Level II Energy Audit Report

For

CATALINA LANDING

310-320-330-340 Golden Shore
Long Beach, CA 90802

June 2, 2009

Prepared by

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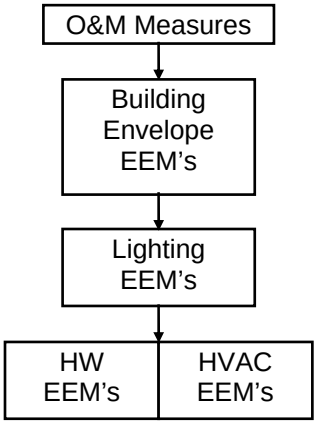
Each EEM has been evaluated for estimated energy operating cost savings, estimated installation cost, projected Simple Payback Period, and anticipated incentive or rebate amount. Each EEM was then evaluated for other parameters that could impact the ultimate implementation of the EEM. These parameters include, but are not limited to: future expansion capability, regulatory compliance and permitting, ease and cost of maintenance, and rebate / incentive reimbursements, etc.

The deliverable for this project consists of this report, signed by a registered engineer, which includes a description of the analyses done, specific site assumptions made, applicable utility rates, available incentive programs, preliminary design sketches, energy analysis calculations, estimate cost worksheets, conclusions, recommendations, and a complete appendix of background information.

Analysis Methodology

Evaluation Order of Energy Efficiency Measures: Energy Efficiency Measures were evaluated using the *California Energy Commission* methodology described in their *Technical Assistance* report guidelines. CEC guidelines require that all Operation and Maintenance items be implemented before evaluating measures requiring capital expenditure. After O&M items are implemented, measures are evaluated in the following order:



Note, for example, that using this methodology, the savings for a replacement boiler would not be versus the Base Case of an Un-Tuned-up boiler, but rather the savings would be compared against the boiler after it was tuned-up and the efficiency had been improved. Each measure was analyzed for estimated savings and estimated costs. When estimating the installed costs, prices were obtained from vendors, recent past projects, and estimating tables. As recommended in the CEC *Technical Assistance* report guidelines, the measure cost estimates also include sales taxes, demolition/disposal, engineering/project management, permits, and an inflation factor. We feel that this makes the Payback estimates for these measures rather conservative.

Available Rebate / Incentive Programs

Incentives or rebates have been included in this analysis unless otherwise noted in the discussion of the specific EEM.

A. Standard Performance Contract:

The SPC program offers financial incentives to offset the capital cost of installing new high efficiency equipment or systems. Project examples may include common retrofits like lighting, HVAC and refrigeration upgrades, or more specialized process improvements and customized equipment replacements. Retrofit or new equipment installations are eligible.

Incentives are based on the type of measure installed and the kilowatt-hour (kWh) saved and the kilowatts (kW) reduced over a 12-month period. Applicants are eligible to receive up to 50% of the total project cost. The incentive limitation is $2,400,000 annually, per project site.

Eligibility: SPC is open to all Southern California Edison (SCE) business customers, regardless of size or energy usage, who: receive services from SCE, and pay the public purpose program surcharge listed on their SCE bill. Direct access, co-generation, or stand-by customers are eligible for incentives; however the savings and incentive may not exceed the amount of kWh purchased from SCE. The usage history is for the 12 months prior to applying to the program.

2009 Incentives Rates: Incentives are based on two factors: 1) The energy savings achieved beyond Title 24 or minimum industry standards. For the purpose of calculating savings, projects use Title 24 or minimum industry standard as the baseline, compared to the efficiency of the proposed equipment; and the amount of peak demand reduction resulting from the project.

Based on the type of measure installed, the following SPC incentive rates apply to new 2009 SPC applications:

2009 SPC Incentive Rates		
Measure Category	**Annual Energy Savings Incentive Rate (kWh)**	**Peak Demand Reduction Incentive Rate (kW)**
Lighting	$0.05 per kWh saved	$100 / kW
Air Conditioning and Refrigeration (AC&R) I*	$0.15 per kWh saved	$100 / kW
Air Conditioning and Refrigeration (AC&R) II*	$0.09 per kWh saved	$100 / kW
Other Equipment	$0.09 per kWh saved	$100 / kW

*Refer to SCE Procedures Manual Section 1, Table 1-3 for a list of specific applicable measures.
SPC Program Terms. The SPC Program is offered on a first-come, first-served basis and is effective until funding is expended or the program is discontinued by the California Public Utilities Commission (CPUC). This program is funded by California utility customers and administered by SCE under the auspices of the CPUC.

B. **Express Efficiency Program**

This unique program offers SCE business customers generous cash rebates toward the purchase and installation of qualified equipment that improves their facility's energy efficiency. High-efficiency equipment is key to lowering your energy costs and reducing your energy use. SCE's Express Efficiency Program is designed specifically to help you obtain high-efficiency equipment.

How The Program Works: SCE business customers can apply for rebates on the purchase and installation of qualifying equipment that improve the energy efficiency of their businesses in the following areas:

* Lighting
* Air Conditioning
* Food Service Equipment
* Refrigeration
* Agricultural Equipment
* Premium Efficiency Motors

New equipment must replace existing equipment. Certain retrofits and upgrades also qualify for rebates. All equipment must be new, whether used to replace, retrofit or upgrade existing equipment. Incentives are offered on a per-item basis and limited to 100% of installed equipment cost. To learn the rebate value of each item, please refer to the qualified itemized measures list.

Rebates are paid on leased equipment if the equipment is acquired through either a lease-purchase agreement or a standard lease with a term of three or more years. Mandatory inspection of installed equipment is required for incentive rebates totaling $7,000 or more. Random inspections are at the discretion of SCE.

What You'll Receive: You can choose to have your Express Efficiency rebate paid directly to your business in the form of a check or as a credit toward your SCE bill. You may also designate a third-party payee, also referred to as the Project Sponsor. The amount of the rebate depends upon the itemized measure installed.
Who Can Participate

Any SCE business customer (non-residential), regardless of size or monthly electricity use can participate in the Express Efficiency program by completing a Business Incentives & Services Application (PDF), or Business Incentives & Services Application (Excel). Rebates are paid on a first-come, first-served basis until the deadline expires or until funds are exhausted, whichever occurs first. Equipment purchased with the intent of resale is not eligible for the rebate.

