, potentially reducing the operational cost.

ECM 05 Lighting Upgrades

To reduce lighting energy consumption, this measure provides a combination of lamp replacement, retrofitting, and/or replacing existing fixtures with energy-efficient LEDs equipped with integrated occupancy sensors. In spaces that are used intermittently, we recommend replacing manual lighting controls with occupancy sensors and dimming switches.

The controls and quantity of devices include a conservative estimate with daylight sensor per room where there are windows can impact lighting controls and one occupancy sensor per room.

The following key issues form part of a well-illuminated interior space and have been considered while providing our recommendations and selections of lamps, luminaires, and controls.

- Fixture appearance and aesthetics of the space
- Illumination of primary task
- Direct / reflective glare
- General illumination (horizontal)
- Light distribution on surfaces
- Illumination of egress paths.

Our proposed solutions fall into three categories: lamp replacement, fixture retrofit, and fixture replacement. The following outlines each option in detail.

LED retrofit kits utilize the existing fixture housing and require minor modifications or accessories to adapt the existing host fixture for use with the proposed hardware and LED components. Retrofit kits provide the look, feel and performance of a new fixture at a fraction of the cost. This option provides far better return on investment when compared to complete fixture replacement. We recommend retrofit kits for the following conditions, a) enclosed fixtures where heat management is necessary, b) where increased performance is desired, c) ceiling access is not possible, or ceiling contains hazardous materials c) dimming and automatic shutoff control options are required.

Minimum listings and warranty for specified retrofit kits include Energy Star / DLC listed, UL listed, 5-year warranty.

Fixture replacement requires the removal of the existing luminaire, supports and seismic bracing. The existing power and controls are disconnected and retained for extension to new luminaires. Generally, the new LED fixtures are installed in existing fixture locations, however there's also the option of revising the layout, and in some cases reducing the fixture count. LED fixtures typically reduce energy costs by 50%

while also improving illumination levels and uniformity. However, the equipment and labor costs associated with the new fixture installation extends the payback several years when compared to lamp replacement and retrofit options. We recommend fixture replacements in the following conditions, a) lamp and retrofit options do not exist, b) decorative fixtures, c) existing fixtures with unique lamp types or sockets.

Minimum warranty for specified light fixtures: 5-year warranty.

For light fixture replacements and retrofits (office fixtures such as 2'x4' Troffers or 1'x4' pendant-mounted linear fixtures), Lithonia is the recommended fixture manufacturer. Contractor-Select options for Lithonia 2'x4' LED fixtures range from $100 to $150, and their 4ft pendant-mounted fixtures range from $125 to $170. Although P2S does not endorse any specific light fixture manufacturer, Lithonia is recommended because of its strong compatibility track record at elementary school campuses.

The lighting controls that are most often used on campuses are nLight and Lutron. These two lighting controls are the most common in the industry as many lighting manufacturers support their controls. The manufacturer of the lighting controls may vary as long as the light fixtures are compatible with the lighting controls. Although P2S does not endorse any specific lighting controls, nLight and Lutron are recommended because of their strong compatibility track record at elementary school campuses.

ECM 06 Solar Photovoltaic and Storage

Solar photovoltaic (PV) is a renewable energy source that reduces reliance on the electric grid and thus reduces the site's carbon footprint. The energy provided by the solar PV system offsets energy that would have been sourced from the electric grid otherwise. The energy from the grid is typically generated from a combination of sources, including burning fossil fuels, which generate carbon emissions. The two options that are most used currently are solar canopies and rooftop solar.

Solar canopies are the most effective and convenient way to install solar as the canopies can be installed above parking lots and open areas giving more space to install the array. The construction cost for canopies is quite high but the ability to use less space makes this a viable option in many campuses.

Rooftop solar is another option we can implement, usually less expensive than solar canopies, but this process usually includes the addition of roof bracing for the additional weight solar brings to the building. Rooftop solar can be implemented everywhere as well since the main requirement is to have a roof to put the array onto.

Solar panels vary based on the manufacturer and the options that are available in their catalog and in our recommendations, we have chosen between SunPower and Qcells. The manufacturer for the panels may differ but if they are up to the wattage designated in our solar design and the district's standard any manufacturer will work for the solar PV arrays.

Battery storage has developed in recent years and most options will allow us to do a two-hour battery backup excluding the EV chargers. We have different types of batteries that we can select from but for our purpose we have chosen Tesla power walls as they have the best compatibility for most of the equipment in the industry.

ECM 07 EV Charging

To reduce fossil fuel consumption, this measure provides EV charging stations for district vehicles such as buses, carts, and any future electric vehicles the district or district employees may own. This will increase the electrical bill in the short term, due to adding a new source of consumption, but overall EV charging will allow the district to decrease the use of fossil fuels heavily.

Our proposed solutions fall into three categories: Level 2 charging, a mixture of Level 2 and 3, and Level 3 charging. The following outlines each option in detail.

Level 2 Charging requires the installation of Level 2 chargers and all necessary infrastructure. The rate of charge for these can range from 9.6kW to 15.4kW (208/240V) and will require more infrastructure work such as adding in bollards for protection, trenching to supply power to charging stations, installation of new electrical equipment, and marking for EV charging spaces. Generally, the chargers can be put into any parking location as long as there is enough electrical capacity for the additional loads. Depending on the existing load new feed may be required to accommodate Level 2 charging. Level 2 charging is usually quick enough for most applications as charging overnight will be the most optimal for everyday use.

Level 2 charging stations are cheaper than Level 3 units and will require less additional infrastructure. However, with Level 2 charging, since the rate of charge is slower than that of Level 3 there are possibilities of not being able to charge fast enough for high-use vehicles.

Level 3 Charging requires the installation of Level 3 chargers and all necessary infrastructure. The rate of charge for these can range from 150kW to 350kW (480V) and on average is 10 times faster than Level 2. Level 3 charging will require more infrastructure work such as adding bollards for protection, trenching to supply power to charging stations, installation of new electrical equipment, and marking for EV charging spaces. Generally, the chargers can be put into any parking location as long as there is enough electrical capacity for the additional loads. Given that in this case we will be using all Level 3 charging the service for individual locations may need to be upsized to allow for the installation. Level 3 charging is extremely fast and will allow for use throughout the day.

Level 3 charging stations are more expensive than Level 2 units and will require additional infrastructure compared to Level 2. However, with Level 3 charging, since the rate of charge is faster than that of Level 2 there will be very little possibility of running into any charging rate/speed issues.

Level 2 and 3 Mixed Charging requires the installation of Level 3 and Level 2 along with all the necessary infrastructure. In combining both Level 3 and Level 2 charging we can eliminate the charging rate problems for Level 2 charging, while not requiring the full use of Level 3 charging.

ECM 08 Heat pumps w/ Energy Recovery for High OSA

This energy conservation measure includes all the advantages of installing a heat pump as per ECM 03. However, this measure includes an energy recovery unit that can assist in lowering the overall energy required to heat or cool space. This is typically effective in spaces that require large amounts of OSA. The OSA required for spaces increases the amount of energy used to condition also increases. By installing an ERU, the energy is transferred from the exhaust air to the OSA, preconditioning the air and, in turn, reducing the energy required to condition the space.

After analysis, this ECM is not recommended as the campus buildings are in mild climate zones. This means that the temperature differential between the indoor and outdoor air is generally smaller. Energy recovery units work for buildings that are located in more extreme temperatures where passive ventilation is not possible. There is also an operational consideration where this system requires regular maintenance and monitoring to ensure optimal performance.

ECM 09 Windows/Film/Insert

The existing fenestration construction throughout the district are single pane windows with tint.

Single Pane to Double Pane Window Upgrade

This measure is associated with building window upgrades from single pane to double pane with respect to Title 24 2022 prescriptive code thresholds. This measure assumes that existing walls, roof, and HVAC systems remain as is.

Title 24 2022 prescriptive requirements for climate zone 6 is a U-factor of 0.36 for fixed windows and a solar heat gain coefficient (SHGC) of 0.25.

Single Pane Film Window

This measure is associated with removing and replacing the existing window tint with more modern thermal films.

Secondary Window System

This measure is associated with installing a secondary window system, such as WinSert by Alpen, to existing windows. Secondary window systems can effectively turn single-pane windows into double-pane windows in terms of performance, without the need to physically replace window framings.

ECM 10 Exterior Wall and Roof Envelope Upgrades

This measure includes upgrading the exterior walls and roof construction to meet Title 24 2022 prescriptive requirements. This will require adding layers of insulation, gypsum board, and other layers to increase the overall U-factor of each component. This ECM does not impact the windows.

ECM 11 Ceiling Fans

This measure is associated with adding ceiling fans to work simultaneously with cooling equipment to save energy. The breeze created by the fans creates a cooling effect without actually lowering space temperature. Ceiling fans allow you to raise the thermostat setpoint about 4 degrees Fahrenheit higher without impacting comfort. The ceiling fans themselves use significantly less electricity compared to an air conditioner. By reducing the workload on the cooling equipment, this measure can add cost savings by reducing electricity usage. This measure also helps with air recirculation and helps extend the lifespan of the cooling unit.

5. COST ANALYSIS & RECOMMENDATIONS

5.1 District Wide Recommendation

In sections 5.2 through 5.9 individual assessment and feasibility of various measure for each campus has been presented. In this section, a reference table is depicted that includes all the recommended measures, measure priority, timeline for implementation, savings, implementation cost and available incentives and grants. It should be noted that escalation is not included in these estimates. The measures are broken up based on the implementation year and priority. More information regarding each specific project can be found in later sections. The implementation cost does not include the incentives available for each project, escalation, or any soft costs. For more information about available incentives refer to section 6 of this report and appendix C.

Below is the list of Summer 2025 Projects. By implementing these measures, District will reduce total energy consumption to 86% of baseline, and reduce operational carbon emission to 85% of baseline.

Project	Annual Energy Saving (MBH)	Annual Cost Saving	Annual Operational Carbon Saving (lbs)	Project Cost
EMES Lighting Upgrade	275,222	$23,392	40,122	$192,360
LBHS Lighting Upgrade	428,929	$36,456	62,529	$344,973
TMS Lighting Upgrade	188,892	$16,055	27,537	$243,691
DO Lighting Upgrade	31,773	$2,700	4,632	$44,293
ToWE Lighting Upgrade	161,521	$13,278	23,546	$220,481
WH Lighting Upgrade	34,372	$2,518	5,011	$192,360
LBHS Stadium Lighting	78,138	$10,330	11,391	$264,400
LBHS Theater Lighting	61,406	$5,399	8,952	$70,200
Total	1,260,253	$110,128	183,719	$1,572,758

Below is the list of Summer 2026 Projects. By implementing these measures, District will reduce total energy consumption to 69% of baseline and reduce operational carbon emission to 67% of baseline. It should be noted that the carbon emission reduction from converting the current fuel burning fleet is not included in the numbers below.

Project	Annual Energy Saving (MBH)	Annual Cost Saving	Annual Operational Carbon Saving (lbs)	Project Cost
WH PV and BESS	1,157,350	$49,816	168,718	$1,153,961
EMES PV and BESS	1,173,387	$55,603	171,056	$919,026
ToWE PV and BESS	561,062	$23,874	81,791	$430,982
DO PV and BESS	360,307	$12,520	52,525	$298,804
DO HP Replacement	34,137	$918	3,661	$136,000
DO EV Stations	0	$0	0	$33,000
ToWE EV Stations	0	$0	0	$16,500
EMES EV Stations	0	$0	0	$22,000
WH EV Stations	0	$0	0	$274,000
Total	3,286,244	$142,731	477,752	$3,284,273

Below is the list of Summer 2027 Projects. By implementing these measures, District will reduce total energy consumption to 29% of baseline and reduce operational carbon emission to 24% of baseline.

Project	Annual Energy Saving (MBH)	Annual Cost Saving	Annual Operational Carbon Saving (lbs)	Project Cost
LBHS PV and BESS	2,146,830	$105,348	312,964	$2,250,460
TMS PV and BESS	1,533,012	$62,738	223,482	$1,656,429
TMS EV Stations	0	$0	0	$11,000
Total	3,679,842	$168,086	536,446	$3,917,889

Below is the list of Summer 2028 Projects. By implementing these measures, District will reduce total energy consumption to 18% of baseline, and reduce operational carbon emission to 15% of baseline.

Project	Annual Energy Saving (MBH)	Annual Cost Saving	Annual Operational Carbon Saving (lbs)	Project Cost
ToWE HP Replacement	221,405	$2,305	24,748	$2,647,943
LBHS HP Replacement	734,171	$4,934	80,688	$3,407,221
Total	955,576	$7,239	105,436	$6,055,164

Below is the list of Summer 2029 Projects. By implementing these measures, District will reduce total energy consumption to 8% of baseline and reduce operational carbon emission to 7% of baseline.

Project	Annual Energy Saving (MBH)	Annual Cost Saving	Annual Operational Carbon Saving (lbs)	Project Cost
EMES HP Replacement	241,763	$1,192	27,161	$2,095,240
TMS HP Replacement	690,315	-$2,961	73,757	$2,305,151
Total	932,078	-$1,769	100,918	$4,400,391

Below is the list of Summer 2030 Projects. By implementing these measures, District will reduce total energy consumption to 5% of baseline and reduce operational carbon emission to 5% of baseline.

Project	Annual Energy Saving (MBH)	Annual Cost Saving	Annual Operational Carbon Saving (lbs)	Project Cost
DO DWH Replacement	1,764	-$430	15	$25,000
ToWE DWH Replacement	8,316	-$2,025	73	$32,000
TMS DWH Replacement	23,373	-$5,692	204	$50,000
WH DWH Replacement	6,664	$110	689	$25,000
LBHS DWH Replacement	50,400	-$12,275	440	$75,000
EMES DWH Replacement	17,232	-$4,197	150	$25,000
Total	107,749	-$24,509	1,572	$232,000

5.2 District Office

General Electrical Recommendations

Based on the existing conditions of the electrical equipment located at the District Office, we recommend that LBUSD replace the existing electrical service and upsize for future additional equipment or upgrades. The main distribution board has also reached the end of its life and will need to be replaced as the rust has damaged the doors and interior of the enclosure. Per NEC Code, all outdoor enclosures must be weatherproof, and for all major electrical work such as installing solar or EV chargers, the system must be upsized to allow for new constructions.

ECM 02 Controls and Scheduling

The table below shows the energy saving in District Office after implementation of this ECM as noted in previous sections.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	103,378	541	406,826	57,750
ECM 02	96,354	541	382,859	54,256
Savings	7,024	0	23,967	3,494
%Savings	7%	0%	6%	6%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$28,830	$2,035	$30,866	-	-
ECM	$26,793	$2,035	$28,829	-	-
Savings	$2,037	$0	$2,037	-	-
%Savings	7%	0%	7%	-	-

ECM 03 HVAC Replacement with Heat Pump

The table below shows the energy saving in District Office for replacing all the existing gas fires units with heat pumps.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	103,378	541	406,826	57,750
ECM	106,767	84	372,689	54,089
Savings	-3,389	457	34,137	3,661
%Savings	-3%	84%	8%	6%

The table below summarizes the cost savings associated with this ECM. The cost of this ECM is based on replacing the equipment that currently utilize gas for heating and does not include the cost of replacing heat pump units in kind. The implementation cost shown in the table below is the total cost of

implementation minus the cost of end of life replacement of the unit. This means if the unit is passed the useful life expectancy, the only cost included in the table below is the premium cost difference between like for like replacement of the unit, and upgrading the unit to heat pump.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$28,830	$2,035	$30,866	-	-
ECM	$29,813	$134	$29,947	$136,000	N/A
Savings	-$983	$1,901	$918	-	-
%Savings	-3%	93%	3%	-	-

ECM 04 Domestic Water Heater Replacement

The table below shows the energy saving in District Office for replacing all the existing domestic water heaters that use natural gas with electric water heaters.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	103,378	541	406,826	57,750
ECM	105,323	457	405,062	57,735
Savings	-1,945	84	1,764	15
%Savings	-2%	16%	0%	0%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$28,830	$2,035	$30,866	-	-
ECM	$29,394	$1,901	$31,295	$25,000	-
Savings	-$564	$134	-$430	-	-
%Savings	-2%	7%	-1%	-	-

ECM 05 Lighting Upgrades

Based on the existing conditions of the District Office, there are a few items that we can recommend. From site observations, many light fixtures have already gone through lamp replacements or LED retrofits and are using updated LED technology. There are existing controls for building C, however building A and B currently do not have any. This is another area where the campus can introduce more savings. We recommend adding controls to the individual rooms and retrofitting the rest of the existing fluorescent ballast to controllable LED light fixtures.

The company that is recommended for light fixtures is Lithonia as most of their fixtures are used in office spaces and classrooms. A bonus to Lithonia is that most lighting control systems are compatible with their fixtures. The manufacturer of the light fixtures may vary as long as the lighting control systems are compatible with the lighting system that the district installs. P2S does not endorse any specific lighting manufacturers.

The lighting controls that are often used are nLight and Lutron. These two lighting controls are very common in the K-12 campuses. The lighting controls from nLight and Lutron are compatible with many fixture manufacturers. The manufacturer of the lighting controls manufacturer may vary as long as the light fixtures are compatible. P2S does not endorse any specific lighting controls manufacturers.

The table below shows the energy saving in District Office proposed lighting upgrades.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	103,378	541	406,826	57,750
ECM	94,066	541	375,053	53,118
Savings	9,312	0	31,773	4,632
%Savings	9%	0%	8%	8%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$28,830	$2,035	$30,866	-	-
ECM	$26,130	$2,035	$28,166	$44,293	13.8
Savings	$2,700	$0	$2,700	-	-
%Savings	9%	0%	9%	-	-

ECM 06 Solar Photovoltaic and Storage

The recommended option for installing solar PV systems for the District Office is on a parking canopy as the roof space at the District Office is very limited. Our solution proposes a fixed-tilt, rack-mounted solar PV system with centralized inverters (one or two large inverters serving the PV system) to be mounted on top of a parking canopy at the parking spaces closest to the main electrical feed to save cost. Where applicable, the solar PV panels should face south (true azimuth 180°) to achieve the highest energy production yield.

Scenario 1: Current Existing Load Optimized PV (under generation)

The proposed PV system was modeled with only the Energy Tool Base program to find the most optimized system that is recommended for the existing loads. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 40kW-DC and would generate approximately 60,433 kWh of electricity per year. Laguna Beach District Office consumed approximately 102,281 kWh of electricity in 2022. The proposed PV system would offset approximately 59% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	82
System Size, kW-DC / kW-AC	40 kW-DC / 34.8 kW-AC
Annual Energy Production	60,433kWh/year
Construction Costs	$191,654
Annual Cost Savings	$7,259 /year
Financial Payback	15.5 years

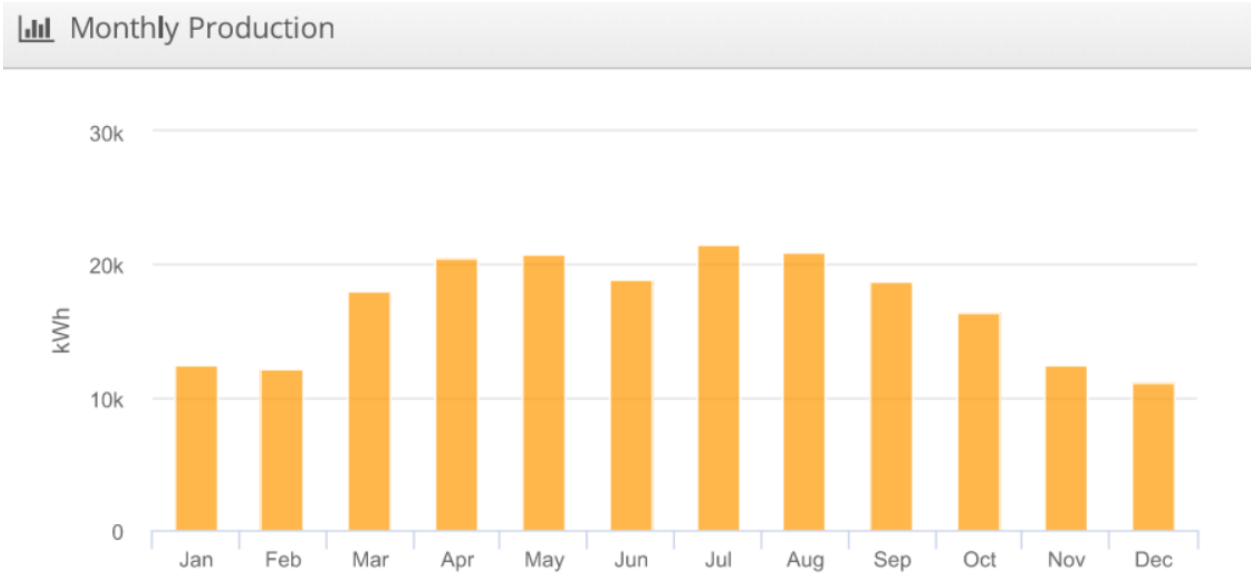
According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[9]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $191,654. This includes one battery rated at 13.2kWh. The annual cost savings is estimated to be $7,259 per year, resulting in a 15.5-year simple payback using average of $0.25/kWh.

Scenario 2: Net Zero PV for Existing Loads (over generation)

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 64.7 kW-DC and would generate approximately 105,600 kWh of electricity per year. For reference, Laguna Beach District Office consumed approximately 102,821 kWh of electricity in 2022. The proposed PV system would offset approximately 102% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	132
System Size, kW-DC / kW-AC	64.7 kW-DC / 72.2 kW-AC
Annual Energy Production	105,600 kWh/year
Construction Costs	$298,804
Annual Cost Savings	$12,520/year
Financial Payback	14.5 years

Building System	Quantity	System Size, kW-DC
Parking Lot Canopy	132	64.7
TOTAL	132	64.7



Month	Monthly kWh
January	5624.9
February	5802.3
March	9140.4
April	11051.2
May	11565.5
June	10732.3
July	12069.3
August	11328.7
September	9644.1
October	8007.3
November	5733.7
December	4876.8
TOTAL:	105576.5



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[9]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $298,804. This includes three total batteries rated at 13.2kWh for a total of 39.6kWh. The annual cost savings is estimated to be $12,520 per year, resulting in a 14.5-year simple payback using average of $0.25/kWh.

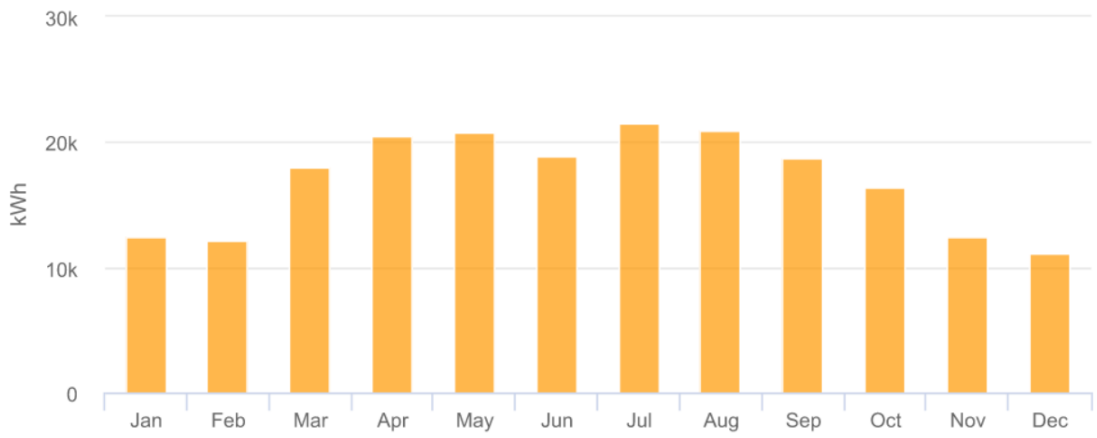
Scenario 3: Scenario 2 with P2S Recommended Loads

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 117.6 kW-DC and would generate approximately 203,900 kWh of electricity per year. For reference, Laguna Beach District Office is expected to consume 338,982 kWh of electricity with the P2S recommended EV loads. The proposed PV system would offset approximately 60% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	240
System Size, kW-DC / kW-AC	117.6 kW-DC / 96.2 kW-AC
Annual Energy Production	203,900 kWh/year
Construction Costs	$518,422
Annual Cost Savings	$23,470/year
Financial Payback	13.4 years

Building System	Quantity	System Size, kW-DC
Parking Lot Canopy	240	117.6
TOTAL	240	117.6

Monthly Production



Month	Monthly kWh
January	12442.2
February	12090.5
March	17944.2
April	20541.7
May	20727.7
June	18938.4
July	21473.8
August	20984.9
September	18748.9
October	16429.7
November	12396
December	11135.1
TOTAL:	203853.1



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[9]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $518,422. This includes three total batteries rated at 13.2kWh for a total of 39.6kWh. The annual cost savings is estimated to be $23,470 per year, resulting in a 13.4-year simple payback from using average of $0.25/kWh.

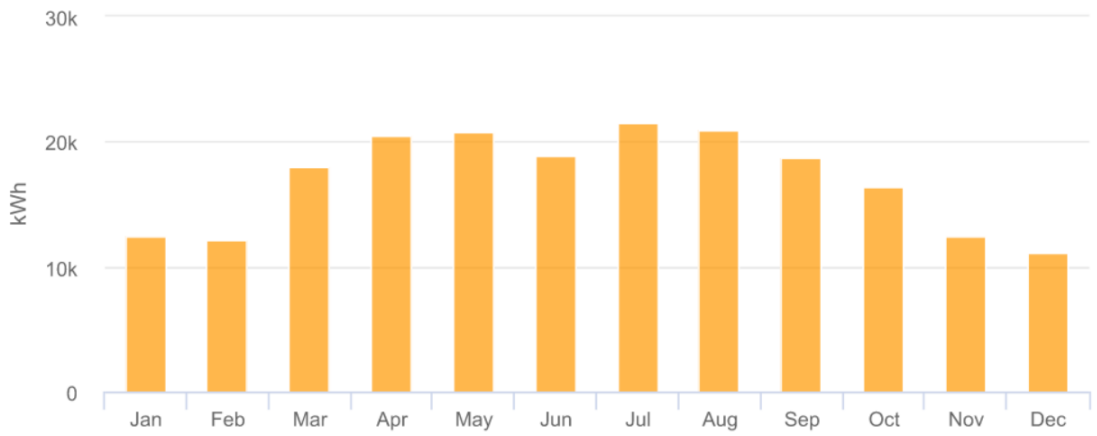
Scenario 4: Scenario 2 with Code Required EV Loads

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 117.6 kW-DC and would generate approximately 203,900 kWh of electricity per year. For reference, Laguna Beach District Office is expected to consume 206,272 kWh of electricity with the code required EV loads. The proposed PV system would offset approximately 99% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	240
System Size, kW-DC / kW-AC	117.6 kW-DC / 96.2 kW-AC
Annual Energy Production	203,900 kWh/year
Construction Costs	$518,422
Annual Cost Savings	$24,704/year
Financial Payback	12.8 years

Building System	Quantity	System Size, kW-DC
Parking Lot Canopy	240	117.6
TOTAL	240	117.6

Monthly Production



Month	Monthly kWh
January	12442.2
February	12090.5
March	17944.2
April	20541.7
May	20727.7
June	18938.4
July	21473.8
August	20984.9
September	18748.9
October	16429.7
November	12396
December	11135.1
TOTAL:	203853.1



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[9]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $518,422. This includes three total batteries rated at 13.2kWh for a total of 39.6kWh. The annual cost savings are estimated to be $24,704 per year, resulting in a 12.8-year simple payback using average of $0.25/kWh.

ECM 07 EV Charging

Based on the existing conditions of the District Office, we recommend installing Level 2 charging infrastructure. The current supply of power to the District Office is 120/208V, which limits our options since Level 3 will require 480V.

Scenario 1: P2S Recommended EV

Currently, the best location to put EV chargers is 14 parking spots on the southwest side. This location will require the least amount of trenching from the main distribution board. For all 14 chargers to be installed at full speed, we need a spare load of 560A. As reference the current code recommends parking lots such as the District Office's with 110 parking spots to have 38 EV capable spaces with 13 of them needing to be installed. EV capable spaces means that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, SCE will cover the cost for the service upgrade and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate %	ROI
Existing Usage	103,378	$25,845	$0	-	-
EV Chargers	232,243	$26,656	$77,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-203,900	-$23,470	$518,422	30% solar & BESS	-
Incentives EV Solar	-	-	-$10,200 -$155,527	-	-
Totals	131,721	$29,031	$416,095	-	17.7

Scenario 2: Code Required EV

For all six chargers to be installed at full speed, we need a spare load of 240A. As reference the current code requires parking lots such as the District Office's with 110 parking spots to have 25 EV capable spaces with six of them needing to be installed. EV capable spaces means that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally, for EV chargers we are able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, they state that they will cover the cost for the upgraded service and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate %	ROI
Existing Usage	103,378	$25,845	$0	-	-
EV Chargers	99,532	$11,424	$33,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-203,900	-$23,470	$518,422	30% solar & BESS	-
Incentives EV Solar	-	-	-$10,200 -$155,527	-	-
Totals	990	$13,799	$385,695		16.4

Energy and Decarbonization Road Map

Tables below shows the summary of the recommended measures, in order of recommendation, alongside with cost and carbon analysis. The negative values in the electrical column indicate over generation of site electricity. The table below shows the energy saving with all the measures included:

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	103,378	541	406,826	57,750
Scheduling	96,354	541	382,859	54,256
Lighting Upgrade	87,042	541	351,086	49,624
PV and BESS	-18,558	541	-9,221	-2,901
HP Replacement	-15,169	84	-43,358	0
DWH Replacement	-13,225	0	-45,122	-6,578
Total Saving After All ECM	103,378	541	451,948	57,750
% saving	100%	100%	111%	100%

The table below summarizes the cost savings associated with these ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost
Baseline	$28,830	$2,035	$30,866	-
Scheduling	$26,793	$2,035	$28,829	-
Lighting Upgrade	$24,093	$2,035	$26,129	$44,293
PV and BESS	$11,573	$2,035	$13,609	$298,804
HP Replacement	$12,556	$134	$12,690	$136,000
DWH Replacement	$13,120	$0	$13,120	$25,000
Total Saving After All ECM	$15,710	$2,035	$17,746	$504,097
% saving	54%	100%	57%	-

And table below summarizes the normalized cost per unit of energy and carbon saved for each measure.

	Annual Electric Cost	Annual Gas Cost
Scheduling	$-	$-
Lighting Upgrade	$1.39	$9.56
PV and BESS	$0.83	$5.69
HP Replacement	$3.98	$37.15
DWH Replacement	$14.17	$1,622.68
Total Saving After All ECM	$1.12	$8.73

5.3 Laguna Beach High School

General Electrical Recommendations

Based on the existing conditions of the electrical equipment located at the Laguna Beach High School, we recommend that LBUSD replace the some of the existing electrical equipment that has been damaged or has reached past the expected use. Much of the interior electrical equipment is in good condition, however the exterior equipment has been damaged due to weather and overall age. The pieces of equipment that are in need of replacing are: Switchboard South of building B 'DBBLB', 'DBBLA', the main service switchboard located at El Camino Del Mar, and the main switchboard located on Park Ave. Per NEC Code, all outdoor enclosures must be weatherproof and with the current state of the existing equipment they do not meet those requirements.

ECM 02 Controls and Scheduling

The table below shows the energy saving in Laguna Beach High School after implementation of this ECM as noted in previous sections.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	701,246	11,552	3,547,851	483,958
ECM 02	693,714	11,552	3,522,152	480,212
Savings	7,532	0	25,700	3,747
%Savings	1%	0%	1%	1%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Operational Cost	Implementation Cost	ROI
Baseline	$206,954	$24,160	$231,114	-	-
ECM	$204,769	$24,160	$228,930	-	-
Savings	$2,184	$0	$2,184	-	-
%Savings	1%	0%	1%	-	-

ECM 03 HVAC Replacement with Heat Pump

The table below shows the energy saving in Laguna Beach High School for replacing all the existing gas fires units with heat pumps.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	701,246	11,552	3,547,851	483,958
ECM	754,302	2,400	2,813,680	403,270
Savings	-53,056	9,152	734,171	80,688
%Savings	-8%	79%	21%	17%

The table below summarizes the cost savings associated with this ECM. The cost of this ECM is based on replacing the equipment that currently utilize gas for heating and does not include the cost of replacing heat pump units in kind. The implementation cost shown in the table below is the total cost of implementation minus the cost of end of life replacement of the unit. This means if the unit is passed the useful life expectancy, the only cost included in the table below is the premium cost difference between like for like replacement of the unit, and upgrading the unit to heat pump.

	Annual Electric Cost	Annual Gas Cost	Annual Operational Cost	Implementation Cost	ROI
Baseline	$206,954	$24,160	$231,114	-	-
ECM	$222,340	$3,840	$226,180	$3,407,221	-
Savings	-$15,386	$20,320	$4,934	-	-
%Savings	-7%	84%	2%	-	-

ECM 04 Domestic Water Heater Replacement

The table below shows the energy saving in Laguna Beach High School for replacing all the existing domestic water heaters that use natural gas with electric water heaters.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	701,246	11,552	3,547,851	483,958
ECM	756,815	9,152	3,497,451	483,518
Savings	-55,569	2,400	50,400	440
%Savings	-8%	21%	1%	0%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Operational Cost	Implementation Cost	ROI
Baseline	$206,954	$24,160	$231,114	-	-
ECM	$223,069	$20,320	$243,389	$75,000	-
Savings	-$16,115	$3,840	-$12,275	-	-
%Savings	-8%	16%	-5%	-	-

ECM 05 Lighting Upgrades

Based on the existing conditions of Laguna Beach High School, there are a few items that can be recommended. From site observations, many light fixtures have already gone through lamp replacements or LED retrofits and are using updated LED technology. However, the majority of the campus does not have lighting controls, and this is another area where the campus can introduce more savings. It is recommended to add controls to the individual rooms and retrofit the rest of the existing fluorescent ballast to controllable LED light fixtures.

The company that is recommended for light fixtures is Lithonia as most of their fixtures are used in office spaces and classrooms. A bonus to Lithonia is that most lighting control systems are compatible with their fixtures. The manufacturer of the light fixtures may vary as long as the lighting control systems are

compatible with the lighting system that the district installs. P2S does not endorse any specific lighting manufacturers.

The lighting controls that are often used are nLight and Lutron. These two lighting controls are very common in the K-12 campuses. The lighting controls from nLight and Lutron are compatible with many fixture manufacturers. The manufacturer of the lighting controls manufacturer may vary as long as the light fixtures are compatible. P2S does not endorse any specific lighting controls manufacturers.
It should be noted that the Theater and Stadium specialty lighting upgrades are not included in this section.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	701,246	11,552	3,547,851	483,958
ECM	575,534	11,552	3,118,922	421,429
Savings	125,712	0	428,929	62,529
%Savings	18%	0%	12%	13%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$206,954	$24,160	$231,114	-	-
ECM	$170,498	$24,160	$194,658	$344,973	9.5
Savings	$36,456	$0	$36,456	-	-
%Savings	18%	0%	16%	-	-

ECM 06 Solar Photovoltaic and Storage

We recommend installing solar PV systems on the rooftops of buildings C, D, F, G, H, N, and K. Our solution proposes a fixed-tilt, rack-mounted solar PV system with centralized inverters (one or two large inverters serving each building's PV system). Where applicable, the solar PV panels should face south (true azimuth 180°) to achieve the highest energy production yield.

Scenario 1: Current Existing Load Optimized PV (under generation)

The proposed PV system was modeled with only the Energy Tool Base program to find the most optimized system recommended for the existing loads. The PV system was based on the site investigation for solar PV feasibility. For the analysis, PV module SunPower SPR-400-WHT-D was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 231.0 kW-DC and would generate approximately 349,000 kWh of electricity per year. For reference, Laguna Beach High School consumed approximately 700,000 kWh of electricity in 2022. The proposed PV system would offset approximately 50% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	400 W
Quantity of PV Modules	472

System Size, kW-DC / kW-AC	231 kW-DC / 201.2 kW-AC
Annual Energy Production	349,001 kWh/year
Construction Costs	$1,242,273
Annual Cost Savings	$72,090 /year
Financial Payback	10.9 years

According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[9]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $1,242,273. This includes one total battery rated at 258kWh. The annual cost savings are estimated to be $72,090 per year, resulting in a 10.9-year simple payback using average of $0.25/kWh.

Scenario 2: Net Zero PV for Existing Loads

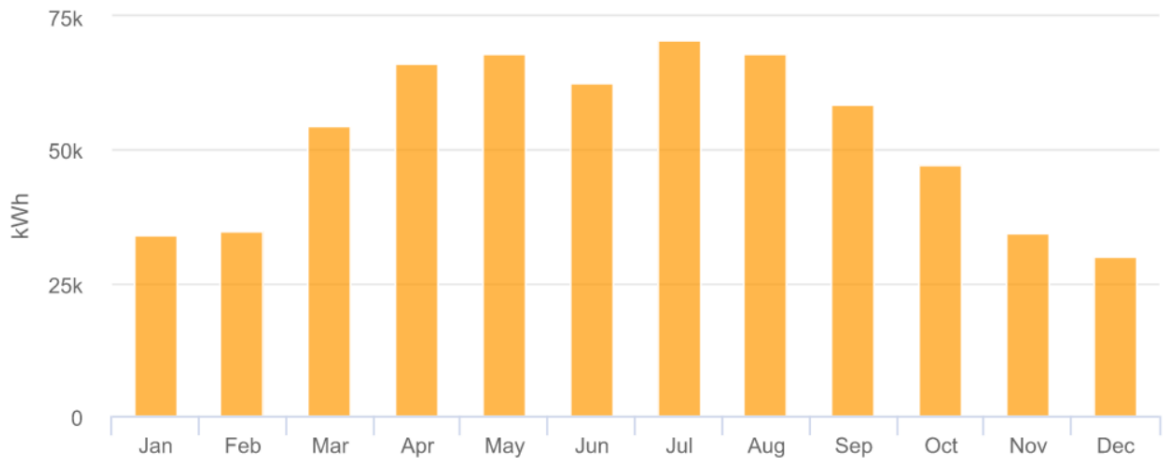
The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, PV module SunPower SPR-400-WHT-D was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 407.2 kW-DC and would generate approximately 629,200 kWh of electricity per year. For reference, Laguna Beach High School consumed approximately 700,000 kWh of electricity in 2022. The proposed PV system would offset approximately 90% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	400 W
Quantity of PV Modules	1018
System Size, kW-DC / kW-AC	407.2 kW-DC / 336.8 kW-AC
Annual Energy Production	629,200kWh/year
Construction Costs	$2,250,460
Annual Cost Savings	$105,348 /year
Financial Payback	13.2 years

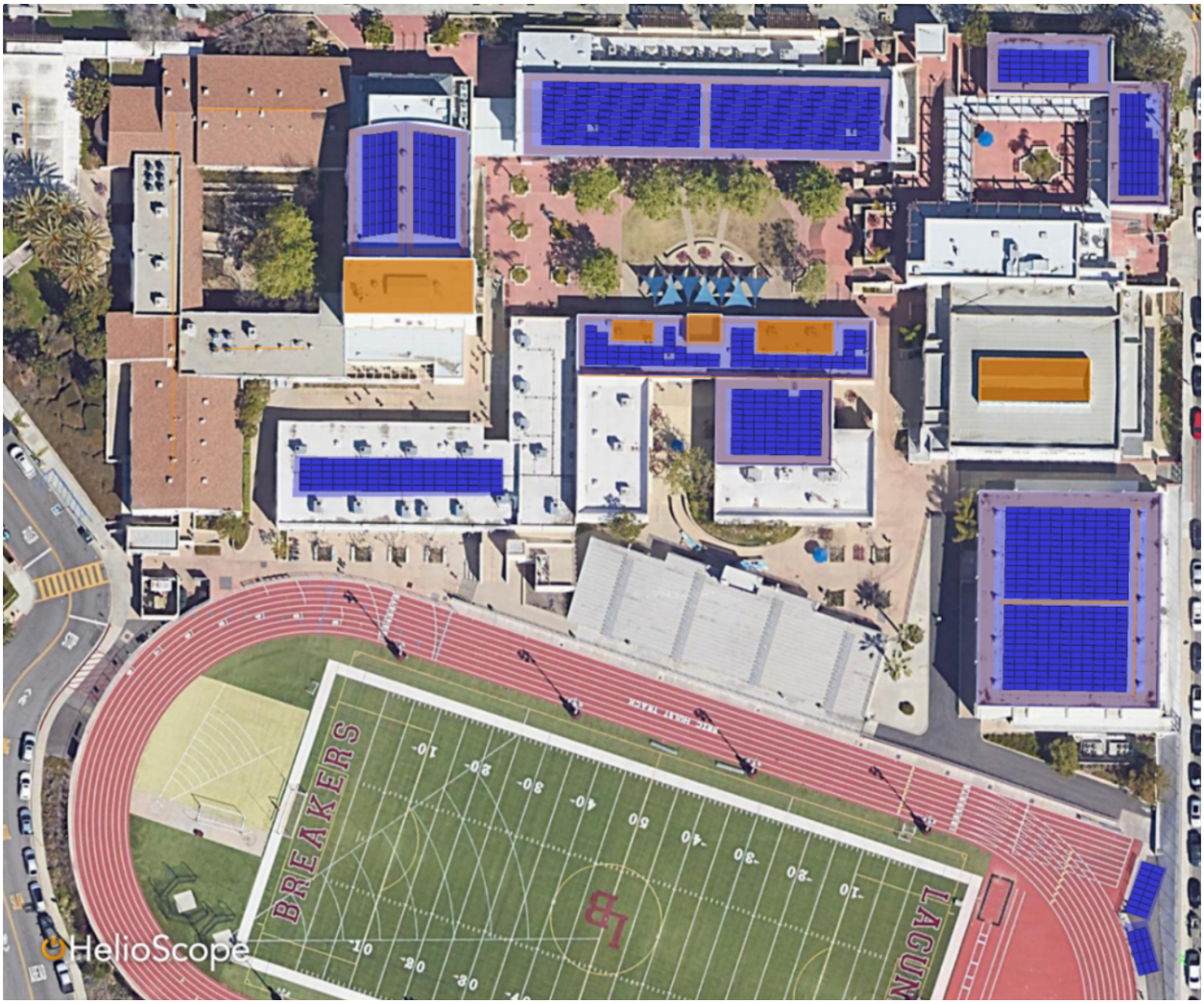
Building System	Quantity	System Size, kW-DC
Bldg. C West	45	18.0
Bldg. C East	54	21.6
Bldg. D South	259	103.6
Bldg. G South	297	118.8
Bldg. H South	79	31.6
Bldg. N South	79	31.6
Bldg. K South	40	16.0
Bldg. E	90	36
Bldg. K East	47	18.8
Bike Canopy	30	11.2

TOTAL	1,018	407.2

Monthly Production



Month	Monthly kWh
January	34051.9
February	34696.4
March	54473.8
April	66326.4
May	68175.1
June	62687.8
July	70719.9
August	67890.6
September	58690.5
October	47086.5
November	34446
December	29924.3
TOTAL:	629,169



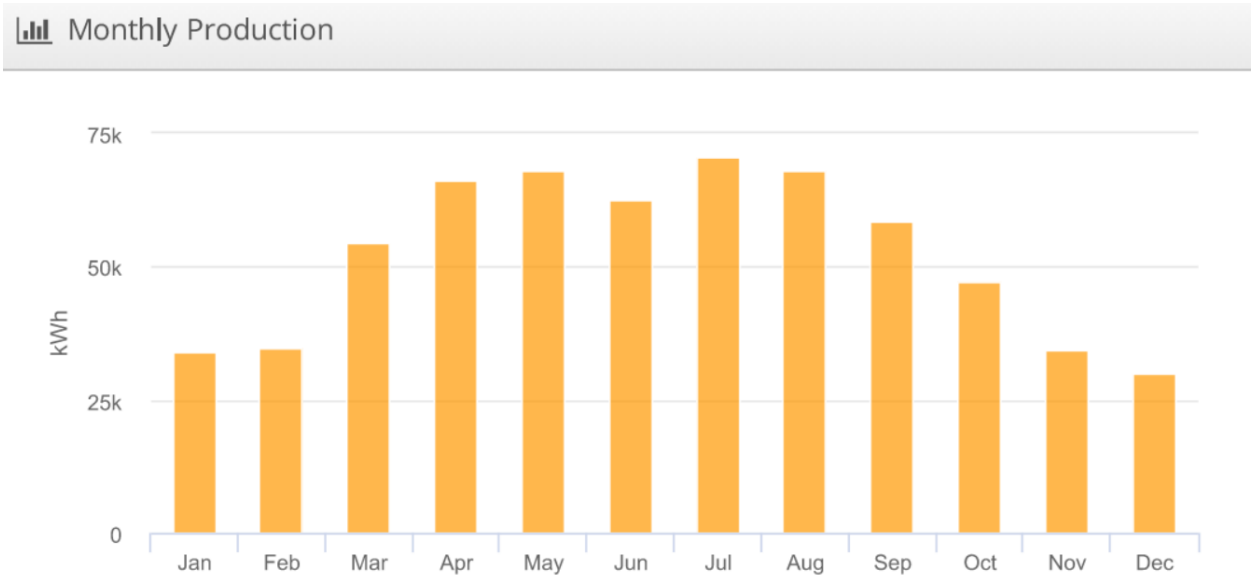
According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[10]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $2,250,460. This includes two total batteries rated at 258kWh for a total battery of 516kWh. The annual cost savings are estimated to be $105,348 per year, resulting in a 13.2-year simple payback using average of $0.30/kWh.

Scenario 3: Scenario 2 with New Loads

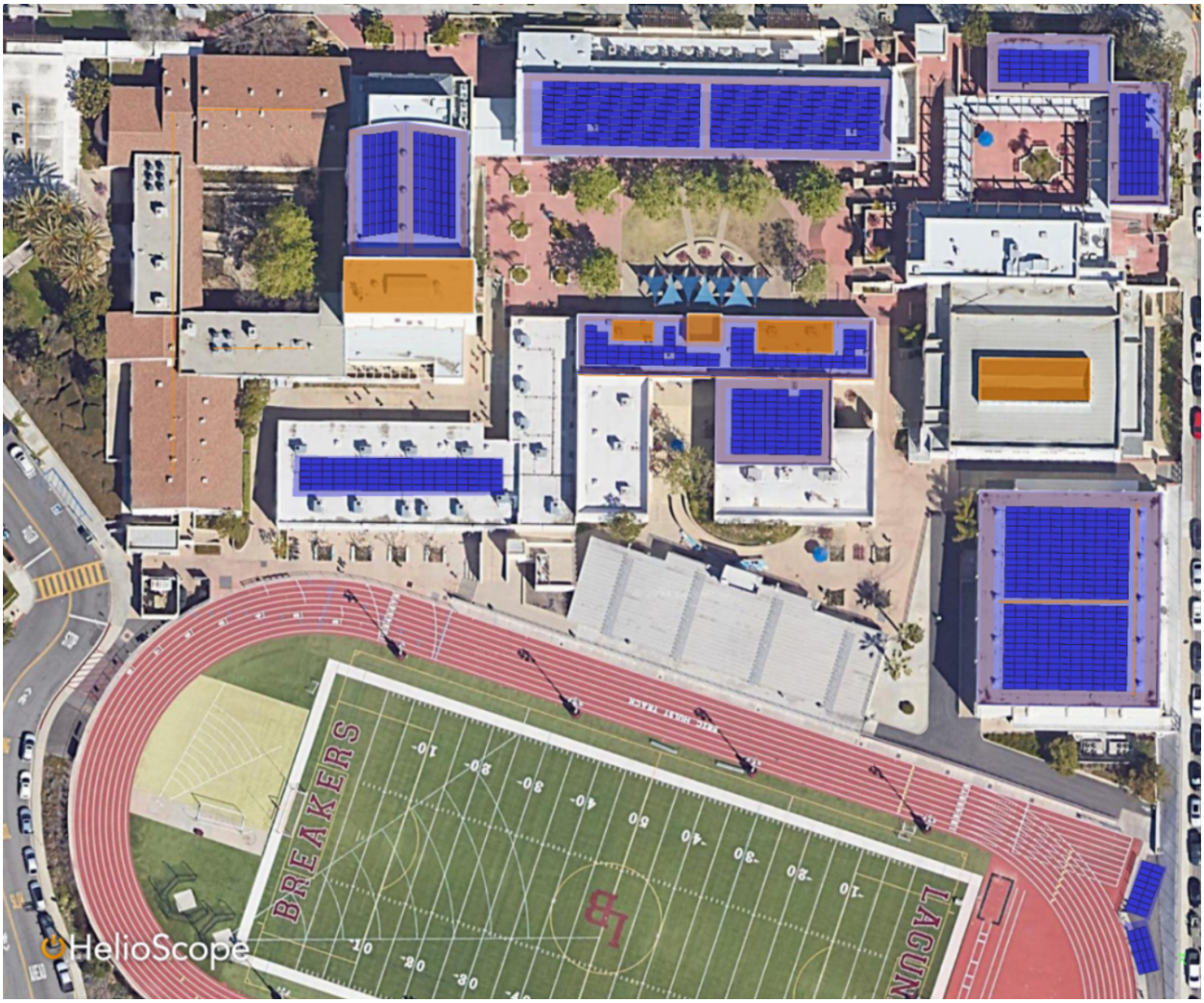
The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, PV module SunPower SPR-400-WHT-D was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 407.2 kW-DC and would generate approximately 629,200 kWh of electricity per year. For reference, Laguna Beach High School is expected to consume approximately 781,000 kWh of electricity with the additional loads. The proposed PV system would offset approximately 81% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle.

Parameter	Description
PV Module Rating	400 W
Quantity of PV Modules	1018
System Size, kW-DC / kW-AC	407.2 kW-DC / 336.8 kW-AC
Annual Energy Production	629,200kWh/year
Construction Costs	$2,250,460
Annual Cost Savings	$105,348 /year
Financial Payback	12.6 years

Building System	Quantity	System Size, kW-DC
Bldg. C West	45	18.0
Bldg. C East	54	21.6
Bldg. D South	259	103.6
Bldg. G South	297	118.8
Bldg. H South	79	31.6
Bldg. N South	79	31.6
Bldg. K South	40	16.0
Bldg. E	90	36
Bldg. K East	47	18.8
Bike Canopy	30	11.2
TOTAL	1,018	407.2



Month	Monthly kWh
January	34051.9
February	34696.4
March	54473.8
April	66326.4
May	68175.1
June	62687.8
July	70719.9
August	67890.6
September	58690.5
October	47086.5
November	34446
December	29924.3
TOTAL:	629,169



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[10]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $2,250,460. This includes two total batteries rated at 258kWh for a total battery of 516kWh. The annual cost savings is estimated to be $105,348 per year, resulting in a 12.6-year simple payback from our using average of $0.30/kWh.

ECM 07 EV Charging

Based on the location of Laguna Beach High School, there are currently no parking lots on campus for EV chargers to be installed. However, the District Office is across the street and a recommendation has been provided for that facility.

Energy and Decarbonization Road Map

Tables below shows the summary of the recommended measures, in order of recommendation, alongside with cost and carbon analysis. The negative values in the electrical column indicate over generation of site electricity. The table below shows the energy saving with all the measures included:

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	701,246	11,552	3,547,851	483,958
Scheduling	693,714	11,552	3,522,152	480,212
Lighting Upgrade	568,002	11,552	3,093,222	417,683
PV and BESS	-61,198	11,552	946,392	104,718
HP Replacement	-8,142	2,400	212,220	0
DWH Replacement	47,427	0	161,820	23,590
Total Saving After All ECM	653,819	11,552	3,386,031	483,958
% saving	100%	100%	95%	100%

The table below summarizes the cost savings associated with these ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost
Baseline	$206,954	$24,160	$231,114	-
Scheduling	$204,769	$24,160	$228,930	-
Lighting Upgrade	$168,313	$24,160	$192,474	$344,973
PV and BESS	$62,965	$24,160	$87,126	$2,250,460
HP Replacement	$78,352	$3,840	$82,192	$3,407,221
DWH Replacement	$94,467	$0	$94,467	$75,000
Total Saving After All ECM	$112,487	$24,160	$136,647	$6,077,654
% saving	54%	100%	59%	-

And table below summarizes the normalized cost per unit of energy and carbon saved for each measure.

	Annual Electric Cost	Annual Gas Cost
Scheduling	$-	$-
Lighting Upgrade	$0.80	$5.52
PV and BESS	$1.05	$7.19
HP Replacement	$4.64	$42.23
DWH Replacement	$1.49	$170.38
Total Saving After All ECM	$1.79	$12.56

5.4 LBHS Stadium

ECM 05 Lighting Upgrades

Based on the existing conditions of Laguna Beach High School Stadium we recommend installing the new LED bulbs that MUSCO currently uses for all their new high-performance sports lighting. The district has already initiated contact with Musco and has ordered the new LED bulbs for energy conservation measures. With the campus having already contacted MUSCO we do not recommend any further measures for lighting. Below is the estimated energy saving based on the plans provided by the district.

Description	Values
TOTAL EXISTING KILOWATT-HOURS PER YEAR	57,600
TOTAL PROPOSED KILOWATT-HOURS PER YEAR	31,840
TOTAL SAVED KILOWATT-HOUR PER YEAR	22,901
AVERAGE COST PER KILOWATT-HOUR (in cents)	0.30
ANNUAL PROPOSED POWER COST	$6,870
EXISTING BUILDING ANNUAL POWER COST	$17,200
COST OF PROPOSED RENOVATION	$264,400
INCENTIVE	$0
TOTAL EXISTING MAINTENANCE COST	$2,100
TOTAL COST	$262,300
SIMPLE PAYBACK CALCULATION	31.5 years

5.5 LBHS Theatre

ECM 05 Lighting Upgrades

Based on the existing conditions of Laguna Beach High School Theatre we recommend installing the new LED bulbs and fixtures along with controls for the entire building. As per the report section for Building C we have observed from the field that many of the lamps have been replaced with LED bulbs without controls. The district is renovating the lighting for the theatre but will not include renovations for the rest of the building. We recommend the rest of the building be renovated at the same time to reduce the cost to the district.

As theatre lighting is mainly done by vendors, below is an estimation of the cost associated with the current theatre renovation.

Description	Values
TOTAL EXISTING KILOWATT-HOURS PER YEAR	30,308
TOTAL PROPOSED KILOWATT-HOURS PER YEAR	12,311
TOTAL SAVED KILOWATT-HOUR PER YEAR	17,997
AVERAGE COST PER KILOWATT-HOUR (in cents)	0.30
ANNUAL PROPOSED POWER COST	$3,693
EXISTING BUILDING ANNUAL POWER COST	$9,092
COST OF PROPOSED RENOVATION	$70,200
INCENTIVE	$0
TOTAL EXISTING MAINTENANCE COST	$15,210
TOTAL COST	$54,990
SIMPLE PAYBACK CALCULATION	13.4 years

5.6 Thurston Middle School

General Electrical Recommendations

Based on the existing conditions of the electrical equipment located at Thurston Middle School we recommend that LBUSD replace the some of the existing electrical equipment that has been damaged or has reached past the expected use. Much of the interior electrical equipment is in good condition, however some equipment has reached close to the end of its usable life. The equipment that is nearing the end of its usable life are the panels 'AL', 'AP-1', 'AP-2', and transformer 'TA'. These are in the building to the right of building A. There is currently no code requirement against old equipment; however, the recommended life of electrical equipment is 30 years, and given the current condition of this equipment, they appear to be reaching the end. This recommendation is for maintenance purposes and is not further analyzed in this report.

ECM 02 Controls and Scheduling

The table below shows the energy saving in Thurston School after implementation of this ECM as noted in previous sections.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	394,052	10,452	2,389,705	318,290
ECM 02	379,087	10,452	2,338,643	310,846
Savings	14,965	0	51,062	7,444
%Savings	4%	0%	2%	2%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Operational Cost	Implementation Cost	ROI
Baseline	$113,809	$19,523	$133,332	-	-
ECM	$109,469	$19,523	$128,992	-	-
Savings	$4,340	$0	$4,340	-	-
%Savings	4%	0%	3%	-	-

ECM 03 HVAC Replacement with Heat Pump

The table below shows the energy saving in Thurston Middle School for replacing all the existing gas fires units with heat pumps.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	394,052	10,452	2,389,705	318,290
ECM	453,057	1,113	1,657,130	238,373
Savings	-59,005	9,339	732,576	79,917
%Savings	-15%	89%	31%	25%

The table below summarizes the cost savings associated with this ECM. The cost of this ECM is based on replacing the equipment that currently utilize gas for heating and does not include the cost of replacing heat pump units in kind. The implementation cost shown in the table below is the total cost of implementation minus the cost of end of life replacement of the unit. This means if the unit is passed the useful life expectancy, the only cost included in the table below is the premium cost difference between like for like replacement of the unit, and upgrading the unit to heat pump.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$113,809	$19,523	$133,332	-	-
ECM	$130,920	$2,593	$133,513	$2,305,151	N/A
Savings	-$17,111	$16,930	-$181	-	-
%Savings	-15%	87%	0%	-	-

ECM 04 Domestic Water Heater Replacement

The table below shows the energy saving in Thurston Middle School for replacing all the existing domestic water heaters that use natural gas with electric water heaters.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	394,052	10,452	2,389,705	318,290
ECM	419,822	9,339	2,366,332	318,086
Savings	-25,770	1,113	23,373	204
%Savings	-7%	11%	1%	0%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$113,809	$19,523	$133,332	-	-
ECM	$121,282	$16,930	$138,212	$50,000	-
Savings	-$7,473	$2,593	-$4,880	-	-
%Savings	-7%	13%	-4%	-	-

ECM 05 Lighting Upgrades

Based on the existing conditions of Thurston Middle School, there are a few items that can be recommended. From site observations, many light fixtures have already gone through lamp replacements or LED retrofits and are using updated LED technology. However, the majority of the campus does not have lighting controls, and this is another area where the campus can introduce more savings. It is recommended to add controls to the individual rooms and retrofit the rest of the existing fluorescent ballast to controllable LED light fixtures.

The company that is recommended for light fixtures is Lithonia as most of their fixtures are used in office spaces and classrooms. A bonus to Lithonia is that most lighting control systems are compatible with their fixtures. The manufacturer of the light fixtures may vary as long as the lighting control systems are

compatible with the lighting system that the district installs. P2S does not endorse any specific lighting manufacturers.

The lighting controls that are often used are nLight and Lutron. These two lighting controls are very common in the K-12 campuses. The lighting controls from nLight and Lutron are compatible with many fixture manufacturers. The manufacturer of the lighting controls manufacturer may vary as long as the light fixtures are compatible. P2S does not endorse any specific lighting controls manufacturers.

The table below shows the energy saving in Thurston Middle School proposed lighting upgrades.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	394,052	10,452	2,389,705	318,290
ECM	338,691	10,452	2,200,814	290,753
Savings	55,361	0	188,892	27,537
%Savings	14%	0%	8%	9%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$113,809	$19,523	$133,332	-	-
ECM	$97,754	$19,523	$117,277	$243,691	15.2
Savings	$16,055	$0	$16,055	-	-
%Savings	14%	0%	12%	-	-

ECM 06 Solar Photovoltaic and Storage

We recommend installing solar PV systems on the rooftops of buildings A,C,E,F,G,H,I and the exterior auditorium. Our solution proposes a fixed-tilt, rack-mounted solar PV system with centralized inverters (one or two large inverters serving each building's PV system) along with a solar canopy structure at the exterior auditorium. Where applicable, the solar PV panels should face south (true azimuth 180°) to achieve the highest energy production yield.

Scenario 1: Current Existing Load Optimized PV (Under Generation)

The proposed PV system was modeled within only the Energy Tool Base program to find the most optimized system that is recommended for the existing loads. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 157kW-DC and would generate approximately 237,200 kWh of electricity per year. Laguna Beach Thurston Middle School consumed approximately 394,052 kWh of electricity in 2022. The proposed PV system would offset approximately 60% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	149
System Size, kW-DC / kW-AC	157 kW-DC / 136.8 kW-AC
Annual Energy Production	237,200 kWh/year
Construction Costs	$742,696
Annual Cost Savings	$32,552 /year
Financial Payback	13.8 years

According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[1]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $742,696 . This includes nine total batteries rated at 13.2kWh for a total battery of 118.8 kWh. The annual cost savings were estimated to be $32,552 per year, resulting in a 13.8-year simple payback using average of $0.29/kWh.

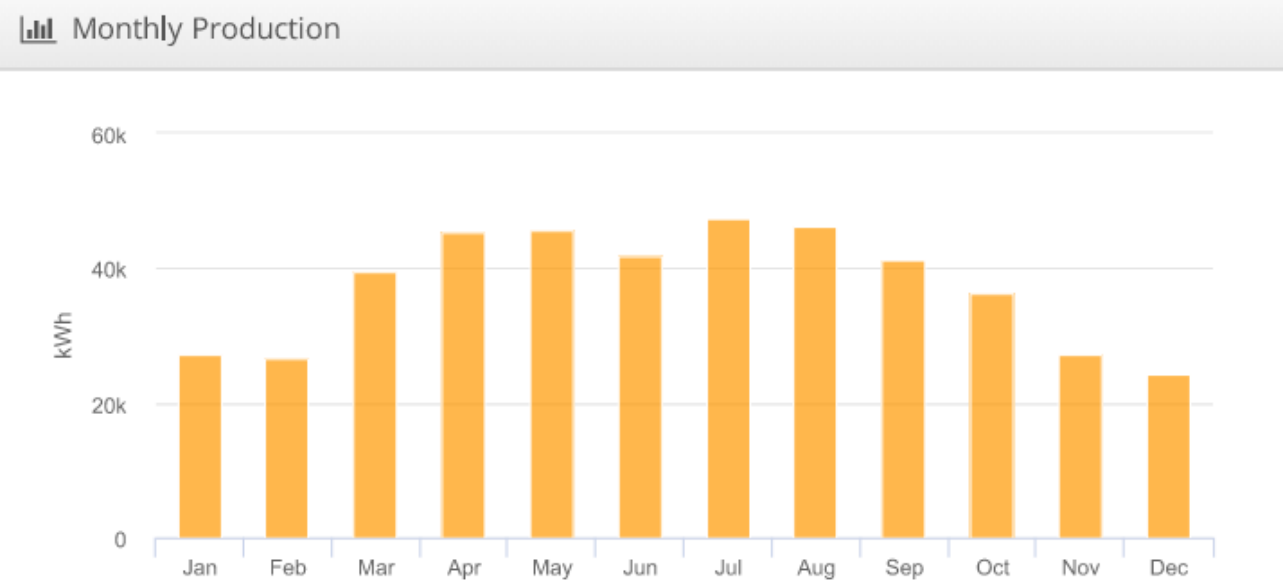
Scenario 2: Net Zero PV for Existing Loads (Over Generation)

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 216.5 kW-DC and would generate approximately 449,300 kWh of electricity per year. For reference, Laguna Beach Thurston Middle School consumed approximately 394,052 kWh of electricity in 2022. The proposed PV system would offset approximately 114% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

[1] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	550
System Size, kW-DC / kW-AC	264.1 kW-DC / 216.5 kW-AC
Annual Energy Production	449,300 kWh/year
Construction Costs	$1,656,429
Annual Cost Savings	$60,098 /year
Financial Payback	16.4 years

Building System	Quantity	System Size, kW-DC
Bldg. A Segment 7	36	17.6
Bldg. C Segment 5	32	10.2
Bldg. F Segment 6	73	35.8
Bldg. G Segment 1	112	54.9
Bldg. H Segment 2	60	29.4
Bldg. I Segment 3	23	11.3
Exterior Auditorium Segment 8	182	89.2
Bike Rack Segment 9	32	15.7
TOTAL	558	264.6



Month	Monthly kWh
January	27283.9
February	26701.2
March	39629.4
April	45373.9
May	45787.3
June	41811.1
July	47381.2
August	46274.4
September	41351
October	36271.1
November	27231.6
December	24205.5
TOTAL:	449302



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 20222. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC) which is $1,656,429 This includes two total batteries rated at 258kWh for a total battery of 516kWh. The annual cost savings were estimated to be $60,098. per year, resulting in a 16.4-year simple payback using average of $0.27/kWh.