There are just two steps to completing your participation:

1. Purchase and install the qualified equipment (installation must be completed before submitting your application).
2. Complete and submit your Business Incentives & Services Application (PDF), or Business Incentives & Services Application (Excel) and supporting documents including proofs of payment (see Sample Invoice), and manufacturers spec sheets to SCE.

Detailed instructions are included with the Application and are available in both PDF and Excel formats. For more information contact your SCE Account Representative or call (800) 736-4777.

Upon receipt of your completed application, SCE will process your application to authorize your incentive payment. You will be contacted if your application is incomplete or if you have been randomly chosen for inspection.

Rebates Available: In addition to lower energy bills, you can receive rebates for installing any of the following equipment:

Equipment Rebate Amounts

Equipment	Rebate Amount
Screw-in compact fluorescent lamps	Up to $5.00 per lamp
Hardwired fluorescent fixtures	Up to $22.50 per fixture
High-efficiency exit signs	$27.00 per fixture
T-8 or T-5 lamps with electronic ballasts	Up to $7.50 per lamp
HID fixtures (Exterior)	Up to $100 per fixture
Occupancy sensors	Up to $44.00 per sensor
Photocells	$7.00 per photocell
Time Clocks	$36.00 per time clock
LED Channel Signs (Red)	Up to $6 per foot
High Bay Fixtures (Interior T-8, T-5)	$100 per 4- or 6-lamp fixture

Executive Summary

Recommendations:

Our team of energy professionals performed a full inspection of **CATALINA LANDING.** All of your facility's energy-using systems were inventoried and evaluated for proper operation. Data collected included equipment nameplate information, building occupancy schedules, equipment-operating times, and utility bills gathered at our on-site visit(s). From this analysis, we developed a list of potential *Energy Efficiency Measures* or "EEM's". Each EEM was then evaluated for cost effectiveness and impact on facility operations.

Simple before-tax Payback (SB-TPB) periods have been calculated for each measure requiring a capital investment and is defined herein as the capital cost divided by the annual savings. Recommendations have been broken down into these main categories, as applicable to this particular site,

Operating & Maintenance (O&M) items are items that may be done with little or no capital expense, and represent items that may be simply done such as equipment repairs, tune-ups, or changes in operating schemes or timing.

Short term EEM's include items that may be easily done at your facility by simply buying equipment or using a licensed contractor to perform relatively simple installation of a single part or uncomplicated system. For example, installation of high efficiency lighting would be a short term EEM. Short term EEM's are projects that do not require a great deal of permitting, planning, engineering, or design and may have fairly short SB-TPB.

Long term EEM's are projects that require some permitting, planning, engineering, or design and may have longer SB-TPB's than the simpler, often less costly, Short-Term EEM's. For Long term EEM's we recommend that an engineer, either outside consultant, or in-house engineer, be retained to provide the necessary planning, design, drawings, permit submittals, construction management, and start-up services needed to complete these more complicated tasks.

The next page contains ***"Table 1 Summary of Energy Efficiency Measures"***, or EEM's, that were evaluated for your facility, plus other tables showing potential energy unit savings. You can use these lists to decide which efficiency options to install at your facility. The sections of this report that follow contain the details, estimated cost worksheets and estimated savings worksheets used to provide these conclusions.

Following *Table 1* is ***Table 1.1 Summary Table of Electric Use, Costs, And Savings***. This table summarizes your present electric uses and costs, plus provides a summary of savings and energy use and cooling indices.

Table 1.0

ENERGY EFFICIENCY MEASURE (EEM) SUMMARY:

Site: Garage: Catalina Landing

Garage: 345 Golden Shore Long Beach CA 90802

EEM Description	*Demand KW Saved*	*Annual KWH Saved*	NET Annual Cost Savings <Note 1>	Estimated Installed Cost	Estimated Rebate	SB-TPB Period (Years)
O&M Items						
None						
Lighting and Exit Sign Incentive Projects						
Garage: Replace 100HPS lighting with high-efficiency LED lamps, T12 lamps to T8, LED Exit Signs	*22.0*	*192,402*	$ 22,338	$ 119,694	$ 11,822	4.8
TOTAL:	*22.0*	*192,402*	*$ 22,338*	*$ 119,694*	*$ 11,822*	4.8
Energy Efficiency Incentive Projects						
None						
Operating & Maintenance Items:						
None						
GRAND TOTAL:	22.0	192,402	$ 22,338	$ 119,694	$ 11,822	4.8
Alternative or Other EEM's						
None						

Notes:
1. Net Annual Savings includes net energy savings, incremental maintenance and annual permit or other requirements where applicable.
2. Simple before tax Pay-back Period includes incentive amount where applicable.
3. SCE incentives / rebates included wherever applicable; either "Express Efficiency Program" or Standard Performance Contract (SPC)" programs
4. Annual savings and usage estimates are based on the consumption history for the preceding twelve calendar months and will vary according to actual usage.

Table 1.1 Annual Energy Analysis Summary

Garage: 345 Golden Shore
Long Beach CA 90802

ELECTRICAL BILL SUMMARY		
Peak Demand kW		57.0
Total Annual kWh Used		369,600
Total Annual Electric Cost	$	42,911
ELECTRICAL COST INDEX		
Estimated Facility Total Area, SF		233,500
Estimated Facility Conditioned Area, SF		-
Electric Energy Cost Index, [$/SF]	$	0.18
ENERGY SAVINGS SUMMARY		
Total Energy Saved from EEM's, Annual kWh		192,402
Percentage Annual Energy kWh Saved		52%
Total Monthly Demand Saved from EEM's, kW		22.0
Percentage Monthly Demand kW Saved		39%
COST SAVINGS SUMMARY		
Total Annual Energy Costs Saved from EEM's	$	22,338
Percentage Annual Energy Costs Saved		52.1%
Daily Cost Savings from EEM's	$	61.20
COMFORT & POWER USE INDEX		
Lighting Use Index, Watts / Square Feet	Before Retrofit	0.18
Lighting Use Index, Watts / Square Feet	After Retrofit	0.09
Energy Use Index, Annual kWh per SF		1.58
Power Use Index, Watts / Square Feet		0.24

#330: E-Star score: 49; 260.0-kBtu per SF. (+49% vs. #310, +29% vs. #320)

- Building 340 appears to have been occupied at a lesser rate than the other complex structures. The entire fourth floor seems to be vacant. For example #310-320-330 buildings are all on So. Cal. Edison (SCE) rate schedule TOU-GS-3B for facilities with monthly demand between 200-kW and 500-kW. #340 was moved by SCE into rate schedule GS-2 for facilities with monthly demands of below 200-kW. Due to the low occupancy, it appears that #340 will not qualify for Energy Star eligibility due to average occupancy below 75%

Other O&M Items that may be considered by the facility include the following:

- The performance of fired boilers for space heating, for example, will degrade with time as deposits build-up inside the burner tips, for example, thus lowering the effective combustion efficiency. It has been our past experience that an annual tune-up of the boiler burners may result in an approximate 10% minimum gain in combustion efficiency.

- Clean all fan coils, supply air handler units, and ductwork. This is recommended generally, as over time, deposits of dirt grease, dust, etc. become lodged in the coil surfaces and inside ductwork. This causes both an HVAC system inefficiency plus potential for indoor air quality issues. However, the cost to provide a wholesale cleaning of all ductwork and air handler systems may be prohibitive. Therefore we suggest that the building clean air handlers and duct work on a rotating basis over a several year period or when spaces are evacuated between leasing.

LIGHTING PROJECTS:

- High Efficiency Lighting Retrofit:
  This facility has already undergone a significant interior lighting retrofit project, completed in the mid-to-late 1990's. The facility has already replaced T-12 fluorescent lighting with then-current generation F032 T-8 lamps and electronic ballasts, plus all incandescent light bulbs with high efficiency compact fluorescent lamps and electronic ballasts throughout the facility.

  However, new technology higher-efficiency T8 lamps and electronic balls now exist versus the older F032 (i.e. 32-Watt) lamps with 8,000-hour life spans, and standard electronic ballasts with 0.9 ballast factors.

  High efficiency F025 (25-Watts), F028 (28-Watts) and F030 (30-Watts) fluorescent lamps are now available in 4-ft. length (including U-Tube configuration) coupled with high-efficiency ("HE") and Low wattage ("LW") electronic ballasts that offer comparable lighting output Lumens, but have life spans that approach 24,000-Hours.

Especially in office areas near windows of have multiple fixtures and could be considered "over-lit", significant energy savings can be gained by selecting the correct lamp/ballast combination that gives reduced output but still maintaining required illuminance parameters. New anti-striation circuitry now does away wit the flicker associated with older technology fluorescent lamps.

In addition to the obvious electrical cost savings generated by retrofit lighting, upgraded lighting will also result in longer lamp & ballast life thus lessening replacement costs, reduced heat gain into the space possibly lowering cooling demand, and studies have shown an improvement in tenant comfort, productivity & ambience.

Please note that this audit uses with a more conservative 1-for-1-replacement method for estimating lighting energy savings. However, additional savings beyond what is shown on our lighting calculation tables may be accrued using a more "Aggressive" approach for de-lamping some areas in selected specific spaces.

In offices, conference rooms, hallways, storage areas, etc., we suggest replacing, for example, a 4- lamp T-8 F032 fixture at 115-Watts may be replaced by a 2 or 3-lamp T-8/ F028 electronic fixture at 47-69 Watts. This is estimated to provide equal illumination levels after retrofit due to the higher efficiency of the new fixtures. However, it is recommended that an illumination calculation is made prior to actual retrofit to assure that the required illumination foot-candles is not compromised beyond acceptable Illumination Engineering Society (IES) and Code levels.

In areas where lighting illumination levels are critical, such as labs, test areas, design/drafting rooms, etc., we recommend 1-for-1 lamp replacements, i.e. a 4- lamp T-8 F032 fixture at 115 Watts may be replaced by a 4-lamp T-8/ F030 electronic fixture at 100 Watts. This assures a generally increased level of illumination after retrofit due to the higher efficiency of the new fixtures.

Although every effort was made to assure that the lighting fixture count shown in this report is accurate, the worksheets are intended to be an approximation of lighting energy use and not a fixture-by-fixture inventory.

- Garage Lighting Retrofit:
  The parking garage is presently lit by old-technology LU100HPS "high pressure sodium" lamps (115-Watts per lamp), estimated life 8,000-hours (i.e. one-year). This is a high intensity discharge (HID) lamp and is undesirable due to the salmon color glow and high color shift that distorts the color of objects. It is recommended that these lamps be replaced with new-technology, very high efficiency LED (light emitting diode) lamps at 55-Watts. In addition to the obvious energy savings, LED lamps emit a pure "white" light without color shift. Although expensive, LED lights offer a 50,000-Hour life span (i.e. 6-year) life span.

- High Bay Lighting Applications:
  The Tenant: Catalina Express space located at Bldg. #320 presently contains "high-bay" lighting fixtures containing old style Mercury Vapor lamps "MV400" (i.e. 465-Watts per lamp). These too are high intensity discharge type fixtures (HID). These are really undesirable due to the greenish color tint and resulting color shift for occupants and passenger guests. Also they are slow starting with a very long warm-up time and cannot be combined wit any lighting controls that require start/stop control.

  We considered replacement of the existing high-bay HID lamps with Multi-lamp T-5 fluorescent high output ("HO") fixtures (218-Watts per fixture).

  Fluorescent lighting has long made sense for low-ceiling applications (under approximately 15 feet in height). It has been normal practice to use high-intensity discharge (HID) lighting for high-bay areas (over 15 feet high ceilings). Recent advances, as noted in publications such as the '*Environmental Building News*' indicate that specially designed T-5 high-bay fluorescent fixtures are now practical for high-bay applications. Replacing metal halide HID high-bay lamps with multi-fixture T-5 fluorescent lamp fixtures can result in energy savings up to 50% per fixture. And the new T-5 fixtures yield an increased amount of illumination at the working surface. Plus, fluorescent lamps provide better light quality than even the best HID's. For example, the color-rendering index (CRI) of T-5's is 82 or higher compared with 65 – 70 for metal halide or 50-60 for Mercury Vapor (pure sunlight would be a CRI of 1.0).