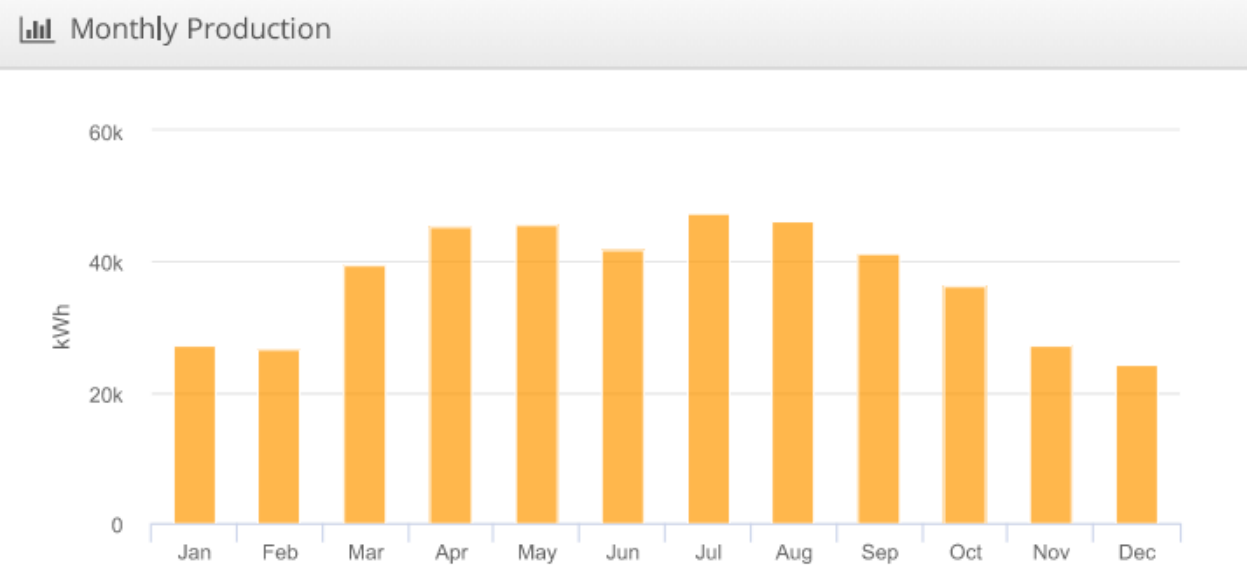
Scenario 3: Scenario 2 with P2S Recommended Loads

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 216.5 kW-DC and would generate approximately 449,300 kWh of electricity per year. For reference, Laguna Beach Thurston Middle School is expected to consume approximately 602,717 kWh with the addition of P2S recommended EV and heat pump loads. The proposed PV system would offset approximately 75% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

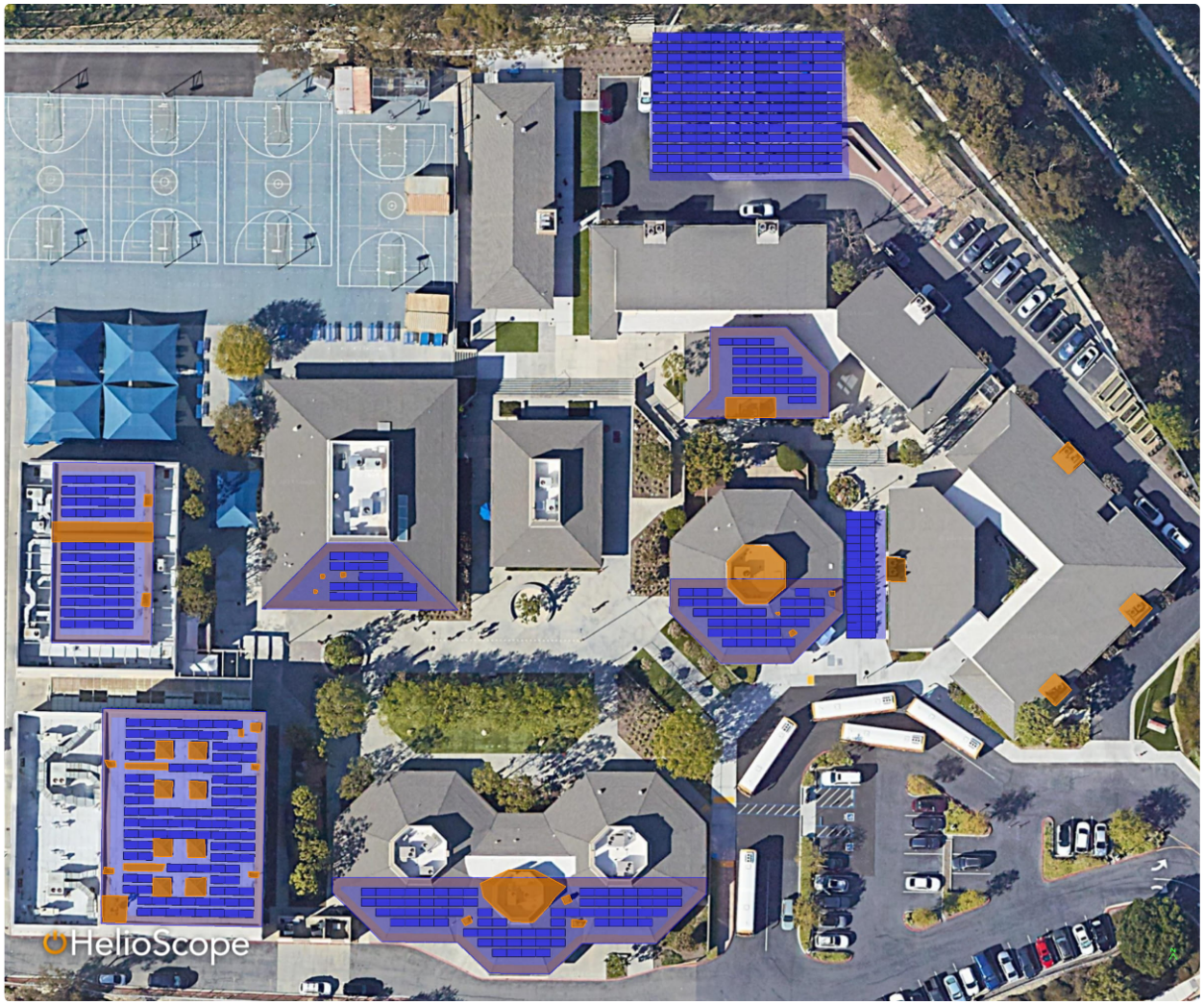
Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	550
System Size, kW-DC / kW-AC	264.1 kW-DC / 216.5 kW-AC
Annual Energy Production	449,300 kWh/year
Construction Costs	$1,656,429
Annual Cost Savings	$61,638 /year
Financial Payback	16.6 years

Building System	Quantity	System Size, kW-DC
Bldg. A Segment 7	37	18.1
Bldg. C Segment 5	32	10.2
Bldg. F Segment 6	73	35.8
Bldg. G Segment 1	112	54.9
Bldg. H Segment 2	60	29.4
Bldg. I Segment 3	23	11.3
Exterior Auditorium Segment 8	182	89.2
Bike Rack Segment 9	32	15.7
TOTAL	558	264.6

[2] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html



Month	Monthly kWh
January	27283.9
February	26701.2
March	39629.4
April	45373.9
May	45787.3
June	41811.1
July	47381.2
August	46274.4
September	41351
October	36271.1
November	27231.6
December	24205.5
TOTAL:	449302



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[3]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $1,656,429. This includes two total batteries rated at 258kWh for a total battery of 516kWh. The annual cost savings were estimated to be $61,638. per year, resulting in a 16.6-year simple payback using average of $0.27/kWh.

Scenario 4: Scenario 2 with Code Required Loads

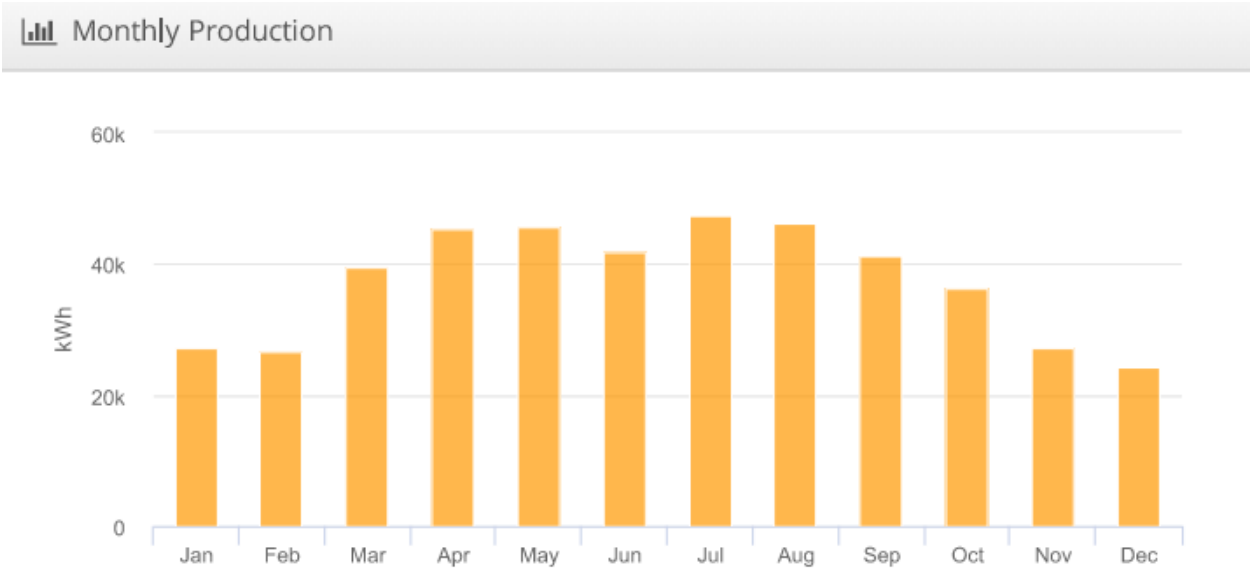
The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 216.5 kW-DC and would generate approximately 449,300 kWh of electricity per year. For reference, Laguna Beach Thurston Middle School is expected to consume approximately 503,183 kWh with the

[3] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

addition of code required EV and heat pump loads. The proposed PV system would offset approximately 75% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	550
System Size, kW-DC / kW-AC	264.1 kW-DC / 216.5 kW-AC
Annual Energy Production	449,300 kWh/year
Construction Costs	$1,656,429
Annual Cost Savings	$61,559 /year
Financial Payback	16.5 years

Building System	Quantity	System Size, kW-DC
Bldg. A Segment 7	37	18.1
Bldg. C Segment 5	32	10.2
Bldg. F Segment 6	73	35.8
Bldg. G Segment 1	112	54.9
Bldg. H Segment 2	60	29.4
Bldg. I Segment 3	23	11.3
Exterior Auditorium Segment 8	182	89.2
Bike Rack Segment 9	32	15.7
TOTAL	558	264.6



Month	Monthly kWh
January	27283.9
February	26701.2
March	39629.4
April	45373.9
May	45787.3
June	41811.1
July	47381.2
August	46274.4
September	41351
October	36271.1
November	27231.6
December	24205.5
TOTAL:	449302



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[4]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $1,656,429. This includes two total batteries rated at 258kWh for a total battery of 516kWh. The annual cost savings were estimated to be $61,559. per year, resulting in a 16.5-year simple payback using average of $0.27/kWh.

[4] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

ECM 07 EV Charging

Based on the existing conditions of Thurston Middle School, the recommended option is to install Level 2 charging infrastructure. The current supply of the building we propose to pull from offers 480V and 208V. LBUSD can use both Level 3 and Level 2 chargers, but in this situation, the best option due to campus parking space use will be to install Level 2's only.

Scenario 1: P2S Recommended EV

The best location to put these chargers in is the eight parking spots in the middle of the parking lot, since that will require the least amount of trenching work. For all eight chargers to be installed at full speed, a spare load of 400A at 208V is required. As reference the current code recommends parking lots such as Thurston Middle School with 40 parking spots to have 11 EV capable spaces with four of them needing to be installed. EV capable spaces means that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, SCE states that they will cover the cost for the service upgrade and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate %	ROI
Existing Usage	394,052	$113,809	-	-	-
EV Chargers	132,710	$35,831	$44,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-449,302	-$61,638	$1,656,429	30% solar & BESS	-
Incentives EV Solar	-	-	-$13,600 -$496,929	-	-
Totals	77,460	$88,002	$1,189,900	-	19.3

Scenario 2: Code Required EV

For both chargers to be installed at full speed, a spare load of 80A at 208V is required. As reference the current code requires parking lots such as Thurston Middle School with 40 parking spots to have eight EV capable spaces with two of them needing to be installed. EV capable spaces means that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, SCE states that they will cover the cost for the service upgrade and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate %	ROI
Existing Usage	394,052	$113,809	-	-	-
EV Chargers	33,178	$8,959	$11,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-449,302	-$61,638	$1,656,429	30% solar & BESS	-
Incentives EV Solar	-	-	-$3,400 -$496,929	-	-
Totals	-22,072	$61,630	$1,156,900	-	18.7

Energy and Decarbonization Road Map

Tables below shows the summary of the recommended measures, in order of recommendation, along side with cost and carbon analysis. The negative values in the electrical column indicate over generation of site electricity. The table below shows the energy saving with all the measures included:

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	394,052	10,452	2,389,705	318,290
Scheduling	379,087	10,452	2,338,643	310,846
Lighting Upgrade	323,726	10,452	2,149,752	283,309
PV and BESS	-125,574	10,452	616,740	59,828
HP Replacement	-54,184	1,113	-73,575	0
DWH Replacement	-28,414	0	-96,948	-14,133
Total Saving After All ECM	394,052	10,452	2,486,654	318,290
% saving	107%	100%	104%	100%

The table below summarizes the cost savings associated with these ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost
Baseline	$113,809	$19,523	$133,332	-
Scheduling	$109,469	$19,523	$128,992	-
Lighting Upgrade	$93,414	$19,523	$112,937	$243,691
PV and BESS	$30,676	$19,523	$50,199	$1,656,429
HP Replacement	$51,379	$1,781	$53,160	$2,305,151
DWH Replacement	$58,852	$0	$58,852	$50,000
Total Saving After All ECM	$54,956	$19,523	$74,480	$4,255,271
% saving	48%	100%	56%	-

And table below summarizes the normalized cost per unit of energy and carbon saved for each measure.

	Annual Electric Cost	Annual Gas Cost
Scheduling	$-	$-
Lighting Upgrade	$1.29	$8.85
PV and BESS	$1.08	$7.41
HP Replacement	$3.34	$31.25
DWH Replacement	$2.14	$244.93
Total Saving After All ECM	$1.71	$13.37

5.7 Top of the World Elementary

General Electrical Recommendations

Based on the existing conditions of the electrical equipment located at Top of the World Elementary, we recommend that LBUSD replace the existing electrical service and upsize for future additional equipment or upgrades. The main distribution board has also reached the end of its life and will need to be replaced as the equipment seems to be over 30 years old. There is currently no code requirement against old equipment, however the recommended life of electrical equipment is 30 years and given the current condition of these equipment, they appear to be reaching the end. The equipment that is in need of replacing are: Main Switchboard, Panels 'F', 'D1', 'D2', and 'D3'. In addition, for all major electrical work such as installing solar or EV chargers, the system currently appears to not have enough spare load and must be upsized to allow for new constructions.

ECM 03 HVAC Replacement with Heat Pump

The table below shows the energy saving in Top of the World Elementary School for replacing all the existing gas fires units with heat pumps.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	239,788	3,012	1,119,357	154,511
ECM	251,569	396	897,952	129,763
Savings	-11,781	2,616	221,405	24,748
%Savings	-5%	87%	20%	16%

The table below summarizes the cost savings associated with this ECM. The cost of this ECM is based on replacing the equipment that currently utilizes gas for heating and does not include the cost of replacing heat pump units in kind. The implementation cost shown in the table below is the total cost of implementation minus the cost of end-of-life replacement of the unit. This means if the unit is passed the useful life expectancy, the only cost included in the table below is the premium cost difference between like for like replacement of the unit, and upgrading the unit to heat pump.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$59,458	$6,355	$65,813	-	-
ECM	$62,875	$634	$63,508	$2,647,943	-
Savings	-$3,416	$5,721	$2,305	-	-
%Savings	-6%	90%	4%	-	-

ECM 04 Domestic Water Heater Replacement

The table below shows the energy saving in Top of the World Elementary School for replacing all the existing domestic water heaters that use natural gas with electric water heaters.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	239,788	3,012	1,119,357	154,511
ECM	248,957	2,616	1,111,041	154,438
Savings	-9,169	396	8,316	73
%Savings	-4%	13%	1%	0%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$59,458	$6,355	$65,813	-	-
ECM	$62,117	$5,721	$67,839	$32,000	-
Savings	-$2,659	$634	-$2,025	-	-
%Savings	-4%	10%	-3%	-	-

ECM 05 Lighting Upgrades

Based on the existing conditions of Top of the World Elementary, there are a few items that can be recommended. From site observations, many light fixtures have already gone through lamp replacements or LED retrofits and are using updated LED technology. However, the majority of the campus does not have lighting controls, and this is another area where the campus can introduce more savings. It is recommended to add controls to the individual rooms and retrofit the rest of the existing fluorescent ballast to controllable LED light fixtures.

The company that is recommended for light fixtures is Lithonia as most of their fixtures are used in office spaces and classrooms. A bonus to Lithonia is that most lighting control systems are compatible with their fixtures. The manufacturer of the light fixtures may vary as long as the lighting control systems are compatible with the lighting system that the district installs. P2S does not endorse any specific lighting manufacturers.

The lighting controls that are often used are nLight and Lutron. These two lighting controls are very common in the K-12 campuses. The lighting controls from nLight and Lutron are compatible with many fixture manufacturers. The manufacturer of the lighting controls manufacturer may vary as long as the light fixtures are compatible. P2S does not endorse any specific lighting controls manufacturers.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	239,788	3,012	1,119,357	154,511
ECM	192,449	3,012	957,836	130,965
Savings	47,339	0	161,521	23,546
%Savings	20%	0%	14%	15%

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$59,458	$6,355	$65,813	-	-
ECM	$46,180	$6,355	$52,535	$220,481	11.5
Savings	$13,278	$0	$13,278	-	-
%Savings	22%	0%	20%	-	-

ECM 06 Solar Photovoltaic and Storage

We recommend installing solar PV systems on the rooftops of buildings B, C, and F. Our solution proposes a fixed-tilt, rack-mounted solar PV system with centralized inverters (one or two large inverters serving each building's PV system). Where applicable, the solar PV panels should face south (true azimuth 180°) to achieve the highest energy production yield.

Scenario 1: Current Existing Load Optimized PV (under generation)

The proposed PV system was modeled with only the Energy Tool Base program to find the most optimized system that we would recommend for the existing loads. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 120kW-DC and would generate approximately 132,086 kWh of electricity per year. Laguna Beach Top of the World Elementary consumed approximately 218,447 kWh of electricity in 2022. The proposed PV system would offset approximately 60.5% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	149
System Size, kW-DC / kW-AC	84 kW-DC / 73.2 kW-AC
Annual Energy Production	132,086 kWh/year
Construction Costs	$412,228
Annual Cost Savings	$20,957 /year
Financial Payback	12.2 years

According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[5]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $412,228. This includes three total batteries rated at 13.2kWh for a total battery of 39.6 kWh. The annual cost savings are estimated to be $20,957 per year, resulting in a 12.2-year simple payback using average of $0.29/kWh.

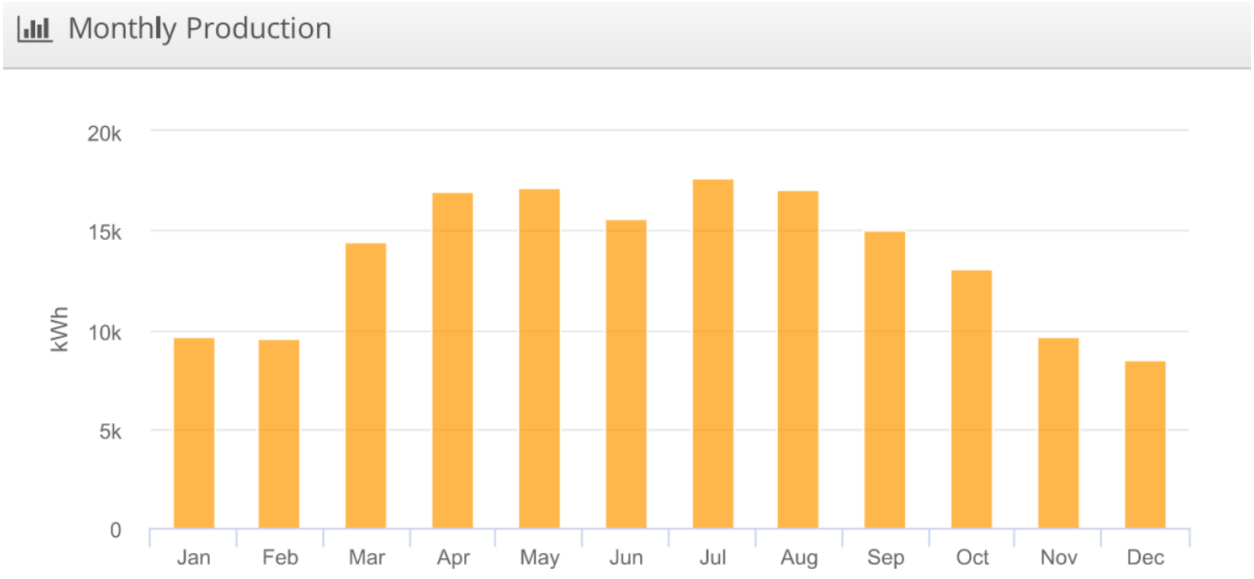
[5] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Scenario 2: Net Zero PV Attempt for Existing Loads

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 96.5 kW-DC and would generate approximately 164,400 kWh of electricity per year. For reference, Laguna Beach Top of the World Elementary consumed approximately 218,447 kWh of electricity in 2022. The proposed PV system would offset approximately 75% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	197
System Size, kW-DC / kW-AC	96.5 kW-DC / 96.2 kW-AC
Annual Energy Production	164,438.1 kWh/year
Construction Costs	$430,982
Annual Cost Savings	$23,874 /year
Financial Payback	11.3 years

Building System	Quantity	System Size, kW-DC
Bldg. B Segment 2	24	11.8
Bldg. C Segment 3	48	23.5
Bldg. F Segment 1	125	61.3
TOTAL	197	96.6



Month	Monthly kWh
January	9,636.4
February	9,570.2
March	14,413.5
April	16,951.4
May	17,171.1
June	15,654.8
July	17,653.3
August	17,080.5
September	15,071.2
October	13,041.6
November	9,669.4
December	8,524.7
TOTAL:	164,438.1



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[6]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC) which is $430,982. This includes three total batteries rated at 13.2kWh for a total battery of 39.6 kWh. The annual cost savings are estimated to be $23,874 per year, resulting in a 11.3-year simple payback using average of $0.29/kWh.

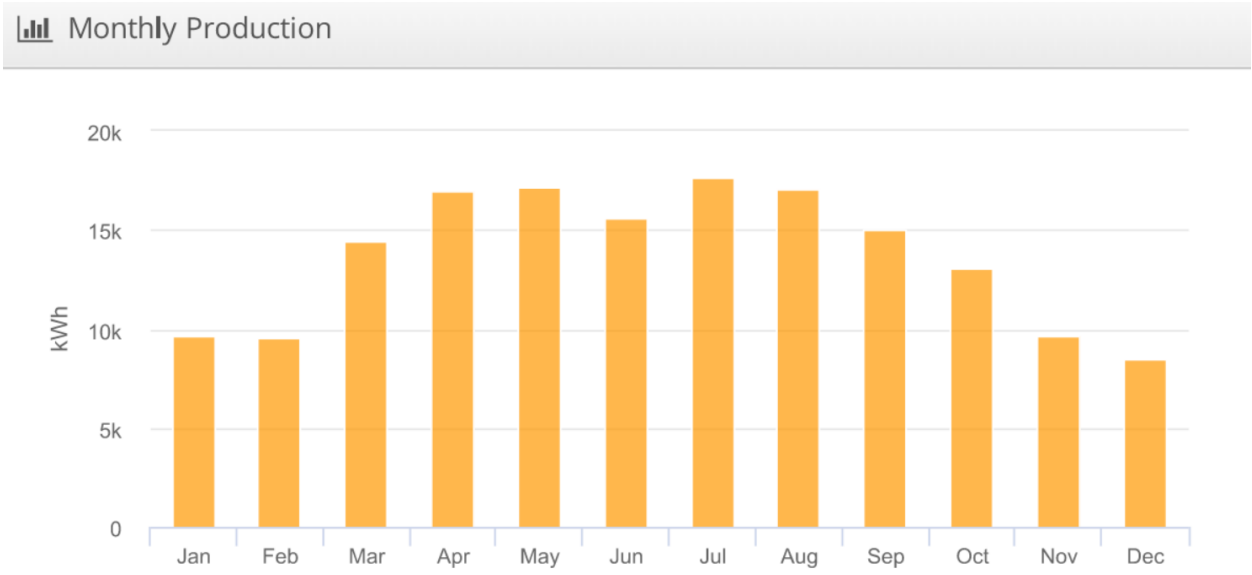
Scenario 3: Scenario 2 with P2S Recommended Loads

The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 96.5 kW-DC and would generate approximately 164,400 kWh of electricity per year. For reference, Laguna Beach Top of the World Elementary is expected to consume approximately 409,048 kWh of electricity with the addition of P2S recommended EV and heat pump loads. The proposed PV system would offset approximately 40.2% of the site's annual electricity usage. For this scenario solar canopies have not been added in the parking lot because the parking is not straight, and the panels would be difficult to construct. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	197
System Size, kW-DC / kW-AC	96.5 kW-DC / 96.2 kW-AC
Annual Energy Production	164,438.1 kWh/year
Construction Costs	$430,982
Annual Cost Savings	$26,775 /year
Financial Payback	10.1 years

Building System	Quantity	System Size, kW-DC
Bldg. B Segment 2	24	11.8
Bldg. C Segment 3	48	23.5
Bldg. F Segment 1	125	61.3
TOTAL	197	96.6

[6] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html



Month	Monthly kWh
January	9,636.4
February	9,570.2
March	14,413.5
April	16,951.4
May	17,171.1
June	15,654.8
July	17,653.3
August	17,080.5
September	15,071.2
October	13,041.6
November	9,669.4
December	8,524.7
TOTAL:	164,438.1



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[7]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $430,982. This includes three total batteries rated at 13.2kWh for a total battery of 39.6 kWh. The annual cost savings are estimated to be $26,775 per year, resulting in a 10.1-year simple payback using average of $0.29/kWh.

Scenario 4: Scenario 2 with Code Required Loads

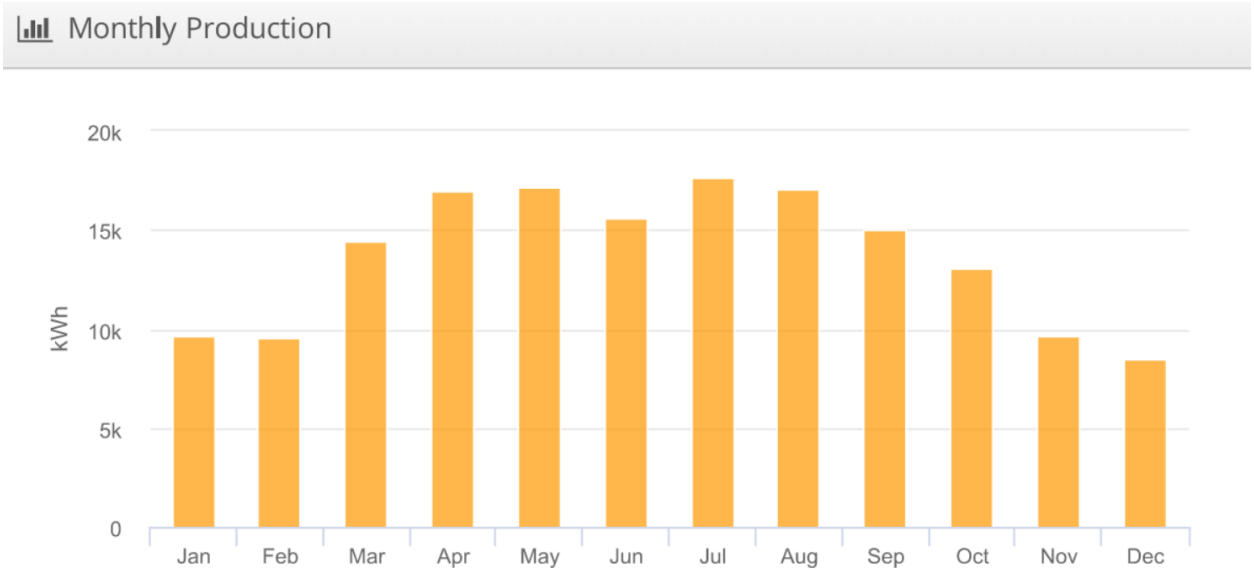
The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 96.5 kW-DC and would generate approximately 164,400 kWh of electricity per year. For reference,

[7] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Laguna Beach Top of the World Elementary is expected to consume approximately 309,551 kWh of electricity with the addition of code required EV and heat pump loads. The proposed PV system would offset approximately 53.3% of the site's annual electricity usage. For this scenario solar canopies have not been added in the parking lot because the parking is not straight and would be difficult to construct. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	197
System Size, kW-DC / kW-AC	96.5 kW-DC / 96.2 kW-AC
Annual Energy Production	164,438.1 kWh/year
Construction Costs	$430,982
Annual Cost Savings	$26,775 /year
Financial Payback	10.2 years

Building System	Quantity	System Size, kW-DC
Bldg. B Segment 2	24	11.8
Bldg. C Segment 3	48	23.5
Bldg. F Segment 1	125	61.3
TOTAL	197	96.6



Month	Monthly kWh
January	9,636.4
February	9,570.2
March	14,413.5
April	16,951.4
May	17,171.1
June	15,654.8
July	17,653.3
August	17,080.5
September	15,071.2
October	13,041.6
November	9,669.4
December	8,524.7
TOTAL:	164,438.1



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[8]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $430,982. This includes three total batteries rated at 13.2kWh for a total battery of 39.6 kWh. The annual cost savings are estimated to be $26,775 per year, resulting in a 10.2-year simple payback using average of $0.29/kWh.

ECM 07 EV Charging

Based on the existing conditions of Top of the World Elementary, the recommended option is to install Level 2 charging infrastructure. The current supply of the building we propose to pull from offers 480V and 208V. LBUSD can use both Level 3 and Level 2 chargers, but in this situation, the best option due to campus parking space use will be to install Level 2's only.

Scenario 1: P2S Recommended EV

The best location to put these chargers in is the 10 parking spots in front of building B since that will require the least amount of trenching work. For all 10 chargers to be installed at full speed, a spare load of 400A at 208V is required. As reference, the current code recommends parking lots like Top of the World Elementary's with 69 parking spots to have 19 EV capable spaces, five of them needing to be installed. EV capable spaces mean that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, SCE states that the incentive will cover the cost for the service upgrade and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate %	ROI
Existing Usage	218,447	$63,350	-	-	-
EV Chargers	165,888	$48,107	$55,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-164,438	-$23,874	$430,982	30% solar & BESS	-
Incentives EV Solar	-	-	-$17,000 -$129,295	-	-
Totals	219,897	$87,583	$339,687	-	14.5

[8] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Scenario 2: Code Required EV

For all three chargers to be installed at full speed, a spare load of 120A at 208V is required. As reference, the current code requires parking lots like Top of the World Elementary's with 69 parking spots to have 13 EV capable spaces, three of them needing to be installed. EV capable spaces mean that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, SCE states that they will cover the cost for the service upgrade and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate %	ROI
Existing Usage	218,447	$63,350	-	-	-
EV Chargers	49,766	$14,432	$16,500	$1,700 Level 2 $37,000 Level 3	-
PV System	-164,438	-$23,874	$430,982	30% solar & BESS	-
Incentives EV Solar	-	-	-$5,100 -$129,295	-	-
Totals	103,775	$53,908	$301,187	-	12.5 years

Energy and Decarbonization Road Map

Tables below shows the summary of the recommended measures, in order of recommendation, along side with cost and carbon analysis. The negative values in the electrical column indicate over generation of site electricity. The table below shows the energy saving with all the measures included:

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	239,788	3,012	1,119,357	154,511
Lighting Upgrade	192,449	3,012	957,836	130,965
PV and BESS	28,011	3,012	396,774	49,173
HP Replacement	39,792	396	175,369	0
DWH Replacement	48,960	0	167,053	24,353
Total Saving After All ECM	190,828	3,012	952,304	130,158
% saving	100%	100%	85%	100%

The table below summarizes the cost savings associated with these ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost
Baseline	$59,458	$6,355	$65,813	-
Lighting Upgrade	$46,180	$6,355	$52,535	$220,481
PV and BESS	$22,306	$6,355	$28,661	$430,982
HP Replacement	$25,723	$634	$26,356	$2,647,943
DWH Replacement	$28,382	$0	$28,382	$32,000
Total Saving After All ECM	$31,077	$6,355	$37,432	$3,331,406
% saving	52%	100%	57%	-

And table below summarizes the normalized cost per unit of energy and carbon saved for each measure.

	Annual Electric Cost	Annual Gas Cost
Lighting Upgrade	$1.37	$9.36
PV and BESS	$0.77	$5.27
HP Replacement	$11.96	$107.00
DWH Replacement	$3.85	$440.58
Total Saving After All ECM	$3.50	$25.60

5.8 El Morro Elementary School

General Electrical Recommendations

Based on the existing electrical equipment conditions at El Morro Elementary, it is recommended that LBUSD remove the abandoned main switchboard on campus along with the SCE meter. The abandoned switchboard has also reached the end of its life and is no longer powering any loads on campus. There is currently no code requirement against old equipment staying in place, however the recommended life of electrical equipment is 30 years. Given the current condition of the equipment, it should not be reused and should be removed. In addition, since the campus has asked us to add EV charger calculations, it is recommended to conduct a load study when the client wishes to proceed with installing EV chargers.

ECM 02 Controls and Scheduling

The table below shows the energy saving in El Morro School after implementation of this ECM as noted in previous sections.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	306,501	3,629	1,408,681	194,913
ECM 02	296,055	3,629	1,373,039	189,717
Savings	10,446	0	35,642	5,196
%Savings	3%	0%	3%	3%

Table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$81,523	$5,827	$87,349	-	-
ECM	$78,493	$5,827	$84,320	-	-
Savings	$3,029	$0	$3,029	-	-
%Savings	4%	0%	3%	-	-

ECM 03 HVAC Replacement with Heat Pump

The table below shows the energy saving in El Morro Elementary School for replacing all the existing gas fires units with heat pumps.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	306,501	3,629	1,408,681	194,913
ECM	317,955	821	1,166,919	167,751
Savings	-11,454	2,808	241,763	27,161
%Savings	-4%	77%	17%	14%

The table below summarizes the cost savings associated with this ECM. The cost of this ECM is based on replacing the equipment that currently utilize gas for heating and does not include the cost of replacing

heat pump units in kind. The implementation cost shown in the table below is the total cost of implementation minus the cost of end of life replacement of the unit. This means if the unit is passed the useful life expectancy, the only cost included in the table below is the premium cost difference between like for like replacement of the unit, and upgrading the unit to heat pump.

	Annual Electric Cost	Annual Gas Cost	Annual Operational Cost	Implementation Cost	ROI
Baseline	$81,523	$5,827	$87,349	-	-
ECM	$84,844	$1,313	$86,157	$2,095,240	-
Savings	-$3,322	$4,514	$1,192	-	-
%Savings	-4%	77%	1%	-	-

ECM 04 Domestic Water Heater Replacement

The table below shows the energy saving in El Moro School for replacing all the existing domestic water heater that use natural gas with electric water heaters.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	306,501	3,629	1,408,681	194,913
ECM	325,500	2,808	1,391,450	194,762
Savings	-18,999	821	17,232	150
%Savings	-6%	23%	1%	0%

Table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$81,523	$5,827	$87,349	-	-
ECM	$87,032	$4,514	$91,546	$25,000	-
Savings	-$5,510	$1,313	-$4,197	-	-
%Savings	-7%	23%	-5%	-	-

ECM 05 Lighting Upgrades

Based on the existing conditions of El Morro Elementary, there are a few items that can be recommended. From site observations, many light fixtures have already gone through lamp replacements or LED retrofits and are using updated LED technology. However, the majority of the campus does not have lighting controls, and this is another area where the campus can introduce more savings. It is recommended to add controls to the individual rooms and retrofit the rest of the existing fluorescent ballast to controllable LED light fixtures.

The company that is recommended for light fixtures is Lithonia as most of their fixtures are used in office spaces and classrooms. A bonus to Lithonia is that most lighting control systems are compatible with their fixtures. The manufacturer of the light fixtures may vary as long as the lighting control systems are compatible with the lighting system that the district installs. P2S does not endorse any specific lighting manufacturers.

The lighting controls that are often used are nLight and Lutron. These two lighting controls are very common in the K-12 campuses. The lighting controls from nLight and Lutron are compatible with many fixture manufacturers. The manufacturer of the lighting controls manufacturer may vary as long as the light fixtures are compatible. P2S does not endorse any specific lighting controls manufacturers.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	306,501	3,629	1,408,681	194,913
ECM	225,838	3,629	1,133,459	154,791
Savings	80,663	0	275,222	40,122
%Savings	26%	0%	20%	21%

Table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$81,523	$5,827	$87,349	-	-
ECM	$58,131	$5,827	$63,957	$192,360	6.4
Savings	$23,392	$0	$23,392	-	-
%Savings	29%	0%	27%	-	-

ECM 06 Solar Photovoltaic and Storage

We recommend installing solar PV systems on the rooftops of buildings B, C, MPR, and the parking lots closest to the buildings. The solutions propose a fixed-tilt, rack-mounted solar PV system with centralized inverters (one or two large inverters serving each building's PV system) along with two solar canopies in the parking lot. Where applicable, the solar PV panels should face south (true azimuth 180°) to achieve the highest energy production yield.

Scenario 1: Current Existing Load Optimized PV (under generation)

The proposed PV system was modeled with only the Energy Tool Base program to find the most optimized system that we would recommend for the existing loads. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 120kW-DC and would generate approximately 191.636 kWh of electricity per year. Laguna Beach El Morro Elementary consumed approximately 311,827 kWh of electricity in 2022. The proposed PV system would offset approximately 61.5% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	214
System Size, kW-DC / kW-AC	120 kW-DC / 104.5 kW-AC
Annual Energy Production	191,636 kWh/year
Construction Costs	$558,764
Annual Cost Savings	$41,676 /year
Financial Payback	9 years

According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[9]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $558,764. This includes six total batteries rated at 13.2kWh for a total battery of 79.2kWh. The annual cost savings are estimated to be $41,676 per year, resulting in a nine-year simple payback using average of $0.25/kWh.

Scenario 2: Net Zero PV for Existing Loads (over generation)

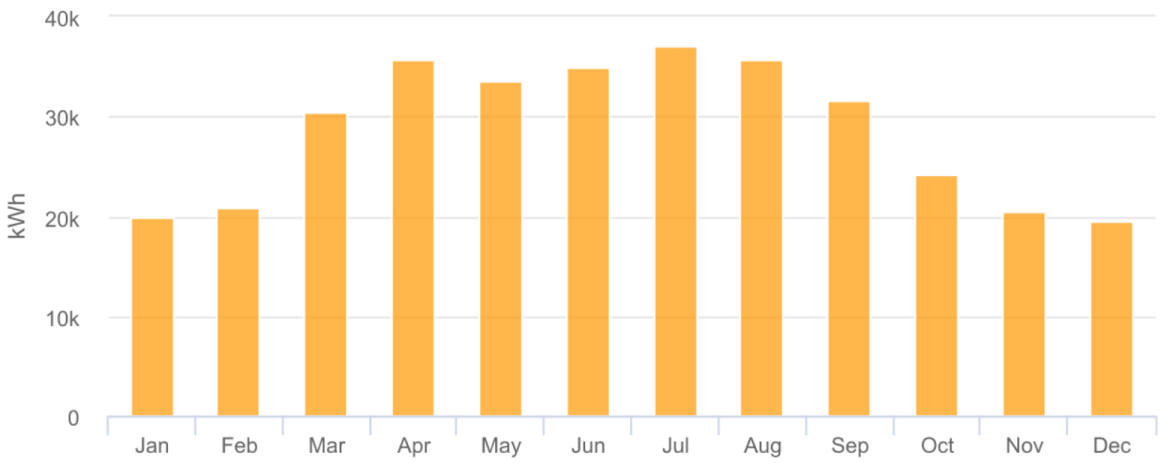
The proposed PV system was modeled within the Helioscope and Energy Tool Base program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 206.8 kW-DC and would generate approximately 343,900 kWh of electricity per year. For reference, Laguna Beach El Morro Elementary consumed approximately 311,827 kWh of electricity in 2022. The proposed PV system would offset approximately 110% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	425
System Size, kW-DC / kW-AC	206.8 kW-DC / 168.4 kW-AC
Annual Energy Production	343,900 kWh/year
Construction Costs	$919,026
Annual Cost Savings	$55,603 /year
Financial Payback	10.5 years

[9] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Building System	Quantity	System Size, kW-DC
Bldg. B Segment 4	89	43.6
Bldg. C Segment 5	96	45.6
Bldg. MPR Segment 3	24	11.8
Parking Lot Canopy 1	108	52.9
Parking Lot Canopy 2	108	52.9
TOTAL	425	206.8

Monthly Production



Month	Monthly kWh
January	19,810.7
February	20,940
March	30,399.1
April	35,655.2
May	33,587.6
June	34,861.9
July	37,114.2
August	35,638.5
September	31,584.7
October	24,259.8
November	20,575.4
December	19,465.1
TOTAL:	343,892.2



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[10]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $919,026. This includes six total batteries rated at 13.2kWh for a total battery of 79.2kWh. The annual cost savings are estimated to be $55,603 per year, resulting in a 10.5-year simple payback using average of $0.25/kWh.

Scenario 3: Scenario 2 with P2S Recommended Loads

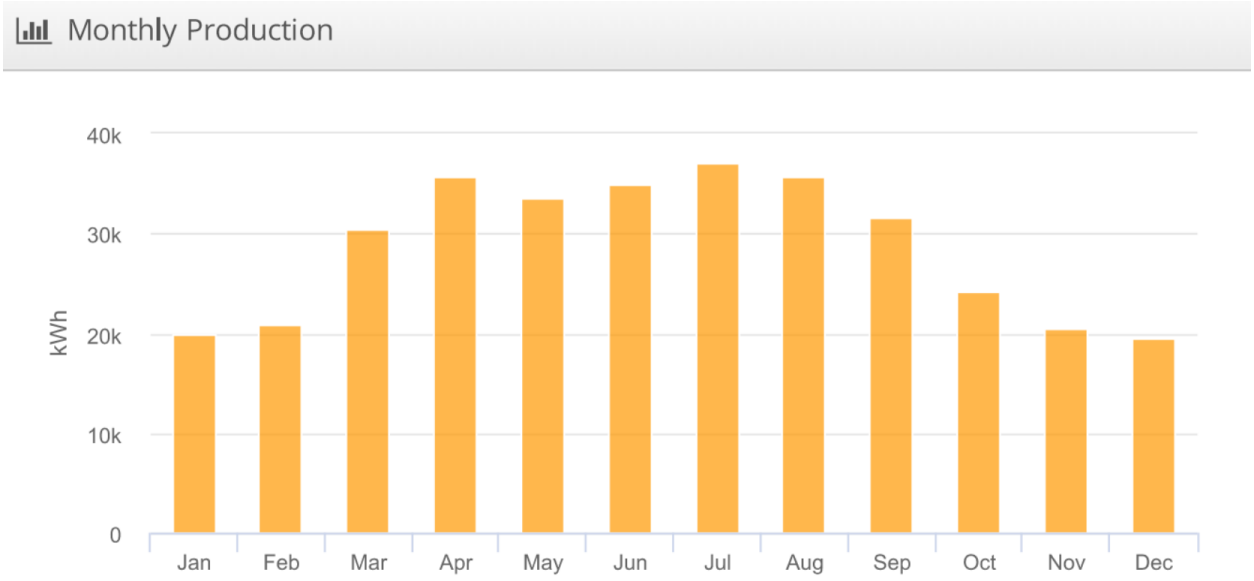
The proposed PV system was modeled within the Helioscope program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 206.8 kW-DC and would generate approximately 343,900 kWh of electricity per year. For reference, Laguna Beach El Morro Elementary is expected to consume approximately 473,021 kWh of electricity with the addition of P2S recommended EV and heat pump loads. The proposed PV system would offset approximately 72.9% of

[10] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	425
System Size, kW-DC / kW-AC	206.8 kW-DC / 168.4 kW-AC
Annual Energy Production	343,900 kWh/year
Construction Costs	$919,026
Annual Cost Savings	$62,738 /year
Financial Payback	9.3 years

Building System	Quantity	System Size, kW-DC
Bldg. B Segment 4	89	43.6
Bldg. C Segment 5	96	45.6
Bldg. MPR Segment 3	24	11.8
Parking Lot Canopy 1	108	52.9
Parking Lot Canopy 2	108	52.9
TOTAL	425	206.8



Month	Monthly kWh
January	19,810.7
February	20,940
March	30,399.1
April	35,655.2
May	33,587.6
June	34,861.9
July	37,114.2
August	35,638.5
September	31,584.7
October	24,259.8
November	20,575.4
December	19,465.1
TOTAL:	343,892.2



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[11]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC) which is $919,026. This includes six total batteries rated at 13.2kWh for a total battery of 79.2kWh. The annual cost savings are estimated to be $62,738 per year, resulting in a 9.3-year simple payback using average of $0.25/kWh.

Scenario 4: Scenario 2 with Code Required Loads

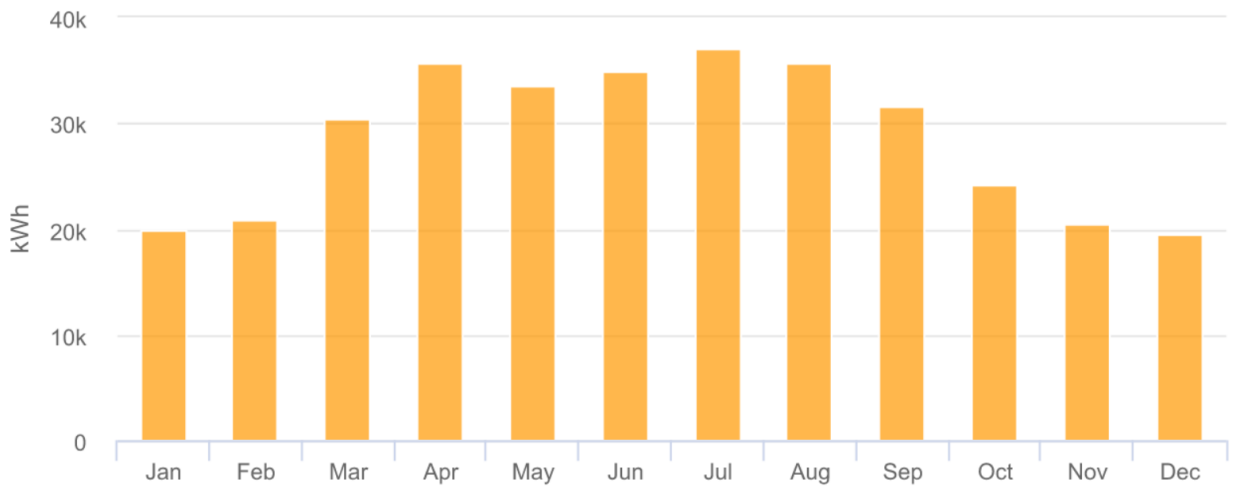
The proposed PV system was modeled within the Helioscope program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 206.8 kW-DC and would generate approximately 343,900 kWh of electricity per year. For reference, Laguna Beach El Morro Elementary is expected to consume approximately 401,991 kWh of electricity with the addition of code required EV and heat pump loads. The proposed PV system would offset approximately 85.8% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	425
System Size, kW-DC / kW-AC	206.8 kW-DC / 168.4 kW-AC
Annual Energy Production	343,900 kWh/year
Construction Costs	$919,026
Annual Cost Savings	$55,434 /year
Financial Payback	10.4 years

Building System	Quantity	System Size, kW-DC
Bldg. B Segment 4	89	43.6
Bldg. C Segment 5	96	45.6
Bldg. MPR Segment 3	24	11.8
Parking Lot Canopy 1	108	52.9
Parking Lot Canopy 2	108	52.9
TOTAL	425	206.8

[11] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Monthly Production



Month	Monthly kWh
January	19,810.7
February	20,940
March	30,399.1
April	35,655.2
May	33,587.6
June	34,861.9
July	37,114.2
August	35,638.5
September	31,584.7
October	24,259.8
November	20,575.4
December	19,465.1
TOTAL:	343,892.2



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[12]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC) which is $919,026. This includes six total batteries rated at 13.2kWh for a total battery of 79.2kWh. The annual cost savings are estimated to be $62,738 per year, resulting in a 10.4-year simple payback using average of $0.25/kWh.

ECM 07 EV Charging

Based on the existing conditions of El Morro Elementary, the recommended option is to install Level 2 charging infrastructure. The current supply of the building the proposed chargers will pull from offers 480V and 208V. LBUSD can use both Level 3 and Level 2 chargers, but in this situation, the best option due to campus parking space use will be to install Level 2's only.

Scenario 1: P2S Recommended EV

The best location to put these chargers in is the 10 parking spots at the parking spots in front of building E since that will require the least amount of trenching work. For all 10 chargers to be installed at full

[12] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

speed, LBUSD will need a spare load of 400A at 208V. As reference, the current code requires parking lots like El Morro Elementary's with 82 parking spots to have 26 EV capable spaces, nine of them needing to be installed. EV capable spaces mean that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of charging infrastructure. Per the SCE program guide, SCE states that they will cover the cost for the upgraded service and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw. Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Electric Grid Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate	ROI
Existing Usage	311,827	$77,957	$0	-	-
EV Chargers	165,888	$41,472	$55,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-343,900	-$62,738	$919,026	30% solar & BESS	-
Incentives EV Solar	-	-	-$17,000 -$275,707	-	-
Totals	133,815	$56,691	$681,319	-	10.9

Scenario 2: Code Required EV

For all four chargers to be installed at full speed, LBUSD will need a spare load of 400A at 208V. As reference, the current code requires parking lots like El Morro Elementary's with 82 parking spots to have 17 EV capable spaces, four of them needing to be installed. EV capable spaces mean that the campus will have to be able to install these spaces in the future so the service size will need to allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of charging infrastructure. Per the SCE program guide, SCE states that they will cover the cost for the upgraded service and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

Return on Investment calculation has been added into PV solar calculations in table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Implementation Cost	Rebate	ROI
Existing Usage	311,827	$77,957	$0	-	-
EV Chargers	66,355	$16,589	$22,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-343,900	-$55,434	$919,026	30% solar & BESS	-
Incentives EV Solar	-	-	-$6,800 -$275,707	-	-
Totals	133,815	$39,112	$658,519	-	11.9

Energy and Decarbonization Road Map

Tables below shows the summary of the recommended measures, in order of recommendation, along side with cost and carbon analysis. The negative values in the electrical column indicate over generation of site electricity. The table below shows the energy saving with all the measures included:

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	306,501	3,629	1,408,681	194,913
Scheduling	296,055	3,629	1,373,039	189,717
Lighting Upgrade	215,392	3,629	1,097,817	149,595
PV and BESS	-128,508	3,629	-75,570	-21,461
HP Replacement	-117,054	821	-317,333	0
DWH Replacement	-98,055	0	-334,564	-48,773
Total Saving After All ECM	306,501	3,629	1,743,246	194,913
% saving	100%	100%	124%	100%

The table below summarizes the cost savings associated with these ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost
Baseline	$81,523	$5,827	$87,349	-
Scheduling	$78,493	$5,827	$84,320	-
Lighting Upgrade	$55,101	$5,827	$60,928	$192,360
PV and BESS	$0	$5,827	$5,325	$919,026
HP Replacement	$2,820	$1,313	$4,133	$2,095,240
DWH Replacement	$8,330	$0	$8,330	$25,000
Total Saving After All ECM	$73,193	$5,827	$79,020	$3,231,626
% saving	90%	100%	90%	-

And table below summarizes the normalized cost per unit of energy and carbon saved for each measure.

	Annual Electric Cost	Annual Gas Cost
Scheduling	$-	$-
Lighting Upgrade	$0.70	$4.79
PV and BESS	$0.78	$5.37
HP Replacement	$8.67	$77.14
DWH Replacement	$1.45	$166.11
Total Saving After All ECM	$1.85	$16.58

5.9 Laguna Beach District Office Warehouse

General Electrical Recommendations

Based on the existing electrical equipment conditions at Laguna Beach District Office Warehouse, we recommend that LBUSD upgrade all the existing electrical infrastructure, as many pieces of equipment have exceeded their life expectancy. There is currently no code requirement against old equipment staying in place, however, the recommended life of electrical equipment is 30 years. Given the current condition of the equipment, it should not be reused and should be replaced. The electrical branch circuits are recommended to be rewired and recircuited. In addition, since the campus has asked us to add EV charger calculations, a load study is recommended when the client wishes to proceed with installing EV chargers.

ECM 04 Domestic Water Heater Replacement

The table below shows the energy saving for replacing the existing domestic water heaters that use natural gas with electric water heaters.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	35,256	98	130,093	18,683
ECM	36,175	0	123,429	17,993
Savings	-919	98	6,664	689
%Savings	-3%	100%	5%	0

The table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$11,660	$414	$12,074	-	-
ECM	$11,964	$0	$11,964	$25,000	-
Savings	-$304	$414	$110	-	-
%Savings	-3%	100%	1%	-	-

ECM 05 Lighting Upgrades

Based on the existing conditions of Laguna Beach District Warehouse, there are a few items that can be recommended. From site observations, many light fixtures are still using fluorescent technology and can be replaced with updated LED. The majority of the facilities do not have lighting controls, and this is another area where the district can introduce more savings. The recommended conservation measure is to add controls to the individual rooms and retrofit the rest of the existing fluorescent ballast to controllable LED light fixtures.

The company that is recommended for light fixtures is Lithonia as most of their fixtures are used in office spaces and classrooms. A bonus to Lithonia is that most lighting control systems are compatible with their fixtures. The manufacturer of the light fixtures may vary as long as the lighting control systems are compatible with the lighting system that the district installs. P2S does not endorse any specific lighting manufacturers.

The lighting controls that are often used are nLight and Lutron. These two lighting controls are very common in the K-12 campuses. The lighting controls from nLight and Lutron are compatible with many fixture manufacturers. The manufacturer of the lighting controls manufacturer may vary as long as the light fixtures are compatible. P2S does not endorse any specific lighting controls manufacturers.

	Annual Grid Electric Usage (kWH)	Annual Gas Usage (Therms)	Annual Operational Energy (MBH)	Annual Operation Carbon
Baseline	35,256	98	130,093	18,683
ECM	25,182	98	95,721	13,672
Savings	10,074	0	34,372	5,011
%Savings	29%	0%	26%	27%

Table below summarizes the cost savings associated with this ECM.

	Annual Electric Cost	Annual Gas Cost	Annual Utility Cost	Implementation Cost	ROI
Baseline	$11,660	$414	$12,074	-	-
ECM	$9,142	$414	$9,556	$192,360	-
Savings	$2,518	$0	$2,518	-	-
%Savings	22%	0%	21%	-	-

ECM 06 Solar Photovoltaic and Storage

The recommended PV solution is to install solar PV systems on the rooftops of the warehouse building. The solutions propose a fixed-tilt, rack-mounted solar PV system with centralized inverters (one or two large inverters serving each building's PV system). Where applicable, the solar PV panels should face south (true azimuth 180°) to achieve the highest energy production yield. In the recommendations the existing data that was given by LBUSD as well as the best engineering judgement was used based off the existing information.

Scenario 1: Current Existing Load Optimized PV (under generation)

The proposed PV system was modeled with only the Energy Tool Base program to find the most optimized system that we would recommend for the existing loads. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 13kW-DC and would generate approximately 21,046 kWh of electricity per year. For reference, Laguna Beach Warehouse consumed approximately 35,014 kWh of electricity in 2022. The proposed PV system would offset approximately 60% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	176
System Size, kW-DC / kW-AC	13 kW-DC / 11.3 kW-AC
Annual Energy Production	21,046 kWh/year
Construction Costs	$74,205
Annual Cost Savings	$4,045 /year
Financial Payback	11.6 years

According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[13]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $74,205. This includes two total batteries rated at 13.2kWh for a total battery of 26.4kWh. The annual cost savings are estimated to be $4,045 per year, resulting in a 11.6-year simple payback using average of $0.25/kWh.

Scenario 2: Net Zero PV for Existing Loads (over generation)

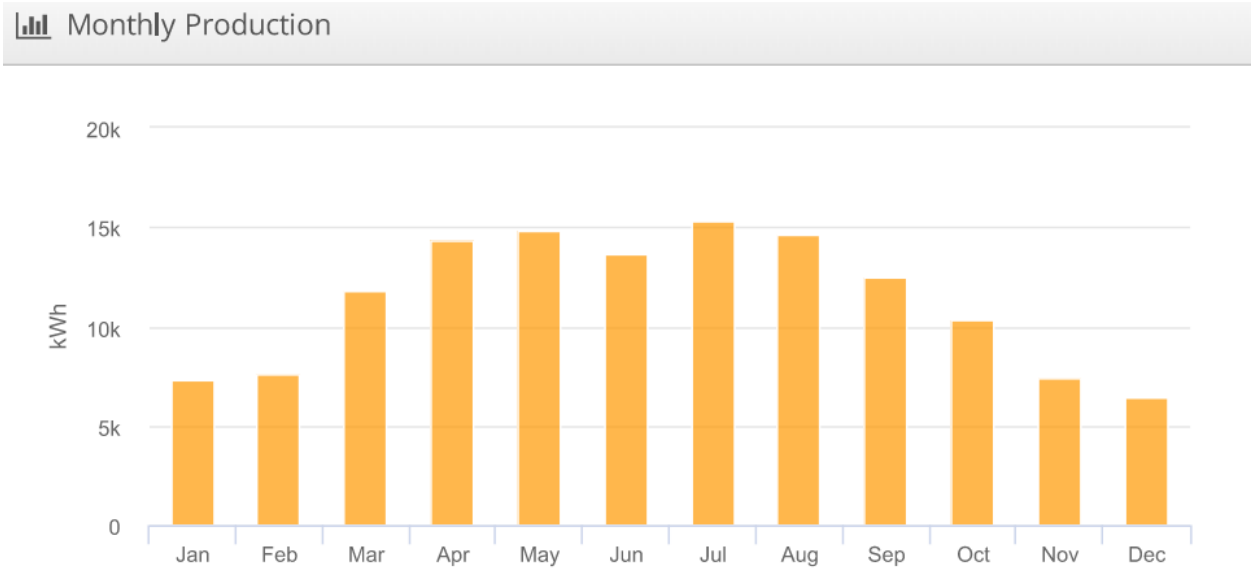
The proposed PV system was modeled using the Helioscope program and Energy Tool Base Program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 206.8 kW-DC and would generate approximately 135,982 kWh of electricity per year. For reference, Laguna Beach Warehouse consumed approximately 35,014 kWh of electricity in 2022. The proposed PV system would offset approximately 388% of the site's annual electricity usage. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	176
System Size, kW-DC / kW-AC	86.2 kW-DC / 72.2 kW-AC
Annual Energy Production	135,982 kWh/year
Construction Costs	$421,524

[13] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

Annual Cost Savings	$11,906 /year
Financial Payback	19.7 years

Building System	Quantity	System Size, kW-DC
Warehouse Segment 1	123	60.3
Warehouse Segment 2	53	26
TOTAL	176	86.3



Month	Monthly kWh
January	7309
February	7571.3
March	11770.1
April	14295.8
May	14809.7
June	13644.4
July	15332
August	14590.7
September	12523.1
October	10340.8
November	7393.3
December	6401.1
TOTAL:	7309



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[14]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $421,524. This includes three total batteries rated at 13.2kWh for a total battery of 40.5kWh. The annual cost savings are estimated to be $11,906 per year, resulting in a 19.7-year simple payback using average of $0.25/kWh.

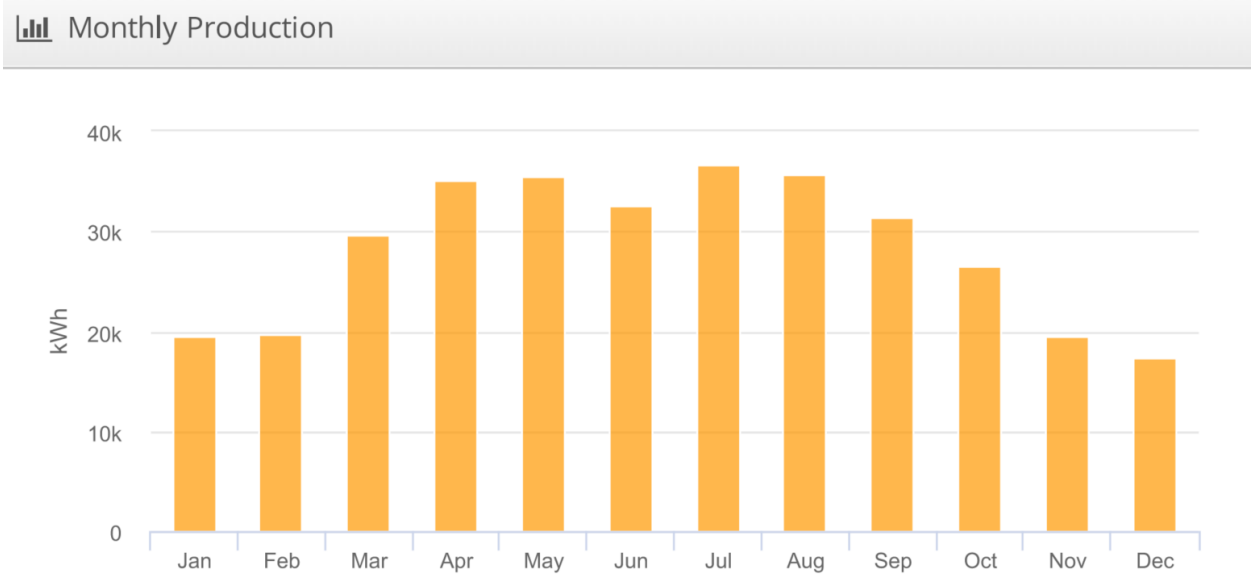
Scenario 3: Additional Solor with Net Zero for EV Fleet Loads

The proposed PV system was modeled within the Helioscope program. The PV system was based on the site investigation for solar PV feasibility. For the analysis, the PV module Qcells, Q.Peak DUO ML-G11.2 490W was used. P2S does not endorse any solar PV equipment manufacturer. This PV module was used for analysis purposes only. The proposed PV system size was estimated to be 206.8 kW-DC and would generate approximately 340,202 kWh of electricity per year. For reference, Laguna Beach Warehouse is expected to consume 560,221 kWh of electricity with the addition of the EV bus fleet. The proposed PV system would offset approximately 60.7% of the site's expected annual electricity usage with EV chargers installed. The offset percentage is expected to increase if other ECMs were implemented, apart from electric vehicle charging.

Parameter	Description
PV Module Rating	490 W
Quantity of PV Modules	428
System Size, kW-DC / kW-AC	209.8 kW-DC / 168.4 kW-AC
Annual Energy Production	339,200 kWh/year
Construction Costs	$1,153,961
Annual Cost Savings	$49,816 /year
Financial Payback	14 years

Building System	Quantity	System Size, kW-DC
Warehouse Segment 1	123	60.3
Warehouse Segment 2	53	26
Warehouse Segment 3	252	123.5
TOTAL	428	209.8

[14] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html



Month	Monthly kWh
January	19,487.1
February	19,616.4
March	29,660
April	35,029.5
May	35,584.8
June	32,600.9
July	36,734.5
August	35,687.1
September	31,321.9
October	26,604.5
November	19,462.9
December	17,393.4
TOTAL:	339,183



According to solar PV market research by the National Renewable Energy Laboratory (NREL), prices of residential and commercial rooftop solar PV systems have averaged between $3.22/W and $3.03/W between the years 2018 and 2022[15]. To estimate the construction cost of a solar PV system from what has been observed this year, a dollar-per-watt value of $4.15 was used. The construction cost is based on the dollar-per-watt cost multiplied by the system capacity (kW-DC), which is $1,153,961 This includes one total battery rated at 258kWh. The annual cost savings are estimated to be $49,816 per year, resulting in a 14-year simple payback using average of $0.25/kWh.

ECM 07 EV Charging

Based on the existing conditions of Laguna Beach District Warehouse, the recommended option is to install Level 2 and Level 3 charging infrastructure. The recommendation for LBUSD warehouse is to upsize the utility to a 750kVA transformer to account for the existing and new load. The best location for EV chargers to be installed are as follows. The Level 3 chargers will be stationed at the two parking spaces in front of the warehouse roll-up door. The Level 2 chargers shall have 12 located at the back where the buses are parked and four additional in front of the maintenance office. For all 18 chargers to be installed

[15] https://www.nrel.gov/solar/market-research-analysis/solar-installed-system-cost.html

at full speed, LBUSD warehouse will require a spare load of 512A at 208V and 160A at 480V. As reference, the current code requires parking lots like Laguna Beach District Warehouse's 33 parking spots to have 11 EV capable spaces, four of them needing to be installed. EV capable spaces mean the campus will have to be able to install them in the future, so the service size must allow for all future chargers.

Additionally for EV chargers LBUSD is able to utilize SCE's Charge Ready program to help offset the cost of the charging infrastructure. Per the SCE program guide, SCE states that they will cover the cost for the service upgrade and up to $37,000 for Level 3 chargers of 150kw or more, and up to $1,700 for Level 2 chargers of 19.2kw.

It is recommended to install EV charging during the Solar installations as digging and other cost can be saved when done together.

Based on conversations and the timeline of LBUSD the plan for the EV fleet integration are as follows:

- Step 1: RFP to retain and Design Plans 1/12025
- Step 2: Bid and award EV infrastructure 1/1/2026
- Step 2.5: SCE to be contacted at the same time as contractor BID's for streamlined EV rebate process 1/1/2026
- Step 3: Bid and Contract Electric Fleet Services 1/1/2027
- Step 4: Durham Transportation end agreement 6/30/2028
- Step 5: Start of electric bus fleet 7/1/2028

Based on this information the calculations have been run for a return on Investment along with PV solar in the table below.

	Annual Grid Electric Usage (kWh)	Annual Electric Cost	Annual Utility Cost	Implementation Cost	Rebate %	ROI
Existing Usage	35,014	$8,754	$	$0	-	-
EV Chargers	524,620	$100,077	$0	$274,000	$1,700 Level 2 $37,000 Level 3	-
PV System	-340,202	-$49,816	$0	$1,153,961	30% solar & BESS	-
Incentives EV Solar	-	-	-	-$101,200 -$346,188	-	-
Fleet Fuel Savings	-	-	-$34,706	-	-	-
Totals	219,432	$59,015	-$34,706	$980,573	-	11.5

6. FUNDING AND INCENTIVES

6.1 Photovoltaic Systems Incentives

6.1.1 Inflation reduction act (IRA):

The Inflation Reduction Act (IRA) of 2022 provides a 30% federal Investment grant for energy storage systems (ESS), applicable to both standalone and solar PV-paired projects, until 2032. This grant offsets and includes a 3-year carryback and 22-year carryforward. For ESS projects over 1 MW AC, prevailing wage and apprenticeship requirements are needed for the full 30% rate; otherwise, the rate is 6%. Projects under 1 MW qualify for the 30% rate without these requirements.

6.2 Energy storage system Incentives

6.2.1 Inflation reduction act (IRA):

The Inflation Reduction Act (IRA) of 2022 provides a 30% federal Investment grant for energy storage systems (ESS), applicable to both standalone and solar PV-paired projects, until 2032. This grant offsets and includes a 3-year carryback and 22-year carryforward. For ESS projects over 1 MW AC, prevailing wage and apprenticeship requirements are needed for the full 30% rate; otherwise, the rate is 6%. Projects under 1 MW qualify for the 30% rate without these requirements.

6.3 Electric Vehicle System Incentives

6.3.1 SCE Charge Ready Program:

Southern California Edison's Charge Ready program provides rebates for installing EV charging infrastructure at businesses, local governments, multi-family dwellings, and other organizations, offering up to 100% for infrastructure costs and 50-100% for EV chargers. The program includes technical assistance for site assessment, planning, and installation, targeting workplaces, public sites, multi-family dwellings, and fleet charging. The application process involves checking eligibility, submitting an application, undergoing a site assessment, and receiving approval for installation. This initiative reduces installation costs, promotes clean transportation, and increases charging convenience, supporting California's clean energy goals.

6.3.2 CALeVIP Rebate Program

The California Electric Vehicle Infrastructure Project (CALeVIP) is a rebate program designed to support the installation of electric vehicle (EV) charging stations across California, providing financial incentives of up to 100% of the installation costs for eligible participants. Aimed at businesses, public agencies, non-profits, and multi-family housing developers. The CALeVIP program provides funding for the installation of electric vehicle (EV) charging stations in California, offering rebates that typically range from $2,000 to $5,000 for Level 2 chargers and $20,000 to $70,000 for DC fast chargers, depending on the project type and location. Additional incentives may be available for installations in underserved communities or for projects that meet equity criteria.

6.3.3 California Air Resource Board (CARB) - Low Emission School Bus Program

The Lower-Emission School Bus Program, administered by the California Air Resources Board (CARB), aims to replace older, high-emission school buses with cleaner alternatives, offering funding of up to 100% for new low-emission buses, with electric buses typically funded up to $300,000 each. School districts can submit multiple applications, with some able to apply for funding for several buses at once, depending on their needs. Eligible buses must meet zero-emission standards, and the program also provides incentives covering up to 80% of the costs for installing EV chargers, which are generally sized between 40 kW and 150 kW. Under this program South Coast AQMD provides funding for the purchase of new CARB-approved Type A, C or D propane, CNG or battery electric buses with a gross vehicle weight rating (GVWR) over 14,000 pounds. Only public-school districts and joint power of authorities are eligible to apply.