  Also, fluorescent high-bay lights can be used with occupancy sensors and can be dimmed or controlled with multi-level switching, thus also decreasing annual energy consumption. The initial cost for T-5 fluorescent fixtures is initially higher than HID fixtures, but lamp life is longer, so an economic evaluation of increased costs versus increased savings must be made in order to justify T-5 installation.

- Occupancy Sensor Controls:
  Many spaces have already been retrofit with occupancy sensor motion detector lighting controls. Recommend the addition of motion detector, or 'occupancy sensors' for lighting control in closets, store-rooms, offices, walk-in refrigerated boxes, and machine room / restrooms that do not already contains them. These units will assure that lights remain off in unoccupied spaces thus saving electric energy. This evaluation uses an average savings rate of 25% for these areas, which is less than the EPA "Green Lights" federal program guidelines, thus resulting in a conservative savings estimate.

- EXIT Signs:
  Replace all existing Incandescent and Compact Fluorescent Exit Signs with new LED type Exit signs in each building.

ENERGY EFFICIENCY PROJECTS:

- Replace Base Building Packaged HVAC Units with new higher-efficiency units that use Non-CFC refrigerant.
  Original 1986 packaged AC units were replaced in 2003. Current units use variable speed (frequency) drives controlled by static pressure for supply and return air fans were also added in 2003 to accomplish an efficient variable air volume (VAV) air delivery system. Present units use refrigerant R-22 and have an original rated efficiency of EER (Energy Efficiency Rating) 9.5 (equivalent to 1.26-kW per Ton).

  New, higher efficiency AC units for large AC units (40-90-Tons) are now available that are rated at EER 11.5 (equivalent to 1.04-kW per Ton, an improvement of 17%). Furthermore, these new units use Non-CFC refrigerant R410A. R-22 is no longer allowed in new AC units for production and sale of R22 must be eliminated by Year 2020. However, there is no compelling reason to replace the existing AC units at this time (Age 6-Years) until units reach normal end of life conditions between 15-20 years of age.

- Highest Efficiency Motors:
  We evaluated replacing the largest continuously operating standard efficiency motors with NEMA premium efficiency motors. The return on investment may be low for a wholesale change out at this time. However, be sure to always replace standard efficiency motors with premium efficiency after end of normal life for existing motors.

Next Steps:

- Apply for all available Southern California Edison(SCE) **public benefits programs** incentives for the measures described above. See the SCE website for more information or contact your SCE representative.

- Retain a bonded, licensed lighting contractor and perform a lighting retrofit for Garage areas in accordance with the enclosed recommended lighting upgrade contained herein. Includes EXIT sign retrofit and addition of occupancy sensors in presently un-controlled areas.

Partner Energy

UTILITY BILL SUMMARY WORKSHEET

SITE: CATALINA LANDING

	310 Golden Shore TOU-GS-3B 3-020-6239-09			320 Golden Shore TOU-GS-3B 3-020-6149-31			330 Golden Shore TOU-GS-3B 3-020-6150-54			340 Golden Shore GS-2 3-020-6240-44 340 Golden Shore GS-2 3-027-9967-17			Parking Garage GS-2 3-020-6239--61			TOTAL METERS		
	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost
Jan-09	232	68,232	$ 9,087	217	55,375	$ 7,758	309	92,482	$ 12,050	175	42,242	$ 5,392	56	30,240	$ 3,133	989	288,571	$ 37,420
Feb-09	212	66,161	$ 8,638	174	46,351	$ 6,396	280	83,220	$ 10,785	164	42,936	$ 5,310	55	30,240	$ 3,098	885	268,908	$ 34,227
Mar-08	262	78,642	$ 10,233	214	66,457	$ 8,589	300	95,339	$ 12,096	166	15,629	$ 2,693	51	29,960	$ 3,012	993	286,027	$ 36,623
Apr-08	307	81,096	$ 11,146	259	67,453	$ 9,267	327	94,152	$ 12,483	371	17,051	$ 3,927	51	28,640	$ 2,955	1315	288,392	$ 39,778
May-08	308	86,209	$ 11,981	265	78,576	$ 10,634	308	96,884	$ 12,905	247	18,818	$ 3,676	52	31,160	$ 3,266	1180	311,647	$ 42,462
Jun-08	316	92,937	$ 20,027	255	78,164	$ 16,416	316	103,338	$ 20,891	228	15,560	$ 5,705	52	28,280	$ 4,144	1167	318,279	$ 67,184
Jul-08	313	95,827	$ 20,116	254	83,125	$ 16,797	312	110,608	$ 21,388	315	17,395	$ 7,401	53	30,160	$ 4,340	1247	337,115	$ 70,041
Aug-08	313	106,520	$ 21,025	260	92,931	$ 17,773	314	103,859	$ 20,940	337	18,978	$ 7,823	54	28,520	$ 4,225	1278	350,808	$ 71,786
Sep-08	305	96,818	$ 20,063	275	82,746	$ 17,597	331	121,976	$ 23,038	327	20,255	$ 8,229	54	32,400	$ 4,587	1292	354,195	$ 73,514
Oct-08	298	93,451	$ 12,104	277	86,549	$ 11,220	326	120,080	$ 14,709	297	25,332	$ 4,456	53	34,040	$ 3,384	1251	359,452	$ 45,874
Nov-08	222	70,215	$ 9,154	259	73,485	$ 9,868	297	95,539	$ 12,200	138	35,592	$ 4,524	54	31,120	$ 3,220	970	305,951	$ 38,965
Dec-08	194	58,134	$ 7,663	212	57,946	$ 7,854	274	87,227	$ 11,106	141	36,169	$ 4,587	57	34,840	$ 3,545	878	274,316	$ 34,755
Total/Max.	316	994,242	$ 161,238	277	869,158	$ 140,170	331	1,204,704	$ 184,592	371	305,957	$ 63,720	57	369,600	$ 42,911	1315	3,743,661	$ 592,630
	Avg. Cost	$ 0.16217	per kWh	Avg. Cost	$ 0.16127	per kWh	Avg. Cost	$ 0.15323	per kWh	Avg. Cost	$ 0.20826	per kWh	Avg. Cost	$ 0.11610	per kWh	Avg. Cost	$ 0.15830	per kWh