LBUSD	Total Buses replaced	Total Vans replaced	Total Funding per Bus (CARB)	Low Emission School Bus Program (CARB)
Laguna Beach Unified School District	12	7	$20,000	$240,000

6.3.4 Summary of Incentives

Summary of Funding and Incentives for each site is given in the table below.

Proposed Site	EV Chargers (SCE Charge Ready)	EV Chargers (CALeVIP)	PV & BESS System (IRA)
District Office	$23,800	$49,000	$155,527
Laguna Beach High School	$0	$0	$675,138
Thruston Middle School	$13,600	$28,000	$496,929
Top of the world Elementary School	$17,000	$35,000	$129,295
El Morro Elementary School	$17,000	$35,000	$275,707
LBDO Warehouse	$101,200	$210,000	$346,188

APPENDIX A – LIGHTING INVENTORY AND CALCULATION

Laguna Beach District Office

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps								Qty											
Building A || Room 101 Boardroom and Lobby	6	Surface mounted Wrap Around Linear 4' Fluorscent	2	64	0.384	840.96	$390.00	0	Sa	ECM-L1	6	32	0.192	420.48	420.48	117.7344	538.2	$432.00	$810.00	$0.00	$0.00	$1,242.00
	6	4' Cove Light	1	32	0.192	420.48	$390.00	0	Sa	ECM-L1	6	16	0.096	210.24	210.24	58.8672	269.1	$432.00	$816.00	$0.00	$0.00	$1,248.00
	1	4'x4' Fluorescent fixture 8 lamp	8	256	0.256	560.64	$65.00	0	Sa	ECM-L1	2	32	0.064	140.16	420.48	39.2448	459.7	$144.00	$300.00	$0.00	$0.00	$444.00
	6	3" LED Downlight	1	16	0.096	210.24	$390.00	0	Sa	ECM-L1	6	16	0.096	210.24	0	58.8672	58.9	$432.00	$1,218.00	$0.00	$0.00	$1,650.00
	1	Office Tracklight LED	1	32	0.032	70.08	$0.00	0	Sa	ECM-L1	1	32	0.032	70.08	0	19.6224	19.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building A || Room 114 & 112 RR amd Storage	2	1'x4' surface mounted 2lamp fluorescent	2	64	0.128	280.32	$130.00	0	Sa	ECM-L1	2	32	0.064	140.16	140.16	39.2448	179.4	$144.00	$270.00	$0.00	$0.00	$414.00
	3	6" Diameter surface mounted downlight	1	64	0.192	420.48	$195.00	0	Sa	ECM-L1	3	32	0.096	210.24	210.24	58.8672	269.1	$216.00	$330.00	$0.00	$0.00	$546.00
Building A || Room 103	2	3" LED Downlight	1	16	0.032	70.08	$130.00	0	Sa	ECM-L1	2	16	0.032	70.08	0	19.6224	19.6	$144.00	$406.00	$0.00	$0.00	$550.00
	2	2'x4' Fluorescent fixture 4 lamp	4	128	0.256	560.64	$130.00	0	Sa	ECM-L1	2	32	0.064	140.16	420.48	39.2448	459.7	$144.00	$300.00	$0.00	$0.00	$444.00
Building A || Room 109	1	3" LED Downlight	1	16	0.016	35.04	$65.00	0	Sa	ECM-L1	1	16	0.016	35.04	0	9.8112	9.8	$72.00	$203.00	$0.00	$0.00	$275.00
	2	2'x4' Fluorescent fixture 4 lamp	4	128	0.256	560.64	$130.00	0	Sa	ECM-L1	2	32	0.064	140.16	420.48	39.2448	459.7	$144.00	$300.00	$0.00	$0.00	$444.00
Building A || Room 108	1	2'x4' Fluorescent fixture 4 lamp	4	128	0.128	280.32	$65.00	0	Sa	ECM-L1	1	32	0.032	70.08	210.24	19.6224	229.9	$72.00	$150.00	$0.00	$0.00	$222.00
	1	3" LED Downlight	1	16	0.016	35.04	$65.00	0	Sa	ECM-L1	1	16	0.016	35.04	0	9.8112	9.8	$72.00	$203.00	$0.00	$0.00	$275.00
Building A || Room 107	1	2'x4' Fluorescent fixture 4 lamp	4	128	0.128	280.32	$65.00	0	Sa	ECM-L1	1	32	0.032	70.08	210.24	19.6224	229.9	$72.00	$150.00	$0.00	$0.00	$222.00
	1	3" LED Downlight	1	16	0.016	35.04	$65.00	0	Sa	ECM-L1	1	16	0.016	35.04	0	9.8112	9.8	$72.00	$203.00	$0.00	$0.00	$275.00
Building A || Room 105	1	2'x4' Fluorescent fixture 4 lamp	4	128	0.128	280.32	$65.00	0	Sa	ECM-L1	1	32	0.032	70.08	210.24	19.6224	229.9	$72.00	$150.00	$0.00	$0.00	$222.00
	2	3" LED Downlight	1	16	0.032	70.08	$130.00	0	Sa	ECM-L1	2	16	0.032	70.08	0	19.6224	19.6	$144.00	$406.00	$0.00	$0.00	$550.00
	2	4' Linear Strip Fluorescent	1	32	0.064	140.16	$130.00	0	Sa	ECM-L1	2	16	0.032	70.08	70.08	19.6224	89.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room 106	2	2'x4' Fluorescent fixture 4 lamp	4	128	0.256	560.64	$130.00	0	Sa	ECM-L1	2	32	0.064	140.16	420.48	39.2448	459.7	$144.00	$300.00	$0.00	$0.00	$444.00
	2	4'x4' Fluorescent fixture 8 lamp	8	256	0.512	1121.28	$130.00	0	Sa	ECM-L1	4	32	0.128	280.32	840.96	78.4896	919.4	$288.00	$600.00	$0.00	$0.00	$888.00
Building A || Hallway	13	3" LED Downlight	1	16	0.208	455.52	$845.00	0	Sa	ECM-L1	13	16	0.208	455.52	0	127.5456	127.5	$936.00	$2,639.00	$0.00	$0.00	$3,575.00
	1	Office Tracklight LED	1	32	0.032	70.08	$0.00	0	Sa	ECM-L1	1	32	0.032	70.08	0	19.6224	19.6	$0.00	$0.00	$0.00	$0.00	$0.00
	1	2'x4' LED Troffer	1	32	0.032	70.08	$65.00	0	Sa	ECM-L1	1	32	0.032	70.08	0	19.6224	19.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room A108	5	4" Cove light Fluorescent 2lamp	2	64	0.32	700.8	$325.00	0	Sa	ECM-L1	5	32	0.16	350.4	350.4	98.112	448.5	$360.00	$750.00	$0.00	$0.00	$1,110.00
Building C || Room A107	4	2'x4' LED Troffer	1	32	0.128	280.32	$260.00	0	Sa	ECM-L1	4	32	0.128	280.32	0	78.4896	78.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room A102	4	2'x4' LED Troffer	1	32	0.128	280.32	$260.00	0	Sa	ECM-L1	4	32	0.128	280.32	0	78.4896	78.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room A104 IDF Room	2	2'x4' LED Troffer	1	32	0.064	140.16	$130.00	0	Sa	ECM-L1	2	32	0.064	140.16	0	39.2448	39.2	$0.00	$0.00	$0.00	$0.00	$0.00
	1	1'x4' LED Troffer	1	16	0.016	35.04	$0.00	0	Sa	ECM-L1	1	16	0.016	35.04	0	9.8112	9.8	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room A105	2	2'x4' LED Troffer	1	32	0.064	140.16	$130.00	0	Sa	ECM-L1	2	32	0.064	140.16	0	39.2448	39.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room Kitchen Kitchen hallway	4	2'x4' Fluorescent fixture 2 lamp	2	64	0.256	560.64	$0.00	0	Sa	ECM-L1	2	32	0.064	140.16	420.48	39.2448	459.7	$144.00	$270.00	$0.00	$0.00	$414.00
	4	3" LED Downlight	1	16	0.064	140.16	$0.00	0	Sa	ECM-L1	4	16	0.064	140.16	0	39.2448	39.2	$0.00	$0.00	$0.00	$0.00	$0.00
	1	1'x4' surface mounted 2lamp fluorescent	2	64	0.064	140.16	$65.00	0	Sa	ECM-L1	1	32	0.032	70.08	70.08	19.6224	89.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building B || South Offices	15	4' Fluorescent pendant mounted 2 lamp	2	64	0.96	2102.4	$975.00	0	Sa	ECM-L1	15	32	0.48	1051.2	1051.2	294.336	1345.5	$1,080.00	$2,025.00	$0.00	$0.00	$3,105.00
	2	2' fluorescent 1 lamp restroom fixture	1	32	0.064	140.16	$130.00	0	Sa	ECM-L1	2	16	0.032	70.08	70.08	19.6224	89.7	$0.00	$0.00	$0.00	$0.00	$0.00
	1	12" square LED Light	1	16	0.016	35.04	$0.00	0	Sa	ECM-L1	1	16	0.016	35.04	0	9.8112	9.8	$0.00	$0.00	$0.00	$0.00	$0.00
	1	Fluorescent track light	1	120	0.12	262.8	$65.00	0	Sa	ECM-L1	1	64	0.064	140.16	122.64	39.2448	161.9	$72.00	$370.00	$0.00	$0.00	$442.00
Building B || North Offices	6	3" LED Downlight	1	16	0.096	210.24	$0.00	0	Sa	ECM-L1	6	16	0.096	210.24	0	58.8672	58.9	$0.00	$0.00	$0.00	$0.00	$0.00
	14	4' Fluorescent pendant mounted 2 lamp	2	64	0.896	1962.24	$910.00	0	Sa	ECM-L1	14	32	0.448	981.12	981.12	274.7136	1255.8	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
Complete campus motion sensors										ECM-L1	29									$230.00	$72.00	$8,758.00
Complete campus daylight sensors										ECM-L1	12									$161.00	$72.00	$2,796.00
ANNUAL TOTALS	126				6.648	14,559	7020	0					3	7,288	7,271	2,041	9,312	$7,056.00	$15,464.00	$391.00	$144.00	$34,074.00

Laguna Beach High School

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data Qty	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps																			
Building A || Room 01	4	Linear Pendant Light 2 fluorescent lamp	2	64	0.256	537.6	$260.00	188.16	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	268.8	94.08	174.7	$288.00	$532.00	$0.00	$0.00	$820.00
Building A || Room 02	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	94.08	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	134.4	47.04	87.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room 03	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	94.08	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	134.4	47.04	87.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room 04	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	141.12	Sa/ CLG OS	ECM-L1	3	32	0.096	201.6	201.6	70.56	131.0	$216.00	$405.00	$0.00	$0.00	$621.00
Building A || Room 05	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	94.08	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	134.4	47.04	87.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room 06	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	94.08	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	134.4	47.04	87.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room 07	4	1x4 fluorescent 2 lamp surface mounted	2	64	0.256	537.6	$260.00	188.16	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	268.8	94.08	174.7	$288.00	$540.00	$0.00	$0.00	$828.00
Building A || Room 08	4	1x4 fluorescent 2 lamp surface mounted	2	64	0.256	537.6	$260.00	188.16	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	268.8	94.08	174.7	$288.00	$540.00	$0.00	$0.00	$828.00
Building A || Room 09, 9a, 9b, 9c	7	1x4 fluorescent 2 lamp surface mounted	2	64	0.448	940.8	$455.00	329.28	Sa/ CLG OS	ECM-L1	7	32	0.224	470.4	470.4	164.64	305.8	$504.00	$945.00	$0.00	$0.00	$1,449.00
	1	Fluorescent Circular Restroom Light	1	72	0.072	151.2	$65.00	0	Sa	ECM-L1	1	48	0.048	100.8	50.4	35.28	85.7	$72.00	$80.00	$0.00	$0.00	$152.00
	1	Screw in LED bulb	1	32	0.032	67.2	$65.00	0	Sa	N/A	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building A || Room 10 and 15	24	2x4 LED Troffers	1	32	0.768	1612.8	$1,560.00	23.52	Sa/ CLG OS	ECM-L1	24	32	0.768	1612.8	0	564.48	541.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building A || Room 11,12,13	4	1x4 fluorescent 2 lamp surface mounted	2	64	0.256	537.6	$260.00	188.16	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	268.8	94.08	174.7	$288.00	$540.00	$0.00	$0.00	$828.00
Building A || Room 14	4	1x4 fluorescent 2 lamp surface mounted	2	64	0.256	537.6	$260.00	188.16	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	268.8	94.08	174.7	$288.00	$540.00	$0.00	$0.00	$828.00
Building A || Room 16	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	94.08	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	134.4	47.04	87.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room 17	4	Linear Pendant Light 2 fluorescent lamp	2	64	0.256	537.6	$260.00	188.16	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	268.8	94.08	174.7	$288.00	$532.00	$0.00	$0.00	$820.00
Building A || Room 18	4	3" diameter downlight LED	1	16	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	4	16	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building A || Room 19	5	1x4 fluorescent 2 lamp surface mounted	2	64	0.32	672	$325.00	235.2	Sa/ CLG OS	ECM-L1	5	32	0.16	336	336	117.6	218.4	$360.00	$675.00	$0.00	$0.00	$1,035.00
Building B || Room 20	16	Linear Pendant Light 2 fluorescent lamp	2	64	1.024	2150.4	$1,040.00	0	Sa	ECM-L1	16	32	0.512	1075.2	1075.2	376.32	1451.5	$1,152.00	$2,128.00	$0.00	$0.00	$3,280.00
	4	1x4 fluorescent 2 lamp staggered	2	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	32	0.128	268.8	268.8	94.08	362.9	$288.00	$540.00	$0.00	$0.00	$828.00
Building B || Room 21	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Room 22	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
	22	Linear Pendant Light 2 fluorescent lamp	2	64	1.408	2956.8	$1,430.00	0	Sa	ECM-L1	22	32	0.704	1478.4	1478.4	517.44	1995.8	$1,584.00	$2,926.00	$0.00	$0.00	$4,510.00
Building B || Room 23	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Room 24	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Room 25	11	3" diameter downlight LED	1	16	0.176	369.6	$0.00	0	Sa	ECM-L1	11	16	0.176	369.6	0	129.36	129.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room 26	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Room 27	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Hallway 28	16	2x4 recessed fluorescent troffer 2 lamp	2	64	1.024	2150.4	$1,040.00	0	Sa	ECM-L1	16	32	0.512	1075.2	1075.2	376.32	1451.5	$1,152.00	$2,400.00	$0.00	$0.00	$3,552.00
	5	Exit signs	1	6	0.03	63	$325.00	0	Sa	ECM-L1	5	4	0.02	42	21	14.7	35.7	$0.00	$0.00	$0.00	$0.00	$0.00
	5	6" diameter recessed downlight LED	1	24	0.12	252	$0.00	0	Sa	ECM-L1	5	24	0.12	252	0	88.2	88.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room 29a, 29b	2	Exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	8.4	5.88	14.3	$0.00	$0.00	$0.00	$0.00	$0.00
	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$266.00	$0.00	$0.00	$410.00
Building B || Room 30	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$266.00	$0.00	$0.00	$410.00
Building B || Room 31	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Room 32	18	Linear Pendant Light 2 fluorescent lamp	2	64	1.152	2419.2	$1,170.00	0	Sa	ECM-L1	18	32	0.576	1209.6	1209.6	423.36	1633.0	$1,296.00	$2,394.00	$0.00	$0.00	$3,690.00
Building B || Room 33	16	Linear Pendant Light 2 fluorescent lamp	2	64	1.024	2150.4	$1,040.00	0	Sa	ECM-L1	16	32	0.512	1075.2	1075.2	376.32	1451.5	$1,152.00	$2,128.00	$0.00	$0.00	$3,280.00
Building B || Room 34	19	Linear Pendant Light 2 fluorescent lamp	2	64	1.216	2553.6	$1,235.00	0	Sa	ECM-L1	19	32	0.608	1276.8	1276.8	446.88	1723.7	$1,368.00	$2,527.00	$0.00	$0.00	$3,895.00
Building B || Room 35	19	Linear Pendant Light 2 fluorescent lamp	2	64	1.216	2553.6	$1,235.00	0	Sa	ECM-L1	19	32	0.608	1276.8	1276.8	446.88	1723.7	$1,368.00	$2,527.00	$0.00	$0.00	$3,895.00
Building B || Room 36	20	Linear Pendant Light 2 fluorescent lamp	2	64	1.28	2688	$1,300.00	0	Sa	ECM-L1	20	32	0.64	1344	1344	470.4	1814.4	$1,440.00	$2,660.00	$0.00	$0.00	$4,100.00
Building B || Room 37A	5	1x4 LED surface mounted	1	32	0.16	336	$325.00	117.6	Sa/ CLG OS	ECM-L1	5	32	0.16	336	0	117.6	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	6" diameter downlight LED	1	32	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room 37B	5	1x4 LED surface mounted	1	32	0.16	336	$325.00	117.6	Sa/ CLG OS	ECM-L1	5	32	0.16	336	0	117.6	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	6" diameter downlight LED	1	32	0.064	134.4	$0.00	47.04		ECM-L1	2	32	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Hallway 28	24	2x4 recessed fluorescent troffer 2 lamp	2	64	1.536	3225.6	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1612.8	1612.8	564.48	2177.3	$1,728.00	$3,600.00	$0.00	$0.00	$5,328.00
	5	Exit signs	5	6	0.03	63	$325.00	0	Sa	ECM-L1	5	4	0.02	42	21	14.7	35.7	$0.00	$0.00	$0.00	$0.00	$0.00
	13	6" diameter recessed downlight LED	16	24	0.312	655.2	$0.00	0	Sa	ECM-L1	13	16	0.208	436.8	218.4	152.88	371.3	$0.00	$0.00	$0.00	$0.00	$0.00
	6	Halo accent low voltage fixture	1	24	0.144	302.4	$390.00	0	Sa	ECM-L1	6	24	0.144	302.4	0	105.84	105.8	$432.00	$846.00	$0.00	$0.00	$1,278.00
Building B || Room 39	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
Building D || Room 140 Floor 1	10	2x4 LED Troffers	1	32	0.32	672	$0.00	235.2	Sa/ CLG OS	ECM-L1	10	32	0.32	672	0	235.2	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	15	1x4 LED surface mounted	1	32	0.48	1008	$0.00	352.8	Sa/ CLG OS	ECM-L1	15	32	0.48	1008	0	352.8	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 141 Floor 1	4	2x4 LED Troffers	1	32	0.128	268.8	$0.00	94.08	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	0	94.08	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	1	2x2 LED Troffers	1	24	0.024	50.4	$0.00	17.64	Sa/ CLG OS	ECM-L1	1	24	0.024	50.4	0	17.64	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 142 Floor 1	4	3" LED downlight	1	16	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	4	16	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 149 Floor 1	8	2x2 LED Troffers	1	24	0.192	403.2	$0.00	141.12	Sa/ CLG OS	ECM-L1	8	24	0.192	403.2	0	141.12	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 144 Floor 1	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building D || Room 145 Floor 1	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building D || Room 146 Floor 1	6	2x4 recessed fluorescent troffer 2 lamp	2	64	0.384	806.4	$390.00	0	Sa	ECM-L1	6	32	0.192	403.2	403.2	141.12	544.3	$432.00	$900.00	$0.00	$0.00	$1,332.00
Building D || Room 143 Floor 1	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	70.56	Sa/ CLG OS	ECM-L1	4	24	0.096	201.6	0	70.56	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	42	2x4 LED Troffers	1	32	1.344	2822.4	$0.00	987.84		ECM-L1	42	32	1.344	2822.4	0	987.84	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	Exit signs	1	6	0.012	25.2	$130.00	8.82		ECM-L1	2	6	0.012	25.2	0	8.82	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	11	3" LED downlight	1	16	0.176	369.6	$0.00	129.36		ECM-L1	11	16	0.176	369.6	0	129.36	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 143B Floor 1	24	2x2 LED Troffers	1	24	0.576	1209.6	$0.00	423.36	Sa/ CLG OS	ECM-L1	24	24	0.576	1209.6	0	423.36	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 143A Floor 1	2	2x4 LED Troffers	1	32	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 143D Floor 1	2	2x4 LED Troffers	1	32	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 143E Floor 1	1	2x4 LED Troffers	1	32	0.032	67.2	$0.00	23.52	Sa/ CLG OS	ECM-L1	1	32	0.032	67.2	0	23.52	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 147 Floor 1	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	282.24	Sa/ CLG OS	ECM-L1	12	32	0.384	806.4	0	282.24	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 148 Floor 1	10	2x4 LED Troffers	1	32	0.32	672	$0.00	235.2	Sa/ CLG OS	ECM-L1	10	32	0.32	672	0	235.2	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 150 Floor 1	5	1x4 LED surface mounted	5	32	0.16	336	$0.00	117.6	Sa/ CLG OS	ECM-L1	5	32	0.16	336	0	117.6	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 152 Floor 1	7	1x4 LED surface mounted	7	32	0.224	470.4	$0.00	164.64	Sa/ CLG OS	ECM-L1	7	32	0.224	470.4	0	164.64	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 151, 153 Floor 1	1	3" LED downlight	1	16	0.016	33.6	$0.00	11.76	Sa/ CLG OS	ECM-L1	1	16	0.016	33.6	0	11.76	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	1	LED industrial linear	1	16	0.016	33.6	$0.00	11.76	Sa/ CLG OS	ECM-L1	1	16	0.016	33.6	0	11.76	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	1x4 LED surface mounted	1	32	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	2	32	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 154,155,156,157,158,159 Floor 1	3	4' LED industrial linear	1	32	0.096	201.6	$0.00	70.56	Sa/ CLG OS	ECM-L1	3	32	0.096	201.6	0	70.56	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	10	1x4 LED linear	1	32	0.32	672	$0.00	235.2	Sa/ CLG OS	ECM-L1	10	32	0.32	672	0	235.2	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	4	4' LED industrial linear	1	32	0.128	268.8	$0.00	94.08	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	0	94.08	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	6	8" diameter LED pendant mounted	1	32	0.192	403.2	$0.00	141.12	Sa/ CLG OS	ECM-L1	6	32	0.192	403.2	0	141.12	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 61A Floor 2	13	2x4 LED Troffers	1	32	0.416	873.6	$0.00	0	Sa	ECM-L1	13	32	0.416	873.6	0	305.76	305.8	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 62A Floor 2	3	2x4 LED Troffers	1	32	0.096	201.6	$0.00	0	Sa	ECM-L1	3	32	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	1	2x2 LED Troffers	1	24	0.024	50.4	$0.00	0	Sa	ECM-L1	1	24	0.024	50.4	0	17.64	17.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 65A and 65B Floor 2	18	2x4 LED Troffers	1	32	0.576	1209.6	$0.00	0	Sa	ECM-L1	18	32	0.576	1209.6	0	423.36	423.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 61 Floor 2	24	Linear Pendant Light 2 fluorescent lamp	2	64	1.536	3225.6	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1612.8	1612.8	564.48	2177.3	$1,728.00	$3,192.00	$0.00	$0.00	$4,920.00
	2	Exit signs	1	6	0.012	25.2	$130.00	0	Sa	N/A	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 62 Floor 2	24	Linear Pendant Light 2 fluorescent lamp	2	64	1.536	3225.6	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1612.8	1612.8	564.48	2177.3	$1,728.00	$3,192.00	$0.00	$0.00	$4,920.00
	2	Exit signs	1	6	0.012	25.2	$130.00	0	Sa	N/A	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 63 Floor 2	18	Linear Pendant Light 2 fluorescent lamp	2	64	1.152	2419.2	$1,170.00	0	Sa	ECM-L1	18	32	0.576	1209.6	1209.6	423.36	1633.0	$1,296.00	$2,394.00	$0.00	$0.00	$3,690.00
	2	Exit signs	1	6	0.012	25.2	$130.00	0	Sa	N/A	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 64 Floor 2	18	Linear Pendant Light 2 fluorescent lamp	2	64	1.152	2419.2	$1,170.00	0	Sa	ECM-L1	18	32	0.576	1209.6	1209.6	423.36	1633.0	$1,296.00	$2,394.00	$0.00	$0.00	$3,690.00
	2	Exit signs	1	6	0.012	25.2	$130.00	0	Sa	N/A	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 65 Floor 2	24	Linear Pendant Light 2 fluorescent lamp	2	64	1.536	3225.6	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1612.8	1612.8	564.48	2177.3	$1,728.00	$3,192.00	$0.00	$0.00	$4,920.00
	2	Exit signs	1	6	0.012	25.2	$130.00	0	Sa	N/A	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 43,43A,43B Floor 1	27	Linear Pendant Light 2 fluorescent lamp	2	64	1.728	3628.8	$1,755.00	0	Sa	ECM-L1	27	32	0.864	1814.4	1814.4	635.04	2449.4	$1,944.00	$3,591.00	$0.00	$0.00	$5,535.00
	4	1x4 fluorescent 2 lamp surface mounted	2	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	32	0.128	268.8	268.8	94.08	362.9	$288.00	$532.00	$0.00	$0.00	$820.00
	13	4' wall mounted fluorscent direct/indirect with pref. bottom	1	32	0.416	873.6	$845.00	0	Sa	ECM-L1	13	16	0.208	436.8	436.8	152.88	589.7	$936.00	$3,250.00	$0.00	$0.00	$4,186.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 42,42A,42B Floor 1	24	Linear Pendant Light 2 fluorescent lamp	2	64	1.536	3225.6	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1612.8	1612.8	564.48	2177.3	$1,728.00	$3,192.00	$0.00	$0.00	$4,920.00
	12	1x4 fluorescent 2 lamp surface mounted	2	64	0.768	1612.8	$780.00	0	Sa	ECM-L1	12	32	0.384	806.4	806.4	282.24	1088.6	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
	9	4' wall mounted fluorscent direct/indirect with pref. bottom	1	32	0.288	604.8	$585.00	0	Sa	ECM-L1	9	16	0.144	302.4	302.4	105.84	408.2	$648.00	$2,250.00	$0.00	$0.00	$2,898.00
	2	exit signs	2	32	0.064	134.4	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 41,41A,41B,41C Floor 1	37	Linear Pendant Light 2 fluorescent lamp	2	64	2.368	4972.8	$2,405.00	0	Sa	ECM-L1	37	32	1.184	2486.4	2486.4	870.24	3356.6	$2,664.00	$4,921.00	$0.00	$0.00	$7,585.00
	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
	9	4' wall mounted fluorscent direct/indirect with pref. bottom	1	32	0.288	604.8	$585.00	0	Sa	ECM-L1	9	16	0.144	302.4	302.4	105.84	408.2	$648.00	$2,250.00	$0.00	$0.00	$2,898.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00

Laguna Beach High School

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data Qty	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps																			
	3	6" diameter recessed downlight LED	1	32	0.096	201.6	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 46,47 Floor 1	4	1x4 fluorescent 2 lamp staggered	2	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	32	0.128	268.8	268.8	94.08	362.9	$288.00	$540.00	$0.00	$0.00	$828.00
Building E || Room 45 Floor 1	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building E || Room 44 Floor 1	5	1x4 fluorescent 2 lamp surface mounted	2	64	0.32	672	$325.00	0	Sa	ECM-L1	5	32	0.16	336	336	117.6	453.6	$360.00	$675.00	$0.00	$0.00	$1,035.00
Building E || Room 57 Floor 2	32	Linear Pendant Light 2 fluorescent lamp	2	64	2.048	4300.8	$2,080.00	0	Sa	ECM-L1	32	32	1.024	2150.4	2150.4	752.64	2903.0	$2,304.00	$4,256.00	$0.00	$0.00	$6,560.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 55A Floor 2	10	Linear Pendant Light 2 fluorescent lamp	2	64	0.64	1344	$650.00	0	Sa	ECM-L1	10	32	0.32	672	672	235.2	907.2	$720.00	$1,330.00	$0.00	$0.00	$2,050.00
Building E || Room 57A Floor 2	1	Linear Pendant Light 2 fluorescent lamp	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$133.00	$0.00	$0.00	$205.00
Building E || Room 59 Floor 2	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building E || Room 55 Floor 2	10	High bay LED with acrylic lens	1	100	1	2100	$0.00	0	Sa	ECM-L1	10	100	1	2100	0	735	735.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 55C Floor 2	10	Linear Pendant Light 2 fluorescent lamp	2	64	0.64	1344	$650.00	0	Sa	ECM-L1	10	32	0.32	672	672	235.2	907.2	$720.00	$1,330.00	$0.00	$0.00	$2,050.00
	10	Halo accent low voltage fixture	1	24	0.24	504	$650.00	0	Sa	ECM-L1	10	24	0.24	504	0	176.4	176.4	$720.00	$1,410.00	$0.00	$0.00	$2,130.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 55C Floor 2	18	Linear Pendant Light 2 fluorescent lamp	2	64	1.152	2419.2	$1,170.00	0	Sa	ECM-L1	18	32	0.576	1209.6	1209.6	423.36	1633.0	$1,296.00	$2,394.00	$0.00	$0.00	$3,690.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
Building E || Room 53,53A,53B,53D Floor 2	16	Linear Pendant Light 2 fluorescent lamp	2	64	1.024	2150.4	$1,040.00	0	Sa	ECM-L1	16	32	0.512	1075.2	1075.2	376.32	1451.5	$1,152.00	$2,128.00	$0.00	$0.00	$3,280.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building E || Room 52,52A Floor 2	16	Linear Pendant Light 2 fluorescent lamp	2	64	1.024	2150.4	$1,040.00	0	Sa	ECM-L1	16	32	0.512	1075.2	1075.2	376.32	1451.5	$1,152.00	$2,128.00	$0.00	$0.00	$3,280.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building E || Room 51,51A Floor 2	16	Linear Pendant Light 2 fluorescent lamp	2	64	1.024	2150.4	$1,040.00	0	Sa	ECM-L1	16	32	0.512	1075.2	1075.2	376.32	1451.5	$1,152.00	$2,128.00	$0.00	$0.00	$3,280.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 180	3	6" diameter recessed downlight LED wet area	1	32	0.096	201.6	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 192,183A	1	2x2 LED Troffers	1	24	0.024	50.4	$65.00	0	Sa	ECM-L1	1	24	0.024	50.4	0	17.64	17.6	$0.00	$0.00	$0.00	$0.00	$0.00
	1	6" diameter recessed downlight LED	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
	18	6" diameter recessed downlight LED	1	32	0.576	1209.6	$0.00	0	Sa	ECM-L1	18	32	0.576	1209.6	0	423.36	423.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 181,183	18	6" diameter recessed downlight LED wet area	1	32	0.576	1209.6	$0.00	0	Sa	ECM-L1	18	32	0.576	1209.6	0	423.36	423.4	$0.00	$0.00	$0.00	$0.00	$0.00
	7	1x4 fluorescent 2 lamp staggered	2	64	0.448	940.8	$455.00	0	Sa	ECM-L1	7	32	0.224	470.4	470.4	164.64	635.0	$504.00	$945.00	$0.00	$0.00	$1,449.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	1	2x2 LED Troffers	1	24	0.024	50.4	$0.00	0	Sa	ECM-L1	1	24	0.024	50.4	0	17.64	17.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 184	1	6" diameter recessed downlight LED	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 192B	1	Screw in LED bulb	1	32	0.032	67.2	$65.00	0	Sa	N/A	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 191	1	6" diameter recessed downlight LED	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
	8	1x4 fluorescent 2 lamp surface mounted	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,080.00	$0.00	$0.00	$1,656.00
Building F || Room 190	16	High bay LED with acrylic lens	1	100	1.6	3360	$0.00	0	Sa	ECM-L1	16	100	1.6	3360	0	1176	1176.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 189	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
Building F || Room 188	1	Screw in LED bulb	1	32	0.032	67.2	$65.00	0	Sa	N/A	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 187	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building F || Room 185	1	Screw in LED bulb	1	32	0.032	67.2	$65.00	0	Sa	N/A	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 70	16	2x4 LED Troffers	1	32	0.512	1075.2	$0.00	0	Sa	ECM-L1	16	32	0.512	1075.2	0	376.32	376.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 71	16	2x4 LED Troffers	1	32	0.512	1075.2	$0.00	0	Sa	ECM-L1	16	32	0.512	1075.2	0	376.32	376.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 72	16	2x4 LED Troffers	1	32	0.512	1075.2	$0.00	0	Sa	ECM-L1	16	32	0.512	1075.2	0	376.32	376.3	$0.00	$0.00	$0.00	$0.00	$0.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 73A	6	2x4 LED Troffers	1	32	0.192	403.2	$0.00	0	Sa	ECM-L1	6	32	0.192	403.2	0	141.12	141.1	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 73**B**	3	2x4 LED Troffers	1	32	0.096	201.6	$0.00	0	Sa	ECM-L1	3	32	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 74	20	2x4 LED Troffers	1	32	0.64	1344	$0.00	0	Sa	ECM-L1	20	32	0.64	1344	0	470.4	470.4	$0.00	$0.00	$0.00	$0.00	$0.00
	1	exit signs	1	6	0.006	12.6	$65.00	0	Sa	ECM-L1	1	4	0.004	8.4	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Room 100	4	6" diameter recessed downlight LED	1	32	0.128	268.8	$0.00	0	Sa	ECM-L1	4	32	0.128	268.8	0	94.08	94.1	$0.00	$0.00	$0.00	$0.00	$0.00
	15	Linear Pendant Light 2 fluorescent lamp	2	64	0.96	2016	$975.00	0	Sa	ECM-L1	15	32	0.48	1008	1008	352.8	1360.8	$1,080.00	$1,995.00	$0.00	$0.00	$3,075.00
Building H || Room 101	4	6" diameter recessed downlight LED	1	32	0.128	268.8	$0.00	0	Sa	ECM-L1	4	32	0.128	268.8	0	94.08	94.1	$0.00	$0.00	$0.00	$0.00	$0.00
	15	Linear Pendant Light 2 fluorescent lamp	2	64	0.96	2016	$975.00	0	Sa	ECM-L1	15	32	0.48	1008	1008	352.8	1360.8	$1,080.00	$1,995.00	$0.00	$0.00	$3,075.00
Building H || Room 102	4	6" diameter recessed downlight LED	1	32	0.128	268.8	$0.00	0	Sa	ECM-L1	4	32	0.128	268.8	0	94.08	94.1	$0.00	$0.00	$0.00	$0.00	$0.00
	15	Linear Pendant Light 2 fluorescent lamp	2	64	0.96	2016	$975.00	0	Sa	ECM-L1	15	32	0.48	1008	1008	352.8	1360.8	$1,080.00	$1,995.00	$0.00	$0.00	$3,075.00
Building G || Room 200 Floor 1	6	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.384	806.4	$390.00	0	Sa	ECM-L1	6	32	0.192	403.2	403.2	141.12	544.3	$432.00	$810.00	$0.00	$0.00	$1,242.00
Building G || Room 201 Floor 1	2	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building G || Room 202 Floor 1	2	2x4 LED Troffers	1	32	0.064	134.4	$0.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 203 Floor 1	2	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building G || Room 204 Floor 1	22	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	1.408	2956.8	$1,430.00	0	Sa	ECM-L1	22	32	0.704	1478.4	1478.4	517.44	1995.8	$1,584.00	$2,970.00	$0.00	$0.00	$4,554.00
	5	1x4 fluorescent 2 lamp surface mounted	2	64	0.32	672	$325.00	0	Sa	ECM-L1	5	32	0.16	336	336	117.6	453.6	$360.00	$675.00	$0.00	$0.00	$1,035.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 206 Floor 1	6	Screw in bulbs non LED	1	64	0.384	806.4	$390.00	0	Sa	ECM-L1	6	32	0.192	403.2	0	141.12	141.1	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 205 Floor 1	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building G || Room 207 Floor 1	2	2x4 LED Troffers	1	32	0.064	134.4	$0.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 208 Floor 1	4	2x4 LED Troffers	1	32	0.128	268.8	$0.00	0	Sa	ECM-L1	4	32	0.128	268.8	0	94.08	94.1	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 209,210 Floor 1	1	1x4 fluorescent 2 lamp staggered	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
	1	6" diameter recessed downlight LED	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
	1	LED Linear	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 211A Floor 1	6	2x4 LED Troffers	1	32	0.192	403.2	$0.00	0	Sa	ECM-L1	6	32	0.192	403.2	0	141.12	141.1	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 212B,212 Floor 1	1	LED Linear	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
	1	1x4 fluorescent 2 lamp staggered	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
	6	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.384	806.4	$390.00	0	Sa	ECM-L1	6	32	0.192	403.2	403.2	141.12	544.3	$432.00	$810.00	$0.00	$0.00	$1,242.00
Building G || Room 213 Floor 1	3	exit signs	1	6	0.018	37.8	$195.00	0	Sa	ECM-L1	3	4	0.012	25.2	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	5	6" diameter recessed downlight LED	1	32	0.16	336	$0.00	0	Sa	ECM-L1	5	32	0.16	336	0	117.6	117.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 214 Floor 1	8	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,080.00	$0.00	$0.00	$1,656.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 213B Floor 1	2	6" diameter recessed downlight LED	1	32	0.064	134.4	$0.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
	1	exit signs	1	6	0.006	12.6	$65.00	0	Sa	ECM-L1	1	4	0.004	8.4	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 215 Floor 1	4	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	32	0.128	268.8	268.8	94.08	362.9	$288.00	$540.00	$0.00	$0.00	$828.00
	1	exit signs	1	6	0.006	12.6	$65.00	0	Sa	ECM-L1	1	4	0.004	8.4	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 215A Floor 1	1	Screw in bulbs non LED	1	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 216 Floor 1	2	2x4 LED Troffers	1	32	0.064	134.4	$0.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 217 Floor 1	2	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
Building G || Room 218 Floor 1	4	1x4 fluorescent 2 lamp staggered	2	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	32	0.128	268.8	268.8	94.08	362.9	$288.00	$540.00	$0.00	$0.00	$828.00
	2	6" diameter recessed downlight LED	1	32	0.064	134.4	$0.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 219 Floor 1	14	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.896	1881.6	$910.00	0	Sa	ECM-L1	14	32	0.448	940.8	940.8	329.28	1270.1	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 220 Floor 2	30	High bay LED with acrylic lens	1	100	3	6300	$0.00	0	Sa	ECM-L1	30	100	3	6300	0	2205	2205.0	$0.00	$0.00	$0.00	$0.00	$0.00
	4	exit signs	1	6	0.024	50.4	$260.00	0	Sa	ECM-L1	4	4	0.016	33.6	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 221 Floor 2	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building G || Room 222 Floor 2	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building G || Room 223 Floor 2	2	Screw in bulbs non LED	1	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room 224 Floor 2	2	Screw in bulbs non LED	1	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || HVAC Storage West Floor 2	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
Building G || HVAC Storage East Floor 2	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
Building K || Kitchen/Cafeteria	24	2x2 LED Troffers	1	24	0.576	1209.6	$0.00	0	Sa	ECM-L1	24	24	0.576	1209.6	0	423.36	423.4	$0.00	$0.00	$0.00	$0.00	$0.00
	1	2x4 LED Troffers	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
	24	1x4 fluorescent 2 lamp surface mounted	2	64	1.536	3225.6	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1612.8	1612.8	564.48	2177.3	$1,728.00	$3,240.00	$0.00	$0.00	$4,968.00
	1	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	67.2	23.52	90.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building K || Mens Restroom Floor 1	10	3" diameter downlight LED	1	16	0.16	336	$0.00	117.6	Sa/ CLG OS	ECM-L1	10	16	0.16	336	0	117.6	0.0	$0.00	$0.00	$0.00	$0.00	$0.00