Partner Energy

UTILITY BILL SUMMARY WORKSHEET

SITE: CATALINA LANDING

	310 Golden Shore TOU-GS-3B 3-020-6239-09			320 Golden Shore TOU-GS-3B 3-020-6149-31			330 Golden Shore TOU-GS-3B 3-020-6150-54			340 Golden Shore GS-2 3-020-6240-44 340 Golden Shore GS-2 3-027-9967-17			Parking Garage GS-2 3-020-6239--61			TOTAL METERS		
	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost	kW	kWh	Cost
Jan-09	232	68,232	$ 9,087	217	55,375	$ 7,758	309	92,482	$ 12,050	175	42,242	$ 5,392	56	30,240	$ 3,133	989	288,571	$ 37,420
Feb-09	212	66,161	$ 8,638	174	46,351	$ 6,396	280	83,220	$ 10,785	164	42,936	$ 5,310	55	30,240	$ 3,098	885	268,908	$ 34,227
Mar-08	262	78,642	$ 10,233	214	66,457	$ 8,589	300	95,339	$ 12,096	166	15,629	$ 2,693	51	29,960	$ 3,012	993	286,027	$ 36,623
Apr-08	307	81,096	$ 11,146	259	67,453	$ 9,267	327	94,152	$ 12,483	371	17,051	$ 3,927	51	28,640	$ 2,955	1315	288,392	$ 39,778
May-08	308	86,209	$ 11,981	265	78,576	$ 10,634	308	96,884	$ 12,905	247	18,818	$ 3,676	52	31,160	$ 3,266	1180	311,647	$ 42,462
Jun-08	316	92,937	$ 20,027	255	78,164	$ 16,416	316	103,338	$ 20,891	228	15,560	$ 5,705	52	28,280	$ 4,144	1167	318,279	$ 67,184
Jul-08	313	95,827	$ 20,116	254	83,125	$ 16,797	312	110,608	$ 21,388	315	17,395	$ 7,401	53	30,160	$ 4,340	1247	337,115	$ 70,041
Aug-08	313	106,520	$ 21,025	260	92,931	$ 17,773	314	103,859	$ 20,940	337	18,978	$ 7,823	54	28,520	$ 4,225	1278	350,808	$ 71,786
Sep-08	305	96,818	$ 20,063	275	82,746	$ 17,597	331	121,976	$ 23,038	327	20,255	$ 8,229	54	32,400	$ 4,587	1292	354,195	$ 73,514
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Nov-08	222	70,215	$ 9,154	259	73,485	$ 9,868	297	95,539	$ 12,200	138	35,592	$ 4,524	54	31,120	$ 3,220	970	305,951	$ 38,965
Dec-08	194	58,134	$ 7,663	212	57,946	$ 7,854	274	87,227	$ 11,106	141	36,169	$ 4,587	57	34,840	$ 3,545	878	274,316	$ 34,755
Total/Max.	316	994,242	$ 161,238	277	869,158	$ 140,170	331	1,204,704	$ 184,592	371	305,957	$ 63,720	57	369,600	$ 42,911	1315	3,743,661	$ 592,630
	Avg. Cost	$ 0.16217	per kWh	Avg. Cost	$ 0.16127	per kWh	Avg. Cost	$ 0.15323	per kWh	Avg. Cost	$ 0.20826	per kWh	Avg. Cost	$ 0.11610	per kWh	Avg. Cost	$ 0.15830	per kWh

Partner Energy

LIGHTING AUDIT WORKSHEET

SITE: Garage: Catalina Landing

ADDRESS: Long Beach CA 90802

OPTION: No Reflectors

E Existing Occupancy Sensor

x Eligible for New Occupancy Sensor

Space	Eligible Occ Snsr ?	Existing Fixture Type	Watts/ (E) Fixt.	No. (E) Fixtures	Hours/ Day	Days/ wk	Hrs/ year	Exist. kW	Exist. kWh	New Fixture Type	Watts/ (N) Fixt.	No. New Fixt's.	New kW	New kWh	kW Saved	kWh Saved
Parking Roof Pole lts		250 HPS	275.0	12	7.0	24.0	8,736	3.30	28,829	Outdoor LED	78.0	12.0	0.9	8,177	2.36	20,652
1st & 2nd Floor Parking		LU100HPS	115.0	315	7.0	24.0	8,736	36.23	316,462	14x14x8 LED	55.0	315.0	17.3	151,351	18.90	165,110
		4x1x1F40 (34)T-12	34.0	58	7.0	24.0	8,736	1.97	17,227	4x1x1F025T8/HE elec	24.0	58.0	1.4	12,161	0.58	5,067
Stairwells (3)		4x1x1F40 (34)T-12	34.0	18	7.0	24.0	8,736	0.61	5,346	4x1x1F025T8/HE elec	24.0	18.0	0.4	3,774	0.18	1,572
Subtotal				403				42.11	367,864				20.09	175,463	22.02	192,402
EXIT signs		2x20W CF Exit	40.0	4	7.0	24.0	8,736	0.16	1,398	LED Exit	3.0	4.0	0.0	105	0.15	1,293
Subtotal				0				-	-				0.00	0	-	-
Total				403				42.11	367,864				20.09	175,463	22.02	192,402

Lighting Index Before retrofit 0.18 Watt/SF

After retrofit: 0.09 Watt/SF

BALANCE

Act. Billing kWh 369,600

Audit Ann. kWh 367,864

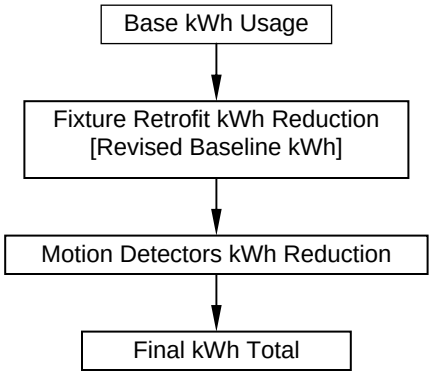
Variance 0.47%

Lighting Occupancy Sensors:

The most effective method of electricity reduction is to TURN OFF THE LIGHTS !!! If an effective system of employee training or very inexpensive signs can be implemented, that is the most cost-effective way to capitalize in keeping un-needed lights in the "off" position. However, as the duties of busy personnel dictates, it is not always safe to rely on human nature to keep unnecessary lights off. Therefore, the use of a control system, or physical means of keeping lights off, may be employed to ensure the reliability of such a task.

The most common use of a mechanical means to turn off unneeded lights is the Occupancy Sensor or Motion Detector. These devices use an infrared light beam to sense motion within a specified range and this will complete a relay circuit that turns on the lights. If after a period of no movement in the area, the sensor breaks the circuit, thus turning off the lights. We recommend using motion detectors that are adjustable. Set the "No Motion" setting to 5 minutes and the "Stay On" setting to ten minutes. If the Stay On setting is too short, the higher current draw of the energy efficient electronic ballasts will offset any savings.

Motion detectors are best suited to rest-rooms, offices, storage rooms, classrooms, and janitor areas. They are not generally suited for nurse's stations, exam rooms, corridors, and surgeries. Sensing range is up to 60 feet with a coverage of approximately 180°. Indoor and outdoor types are available. Costs range from $40 for the unit only up to $100 fully installed material and labor total for some models. Note that the kWh savings must be compared not to the original base electric usage, but to the new, lower wattage, retrofitted light fixtures. As the retrofitted light fixtures use significantly less kW per fixture, motion detectors will have a reduced return on investment versus being used on non-retrofitted fixtures.



For example, look at the case of this sample fixture:

Before retrofit, 4-f40t12/Std-mag @ 188 Watts x 500 annual hours saved by motion detectors = 94 kWh saved. After retrofit, 3-f32t8/elec. @ 90 Watts x 500 annual hours saved by motion detectors = 45 kWh saved.

Replace High Intensity Discharge Lighting with T-5 Fluorescent Lamps:

Fluorescent lighting has long made sense for low-ceiling applications (under approximately 15 feet in height). It has been normal practice to use high-intensity discharge (HID) lighting for high-bay areas (over 15 feet high ceilings). Recent advances, as noted in publications such as the '*Environmental Building News*' indicate that specially designed T-5 high-bay fluorescent fixtures are now practical for high-bay applications. Replacing metal halide HID high-bay lamps with multi-fixture T-5 fluorescent lamp fixtures can result in energy savings up to 50% per fixture. And the new T-5 fixtures yield an increased amount of illumination at the working surface. Plus, fluorescent lamps provide better light quality than even the best HID's. For example, the color-rendering index (CRI) of T-5's is 82 or higher compared with 65 – 70 for metal halide (pure sunlight would be a CRI of 100.0).

Also, fluorescent high-bay lights can be used with occupancy sensors and can be dimmed or controlled with multi-level switching, thus also decreasing annual energy consumption. The initial cost for T-5 fluorescent fixtures is initially higher than HID fixtures, but lamp life is longer, so an economic evaluation of increased costs versus increased savings must be made in order to justify T-5 installation.

The following comments are directed specifically for the retrofit of Metal Halide HID lighting with multi-lamp T-5 fluorescent fixtures. The following describes in more detail descriptions of the improvements made by retrofitting Metal Halide HID lighting with T-5 high-output multi-lamp fluorescent fixtures.

1. Energy Savings: Existing high-bay 400 Metal Halide (461-Watts per fixture) lamps can be replaced with Multi-lamp T-5 fluorescent high output fixtures (234-Watts per fixture) and1,000 Metal Halide (1,100-Watts per fixture) lamps can be replaced with Multi-lamp T-5 fluorescent high output fixtures (468-watts per fixture).

2. Dimming Capabilities: T-5 high-output multi-lamp fluorescent fixtures use combination of switches to stage the lighting using a 2-lamp per ballast configuration. For example, an eight-lamp fixture would be switched with 2, 4, 6, or 8 lamps on, thus achieving incremental steps of 25%, 50%, 75%, and 100% illumination levels.

3. Program Start Ballast (PSB): Current Metal Halide (MH) HID lighting takes a long time, up to 10-minutes, to warm-up and reach operating temperature, color, and illumination. HID lighting is therefore incompatible with occupancy sensor applications. PSB significantly reduces or even eliminates the "warm-up" time required for standard HID lighting. It is best suited for occupancy sensor application.

4. Color: Color-rendering index (CRI) i.e., "color shift" for T-5 fluorescent high output fixtures is better than Metal Halide (MH) bulbs. For example, the color-rendering index (CRI) of T-5's is 82 or higher compared with 65 – 70 for Metal Halide bulbs (sunlight would be considered as CRI 100). This is an important aspect for Exhibition Hall lighting where 'true' color representation of displayed products is important to the exhibitors. Also, the color of MH lamps degrades over time so an undesirable inconsistent color 'checker boarding' with white and pink lamps occurs in a large space over time.

5. Illumination: T-5 high-output multi-lamp fluorescent fixtures will increase lighting illumination on the surface by about 25% versus Metal Halide (MH) bulbs.

6. Illumination Degradation: T-5 high-output fluorescent lamps retain their illumination outputs at a higher level throughout their life versus HID's. Metal Halide (MH) lamps degrade by up to 60% foot-candle output over the life of the lamp. T-5 high-output fluorescent lamps retain 95% of illumination output over entire life. Therefore the space lighting illumination with T-5 fluorescent high output fixtures will stay at a higher level for a longer period than with HID's..

7. Lamp Life: Rated lamp life for MH lamp is12,000-hours vs. rated life of 24,000-hours for T-5 high-output fluorescent lamps, based on standard rating system. Rated, or average (median), life for metal halide lamps is a value of lamp life expectancy based on laboratory and field tests of representative lamps, operating on approved ballasts, with a burn cycle of at least 10 hours per start. The average life is determined when 50% of traditional metal halide lamps initially installed are still operating. For 300 - 875-Watt MH lamps, life is determined when 70% of the initial lamps installed are still operating.

   Various operating conditions affect lamp life. One key factor is operating position. Position-oriented lamps (designed to operate in one specific position) are tested and rated based on that designated position. Operating these lamps in any other positions can dramatically shorten life, reduce lumen output and cause color shift. Lamps designated universal can be operated in any position. However, life expectancy and lumen output are sacrificed in certain positions. Published "rated life" for universal lamps is based on operation in the vertical position. "Rated life" for a universal lamp operated horizontally is 75% of the published rating.