Laguna Beach High School

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data Qty	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps																			
Building K || Womens Restroom Floor 1	10	3" diameter downlight LED	1	16	0.16	336	$0.00	117.6	Sa/ CLG OS	ECM-L1	10	16	0.16	336	0	117.6	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Staff Restroom 1 Floor 1	4	3" diameter downlight LED	1	16	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	4	16	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Staff Restroom 2 Floor 1	4	3" diameter downlight LED	1	16	0.064	134.4	$0.00	47.04	Sa/ CLG OS	ECM-L1	4	16	0.064	134.4	0	47.04	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Supply Floor 1	1	LED Linear	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Custodian Floor 1	1	LED Linear	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Hallway Floor 1	5	2x2 LED Troffers	1	24	0.12	252	$0.00	88.2	Sa/ CLG OS	ECM-L1	5	24	0.12	252	0	88.2	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Room 182 Floor 1	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Room 81 Floor 1	3	2x2 LED Troffers	1	24	0.072	151.2	$0.00	0	Sa	ECM-L1	3	24	0.072	151.2	0	52.92	52.9	$0.00	$0.00	$0.00	$0.00	$0.00
	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || Room 82 Floor 1	3	2x2 LED Troffers	1	24	0.072	151.2	$0.00	0	Sa	ECM-L1	3	24	0.072	151.2	0	52.92	52.9	$0.00	$0.00	$0.00	$0.00	$0.00
	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || North Building Left Room Floor 2	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	0	Sa	ECM-L1	4	24	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || North Building Right Room Floor 2	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	0	Sa	ECM-L1	4	24	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || West Building North Room Floor 2	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	0	Sa	ECM-L1	4	24	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || West Building South Room Floor 2	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	0	Sa	ECM-L1	4	24	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	12	2x4 LED Troffers	1	32	0.384	806.4	$0.00	0	Sa	ECM-L1	12	32	0.384	806.4	0	282.24	282.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || South Building Right Room Floor 2	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	0	Sa	ECM-L1	4	24	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	11	2x4 LED Troffers	1	32	0.352	739.2	$0.00	0	Sa	ECM-L1	11	32	0.352	739.2	0	258.72	258.7	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || South Building Middle Room Floor 2	4	2x2 LED Troffers	1	24	0.096	201.6	$0.00	0	Sa	ECM-L1	4	24	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	11	2x4 LED Troffers	1	32	0.352	739.2	$0.00	0	Sa	ECM-L1	11	32	0.352	739.2	0	258.72	258.7	$0.00	$0.00	$0.00	$0.00	$0.00
Building K || South Building Left Room Floor 2	6	2x4 LED Troffers	1	32	0.192	403.2	$0.00	0	Sa	ECM-L1	6	32	0.192	403.2	0	141.12	141.1	$0.00	$0.00	$0.00	$0.00	$0.00
Building L || Room 230 Floor 1	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	2	0.004	8.4	260.4	2.94	263.3	$144.00	$270.00	$0.00	$0.00	$414.00
Building L || Room 231 Floor 1	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	2	0.002	4.2	130.2	1.47	131.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building L || Room 232 Floor 1	4	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	32	0.128	268.8	268.8	94.08	362.9	$288.00	$540.00	$0.00	$0.00	$828.00
Building L || Room 234 Floor 1	5	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.32	672	$325.00	0	Sa	ECM-L1	5	32	0.16	336	336	117.6	453.6	$360.00	$675.00	$0.00	$0.00	$1,035.00
	1	6" diameter recessed downlight LED	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building L || Room 235 Floor 1	3	1x4 fluorescent 2 lamp surface mounted damp locations	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$405.00	$0.00	$0.00	$621.00
Building L || Room 236 Floor 1	2	1x4 fluorescent 2 lamp surface mounted	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	2	0.004	8.4	260.4	2.94	263.3	$144.00	$270.00	$0.00	$0.00	$414.00
Building L || Room 237 Floor 1	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	2	0.006	12.6	390.6	4.41	395.0	$216.00	$405.00	$0.00	$0.00	$621.00
Building L || Announcer Stand Floor 2	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	2	0.006	12.6	390.6	4.41	395.0	$216.00	$405.00	$0.00	$0.00	$621.00
Building M || Whole Building	4	2x4 LED Troffers	1	32	0.128	268.8	$0.00	94.08	Sa/ CLG OS	ECM-L1	4	32	0.128	268.8	0	94.08	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building Baseball || Whole Building	8	2x2 LED Troffers	1	24	0.192	403.2	$0.00	0	Sa	ECM-L1	8	24	0.192	403.2	0	141.12	141.1	$0.00	$0.00	$0.00	$0.00	$0.00
	17	1x4 fluorescent 2 lamp surface mounted	2	64	1.088	2284.8	$1,105.00	0	Sa	ECM-L1	17	2	0.034	71.4	2213.4	24.99	2238.4	$1,224.00	$2,295.00	$0.00	$0.00	$3,519.00
Building N || Room 110	12	High bay LED with acrylic lens	1	100	1.2	2520	$0.00	0	Sa	ECM-L1	12	100	1.2	2520	0	882	882.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	exit signs	1	6	0.012	25.2	$130.00	0	Sa	ECM-L1	2	4	0.008	16.8	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building N || Room 111	2	2x4 LED Troffers	1	32	0.064	134.4	$0.00	0	Sa	ECM-L1	2	32	0.064	134.4	0	47.04	47.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building N || Room 112	1	2x4 LED Troffers	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building N || Room 113	3	1x4 fluorescent 2 lamp surface mounted	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	2	0.006	12.6	390.6	4.41	395.0	$216.00	$405.00	$0.00	$0.00	$621.00
Building N || Room 116	2	1x4 fluorescent 2 lamp staggered	2	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	134.4	47.04	181.4	$144.00	$270.00	$0.00	$0.00	$414.00
	4	6" diameter recessed downlight LED	1	32	0.128	268.8	$0.00	0	Sa	ECM-L1	4	32	0.128	268.8	0	94.08	94.1	$0.00	$0.00	$0.00	$0.00	$0.00
	4	2x4 LED Troffers	1	32	0.128	268.8	$0.00	0	Sa	ECM-L1	4	32	0.128	268.8	0	94.08	94.1	$0.00	$0.00	$0.00	$0.00	$0.00
	1	6" diameter recessed downlight LED wet area	1	32	0.032	67.2	$0.00	0	Sa	ECM-L1	1	32	0.032	67.2	0	23.52	23.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building N || Room 115	3	exit signs	1	6	0.018	37.8	$195.00	0	Sa	ECM-L1	3	4	0.012	25.2	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	33	6" diameter recessed downlight LED	1	32	1.056	2217.6	$0.00	0	Sa	ECM-L1	33	32	1.056	2217.6	0	776.16	776.2	$0.00	$0.00	$0.00	$0.00	$0.00
	3	6" diameter recessed downlight LED wet area	1	32	0.096	201.6	$0.00	0	Sa	ECM-L1	3	32	0.096	201.6	0	70.56	70.6	$0.00	$0.00	$0.00	$0.00	$0.00
	10	1x4 fluorescent 2 lamp staggered	2	64	0.64	1344	$650.00	0	Sa	ECM-L1	10	32	0.32	672	672	235.2	907.2	$720.00	$1,350.00	$0.00	$0.00	$2,070.00
	1	1x4 fluorescent 2 lamp surface mounted	2	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	2	0.002	4.2	130.2	1.47	131.7	$72.00	$135.00	$0.00	$0.00	$207.00
Building C || Room 1	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
	8	8" circular light	1	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	24	0.192	403.2	672	141.12	813.1	$576.00	$472.00	$0.00	$0.00	$1,048.00
Building C || Principals Office	3	Linear Pendant Light 2 fluorescent lamp	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	2	32	0.064	134.4	268.8	47.04	315.8	$144.00	$266.00	$0.00	$0.00	$410.00
	4	8" circular light	1	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	16	0.064	134.4	403.2	47.04	450.2	$288.00	$236.00	$0.00	$0.00	$524.00
Building C || Principals Secretary Office	5	Linear Pendant Light 2 fluorescent lamp	2	64	0.32	672	$325.00	0	Sa	ECM-L1	5	32	0.16	336	336	117.6	453.6	$360.00	$665.00	$0.00	$0.00	$1,025.00
	2	8" circular light	1	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	24	0.048	100.8	168	35.28	203.3	$144.00	$118.00	$0.00	$0.00	$262.00
Building C || Attendance Office	7	8" circular light	1	64	0.448	940.8	$455.00	0	Sa	ECM-L1	7	24	0.168	352.8	588	123.48	711.5	$504.00	$413.00	$0.00	$0.00	$917.00
	3	Linear Pendant Light 2 fluorescent lamp	2	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	32	0.096	201.6	201.6	70.56	272.2	$216.00	$399.00	$0.00	$0.00	$615.00
Building C || Typing Room 9	4	8" circular light	1	64	0.256	537.6	$260.00	0	Sa	ECM-L1	4	24	0.096	201.6	336	70.56	406.6	$288.00	$236.00	$0.00	$0.00	$524.00
	10	Linear Pendant Light 2 fluorescent lamp	2	64	0.64	1344	$650.00	0	Sa	ECM-L1	10	32	0.32	672	672	235.2	907.2	$720.00	$1,330.00	$0.00	$0.00	$2,050.00
Building C || Room 10	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Room 11	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Room 2	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Room 3	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Room 4	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Room 5	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Room 14	2	8" circular light	1	64	0.128	268.8	$130.00	0	Sa	ECM-L1	2	24	0.048	100.8	168	35.28	203.3	$144.00	$118.00	$0.00	$0.00	$262.00
	6	Linear Pendant Light 2 fluorescent lamp	2	64	0.384	806.4	$390.00	0	Sa	ECM-L1	6	32	0.192	403.2	403.2	141.12	544.3	$432.00	$798.00	$0.00	$0.00	$1,230.00
Building C || Room 14	1	8" circular light	1	64	0.064	134.4	$65.00	0	Sa	ECM-L1	1	24	0.024	50.4	84	17.64	101.6	$72.00	$59.00	$0.00	$0.00	$131.00
	7	Linear Pendant Light 2 fluorescent lamp	2	64	0.448	940.8	$455.00	0	Sa	ECM-L1	7	32	0.224	470.4	470.4	164.64	635.0	$504.00	$931.00	$0.00	$0.00	$1,435.00
Building C || Room 15	8	Linear Pendant Light 2 fluorescent lamp	2	64	0.512	1075.2	$520.00	0	Sa	ECM-L1	8	32	0.256	537.6	537.6	188.16	725.8	$576.00	$1,064.00	$0.00	$0.00	$1,640.00
Building C || Women's RR	8	3" diameter downlight LED	1	16	0.128	268.8	$0.00	94.08	Sa/ CLG OS	ECM-L1	8	16	0.128	268.8	0	94.08	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Men's RR	8	3" diameter downlight LED	1	16	0.128	268.8	$0.00	94.08	Sa/ CLG OS	ECM-L1	8	16	0.128	268.8	0	94.08	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || North Hallway	13	8" circular light	1	64	0.832	1747.2	$845.00	0	Sa	ECM-L1	13	24	0.312	655.2	1092	229.32	1321.3	$936.00	$767.00	$0.00	$0.00	$1,703.00
Building C || West Hallway	3	8" circular light	1	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	24	0.072	151.2	252	52.92	304.9	$216.00	$177.00	$0.00	$0.00	$393.00
Building C || East Hallway	3	8" circular light	1	64	0.192	403.2	$195.00	0	Sa	ECM-L1	3	24	0.072	151.2	252	52.92	304.9	$216.00	$177.00	$0.00	$0.00	$393.00
Building C || South Hallway	10	8" circular light	1	64	0.64	1344	$650.00	0	Sa	ECM-L1	10	24	0.24	504	840	176.4	1016.4	$720.00	$590.00	$0.00	$0.00	$1,310.00
Building C || Auditorium 1st floor	19	4' industrial strip light	1	43	0.817	894.615	$1,235.00	0	Sa	ECM-L1	19	32	0.608	1276.8	-382.185	446.88	64.7	$1,368.00	$2,565.00	$0.00	$0.00	$3,933.00
	12	Kurt Versen Catwalk Theatre Lights	1	500	6	6570	$780.00	0	Sa	ECM-L1	12	117	1.404	2948.4	3621.6	1031.94	4653.5	$864.00	$2,880.00	$0.00	$0.00	$3,744.00
	2	1'x4' 4lamp T12 fluorescent fixture	4	171	0.342	374.49	$130.00	0	Sa	ECM-L1	2	32	0.064	134.4	240.09	47.04	287.1	$144.00	$270.00	$0.00	$0.00	$414.00
	12	12" diameter downlight fluorescent	2	96	1.152	1261.44	$780.00	0	Sa	ECM-L1	12	24	0.288	604.8	656.64	211.68	868.3	$864.00	$1,344.00	$0.00	$0.00	$2,208.00
	9	9" diameter downlight theatre fluorescent	1	150	1.35	1478.25	$585.00	0	Sa	ECM-L1	9	38	0.342	718.2	760.05	251.37	1011.4	$648.00	$2,025.00	$0.00	$0.00	$2,673.00
	11	Fluorescent theatre exit signs	1	6	0.066	72.27	$715.00	0	Sa	ECM-L1	11	4	0.044	92.4	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Auditorium 2nd floor	8	12" diameter downlight fluorescent	2	96	0.768	840.96	$520.00	0	Sa	ECM-L1	8	24	0.192	403.2	437.76	141.12	578.9	$576.00	$896.00	$0.00	$0.00	$1,472.00
	1	1'x4' 4lamp T12 fluorescent fixture	4	171	0.171	187.245	$65.00	0	Sa	ECM-L1	1	32	0.032	67.2	120.045	23.52	143.6	$72.00	$135.00	$0.00	$0.00	$207.00
Building C || Auditorium 3rd floor	5	4' industrial strip light	1	43	0.215	235.425	$325.00	0	Sa	ECM-L1	5	32	0.16	336	-100.575	117.6	17.0	$360.00	$675.00	$0.00	$0.00	$1,035.00
Building C || Auditorium Basement	13	3" Fluorescent downlight	1	32	0.416	455.52	$845.00	0	Sa	ECM-L1	13	16	0.208	436.8	18.72	152.88	171.6	$936.00	$1,989.00	$0.00	$0.00	$2,925.00
Complete campus motion sensors										ECM-L6	210									$230.00	$72.00	$63,420.00
Complete campus daylight sensors										ECM-l5	60									$161.00	$72.00	$13,980.00
ANNUAL TOTALS	2137				112.98	225894.015	89180	7441.14					67	140,729	84,097	49,055	125,711	$88,776.00	$166,801.00	$391.00	$144.00	$332,977.00

Laguna Beach High School Stadium

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps								Qty											
LBHS Stadium Sports Lighting	8	TLC BT		1500	12	9600	$0.00	0	Sa	ECM-L1	8	575	4.6	3680	5920	1288	7208.0	$0.00	$0.00	$0.00	$0.00	$0.00
	24	TLC HALLOGEN TO LED 1200		1500	36	28800	$0.00	0	Sa	ECM-L1	24	1170	28.08	22464	6336	7862.4	14198.4	$0.00	$0.00	$0.00	$0.00	$0.00
	8	TLC HALLOGEN TO LED 550		1500	12	9600	$0.00	0	Sa	ECM-L1	8	540	4.32	3456	6144	1209.6	7353.6	$0.00	$0.00	$0.00	$0.00	$0.00
	8	TLC HALLOGEN TO LED 900		1500	12	9600	$0.00	0	Sa	ECM-L1	8	880	7.04	5632	3968	1971.2	5939.2	$0.00	$0.00	$0.00	$0.00	$0.00
					0	0	$0.00	0	Sa	ECM-L1			0	0	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Project Cost Totals							2,100															$264,400.00
ANNUAL TOTALS	48				72	57600	2100	0					44	35,232	22,368	12,331	34,699	$0.00	$0.00	$0.00	$0.00	$264,400.00

Laguna Beach High School Theater

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps								Qty											
LBHS Theatre	12	Elation Seven Batten 72	1	420	5.04	1008	$780.00	0	Sa	ECM-L1	12	1000	12	2400	-1392	0	-1392.0	$0.00	$0.00	$0.00	$0.00	$0.00
	36	Color Source Fresnel V	1	750	27	5400	$2,340.00	0	Sa	ECM-L1	36	148	5.328	1065.6	4334.4	0	4334.4	$0.00	$0.00	$0.00	$0.00	$0.00
	8	Elation SIX+PAR S7X 20W	1	0	0	0	$520.00	0	Sa	ECM-L1	8	140	1.12	224	-224	0	-224.0	$0.00	$0.00	$0.00	$0.00	$0.00
	6	Color Source V10	1	750	4.5	900	$390.00	0	Sa	ECM-L1	6	197	1.182	236.4	663.6	0	663.6	$0.00	$0.00	$0.00	$0.00	$0.00
	42	Color Sourve V19	1	750	31.5	6300	$2,730.00	0	Sa	ECM-L1	42	197	8.274	1654.8	4645.2	0	4645.2	$0.00	$0.00	$0.00	$0.00	$0.00
	40	Color Source V26	1	750	30	6000	$2,600.00	0	Sa	ECM-L2	40	197	7.88	1576	4424	0	4424.0	$0.00	$0.00	$0.00	$0.00	$0.00
	58	Color Source V36	1	750	43.5	8700	$3,770.00	0	Sa	ECM-L3	58	197	11.426	2285.2	6414.8	0	6414.8	$0.00	$0.00	$0.00	$0.00	$0.00
	8	Color Sourve V50	1	750	6	1200	$520.00	0	Sa	ECM-L4	8	197	1.576	315.2	884.8	0	884.8	$0.00	$0.00	$0.00	$0.00	$0.00
	16	HyperStar	1	0	0	0	$1,040.00	0	Sa	ECM-L5	16	535	8.56	1712	-1712	0	-1712.0	$0.00	$0.00	$0.00	$0.00	$0.00
	6	LoneStar	1	0	0	0	$390.00	0	Sa	ECM-L6	6	535	3.21	642	-642	0	-642.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	Follow spot	1	2000	4	800	$130.00	0	Sa	ECM-L7	2	500	1	200	600	0	600.0	$0.00	$0.00	$0.00	$0.00	$0.00
Project Cost Totals																						$70,200.00
ANNUAL TOTALS	234				151.54	30308	15210	0					62	12,311	17,997	0	17,997	$0.00	$0.00	$0.00	$0.00	$70,200.00

Thurston Middle School

1,710

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data Qty	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps																			
Building A || Admin	1	Recessed Mounted 1'x4' 2 fluorescent lamp	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	54.72	19.152	73.9	$72.00	$135.00	$0.00	$0.00	$207.00
	20	3" LED Downlight	1	16	0.32	547.2	$0.00	191.52	Sa/ CLG OS	ECM-L1	20	16	0.32	547.2	0	191.52	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	33	2x4 LED Troffers	1	32	1.056	1805.76	$0.00	632.016	Sa/ CLG OS	ECM-L1	33	32	1.056	1805.76	0	632.016	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building A || Electrical Room	2	Surface Mounted 1'x4' Fluorescent 2 lamp	2	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building B || Room B3	13	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.832	1422.72	$845.00	0	Sa	ECM-L1	13	32	0.416	711.36	711.36	248.976	960.3	$936.00	$1,755.00	$0.00	$0.00	$2,691.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B4	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B5	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B6	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$65.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B7	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B8	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B2	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B1	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C8	12	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.768	1313.28	$780.00	0	Sa	ECM-L1	12	32	0.384	656.64	656.64	229.824	886.5	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	1	4' industrial pendant mounted fluorescent 2 lamps	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	16	0.016	27.36	82.08	9.576	91.7	$72.00	$135.00	$0.00	$0.00	$207.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C7	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C6	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C5	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C9	12	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.768	1313.28	$780.00	0	Sa	ECM-L1	12	32	0.384	656.64	656.64	229.824	886.5	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C4	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	1	4' industrial pendant mounted fluorescent 2 lamps	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	16	0.016	27.36	82.08	9.576	91.7	$72.00	$135.00	$0.00	$0.00	$207.00
	2	Surface Mounted 1'x4' Fluorescent 2 lamp	2	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C3	14	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C2	8	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.512	875.52	$520.00	0	Sa	ECM-L1	8	32	0.256	437.76	437.76	153.216	591.0	$576.00	$1,080.00	$0.00	$0.00	$1,656.00
	4	Fluoresecnt 4' Cove Lights	1	32	0.128	218.88	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	109.44	38.304	147.7	$288.00	$408.00	$0.00	$0.00	$696.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C1	11	Linear Pendant 4' Light 2 fluorescent lamp	2	64	0.704	1203.84	$715.00	0	Sa	ECM-L1	11	32	0.352	601.92	601.92	210.672	812.6	$792.00	$1,485.00	$0.00	$0.00	$2,277.00
	3	Fluoresecnt 4' Cove Lights	1	32	0.096	164.16	$195.00	0	Sa	ECM-L1	3	16	0.048	82.08	82.08	28.728	110.8	$216.00	$306.00	$0.00	$0.00	$522.00
	1	4' industrial pendant mounted fluorescent 2 lamps	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	16	0.016	27.36	82.08	9.576	91.7	$72.00	$135.00	$0.00	$0.00	$207.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 1	2	Surface Mounted 1'x4' LED	1	32	0.064	109.44	$130.00	38.304	Sa/ CLG OS	ECM-L1	2	32	0.064	109.44	0	38.304	0.0	$144.00	$270.00	$0.00	$0.00	$414.00
Building D || Room 2	1	Linear recessed 4' LED	1	32	0.032	54.72	$0.00	19.152	Sa/ CLG OS	ECM-L1	1	32	0.032	54.72	0	19.152	0.0	$72.00	$135.00	$0.00	$0.00	$207.00
Building D || Room 3	2	Surface Mounted 1'x4' LED	1	32	0.064	109.44	$130.00	38.304	Sa/ CLG OS	ECM-L1	2	32	0.064	109.44	0	38.304	0.0	$144.00	$270.00	$0.00	$0.00	$414.00
Building D || Room 4	1	Linear recessed 4' LED	1	32	0.032	54.72	$0.00	19.152	Sa/ CLG OS	ECM-L1	1	32	0.032	54.72	0	19.152	0.0	$72.00	$135.00	$0.00	$0.00	$207.00
Building D || Room 5	10	Linear Pendant LED 4'	1	32	0.32	547.2	$650.00	191.52	Sa/ CLG OS	ECM-L1	10	32	0.32	547.2	0	191.52	0.0	$720.00	$1,350.00	$0.00	$0.00	$2,070.00
	8	3" LED DL	1	16	0.128	218.88	$0.00	76.608	Sa/ CLG OS	ECM-L1	8	16	0.128	218.88	0	76.608	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building D || Room 6	8	Linear Pendant LED 4'	1	32	0.256	437.76	$520.00	153.216	Sa/ CLG OS	ECM-L1	8	32	0.256	437.76	0	153.216	0.0	$576.00	$1,080.00	$0.00	$0.00	$1,656.00
	8	3" LED DL	1	16	0.128	218.88	$0.00	76.608	Sa/ CLG OS	ECM-L1	8	16	0.128	218.88	0	76.608	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Room 1	43	Linear Pendant 4' Light 2 fluorescent lamp	2	64	2.752	4705.92	$2,795.00	0	Sa	ECM-L1	43	32	1.376	2352.96	2352.96	823.536	3176.5	$3,096.00	$5,805.00	$0.00	$0.00	$8,901.00
	3	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	0.192	328.32	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	164.16	57.456	221.6	$216.00	$405.00	$0.00	$0.00	$621.00
Building F || Room 101	22	Linear Pendant Light 2 fluorescent lamp	2	64	1.408	2407.68	$1,430.00	0	Sa	ECM-L1	22	32	0.704	1203.84	1203.84	421.344	1625.2	$1,584.00	$2,970.00	$0.00	$0.00	$4,554.00
	26	3" LED DL	1	16	0.416	711.36	$0.00	0	Sa	ECM-L1	26	16	0.416	711.36	0	248.976	249.0	$0.00	$0.00	$0.00	$0.00	$0.00
	1	Linear recessed 4' LED	1	32	0.032	54.72	$0.00	0	Sa	ECM-L1	1	32	0.032	54.72	0	19.152	19.2	$72.00	$135.00	$0.00	$0.00	$207.00
Building F || Room 103	25	Linear Pendant 4' Light 2 fluorescent lamp	2	64	1.6	2736	$1,625.00	0	Sa	ECM-L1	25	32	0.8	1368	1368	478.8	1846.8	$1,800.00	$3,375.00	$0.00	$0.00	$5,175.00
	26	3" LED DL	1	16	0.416	711.36	$0.00	0	Sa	ECM-L1	26	16	0.416	711.36	0	248.976	249.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 106	2	Linear recessed 4' LED	1	32	0.064	109.44	$130.00	38.304	Sa/ CLG OS	ECM-L1	2	32	0.064	109.44	0	38.304	0.0	$144.00	$270.00	$0.00	$0.00	$414.00
	4	2x4 LED Troffers	1	32	0.128	218.88	$0.00	76.608	Sa/ CLG OS	ECM-L1	4	32	0.128	218.88	0	76.608	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	6	2x2 LED Troffers	1	32	0.192	328.32	$390.00	114.912	Sa/ CLG OS	ECM-L1	6	32	0.192	328.32	0	114.912	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	5	3" LED DL	1	16	0.08	136.8	$0.00	47.88	Sa/ CLG OS	ECM-L1	5	16	0.08	136.8	0	47.88	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 108	24	Linear Pendant 4' Light 2 fluorescent lamp	2	64	1.536	2626.56	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	1313.28	459.648	1772.9	$1,728.00	$3,240.00	$0.00	$0.00	$4,968.00
Building F || Room 109	26	Linear Pendant 4' Light 2 fluorescent lamp	2	64	1.664	2845.44	$1,690.00	0	Sa	ECM-L1	26	32	0.832	1422.72	1422.72	497.952	1920.7	$1,872.00	$3,510.00	$0.00	$0.00	$5,382.00
	26	3" LED DL	1	32	0.832	1422.72	$0.00	0	Sa	ECM-L1	26	32	0.832	1422.72	0	497.952	498.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room 110	24	Linear Pendant Light 2 fluorescent lamp	2	64	1.536	2626.56	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	1313.28	459.648	1772.9	$1,728.00	$3,240.00	$0.00	$0.00	$4,968.00
	26	3" LED DL	1	32	0.832	1422.72	$0.00	0	Sa	ECM-L1	26	32	0.832	1422.72	0	497.952	498.0	$0.00	$0.00	$0.00	$0.00	$0.00
	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Womens Locker	5	Linear Pendant Light 2 fluorescent lamp	2	64	0.32	547.2	$325.00	0	Sa	ECM-L1	5	32	0.16	273.6	273.6	95.76	369.4	$360.00	$675.00	$0.00	$0.00	$1,035.00
	15	6" DL Fluorescent	1	32	0.48	820.8	$0.00	0	Sa	ECM-L1	15	16	0.24	410.4	410.4	143.64	554.0	$1,080.00	$2,025.00	$0.00	$0.00	$3,105.00
	12	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	0.768	1313.28	$780.00	0	Sa	ECM-L1	12	32	0.384	656.64	656.64	229.824	886.5	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
Building G || Womens Locker Office	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Locker Meeting Room	4	2x4 LED Troffers	1	32	0.128	218.88	$0.00	0	Sa	ECM-L1	4	32	0.128	218.88	0	76.608	76.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Mens Locker	3	Linear Pendant Light 2 fluorescent lamp	2	64	0.192	328.32	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	164.16	57.456	221.6	$216.00	$405.00	$0.00	$0.00	$621.00
	14	6" DL Fluorescent	1	32	0.448	766.08	$0.00	0	Sa	ECM-L1	14	16	0.224	383.04	383.04	134.064	517.1	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
	2	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building G || Mens Locker Office	4	2x4 LED Troffers	1	32	0.128	218.88	$0.00	0	Sa	ECM-L1	4	32	0.128	218.88	0	76.608	76.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Open Gym	1	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	54.72	19.152	73.9	$72.00	$135.00	$0.00	$0.00	$207.00
	29	HighBay fixture LED	1	150	4.35	7438.5	$1,885.00	0	Sa	ECM-L1	29	150	4.35	7438.5	0	2603.475	2603.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Theater Office 3	8	2x4 LED Troffers	1	32	0.256	437.76	$0.00	0	Sa	ECM-L1	8	32	0.256	437.76	0	153.216	153.2	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Theater Office 2	3	2x4 LED Troffers	1	32	0.096	164.16	$0.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Boys Restroom	3	Surface Mounted 1'x4' Fluorescent 2 lamp	2	64	0.192	328.32	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	164.16	57.456	221.6	$216.00	$405.00	$0.00	$0.00	$621.00
Building H || Girls Restroom	4	Surface Mounted 1'x4' Fluorescent 2 lamp	2	64	0.256	437.76	$260.00	0	Sa	ECM-L1	4	32	0.128	218.88	218.88	76.608	295.5	$288.00	$540.00	$0.00	$0.00	$828.00
Building H || Theater Room	34	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	2.176	3720.96	$2,210.00	0	Sa	ECM-L1	34	32	1.088	1860.48	1860.48	651.168	2511.6	$2,448.00	$4,590.00	$0.00	$0.00	$7,038.00
	6	3" LED DL	1	16	0.096	164.16	$0.00	0	Sa	ECM-L1	6	16	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
	6	2x4 LED Troffers	1	32	0.192	328.32	$0.00	0	Sa	ECM-L1	6	32	0.192	328.32	0	114.912	114.9	$0.00	$0.00	$0.00	$0.00	$0.00

Thurston Middle School

1,710

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps								Qty											
Building H || Music Equipment Room	4	Linear Pendant Light 2 fluorescent lamp	2	64	0.256	437.76	$260.00	0	Sa	ECM-L1	4	32	0.128	218.88	218.88	76.608	295.5	$288.00	$540.00	$0.00	$0.00	$828.00
Building H || Custodian Closet	2	2x4 LED Troffers	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building H || Music Room	40	Linear Pendant Light 2 fluorescent lamp	2	64	2.56	4377.6	$2,600.00	0	Sa	ECM-L1	40	32	1.28	2188.8	2188.8	766.08	2954.9	$2,880.00	$5,400.00	$0.00	$0.00	$8,280.00
	1	2x4 LED Troffers	1	32	0.032	54.72	$0.00	0	Sa	ECM-L1	1	32	0.032	54.72	0	19.152	19.2	$0.00	$0.00	$0.00	$0.00	$0.00
	2	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building I || Kitchen	20	2x4 LED Troffers	1	32	0.64	1094.4	$0.00	0	Sa	ECM-L1	20	32	0.64	1094.4	0	383.04	383.0	$0.00	$0.00	$0.00	$0.00	$0.00
	6	Linear Pendant Light 2 fluorescent lamp	2	64	0.384	656.64	$390.00	0	Sa	ECM-L1	6	32	0.192	328.32	328.32	114.912	443.2	$432.00	$810.00	$0.00	$0.00	$1,242.00
	2	Surface Mounted 1'x4' Fluorescent 2 lamp	2	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
	3	2x2 LED Troffers	1	32	0.096	164.16	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	0	57.456	57.5	$0.00	$0.00	$0.00	$0.00	$0.00
	1	Area Lighting 4'x10' (2' Fluorescent Lamp)	10	320	0.32	547.2	$65.00	0	Sa	ECM-L1	1	100	0.1	171	376.2	59.85	436.1	$72.00	$500.00	$0.00	$0.00	$572.00
Building I || Library	53	Linear Pendant Light 2 fluorescent lamp	2	64	3.392	5800.32	$3,445.00	0	Sa	ECM-L1	53	32	1.696	2900.16	2900.16	1015.056	3915.2	$3,816.00	$7,155.00	$0.00	$0.00	$10,971.00
	6	2x2 LED Troffers	1	32	0.192	328.32	$390.00	0	Sa	ECM-L1	6	32	0.192	328.32	0	114.912	114.9	$0.00	$0.00	$0.00	$0.00	$0.00
	4	2x4 LED Troffers	1	32	0.128	218.88	$0.00	0	Sa	ECM-L1	4	32	0.128	218.88	0	76.608	76.6	$0.00	$0.00	$0.00	$0.00	$0.00
	21	Surface Mounted 1'x4' Fluorescent 2 lamp	1	64	1.344	2298.24	$1,365.00	0	Sa	ECM-L1	21	32	0.672	1149.12	1149.12	402.192	1551.3	$1,512.00	$2,835.00	$0.00	$0.00	$4,347.00
Building I || Computer Classroom	18	Linear Pendant Light 2 fluorescent lamp	2	64	1.152	1969.92	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	984.96	344.736	1329.7	$1,296.00	$2,430.00	$0.00	$0.00	$3,726.00
Complete campus motion sensors										ECM-L1	203									$230.00	$72.00	$61,306.00
Complete campus daylight sensors										ECM-L1	60									$161.00	$72.00	$13,980.00
ANNUAL TOTALS	1069				55.822	95455.62	48230	1714.104					35	59,046	36,409	20,666	55,361	$52,776.00	$97,109.00	$391.00	$144.00	$225,171.00

Top of the World Elementary

1620

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data Qty	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps																			
Building G || Room G4 & G5	16	2'x4' LED Troffer	1	32	0.512	829.44	$0.00	290.304	Sa/ CLG OS	ECM-L1	16	32	0.512	875.52	-46.08	306.432	-30.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building G || Room G3	8	2'x4' LED Troffer	1	32	0.256	414.72	$0.00	145.152	Sa/ CLG OS	ECM-L1	8	32	0.256	437.76	-23.04	153.216	-15.0	$0.00	$0.00	$0.00	$0.00	$0.00
	5	2'x4' Fluorescent Troffer LED lamps	2	48	0.24	388.8	$0.00	136.08	Sa/ CLG OS	ECM-L1	5	32	0.16	273.6	115.2	95.76	74.9	$360.00	$675.00	$0.00	$0.00	$1,035.00
Building G || Room G1 & G2	16	2'x4' LED Troffer	1	32	0.512	829.44	$0.00	290.304	Sa/ CLG OS	ECM-L1	16	32	0.512	875.52	-46.08	306.432	-30.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building F || Room F1	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$2.00	$0.00	$0.00	$146.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F2	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F3	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F4	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F5	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F6	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F7	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room F8	4	6" LED Downlights	1	16	0.064	103.68	$0.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	15	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.72	1166.4	$975.00	0	Sa	ECM-L1	2	32	0.064	109.44	1056.96	38.304	1095.3	$144.00	$204.00	$0.00	$0.00	$348.00
	2	Classroom 6 lamp accent lighting	6	300	0.6	972	$130.00	0	Sa	ECM-L1	2	150	0.3	513	459	179.55	638.6	$144.00	$800.00	$0.00	$0.00	$944.00
Building F || Room Boys RR	6	4' Surface Mounted Fluorescent	2	48	0.288	466.56	$390.00	0	Sa	ECM-L1	1	32	0.032	54.72	411.84	19.152	431.0	$72.00	$135.00	$0.00	$0.00	$207.00
Building F || Room Girls RR	4	4' Surface Mounted Fluorescent	2	48	0.192	311.04	$260.00	0	Sa	ECM-L1	1	32	0.032	54.72	256.32	19.152	275.5	$72.00	$135.00	$0.00	$0.00	$207.00
Building F || Room PE Office	6	4' Surface Mounted Fluorescent	2	48	0.288	466.56	$390.00	0	Sa	ECM-L1	6	32	0.192	328.32	138.24	114.912	253.2	$432.00	$810.00	$0.00	$0.00	$1,242.00
Building F || Room Staff RR, Electrical, Custodian	3	4' Surface Mounted Fluorescent	2	48	0.144	233.28	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	69.12	57.456	126.6	$216.00	$405.00	$0.00	$0.00	$621.00
Building F || Overhang Lighting	29	8" Fluorescent Downlights	1	48	1.392	2255.04	$0.00	0	Sa	ECM-L1	29	32	0.928	1586.88	668.16	555.408	1223.6	$2,088.00	$3,915.00	$0.00	$0.00	$6,003.00
Building C || Room C1	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C2	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C3	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C4	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C5	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C6	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C7	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C8	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room C9	18	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.864	1399.68	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	414.72	344.736	759.5	$1,296.00	$1,836.00	$0.00	$0.00	$3,132.00
Building C || Room C12	18	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.864	1399.68	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	414.72	344.736	759.5	$1,296.00	$1,836.00	$0.00	$0.00	$3,132.00
Building C || Room C11	6	2'x4' LED Troffer	1	32	0.192	311.04	$0.00	0	Sa	ECM-L1	6	32	0.192	328.32	-17.28	114.912	97.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room C10	6	2'x4' LED Troffer	1	32	0.192	311.04	$0.00	0	Sa	ECM-L1	6	32	0.192	328.32	-17.28	114.912	97.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Center Building	28	2'x4' Fluorescent Troffer LED lamps	2	48	1.344	2177.28	$1,820.00	0	Sa	ECM-L1	28	32	0.896	1532.16	645.12	536.256	1181.4	$2,016.00	$2,856.00	$0.00	$0.00	$4,872.00
Building C || Room E1	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E2	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E3	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E4	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E5	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E6	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E7	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E8	14	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.672	1088.64	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	322.56	268.128	590.7	$1,008.00	$1,428.00	$0.00	$0.00	$2,436.00
	3	6" LED Downlights	1	16	0.048	77.76	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	-4.32	28.728	24.4	$216.00	$405.00	$0.00	$0.00	$621.00
Building C || Room E10	18	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.864	1399.68	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	414.72	344.736	759.5	$1,296.00	$1,836.00	$0.00	$0.00	$3,132.00
Building C || Room E9	18	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.864	1399.68	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	414.72	344.736	759.5	$1,296.00	$1,836.00	$0.00	$0.00	$3,132.00
Building C || Room E11	6	2'x4' LED Troffer	1	32	0.192	311.04	$0.00	0	Sa	ECM-L1	6	32	0.192	328.32	-17.28	114.912	97.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Room E12	6	2'x4' LED Troffer	1	32	0.192	311.04	$0.00	0	Sa	ECM-L1	6	32	0.192	328.32	-17.28	114.912	97.6	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Room B1	1	4' Surface Mounted Fluorescent	2	48	0.048	77.76	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	23.04	19.152	42.2	$72.00	$135.00	$0.00	$0.00	$207.00
	22	4' Direct/Indirect Pendant Fluorescent fixture	2	48	1.056	1710.72	$1,430.00	0	Sa	ECM-L1	22	32	0.704	1203.84	506.88	421.344	928.2	$1,584.00	$2,244.00	$0.00	$0.00	$3,828.00
Building B || Room B2	22	4' Direct/Indirect Pendant Fluorescent fixture	2	48	1.056	1710.72	$1,430.00	0	Sa	ECM-L1	22	32	0.704	1203.84	506.88	421.344	928.2	$1,584.00	$2,244.00	$0.00	$0.00	$3,828.00
Building B || Room B3	18	4' Direct/Indirect Pendant Fluorescent fixture	2	48	0.864	1399.68	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	414.72	344.736	759.5	$1,296.00	$1,836.00	$0.00	$0.00	$3,132.00
Building B || Room B3	11	2'x4' Fluorescent Troffer LED lamps	2	48	0.528	855.36	$715.00	0	Sa	ECM-L1	11	32	0.352	601.92	253.44	210.672	464.1	$792.00	$1,122.00	$0.00	$0.00	$1,914.00
Building B || Restrooms	4	4' Surface Mounted Fluorescent	2	64	0.256	414.72	$260.00	0	Sa	ECM-L1	4	32	0.128	218.88	195.84	76.608	272.4	$288.00	$540.00	$0.00	$0.00	$828.00
Building B || Custodian	1	4' industrial pendant mounted fluorescent 2 lamps	2	64	0.064	103.68	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	48.96	19.152	68.1	$72.00	$135.00	$0.00	$0.00	$207.00
Building A || North building	53	1'x4' Recessed 2 lamp Troffer	2	64	3.392	5495.04	$0.00	0	Sa	ECM-L1	53	32	1.696	2900.16	2594.88	1015.056	3609.9	$0.00	$0.00	$0.00	$0.00	$0.00
	7	6" LED Downlights	1	16	0.112	181.44	$455.00	0	Sa	ECM-L1	7	16	0.112	191.52	-10.08	67.032	57.0	$504.00	$945.00	$0.00	$0.00	$1,449.00
	16	2'x4' Fluorescent Troffer LED lamps	2	48	0.768	1244.16	$1,040.00	0	Sa	ECM-L1	16	32	0.512	875.52	368.64	306.432	675.1	$1,152.00	$1,632.00	$0.00	$0.00	$2,784.00
Building A || South Building	29	2'x4' Fluorescent Troffer LED lamps	2	48	1.392	2255.04	$1,885.00	0	Sa	ECM-L1	21	32	0.672	1149.12	1105.92	402.192	1508.1	$1,512.00	$2,142.00	$0.00	$0.00	$3,654.00
	25	4' Surface Mounted Fluorescent	2	64	1.6	2592	$1,625.00	0	Sa	ECM-L1	7	32	0.224	383.04	2208.96	134.064	2343.0	$504.00	$945.00	$0.00	$0.00	$1,449.00
	1	2x2 LED Troffers	1	32	0.032	51.84	$0.00	0	Sa	ECM-L1	1	32	0.032	54.72	-2.88	19.152	16.3	$72.00	$135.00	$0.00	$0.00	$207.00
	10	6" Theatre LED Stage Light	1	16	0.16	259.2	$650.00	0	Sa	ECM-L1	10	16	0.16	273.6	-14.4	95.76	81.4	$720.00	$1,350.00	$0.00	$0.00	$2,070.00
	33	4" LED Downlights	1	16	0.528	855.36	$0.00	0	Sa	ECM-L1	24	16	0.384	656.64	198.72	229.824	428.5	$0.00	$0.00	$0.00	$0.00	$0.00
	4	6" LED Downlights	1	16	0.064	103.68	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	-5.76	38.304	32.5	$288.00	$540.00	$0.00	$0.00	$828.00
	98	1'x4' Recessed 2 lamp Troffer	2	48	4.704	7620.48	$0.00	0	Sa	ECM-L1	98	32	3.136	5362.56	2257.92	1876.896	4134.8	$7,056.00	$12,936.00	$0.00	$0.00	$19,992.00
	4	LED Wet Listed Mech Room Lights	1	48	0.192	311.04	$0.00	0	Sa	ECM-L1	4	48	0.192	328.32	-17.28	114.912	97.6	$288.00	$528.00	$0.00	$0.00	$816.00
Complete campus motion sensors										ECM-L1	70							5040		$230.00	$72.00	$21,140.00
Complete campus daylight sensors										ECM-L1	35							2520		$161.00	$72.00	$8,155.00
ANNUAL TOTALS	1016				48.8	79056	42185	861.84					28	47,470	31,586	16,614	47,339	$59,976.00	$87,162.00	$391.00	$144.00	$168,873.00

El Morro Elementary

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps								Qty											
Building A || Room Electrical & Storage	4	Surface mounted Linear 4' LED	1	16	0.064	109.44	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building A || Room Kindergarten 1	4	2'x4' LED Troffer	1	32	0.128	218.88	$0.00	0	Sa	ECM-L1	4	32	0.128	218.88	0	76.608	76.6	$0.00	$0.00	$0.00	$0.00	$0.00
	19	Pendant 4' 3 Lamp Fluorescent	3	96	1.824	3119.04	$1,235.00	0	Sa	ECM-L1	19	32	0.608	1039.68	2079.36	363.888	2443.2	$1,368.00	$2,850.00	$0.00	$0.00	$4,218.00
	3	Wet Listed 2'x2' 2 Fluorescent lamp fixture	2	64	0.192	328.32	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	164.16	57.456	221.6	$216.00	$609.00	$0.00	$0.00	$825.00
	3	3" Diameter Downlights LED	1	16	0.048	82.08	$0.00	0	Sa	ECM-L1	3	16	0.048	82.08	0	28.728	28.7	$0.00	$0.00	$0.00	$0.00	$0.00
	2	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building A || Room Kindergarten 2	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
	1	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	54.72	19.152	73.9	$72.00	$135.00	$0.00	$0.00	$207.00
Building A || Room Kindergarten 3	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building A || Room Kindergarten 4	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room 1	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room 2	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room 3	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room 4	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room 5	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room 6	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building B || Room Electrical & Storage	4	Surface mounted Linear 4' LED	1	16	0.064	109.44	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building B || Boys RR, Girls RR, and Jan	12	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.768	1313.28	$780.00	0	Sa	ECM-L1	12	32	0.384	656.64	656.64	229.824	886.5	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
Building C || Room 1	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building C || Room 2	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building C || Room 3	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building C || Room 4	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building C || Room 5	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building C || Room 6	15	Pendant 4' 3 Lamp Fluorescent	3	96	1.44	2462.4	$975.00	0	Sa	ECM-L1	15	32	0.48	820.8	1641.6	287.28	1928.9	$0.00	$2,250.00	$0.00	$0.00	$2,250.00
Building C || Room Electrical & Storage	4	Surface mounted Linear 4' LED	1	16	0.064	109.44	$260.00	0	Sa	ECM-L1	4	16	0.064	109.44	0	38.304	38.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building C || Boys RR, Girls RR, and Jan	12	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.768	1313.28	$780.00	0	Sa	ECM-L1	12	32	0.384	656.64	656.64	229.824	886.5	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
Building J || Floor 1 Room 41	16	2'x4' LED Troffer	1	32	0.512	875.52	$0.00	0	Sa	ECM-L1	16	32	0.512	875.52	0	306.432	306.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building J || Floor 1 Room 42	16	2'x4' LED Troffer	1	32	0.512	875.52	$0.00	0	Sa	ECM-L1	16	32	0.512	875.52	0	306.432	306.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building J || Floor 1 Room 43	16	2'x4' LED Troffer	1	32	0.512	875.52	$0.00	0	Sa	ECM-L1	16	32	0.512	875.52	0	306.432	306.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building J || Floor 1 Room 44	16	2'x4' LED Troffer	1	32	0.512	875.52	$0.00	0	Sa	ECM-L1	16	32	0.512	875.52	0	306.432	306.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building J || Floor 1 Room 45	16	2'x4' LED Troffer	1	32	0.512	875.52	$0.00	0	Sa	ECM-L1	16	32	0.512	875.52	0	306.432	306.4	$0.00	$0.00	$0.00	$0.00	$0.00
Building J || Floor 1 Room 45 Storage	2	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building J || Floor 1 Room Staff Work Room	1	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	54.72	19.152	73.9	$72.00	$135.00	$0.00	$0.00	$207.00
	2	Surface mounted Linear 4' LED	1	16	0.032	54.72	$130.00	0	Sa	ECM-L1	2	16	0.032	54.72	0	19.152	19.2	$0.00	$0.00	$0.00	$0.00	$0.00
	5	2'x4' LED Troffer	1	32	0.16	273.6	$0.00	0	Sa	ECM-L1	5	32	0.16	273.6	0	95.76	95.8	$0.00	$0.00	$0.00	$0.00	$0.00
Building J || Floor 2 Room 46	24	Pendant 4' 3 Lamp Fluorescent	3	96	2.304	3939.84	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	2626.56	459.648	3086.2	$1,728.00	$3,600.00	$0.00	$0.00	$5,328.00
Building J || Floor 2 Room Staff Work Room	7	2'x4' LED Troffer	1	32	0.224	383.04	$0.00	0	Sa	ECM-L1	7	32	0.224	383.04	0	134.064	134.1	$0.00	$0.00	$0.00	$0.00	$0.00
	1	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.064	109.44	$65.00	0	Sa	ECM-L1	1	32	0.032	54.72	54.72	19.152	73.9	$72.00	$135.00	$0.00	$0.00	$207.00
Building J || Floor 2 Room 47	24	Pendant 4' 3 Lamp Fluorescent	3	96	2.304	3939.84	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	2626.56	459.648	3086.2	$1,728.00	$3,600.00	$0.00	$0.00	$5,328.00
Building J || Floor 2 Room 48	24	Pendant 4' 3 Lamp Fluorescent	3	96	2.304	3939.84	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	2626.56	459.648	3086.2	$1,728.00	$3,600.00	$0.00	$0.00	$5,328.00
Building J || Floor 2 Room 49	24	Pendant 4' 3 Lamp Fluorescent	3	96	2.304	3939.84	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	2626.56	459.648	3086.2	$1,728.00	$3,600.00	$0.00	$0.00	$5,328.00
Building J || Floor 2 Room 50	24	Pendant 4' 3 Lamp Fluorescent	3	96	2.304	3939.84	$1,560.00	0	Sa	ECM-L1	24	32	0.768	1313.28	2626.56	459.648	3086.2	$1,728.00	$3,600.00	$0.00	$0.00	$5,328.00
Building J || Floor 1 Boys RR & Girls RR	14	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.896	1532.16	$910.00	0	Sa	ECM-L1	14	32	0.448	766.08	766.08	268.128	1034.2	$1,008.00	$1,890.00	$0.00	$0.00	$2,898.00
Building E || Room 51	18	Pendant 4' 3 Lamp Fluorescent	3	96	1.728	2954.88	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	1969.92	344.736	2314.7	$0.00	$2,700.00	$0.00	$0.00	$2,700.00
Building E || Room 52	18	Pendant 4' 3 Lamp Fluorescent	3	96	1.728	2954.88	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	1969.92	344.736	2314.7	$1,296.00	$2,700.00	$0.00	$0.00	$3,996.00
Building E || Room 53	18	Pendant 4' 3 Lamp Fluorescent	3	96	1.728	2954.88	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	1969.92	344.736	2314.7	$1,296.00	$2,700.00	$0.00	$0.00	$3,996.00
Building E || Room 54	18	Pendant 4' 3 Lamp Fluorescent	3	96	1.728	2954.88	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	1969.92	344.736	2314.7	$1,296.00	$2,700.00	$0.00	$0.00	$3,996.00
Building E || Room 55	12	2'x4' LED Troffer	1	32	0.384	656.64	$0.00	0	Sa	ECM-L1	12	32	0.384	656.64	0	229.824	229.8	$0.00	$0.00	$0.00	$0.00	$0.00
Building E || Boys RR, Girls RR, & Storage	10	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.64	1094.4	$650.00	0	Sa	ECM-L1	10	32	0.32	547.2	547.2	191.52	738.7	$720.00	$1,350.00	$0.00	$0.00	$2,070.00
Building MPR || Room 102	3	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.192	328.32	$195.00	0	Sa	ECM-L1	3	32	0.096	164.16	164.16	57.456	221.6	$216.00	$405.00	$0.00	$0.00	$621.00
Building MPR || Room 108	10	2'x4' LED Troffer	1	32	0.32	547.2	$0.00	0	Sa	ECM-L1	10	32	0.32	547.2	0	191.52	191.5	$0.00	$0.00	$0.00	$0.00	$0.00
Building MPR || Room 100	6	High Bay LED Light fixtures	1	150	0.9	1539	$0.00	0	Sa	ECM-L1	6	150	0.9	1539	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Building MPR || Room 101	4	LED Wall Sconces	1	32	0.128	218.88	$0.00	0	Sa	ECM-L1	4	32	0.128	218.88	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
	4	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.256	437.76	$260.00	0	Sa	ECM-L1	4	32	0.128	218.88	218.88	76.608	295.5	$288.00	$540.00	$0.00	$0.00	$828.00
Building MPR || Room 104 RR's	2	Surface mounted 1'x4' fluorescent 2 lamp	2	64	0.128	218.88	$130.00	0	Sa	ECM-L1	2	32	0.064	109.44	109.44	38.304	147.7	$144.00	$270.00	$0.00	$0.00	$414.00
Building MPR || Room 108	5	2'x4' LED Troffer	1	32	0.16	273.6	$0.00	0	Sa	ECM-L1	5	32	0.16	273.6	0	95.76	95.8	$0.00	$0.00	$0.00	$0.00	$0.00
	19	Surface mounted 1'x4' fluorescent 2 lamp	2	64	1.216	2079.36	$1,235.00	0	Sa	ECM-L1	19	32	0.608	1039.68	1039.68	363.888	1403.6	$1,368.00	$2,565.00	$0.00	$0.00	$3,933.00
Building H || All Rooms	21	2'x4' LED Troffer	1	32	0.672	1149.12	$0.00	0	Sa	ECM-L1	21	32	0.672	1149.12	0	402.192	402.2	$0.00	$0.00	$0.00	$0.00	$0.00
	9	3" Diameter Downlights LED	1	16	0.144	246.24	$0.00	0	Sa	ECM-L1	9	16	0.144	246.24	0	86.184	86.2	$0.00	$0.00	$0.00	$0.00	$0.00
	40	Pendant 4' 3 Lamp Fluorescent	3	96	3.84	6566.4	$2,600.00	0	Sa	ECM-L1	40	32	1.28	2188.8	4377.6	766.08	5143.7	$2,880.00	$6,000.00	$0.00	$0.00	$8,880.00
	1	Industrial 4' linear strip light	1	32	0.032	54.72	$0.00	0	Sa	ECM-L1	1	32	0.032	54.72	0	19.152	19.2	$72.00	$135.00	$0.00	$0.00	$207.00
Building Admin || All Rooms	18	Surface mounted 1'x4' fluorescent 2 lamp	2	64	1.152	1969.92	$1,170.00	0	Sa	ECM-L1	18	32	0.576	984.96	984.96	344.736	1329.7	$1,296.00	$2,430.00	$0.00	$0.00	$3,726.00
	20	2'x4' LED Troffer	1	32	0.64	1094.4	$0.00	0	Sa	ECM-L1	20	32	0.64	1094.4	0	383.04	383.0	$0.00	$0.00	$0.00	$0.00	$0.00
	61	Pendant 4' 3 Lamp Fluorescent	3	96	5.856	10013.76	$3,965.00	0	Sa	ECM-L1	61	32	1.952	3337.92	6675.84	1168.272	7844.1	$4,392.00	$9,150.00	$0.00	$0.00	$13,542.00
	50	3" Diameter Downlights LED	1	16	0.8	1368	$0.00	0	Sa	ECM-L1	50	16	0.8	1368	0	478.8	478.8	$0.00	$0.00	$0.00	$0.00	$0.00
	2	Industrial 4' linear strip light	1	32	0.064	109.44	$0.00	0	Sa	ECM-L1	2	32	0.064	109.44	0	38.304	38.3	$144.00	$270.00	$0.00	$0.00	$414.00
Building Admin || Exterior stair sconces	9	LED Wall Sconces	1	32	0.288	492.48	$0.00	0	Sa	ECM-L1	9	32	0.288	492.48	0	0	0.0	$0.00	$0.00	$0.00	$0.00	$0.00
Complete campus motion sensors										ECM-L1	60									$230.00	$72.00	$18,120.00
Complete campus daylight sensors										ECM-L1	15									$161.00	$72.00	$3,495.00
ANNUAL TOTALS	903				66.084	113003.64	42575	0					28	48,543	64,460	16,203	80,663	$28,872.00	$95,199.00	$391.00	$144.00	$145,686.00

Warehouse

Area Designation	Existing Fixture / Lamp Data									Proposed Measure	Proposed Fixture / Lamp Data / Control				Savings		Total Saving kwh/Yr	Cost				
	Fixture Data			Fixture Watts	Total kW	Total kwh/YR	Maintenance Cost	Savings Controls	Control Type		Fixture Data	Fixture Watts	Total kW	Total kwh/YR	Fixture	Controls		Fixture Labor	Fixture*	Controls*	Controls Labor	Total
	Qty	Description	No. of Lamps								Qty											
Building Warehouse || Bus Docking Station	12	Surface Mounted 1'x4' 2 Lamp Fluorescent T8	2	64	0.768	1305.6	$780.00	0	Sa	ECM-L1	12	32	0.384	652.8	652.8	228.48	881.3	$864.00	$1,620.00	$0.00	$0.00	$2,484.00
Building Warehouse || Warehouse Storage	46	Surface Mounted 1'x4' 2 Lamp Fluorescent T8	2	64	2.944	5004.8	$2,990.00	0	Sa	ECM-L1	46	32	1.472	2502.4	2502.4	875.84	3378.2	$3,312.00	$6,210.00	$0.00	$0.00	$9,522.00
	8	Surface Mounted 1'x4' 4 Lamp Fluorescent T12	4	192	1.536	2611.2	$520.00	0	Sa	ECM-L1	8	32	0.256	435.2	2176	152.32	2328.3	$576.00	$1,080.00	$0.00	$0.00	$1,656.00
Building Warehouse || Bus Driver Units	8	Surface Mounted 1'x4' 2 Lamp Fluorescent T12	2	96	0.768	1305.6	$520.00	0	Sa	ECM-L1	8	32	0.256	435.2	870.4	152.32	1022.7	$576.00	$1,080.00	$0.00	$0.00	$1,656.00
	1	Surface Mounted 1'x4' 2 Lamp Fluorescent T8	2	64	0.064	108.8	$0.00	0	Sa	ECM-L1	1	32	0.032	54.4	54.4	19.04	73.4	$72.00	$135.00	$0.00	$0.00	$207.00
	4	Pendant Mounted 4' Linear 2 Lamp T8	2	64	0.256	435.2	$260.00	0	Sa	ECM-L1	4	32	0.128	217.6	217.6	76.16	293.8	$288.00	$540.00	$0.00	$0.00	$828.00
	1	4' LED Strip Light	1	16	0.016	27.2	$65.00	0	Sa	ECM-L1	1	16	0.016	27.2	0	9.52	9.5	$0.00	$0.00	$0.00	$0.00	$0.00
	5	3" LED Downlight	1	16	0.08	136	$325.00	0	Sa	ECM-L1	1	16	0.016	27.2	108.8	9.52	118.3	$0.00	$0.00	$0.00	$0.00	$0.00
Building Warehouse || Mechanic Office	5	Surface Mounted 4' Linear 1 Lamp Fluorescent T8	1	32	0.16	272	$325.00	0	Sa	ECM-L1	1	16	0.016	27.2	244.8	9.52	254.3	$72.00	$135.00	$0.00	$0.00	$207.00
	2	Surface Mounted 1'x4' 2 Lamp Fluorescent T8	2	64	0.128	217.6	$130.00	0	Sa	ECM-L1	2	32	0.064	108.8	108.8	38.08	146.9	$144.00	$270.00	$0.00	$0.00	$414.00
	3	Pendant Mounted 4' Linear 2 Lamp T8	2	64	0.192	326.4	$195.00	0	Sa	ECM-L1	2	32	0.064	108.8	217.6	38.08	255.7	$144.00	$270.00	$0.00	$0.00	$414.00
	2	4' LED Lienar	1	16	0.032	54.4	$130.00	0	Sa	ECM-L1	1	16	0.016	27.2	27.2	9.52	36.7	$0.00	$0.00	$0.00	$0.00	$0.00
Building Warehouse || Second Floor	4	Surface Mounted 1'x4' 4 Lamp Fluorescent T12	4	192	0.768	1305.6	$260.00	0	Sa	ECM-L1	4	32	0.128	217.6	1088	76.16	1164.2	$288.00	$540.00	$0.00	$0.00	$828.00
	1	Surface Mounted 1'x4' 2 Lamp Fluorescent T8	2	64	0.064	108.8	$65.00	0	Sa	ECM-L1	1	32	0.032	54.4	54.4	19.04	73.4	$72.00	$135.00	$0.00	$0.00	$207.00
	1	3" Fluorescent Downlight	1	32	0.032	54.4	$65.00	0	Sa	ECM-L1	1	16	0.016	27.2	27.2	9.52	36.7	$72.00	$203.00	$0.00	$0.00	$275.00
Complete campus motion sensors										ECM-L1	12									$230.00	$72.00	$3,624.00
Complete campus daylight sensors										ECM-L1	0									$161.00	$72.00	$0.00
ANNUAL TOTALS	103				7.808	13273.6	6630	0					3	4,923	8,350	1,723	10,074	$6,480.00	$12,218.00	$391.00	$144.00	$22,322.00