   Shorter operating cycles reduce life. At operating cycles shorter than 10 hours per start, life will shorten as follows: 5-hrs/start: Life is 75% of rating; 2.5-hrs/start: Life is 55% of rating; 1.25-hrs/start: Life is 40% of rating. Other factors, alone or in combination, that can also reduce lamp life include: 1) High or low line voltages; 2) Marginally-operating control devices (ballasts, capacitors, ignitors, dimming systems, etc.); and 3)Extremely high operating temperatures.

Economic life refers to the hours of operation during which a lamp is designed to provide optimum light output and color quality as well as lowest replacement cost. Economic life describes actual lamp life better than rated life because rated life does not account for the lumen depreciation and color shift that occur as lamps age. The economic life of lamps is generally 60% to 75% of the lamp rated life. Though economic life is important when considering a lighting system, lamp data tables show "Rated" life because they provide a comparison with other lamp manufacturers' ratings.

8. Light Distribution: T-5 high-output multi-lamp fluorescent fixtures will distribute the light more evenly than the present MH HID domed fixtures. In addition, the light on the surface of the space will be even and reduce or eliminate the variance in illuminance foot-candles described above for the present condition.

9. Lower Cooling Requirement: Less internal space heat gain from lighting is another result of T-5 high-output multi-lamp fluorescent fixture installation. One-Ton of refrigeration air conditioning equals 12,000-Btu per hour. One-kW of electricity equals 3,413-Btu per hour, therefore, in theory anyway, one-kW reduction in lighting demand is equivalent to 0.28-Tons of cooling. Of course this assumes the peak cooling demand coincides with peak lighting demand, and actual cooling Tons demand is affected by this diversity.

10. Fixture Mounting: Fixtures can be suspended in a "flat" position – this distributes weight and heat more evenly using aircraft cables for suspension. Installation would meet current seismic safety requirements.

EEM Summary:

Retrofit high-bay and exterior lighting in accordance with the attached Lighting Audit Worksheets using T-5 fluorescent high output fixtures.

Partner Energy

CUSTOMER DATA COVER SHEET

Comprehensive Energy Audit Program (CEAP):

CUSTOMER NAME:	Garage: Catalina Landing	
ADDRESS:	Garage: 345 Golden Shore Long Beach CA 90802	
	ELECTRIC METER #1	
UTILITY:	S.C.E.	
SERVICE ADDRESS:	Parking Garage	
ELECTRIC RATE	GS-2	
ELEC ACCT NO.	3-020-6239--61	
METER NO.	N/a	
TOTAL AREA (SF): CONDITIONED AREA (SF):	233,500 SF, est'd. - SF, est'd.	
SCHEDULE:	24-7 Mon-Sun	
LOCATION:	AREA (SF)	CONDITIONED AREA (SF)
Garage	233,500	-
Total SF:	233,500	-

Partner Energy

ITEMIZED CALCULATION OF LIGHTING / MECHANICAL EEM's

Site: Garage: Catalina Landing
Long Beach CA 90802

Note: Annual savings and usage estimates are based on the consumption history for the preceding twelve calendar months and will vary according to actual usage.

DESCRIPTION:
Garage: Replace 100HPS lighting with high-efficiency LED lamps, T12 lamps to T8, LED Exit Signs

A	Existing Annual Lighting Use	Lighting Worksheet Table		367,864	kWh/year
A1	Existing Annual Lighting Demand	Lighting Worksheet Table		42.1	kW
B	New Annual Lighting Use	Lighting Worksheet Table		175,463	kWh/year
B1	New Annual Lighting Demand	Lighting Worksheet Table		20.1	kW
C	Occupancy (Load) Factor			100%	
D	Lighting Energy Savings	= (A - B) x C		192,402	kWh/year
D1	Lighting Demand Savings	= (A1 - B1) x C1		22.0	kW
E	Electric kWh savings Rate	With kW Demand Sav's.	$	0.1161	/ kWh
F	Annual Cost Savings	= C x D	$	22,338	/ Year
		SCE SPC Incentive program	$	0.05	per kWh Saved
			$	100	per kW Saved
		Rebate Amount	$	11,822	

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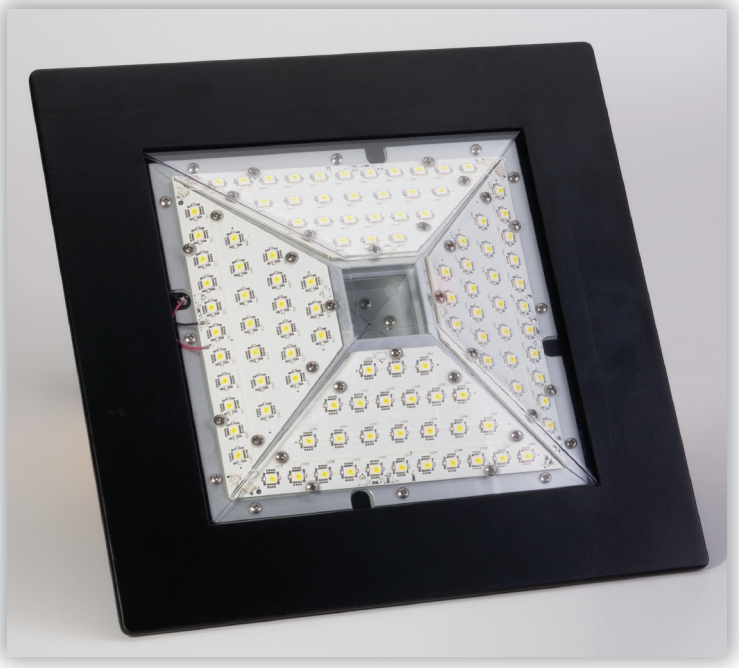
Changing the way the world experiences light.



Pyramid LowBay

Combining superior performance and energy efficiency with style. Typical applications include warehouse, stockroom, parking garage and other large volume facilities requiring wide distribution of glare free, low maintenance light.

Mounting options include pendant, surface or sloped conditions. The wide range power supply does not require special ballast or voltage considerations.

Features

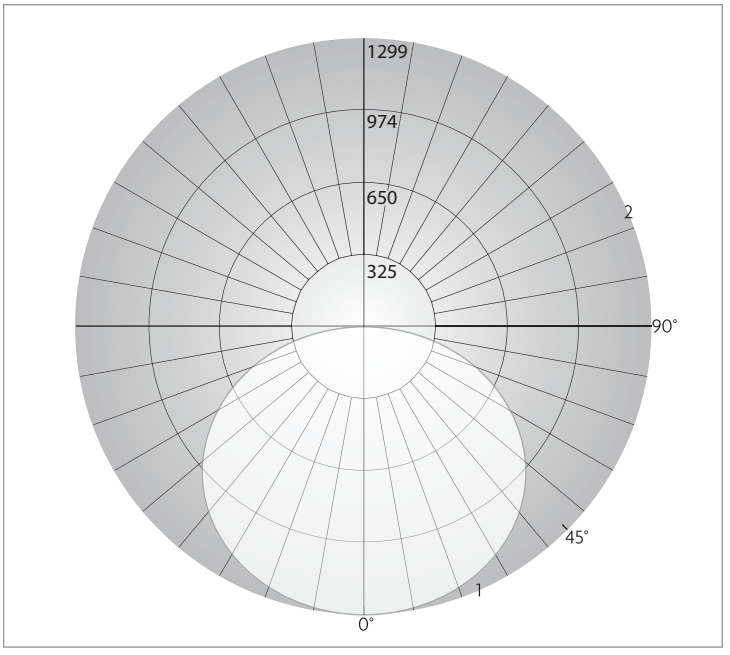
Features	Generation 1	Generation 2
Lumen Output	3100	4700
Input Power	85 Watts	78 Watts
Efficacy	36.5 (lm/w)	60.2 (lm/w)
Color Temperature (CCT)	5500K	5500K
Color Rendering Index (CRI)	75	75
Beam Spread	30°, 45°	30°, 45°
Rated Life	50,000 Hours	
	70% Lumen Maintenance	
LEDs	108 per Fixture	
Housing	Anodized Aluminum	
Included standard	Black	
Optional	Silver	
Mounting Options	Surface Mount	
	Pendant Mount	
Dimensions	14"x 14"x 4" w/o PSU	
	356 x 356 x 102mm w/o PSU	
	14"x 14"x 8" w/ PSU	
	356 x 356 x 203mm w/ PSU	
Power Supply	5" x 4.4" x 1.84"	
	127 x 112 x 47mm	
Operating Temperature	-40°C to +45°C	
Voltage	100-277 Volts AC @ 50-60 Hz	
Weight	28lbs w/PSU	
Warranty	5 Year Limited	
Certification	CE ETL RoHS COMPLIANT	
Environment	IP66 WET	

Benefits

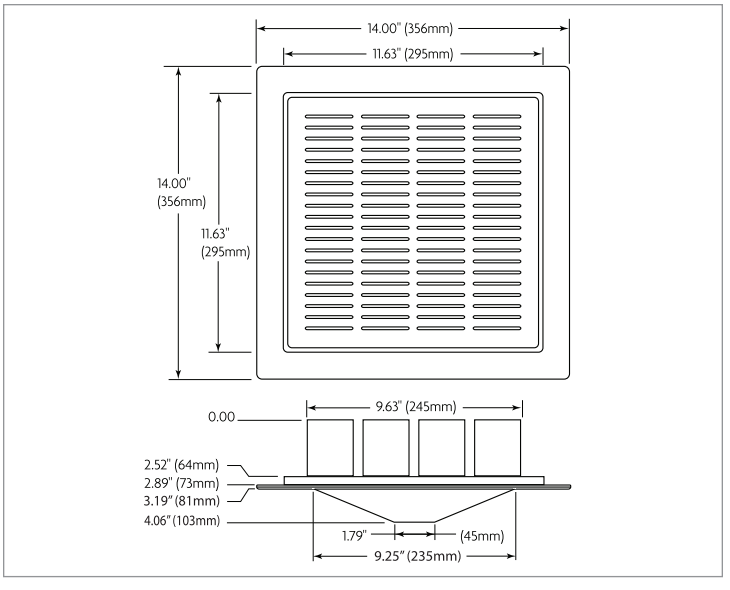
- Up to three times longer life at approximately half the energy consumption of conventional sources.
- Significantly longer life leads to reduced maintenance and material costs.
- Good color rendering for enhanced visibility and safety.
- Choice of mounting options to meet a variety of architectural forms in horizontal and vertical positions.
- Instant on/instant re-strike.

LBP G4 SP002
Apr 2009

Pyramid LowBay



Maximum candela = 1299 Located at Horizontal Angle = 5, Vertical Angle = 3
#1—Vertical Plane Through Horizontal Angles (5–185) (Through Max. Cd.) : BLUE
#2—Horizontal Cone Through Vertical Angle (3) (Through Max. Cd.) : RED



Dimensions shown in inches (mm)

Luminance Data (cd/sq.m)

Angle In Degrees	Average 0°	Average 45°	Average 90°
45°	24,355	23,398	24,355
55°	23,924	22,957	23,952
65°	24,217	21,000	24,396
75°	25,934	21,439	25,985
85°	27,366	31,720	27,466

Zonal Lumen Summary

Zone	Lumens	% Lamp	% Fixt
0–30	984.38	N.A.	19.8
0–40	1,577.4	N.A.	31.8
0–60	2,960.33	N.A.	59.6
0–90	4,852.94	N.A.	97.7
90–120	114.49	N.A.	2.3
90–130	114.49	N.A.	2.3
90–150	114.49	N.A.	2.3
90–180	114.49	N.A.	2.3
0–180	4,700	N.A.	100.0

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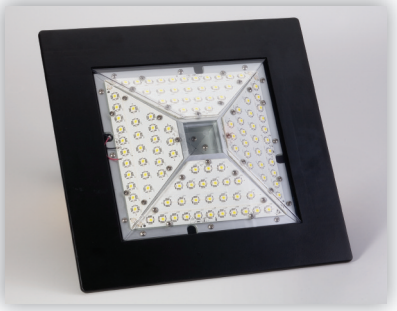
Specifications subject to change.



Pyramid LowBay

Ordering Information

Example: PLB CW 4D CLR SRF G2

Product	Color Temperature	Beam Spread	Lens	Mounting	Housing Generation	Color
PLB Pyramid LowBay	**CW** Cool White	**30** 30°	**CLR** Clear	**SRF** Surface	**G1** 3100 Lumens	Black - Included standard
		45 45°	**FRT** Frosted	**PND** Pendant	**G2** 4700 Lumens	**SLV** Silver

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