APPENDIX B – HVAC INVENTORY

Building	Unit Tag	Type	Install Year	Age	Life Expectancy	Replacement Year	Model Number	Serial Number
B	CU-1	Split System Heat Pump	2007	17	15	2022	Carrier 24ANB48A0031030	4917E06402
A	CU	Split System Heat pump	2016	8	15	2031	Goodman VSX140481AB	1603090128
C	CU	Split System Heat pump	2016	8	15	2031	Fujitsu AOU9RQ	BNN002838
C	CU	Split System Heat pump	2016	8	15	2031	Fujitsu AOU24RLX	CTN009399
C	CU	Split System Heat pump	2016	8	15	2031	Fujitsu AOU24RLX	CTN000458
A	CU	Split System Heat pump	2017	7	15	2032	Friedrich MRM09Y1J	-
A	FC	Split System Heat pump	2017	7	15	2032	Friedrich -	-
A	CU	Split System Cooling only	2017	7	15	2032	Goodman GSX140601KD	1705339752
B	CU-2	Split System Cooling Only	2017	7	15	2032	-	-
C	CU-AC-1	Split System Heat pump	2018	6	15	2033	Mitsubishi PUZ-A36NKA7	PUZ-A36NKA7
C	CU-AC-2	Split System Heat pump	2018	6	15	2033	Mitsubishi PUZ-A36NKA7	PUZ-A36NKA7
C	CU-AC-3	Split System Heat pump	2018	6	15	2033	Mitsubishi PUZ-A36NKA7	PUZ-A36NKA7
C	CU-AC-4	Split System Heat pump	2018	6	15	2033	Mitsubishi PUZ-A36NKA7	PUZ-A36NKA7
C	AC-1	Split System Heat pump	2018	6	15	2033	Mitsubishi PKA-A36KA7	-
C	AC-2	Split System Heat pump	2018	6	15	2033	Mitsubishi PKA-A36KA7	-
C	AC-3	Split System Heat pump	2018	6	15	2033	Mitsubishi PKA-A36KA7	-
C	AC-4	Split System Heat pump	2018	6	15	2033	Mitsubishi PKA-A36KA7	-
C	FC	Split System (Cassette)	-	-	15	-	Fujitsu	-
C	FC	Split System (Cassette)	-	-	15	-	Fujitsu	-
B	FAU-1	-	-	-	15	-	-	-
B	FAU-2	-	-	-	15	-	-	-
-	DWH	Gas Water Heater	-	-	15	-	-	-

Laguna Beach Highschool Equipment Matrix

Building	Unit Tag	Type	Install Year	Age	Life Expectancy	Replacement Year	Model Number	Serial Number
A	AC-1	PACKAGED HEAT PUMP	2006	18	15	2021	CARRIER 50SZ-048---301--	2406G31474
A	AC-2	PACKAGED HEAT PUMP	2008	16	15	2023	CARRIER 50SZ-048---301--	2108G42461
A	CU-3X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	FUJITSU A0U12RQ	BPN009632
A	CU-4X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	FUJITSU A0U12RQ	BPN005317
A	CU-5X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	FUJITSU A0U12RL2	EYN010881
A	CU-6X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	FUJITSU A0U12RQ	BPN004628
A	FC-3X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	FUJITSU ASU12RQ	-
B	AC-B1	RTU GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48GCLM05A2A5A0A3A0	1421C89625
B	AC-B2	RTU GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48GCLM05A2A5A0A3A0	1421C89622
B	AC-B3	RTU GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48GCLM05A2A5A0A3A0	1421C89627
B	AC-B4	RTU GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48GCLM05A2A5A0A3A0	1421C8531
B	AC-B5	RTU GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48GCLM05A2A5A0A3A0	1421C89617
B	FAU-B1	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B2	SPLIT SYSTEM GAS ELECTRIC	2022	2	15	2037	-	-
B	FAU-B3	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B4	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B5	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B6	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B7	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B8	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B9	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	FAU-B10	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	-	-
B	CU-B1	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	4521E20828
B	CU-B2	SPLIT SYSTEM GAS ELECTRIC	2022	2	15	2037	CARRIER 24AAA54830011	0222E01384
B	CU-B3	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	4521E20847
B	CU-B4	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	4521E20791
B	CU-B5	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA560A300	0222E01369
B	CU-B6	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	421E20850
B	CU-B7	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	421E20786
B	CU-B8	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	421R20849
B	CU-B9	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	421E20816
B	CU-B10	SPLIT SYSTEM GAS ELECTRIC	2021	3	15	2036	CARRIER 24AAA54830011	421E20785
C	AHU-1	GAS/ELECTRIC UNIT	2018	6	15	2033	ALLIANCE 3SV-23-AS-PF-MB-FF-DX-PF-AS-GS	-
C	UH-1	GAS FURNACE	2003	21	15	2018	REZNOR F75	-
C	CU-7X	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	TRANE TTA18043CAA00AE000000-	18283151TA
C	CU-8X	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	TRANE TTA18043CAA00AE000000-	18272159TA
C	CU-1	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	MITSUBISHI PUZ-A30NHA7	6XU00126A
C	CU-2	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	MITSUBISHI PUZ-A30NHA7	6XU00125A
C	CU-3	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	MITSUBISHI PUZ-A24NHA7	6XU00266A
C	CU-4	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	MITSUBISHI PUZ-A24NHA7	6XU00201A
C	CU-5	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	MITSUBISHI PUZ-A24NHA7	6XU00125A
C	CU-6	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	MITSUBISHI PUZ-A24NHA7	6XU00266A
D	AC-1	PACKAGED GAS-ELECTRIC	2013	11	15	2028	BRYANT 580JP16D240A2A0AAA	1613P00875
D	AC-2	PACKAGED GAS-ELECTRIC	2016	8	15	2031	YORK PCG4B480652X1	W1 B6382740
D	CU-1X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK YXT36B21SA	W2C0690289
D	CU-2X	SPLIT GAS/ELECTRIC	2019	5	15	2034	YORK YXT36B21SA	W1N9492745
D	CU-3X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK YXT48B21SA	W2C0692770
D	CU-4X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK YXT48B21SA	W2B0600289
D	CU-5X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK YXT60B21SA	W2A05420688
D	CU-6X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK YXT48B21SA	W2AC692766

D	CU-7X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK YXT48B21SA	W2N0600295
D	CU-8X	SPLIT SYSTEM HEAT PUMP	2020	4	15	2035	LENNOX MPB024S4S-1P	S6920H06059
D	CU-9X	SPLIT SYSTEM HEAT PUMP	2020	4	15	2035	LENNOX MPB024S4S-1P	S6920H06058
D	CU-10X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	-	-
D	CU-11X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	-	-
D	FAU-D1X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK CV360B6	-
D	FAU-D2X	SPLIT GAS/ELECTRIC	2019	5	15	2034	YORK CV360B6	-
D	FAU-D3X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK CV480C6	-
D	FAU-D4X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK -	-
D	FAU-D5X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK CV360B6	-
D	FAU-D6X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK CV480C6	-
D	FAU-D7X	SPLIT GAS/ELECTRIC	2020	4	15	2035	YORK CV480C6	-
D	FC-8X	SPLIT SYSTEM HEAT PUMP	2020	4	15	2035	LENNOX -	-
D	FC-9X	SPLIT SYSTEM HEAT PUMP	2020	4	15	2035	LENNOX -	-
D	FC-10X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	-	-
D	FC-11X	SPLIT SYSTEM HEAT PUMP	-	-	15	-	-	-
E	AC-E1	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08665
E	AC-E2	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08668
E	AC-E3	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	5121C08365
E	AC-E4	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08670
E	AC-E5	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08663
E	AC-E6	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08653
E	AC-E7	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08651
E	AC-E8	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08648
E	AC-E9	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08664
E	AC-E10	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08666
E	AC-E11	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08650
E	AC-E12	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	5121C08667
E	AC-E13	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08642
E	AC-E14	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08647
E	AC-E15	RTU PACKAGE GAS/ELECTRIC UNIT	2021	3	15	2036	CARRIER 48FCGA05A2A5A0A0A0	4921C08359
F	HV-1	HEATING VENTILATOR	2003	21	15	2018	REZNOR SCE-150	EBCG66X2N06480
F	WH	GAS WAHTER HEATER	2018	6	12	2030	AMERICAN WATER HEATER CO G61-50T40R 400	
G	FC-G1	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	YORK ND360C00N6AAA1	N1B8513378
G	FC-G2	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	YORK ND360C00N6AAA1	N1B8512678
G	FAU-G1	SPLIT SYSTEM GAS ELECTRIC	2003	21	15	2018	-	-
G	FAU-G2	SPLIT SYSTEM GAS ELECTRIC	2003	21	15	2018	-	-
G	FC-1	SPLIT SYSTEM HEAT PUMP	-	-	15	-	-	-
G	CU-G1	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	YORK YD360C00A4AAA2	N1B8510540
G	CU-G2	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	YORK YD360C00A4AAA2	N1D8718921
G	CU-G1	SPLIT SYSTEM GAS ELECTRIC	2003	21	15	2018	YORK YCS60B21SA	W1E6580462
G	CU-G2	SPLIT SYSTEM GAS ELECTRIC	2003	21	15	2018	YORK YCS60B21SA	W1E6580352
G	CU-1	SPLIT SYSTEM HEAT PUMP	-	-	15	-	CARRIER 38MARBQ12AA1	1521V10492
G	HV-G1	GAS FURNACE	2003	21	15	2018	REZNOR PGBH-400 (INDOOR)	-
G	UH-G1	GAS UNIT HEATER	-	-	15	-	REZNOR F250	GAS UNIT HEATER
G	UH-G2	GAS UNIT HEATER	-	-	15	-	REZNOR F250	GAS UNIT HEATER
G	UH-G3	GAS UNIT HEATER	-	-	15	-	REZNOR F250	GAS UNIT HEATER
G	UH-G4	GAS UNIT HEATER	-	-	15	-	REZNOR F250	GAS UNIT HEATER
G	UH-G5	GAS UNIT HEATER	-	-	15	-	REZNOR F250	GAS UNIT HEATER
G	UH-G6	GAS UNIT HEATER	-	-	15	-	REZNOR F250	GAS UNIT HEATER
G	WH	ELECTRIC WATER HEATER	2013	11	15	2028	RHEEM XFYRE	-
N	AC-N1	TRANE YCZ050 DOWN FLOW	2003	21	15	2018	TRANE YCZ050 DOWN FLOW	32320R92H
N	AC-N2	TRANE YCZ050 DOWN FLOW	2014	10	15	2029	TRANE 4YCZ6048A3096CA	140810397L

N	AC-N3	PACKAGED GAS ELECTRIC	2002	22	15	2017	TRANE YCZ050 DOWN FLOW	2171N0J2H
N	AC-N4	PACKAGED GAS ELECTRIC	2016	8	15	2031	YORK ZXG12D2B1AA1A111A2	N1G6781401
N	AC-N5	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ036F3M0BC	329229N1H
H	CU-1	SPLIT SYSTEM HEAT PUMP	2004	20	15	2019	CARRIER 38ARQ008---501--	2204G20040
H	CU-2	SPLIT SYSTEM HEAT PUMP	2004	20	15	2019	CARRIER 38ARQ008---501--	2204G20036
H	CU-3	PACKAGED GAS ELECTRIC	2007	17	15	2022	CARRIER 48GSN036060511--	3907G12231
H	CU-4	PACKAGED GAS ELECTRIC	2007	17	15	2022	CARRIER 48GSN036060511--	3907G12238
H	CU-x	SPLIT SYSTEM HEAT PUMP	-	-	15	-	FUJITSU AOU9RL2	-
H&N	HV-N1	HEATING AND VENTILATING	2003	21	15	2018	REZNOR CRGBH-350 (OUTDOOR)	EBCF66X3N06003
K	HV-X	GAS FURNACE	-	-	15	-	REZNOR	-
K	AC-X	PACKAGED GAS-ELECTRIC	2017	7	15	2032	CARRIER 48TCDD14A2A5A0A0G0	5017P35806
K	CU-87	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	YORK THE60-B31SA	W1M6178868
K	CU-86	SPLIT SYSTEM HEAT PUMP	2015	9	15	2030	RHEEM RP1448JINA	W1 61508217
K	CU-X	CONDENSING UNIT	0	2024	15	15	HEATCRAFT LCH0010MCACZA0000	T20B09978
K	CU-XX	CONDENSING UNIT	0	2024	15	15	HEATCRAFT LCH0025LCACZA0000	T19K03686
K	CU-88	SPLIT SYSTEM HEAT PUMP	2023	1	15	2038	MITSUBISHI TRUZA0241HA70NA	34U068357H12K26
K	CU-85	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	YORK THE60B31SA	W1N62255531
K	CU-81	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	YORK THE60B31SA	W1M6178901
K	CU-89	SPLIT SYSTEM HEAT PUMP	2013	11	15	2028	RHEEM 13PJL24A01	7688W291305927
K	CU-89	SPLIT SYSTEM HEAT PUMP	2013	11	15	2028	RHEEM 13PJL24A01	7688W291305830
K	CU-80	SPLIT SYSTEM HEAT PUMP	2014	10	15	2029	RHEEM 13PJL48A01	W361424506
K	CU-84	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	YORK THE60B31SA	W1M6178872
K	CU-83	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	YORK THE60B31SA	W1M6178874
K	CU-82	SPLIT SYSTEM HEAT PUMP	2023	1	15	2038	CARRIER 25SPA548A301	0523E05977
K	WH	GAS FURNACE	2018	6	12	2030	AMERICAN GU61-50TR40R 400	-
BASEBALL	CU-1X	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	MITSUBISHI PUZ-A12NKA7	-
BASEBALL	CU-2X	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	MITSUBISHI PUZ-A24NHA7	-
BASEBALL	DWH	ELECTRIC WATER HEATER	-	-	15	-	BRADFORD WHITE LE120L3-3NCWW	-

TMS EQUIPMENT MATRIX

Building	Unit Tag	Type	Install Year	Age	Life Expectancy	Replacement Year	Model Number	Serial Number
A	AC-1-3	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZXG14D4B1AA1A111A2	N1D6488777
A	CU-x	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	Mitsubishi PUZ-A18NKA7	94U11499C
A	FC-x	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	Mitsubishi PKA-A18HA7	96A16813C
B	CU 1 THRU 8	SPLIT SYSTEM GAS ELECTRIC	2016	8	15	2031	York YHJD48S44S3A	W1L5117827
B	FC 1 THRU 8	SPLIT SYSTEM GAS ELECTRIC	2016	8	15	2031	York CV480C6	6016M20324
B	WH	ELECTRIC WATER HEATETR	-	-	15	-	-	-
C	CU-9 THRU 17	SPLIT SYSTEM GAS ELECTRIC	2016	8	15	2031	York YHJD48S44S3A	W1M5180598
C	FC-9 THRU 17	SPLIT SYSTEM GAS ELECTRIC	2016	8	15	2031	York CV480C6	6016M20302
C	CU-15	SPLIT SYSTEM GAS ELECTRIC	2016	8	15	2031	York TCD36V41SA	W1L6057039
C	FC-15	SPLIT SYSTEM GAS ELECTRIC	2016	8	15	2031	York CV360B6	6015M01638
C	WH	ELECTRIC WATER HEATETR	-	-	15	-	AO SMITH DEL 20 102	-
D	FC (Typ. 2)	SPLIT SYSTEM GAS ELECTRIC	2010	14	15	2025	York C60A210L186	7120L39199
D	CU (Typ. 2)	SPLIT SYSTEM GAS ELECTRIC	2015	9	15	2030	York -	-
D	FC	SPLIT SYSTEM HEAT PUMP	2021	3	15	2036	Carrier 40MAHBW13XA3	2321V18897
D	CU	SPLIT SYSTEM HEAT PUMP	2022	2	15	2037	Carrier 38MARBQ12AA3	0222V14159
D	CU	SPLIT SYSTEM HEAT PUMP	-	-	15	-	Toshiba RAV-SP180ATTT2-UL	420035
D	FC	SPLIT SYSTEM HEAT PUMP	-	-	15	-	Toshiba Carrier RAV-SP180KRT-UL	02500047
E	AC	PACKAGED GAS ELECTRIC	2003	21	15	2018	Trane YCZ060F3M0BC	3185SFK2H
E	AC	PACKAGED GAS ELECTRIC	2003	21	15	2018	Trane YCZ050F3H0QAC	3201XSS2H
F	CU-1-5	SPLIT SYSTEM HEATPUMP	2000	24	15	2015	Mitsubishi PU18EK	-
F	FC-1-5	SPLIT SYSTEM HEATPUMP	2000	24	15	2015	Mitsubishi PK18EL	-
F	AC-2-5	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZYG05L4C1AA1A111A2	N1F6654394
F	AC-1-5	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZXG08D4B1AA1A111A2	N1H6859140
F	AC-3-5	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZYG05L4C1AA1A111A2	N1E6649799
F	AC-6-5	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZXG08D4B1AA1A111A2	N1K6931112
F	AC-7-5	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZXG08D4B1AA1A111A2	N1H6871677
F	AC-4-5	PACKAGED GAS ELECTRIC	2016	8	15	2031	York ZXG07D4B1AA1A111A2	N1H6852653
F	AC-5-5	PACKAGED GAS ELECTRIC	2017	7	15	2032	York ZXG07D4B1AA1A111A2	N1B7470030
G	RTU-7, 8	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCH211C4L0CA	323100483D
G	MUA-1, 2	GAS FIRED MAU	-	-	15	-	-	-
G	CU-x	SPLIT SYSTEM AC	-	-	15	-	ENVIRO-MASTER SHC-12DA000AAA0A	1-03 G-24524-24
G	CU-x	SPLIT SYSTEM AC	-	-	15	-	ENVIRO-MASTER SHC-12DA000AAA0A	1-03 G-2452-24
G	CU-x	SPLIT SYSTEM HEATPUMP	-	-	15	-	NTXSKS12A112AA	2XU0486665PJ2B
G	WH	GAS WATER HEATETR	2003	21	15	2018	Rheem GN100-200	-
H	RTU-1	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ036F3M0BC	3202SEM1H
H	RTU-X	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ036F3M0BC	31843KE1H
H	RTU-4	PACKAGED GAS ELECTRIC	-	-	15	-	TRANE YHC092A4RLA12G102C10000F	-
H	RTU-X	PACKAGED GAS ELECTRIC	-	-	15	-	TRANE -	-
H	WH	ELECTRIC WATER HEATETR	-	-	15	-	-	-
I	RTU-3	PACKAGED GAS ELECTRIC	2002	22	15	2017	Carrier 48FCLA06A2AA5A0A0A0	212C53008
I	RTU-6	PACKAGED GAS ELECTRIC	2002	22	15	2017	Carrier 48TCDD14A2A6A0A0G0	4521P39927
I	CU-1	SPLIT SYSTEM HEAT PUMP	2013	11	15	2028	Mitsubishi MXZ-3B24NA	32909791

I	FC-1	SPLIT SYSTEM HEAT PUMP	2013	11	15	2028	Mitsubishi CS-KS12NB1	-
I	FC-2	SPLIT SYSTEM HEAT PUMP	2013	11	15	2028	Mitsubishi CS-KS12NB1	-
I	RTU-5	PACKAGED GAS ELECTRIC	2018	6	15	2033	Trane YHC102F4RLA0LK70A4C10-	180510988L
I	WH	GAS WATER HEATETR	-	-	12	-	Bradford White UCG80H1253N	YF49868523

Top of the World Elementary Equipment Matrix

Building	Unit Tag	Type	Install Year	Age	Life Expectancy	Replacement Year	Model Number	Serial Number
ADMIN	A-AC-1A	PACKAGED GAS ELECTRIC	2003	21	15	2018	Trane YCZ060F3M0BC	3201XRK2H
ADMIN	A-AC-2A	PACKAGED GAS ELECTRIC	2022	2	15	2037	Carrier 48VLUE2404030TP	1322F46819
ADMIN	A-AC-3A	PACKAGED GAS ELECTRIC	2022	2	15	2037	Carrier 48VLUE4809050--	1622F48890
MPR	A-AC-1	PACKAGED HEAT PUMP	2005	19	15	2020	CARRIER 50JX-048---511--	4405G31403
MPR	A-AC-2	PACKAGED HEAT PUMP	2005	19	15	2020	CARRIER 50JX-048---511--	-
MPR	A-AC-3	PACKAGED HEAT PUMP	2005	19	15	2020	CARRIER 50JX-048---511--	-
MPR	A-AC-4	PACKAGED HEAT PUMP	2005	19	15	2020	CARRIER 50JX-048---511--	-
KITCHEN	A-AC-KITCH	WALL MOUNTED HEAT PUMP	2015	9	15	2030	BARD W48H2-A04VP4XXX	343K153265823-02
B	CU-X	SPLIT SYSTEM	-	-	15	-	-	-
B	C-CU-4C	SPLIT SYSTEM AC	-	-	15	-	MITSUBISHI	-
B	C-FC-4C	SPLIT SYSTEM AC	-	-	15	-	MITSUBISHI MR SLIM	-
B	FAU-3C	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ036F3M0BC	31853UW1H
B	C-CU-1C	SPLIT SYSTEM GAS ELECTRIC	-	-	15	-	MITSUBISHI PU30EK	-
B	C-CU-2C	SPLIT SYSTEM GAS ELECTRIC	2020	4	15	2035	Carrier 24AHA448A600	1320X61218
B	FAU-1C	SPLIT SYSTEM GAS ELECTRIC	2020	4	15	2035	CARRIER CAPMP4821ALAEAAA	2220J05656
B	FAU-2C	SPLIT SYSTEM GAS ELECTRIC	2020	4	15	2035	CARRIER CAPMP4821ALAEAAA	-
C	FAU-9D & 10D	SPLIT SYSTEM GAS ELECTRIC	2000	24	15	2015	-	-
C	CU-1D & 10D	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	Carrier 24AHA436A600 or 24AHA448A60(	-
C	FAU-11D	SPLIT SYSTEM GAS ELECTRIC	2000	24	15	2015	-	-
C	CU-11D	SPLIT SYSTEM GAS ELECTRIC	2007	17	15	2022	Goodman GSX160361FD	160771116
C	CU-1D THRU 8D	SPLIT SYSTEM GAS ELECTRIC	-	-	15	-	CARRIER	-
C	FAU-1D THRU 8D	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	CARRIER CNPVT4821ALAAAAA	11618X70290
E	FAU-9E & 10E	SPLIT SYSTEM GAS ELECTRIC	2000	24	15	2015	-	-
E	FAU-11E	SPLIT SYSTEM GAS ELECTRIC	2000	24	15	2015	-	-
E	CU-1E thru 8E	CONDENSING UNIT	2019	5	15	2034	Carrier 24AHA436A600	1419X63686
E	CU-9E & 10E	CONDENSING UNIT	2019	5	15	2034	Goodman GSX160361FD	1419X64631
E	CU-11E	SPLIT SYSTEM GAS ELECTRIC	2000	24	15	2015	-	-
E	CU-1E THRU 10E	SPLIT SYSTEM GAS ELECTRIC	-	-	15	-	-	-
E	FAU-1E THRU 10E	SPLIT SYSTEM GAS ELECTRIC	2018	6	15	2033	CARRIER CNPVT4821ALAAAAA	-
F	F-AC-1F	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ050F3H0AC	319327N2H
F	F-AC-2F	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ050F3H0AC	3191LC2H
F	F-AC-3F	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ050F3H0AC	317420B24
F	F-AC-4F	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ050F3H0AC	31822562H
F	F-AC-5F	PACKAGED GAS ELECTRIC	2003	21	15	2018	TRANE YCZ050F3H0AC	3183K3B2H
F	F-AC-6F	PACKAGED GAS ELECTRIC	-	-	15	-	TRANE YCZ050F3H0AC	-
F	F-AC-7F	PACKAGED GAS ELECTRIC	-	-	15	-	TRANE YCZ050F3H0AC	-
F	F-AC-8F	PACKAGED GAS ELECTRIC	-	-	15	-	TRANE YCZ050F3H0AC	-
G	G-AC-4G	WALL MOUNTED HEAT PUMP	2015	9	15	2030	BARD I48H1-A045MN4XXX	-
G	G-AC-5G	WALL MOUNTED HEAT PUMP	2015	9	15	2030	BARD I48H1-A045MN4XXX	-
G	G-AC-3G	WALL MOUNTED HEAT PUMP	2015	9	15	2030	BARD I48H1-A045MN4XXX	382D163319773-01
G	G-AC-1G	WALL MOUNTED HEAT PUMP	2015	9	15	2030	BARD I48H1-A045MN4XXX	-
G	G-AC-2G	WALL MOUNTED HEAT PUMP	2015	9	15	2030	BARD I48H1-A045MN4XXX	-
KITCHEN	WH	GAS WATER HEATER	-	-	15	-	-	-
C	DWH	ELECTRIC WATER HEATER	-	-	15	-	AO SMITH	-
D	DWH	ELECTRIC WATER HEATER	-	-	15	-	AO SMITH DSE10-6	SB01-88565

El Morro Elementary Equipment Matrix

Building	Unit Tag	Type	Install Year	Age	Life Expectancy	Replacement Year	Model Number	Serial Number
ADMIN	FC-1	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	MITSUBISHI PKA-A18HA7	97A17674D
ADMIN	FC-2	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	MITSUBISHI PKA-A18HA7	93A22261B
ADMIN	FC-3	SPLIT SYSTEM AC	2012	12	15	2027	-	-
ADMIN	AC-1	PACKAGED GAS ELECTRIC	2020	4	15	2035	CARRIER 48TCDD14A2A6A0A0G0	3920P38012
ADMIN	CU-1	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	MITSUBISHI PUZ-A18NKA7	94U11502C
ADMIN	CU-2	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	MITSUBISHI PUZ-A18NKA7	94U11503C
ADMIN	CU-3	SPLIT SYSTEM AC	2012	12	15	2027	TRANE 4TTB3024E1000AA	12272R995F
MPR	MAU-1	MAU GAS ELECTRIC	2023	1	15	2038	CARRIER 48VLUK4809030--	0823F48240
MPR	AC-1	PACKAGED GAS ELECTRIC	2020	4	15	2035	CARRIER 48TCDD14A2A6-0A0G0	0519P31002
A	CU-1 THRU CU-4	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM 13AJN48A01	-
A	FAU-1 THRU FAU-4	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM RG35648C175B2222AP	7115E28749
B	CU-1 THRU CU-6	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM 13AJN48A01	-
B	FAU-1 THRU FAU- 6	SPLIT SYSTEM GAS ELECTRIC	-	-	15	-	RHEEM RG35648C175B2222AP	7115E23948
C	CU-1 through 6	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM 13AJN48A01	-
C	FAU-1 through 6	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM RG35648C175B2222AP	-
E	CU-1 THRU CU-4	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM 13AJN48A01	W471426543
E	FAU-1 THRU FAU-4	SPLIT SYSTEM GAS ELECTRIC	2014	10	15	2029	RHEEM RG35648C175B2222AP	7115C38360
E	HP-X	WALL MOUNT HEAT PUMP	2013	11	15	2028	BARD W48H1-0A04VP4XXX	343L133061950-02
H	RTU-X	PACKAGED GAS ELECRTIC	2004	20	15	2019	CARRIER 48TCDD08A2A5-0A0A0	0204P36517
J	CU-1	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE436A310	1718E22534
J	CU-2	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	Goodman GSZ160361BA	1605361176
J	CU-3	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	Goodman GSZ160361BA	1608338104
J	CU-4	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE436A310	1618E13373
J	CU-5	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE424A300	0118E01968
J	CU-6	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE436A310	1618E20664
J	CU-7	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE436A310	1618E20654
J	CU-8	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE436A310	1618E20677
J	CU-9	SPLIT SYSTEM HEAT PUMP	-	-	15	-	Carrier 25HCE436A310	-
J	CU-10	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE424A300	0118E01965
J	CU-11	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	Mitsubishi PUZ-A18NKA7	94U11478C
J	FC-1	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-2	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	-	-
J	FC-3	SPLIT SYSTEM HEAT PUMP	2016	8	15	2031	-	-
J	FC-4	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-5	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-6	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-7	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-8	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-9	SPLIT SYSTEM HEAT PUMP	-	-	15	-	-	-
J	FC-10	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	-	-
J	FC-11	SPLIT SYSTEM HEAT PUMP	2019	5	15	2034	Mitsubishi PK18EK	-
J	AC-1	SPLIT SYSTEM HEAT PUMP	2017	7	15	2032	Carrier 25HHA436A300	4917X79898
J	AC-2	SPLIT SYSTEM HEAT PUMP	2018	6	15	2033	Carrier 25HCE436A310	1718E22526
ADMIN	WH	ELECTRIC WATER HEATER	-	-	15	-	RHEEM ELD30-FTB	DX0120 Q151903480
MPR	WH	GAS WATER HEATER	-	-	12	-	BRADFORD WHITE URG240T6N	TM44385384
B	WH	ELECTRIC WATER HEATER	-	-	15	-	AO SMITH -	
J	WH	ELECTRIC WATER HEATER			15		A.O. SMITH	SA02-93104

APPENDIX C – MULTI-FACTOR MATRIX OF PROJECT PRIORITIES

ECM Name	Priority	Implementation Year	Energy Savings MBH	Cost Savings $	Carbon Savings lbs	Implementation Cost	Engineering Cost	Available Incentive	Total Cost	$/ MBH saved	$/lbs of CO2	Simple Payback
ToWE Scheduling	0	Summer 2024	15,604	$1,326	2,275	$0	$0	$0	$0	$0.00	$0.00	0.0
DO Scheduling	0	Summer 2024	23,967	$2,037	3,494	$0	$0	$0	$0	$0.00	$0.00	0.0
LBHS Scheduling	0	Summer 2024	25,700	$2,184	3,747	$0	$0	$0	$0	$0.00	$0.00	0.0
EMES Scheduling	0	Summer 2024	35,642	$3,029	5,196	$0	$0	$0	$0	$0.00	$0.00	0.0
TMS Scheduling	0	Summer 2024	51,062	$4,340	7,444	$0	$0	$0	$0	$0.00	$0.00	0.0
EMES Lighting Upgrade	1	Summer 2025	275,222	$23,392	40,122	$192,360	$32,701	$0	$225,061	$0.70	$4.79	8.2
LBHS Lighting Upgrade	1	Summer 2025	428,929	$36,456	62,529	$344,973	$58,645	$0	$403,618	$0.80	$5.52	9.5
TMS Lighting Upgrade	1	Summer 2025	188,892	$16,055	27,537	$243,691	$41,427	$0	$285,118	$1.29	$8.85	15.2
DO Lighting Upgrade	1	Summer 2025	31,773	$2,700	4,632	$44,293	$7,530	$0	$51,823	$1.39	$9.56	16.4
ToWE Lighting Upgrade	1	Summer 2025	161,521	$13,278	23,546	$220,481	$37,482	$0	$257,963	$1.37	$9.36	16.6
WH Lighting Upgrade	1	Summer 2025	34,372	$2,518	5,011	$192,360	$32,701	$0	$225,061	$5.60	$38.39	76.4
LBHS Stadium Lighting	1	Summer 2025	78,138	$10,330	11,391	$264,400	$44,948	$0	$309,348	$3.38	$23.21	25.6
LBHS Theater Lighting	1	Summer 2025	61,406	$5,399	8,952	$70,200	$11,934	$0	$82,134	$1.14	$7.84	13.0
WH PV and BESS	2	Summer 2026	1,157,350	$49,816	168,718	$1,153,961	$196,173	$346,188	$1,003,946	$1.00	$6.84	23.2
EMES PV and BESS	2	Summer 2026	1,173,387	$55,603	171,056	$919,026	$156,234	$275,708	$799,553	$0.78	$5.37	16.5
ToWE PV and BESS	2	Summer 2026	561,062	$23,874	81,791	$430,982	$73,267	$129,295	$374,954	$0.77	$5.27	18.1
DO PV and BESS	2	Summer 2026	360,307	$12,520	52,525	$298,804	$50,797	$89,641	$259,959	$0.83	$5.69	23.9
DO HP Replacement	2	Summer 2026	34,137	$918	3,661	$136,000	$23,120	$0	$159,120	$3.98	$37.15	148.1
DO EV Stations	2	Summer 2026	0	$0	0	$33,000	$5,610	$10,200	$28,410	0	0	0.0
ToWE EV Stations	2	Summer 2026	0	$0	0	$16,500	$2,805	$5,100	$14,205	$0.00	$0.00	0.0
EMES EV Stations	2	Summer 2026	0	$0	0	$22,000	$3,740	$6,800	$18,940	$0.00	$0.00	0.0
WH EV Stations	2	Summer 2026	-1,791,181	-$131,241	0	$274,000	$46,580	$101,200	$219,380	$0.00	$0.00	0.0
LBHS PV and BESS	3	Summer 2027	2,146,830	$105,348	312,964	$2,250,460	$382,578	$675,138	$1,957,900	$1.05	$7.19	21.4
TMS PV and BESS	3	Summer 2027	1,533,012	$62,738	223,482	$1,656,429	$281,593	$496,929	$1,441,093	$1.08	$7.41	26.4
TMS EV Stations	3	Summer 2027	0	$0	0	$11,000	$1,870	$3,400	$9,470	$0.00	$0.00	0.0
ToWE HP Replacement	4	Summer 2028	221,405	$2,305	24,748	$2,647,943	$450,150	$0	$3,098,093	$11.96	$107.00	1,148.8
LBHS HP Replacement	4	Summer 2028	734,171	$4,934	80,688	$3,407,221	$579,227	$0	$3,986,448	$4.64	$42.23	690.6
EMES HP Replacement	5	Summer 2029	241,763	$1,192	27,161	$2,095,240	$356,191	$0	$2,451,430	$8.67	$77.14	1,757.7
TMS HP Replacement	5	Summer 2029	690,315	-$2,961	73,757	$2,305,151	$391,876	$0	$2,697,027	$3.34	$31.25	-778.5
DO DWH Replacement	6	Summer 2030	1,764	-$430	15	$25,000	$4,250	$0	$29,250	$14.17	$1,622.68	-58.2
ToWE DWH Replacement	6	Summer 2030	8,316	-$2,025	73	$32,000	$5,440	$0	$37,440	$3.85	$440.58	-15.8
TMS DWH Replacement	6	Summer 2030	23,373	-$5,692	204	$50,000	$8,500	$0	$58,500	$2.14	$244.93	-8.8
WH DWH Replacement	6	Summer 2030	6,664	$110	689	$25,000	$4,250	$0	$29,250	$3.75	$36.26	227.8
LBHS DWH Replacement	6	Summer 2030	50,400	-$12,275	440	$75,000	$12,750	$0	$87,750	$1.49	$170.38	-6.1
EMES DWH Replacement	6	Summer 2030	17,232	-$4,197	150	$25,000	$4,250	$0	$29,250	$1.45	$166.11	-6.0