

New Strategies for Old Buildings: Working in Existing Buildings

How to Sell Your Project Using Financial Matrices

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City of Culver City

Culver City At a Glance

Location – Westside of Los Angeles County, 6 miles Northeast of LAX

Population – 40,000

Size- 5+ Sq. Miles



Step #1: Benchmarking

Determine where the best opportunities for savings may be.



Benchmarking Report

Comparative Energy Analysis

Prepared for
City of Culver City

Prepared by
The Energy Network

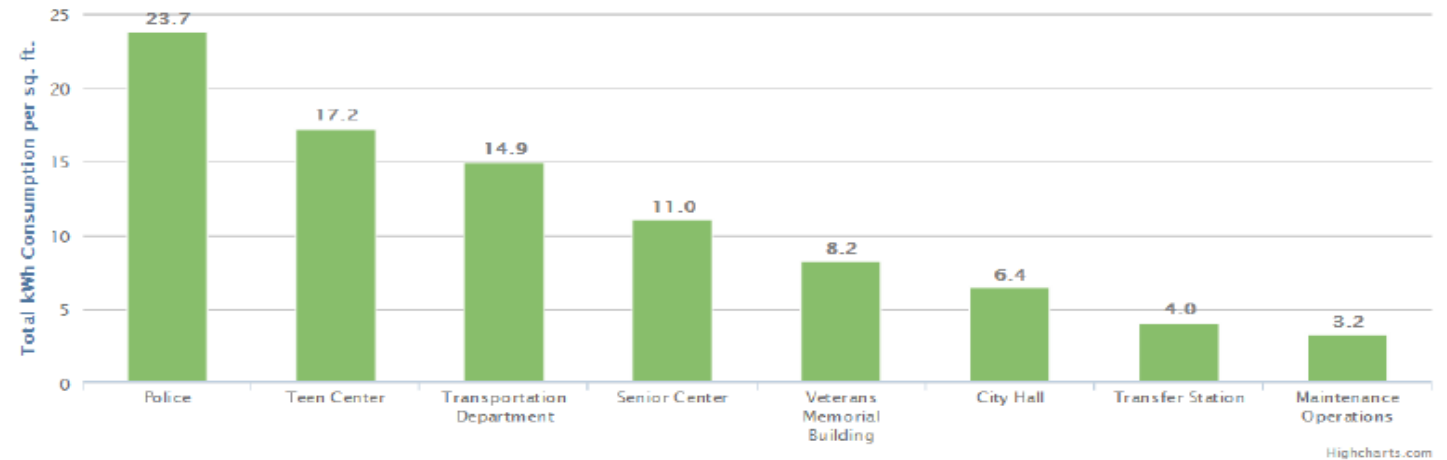
10/22/2013

Benchmarking cont.

Metrics Included:

- Total Annual Electrical Costs & Use per Facility
- Total Annual Use & Cost Intensity (Per Square Foot) per Facility

Figure 5.1 – Annual Electricity Use Intensity (kWh/sq.ft.) – Selected Facilities (buildings only)



Step #2: Comprehensive Audits

Quantify Possible Savings
Financial Measures
demonstrate project value

- Net Present Value
- Internal Rate of Return
- Return on Investment
- Simple Payback

Recommended Measures

Energy Efficiency Measure	Annual Savings ¹			Cost Savings, Project Costs, and Utility Incentives					
	Electric Savings (kWh)	Peak Savings (kW)	Gas Savings (therms/yr)	Annual Electric Cost Savings ² (\$/yr)	Annual Gas Cost Savings ² (\$/yr)	Total Annual Cost Savings ² (\$/yr)	Gross Project Costs ³ (\$)	Total Rebates/Incentives ⁴ (\$)	Net Project Costs (\$)
Interior LED fixture replacements (utilizing approved luminaries)	116,723	34.4	(419)	\$15,730	-\$193	\$15,538	\$141,240	\$16,277	\$124,963
Wall- or ceiling-mounted lighting sensor < 500 watts controlled	6,644	4.9	(24)	\$895	-\$11	\$884	\$6,600	\$2,100	\$4,500
Subtotal	123,367	39.3	(443)	\$16,626	-\$204	\$16,422	\$147,840	\$18,377	\$129,463

Financials

Project Costs	Gross Project Costs (\$)	Total Rebates/Incentives (\$)	Net Project Costs (\$)	Net Present Value ^{5,8} (NPV)	Internal Rate of Return (IRR)	Savings-to-Investment Ratio ⁷	Return on Investment ⁸ (ROI)	Simple Payback ⁹ (years)
Total Project Cost	\$185,216	\$18,377	\$166,839	-\$12,720	2.7%	0.92	9.8%	10.2
Energy Network	\$37,376		\$37,376					
Agency Only Cost	\$147,840	\$18,377	\$129,463	\$24,656	7.1%	1.19	12.7%	7.9

Additional Benefits

In addition to both cost and energy savings, this project would generate the following benefits:

- ✓ Upgraded lighting quality
- ✓ Improved lighting levels and safety
- ✓ Reduce maintenance (labor and materials) for future lamp and ballast replacements
- ✓ Reduced greenhouse gas emissions
- ✓ Position city as community leader
- ✓ Positive public image and community recognition

Develop List of Proposed Energy Saving Measures

- Utilizing the comparison metrics and expected available budget – select the most cost effective and desirable energy savings measures to pursue.

1.1 Recommended Measures

The following mechanical energy efficiency measures (EEMs) are recommended for the city to pursue based on an analysis of the energy savings, costs, available rebates, and additional O&M improvements that these measures provide.

- **EEM-1: Install or Repair Supply Fan VFD (retrocommissioning)**

This measure proposes to replace the existing variable frequency drives (VFDs) that are intended to control the supply fan motor speeds on the building's rooftop air conditioning units. The existing VFDs have malfunctioned and the fans now operate in 'bypass mode,' meaning that the fans are operating at full speed whenever they're active. Installing new drives will re-establish variable speed control of the supply fan motors and allow for reduced fan energy consumption any time the full airflow is not required.

- **EEM-2: Install, Repair, or Optimize Return Fan VFD (retrocommissioning)**

This measure proposes to replace the existing VFDs that are intended to control the return fan motor speeds on the building's rooftop air conditioning units. The existing VFDs have malfunctioned and the fans now operate in 'bypass mode,' meaning that the fans are operating at full speed whenever they're active. Installing new drives will re-establish variable speed control of the supply fan motors and allow for reduced fan energy consumption any time the full airflow is not required.

- **EEM-3: HVAC Energy Management System (EMS)**

This measure proposes to replace the existing HVAC energy management system (EMS) with a new, upgraded EMS. The new EMS will allow for better control of equipment operating hours, improved air-side economizer operation, and finer control of temperature set points throughout the building.

Project Financial Plan

Energy Efficiency Measure (EEM) Description	Electric Savings (kWh)	Peak Savings (kW)	Gas Savings (therms/yr)	TOTAL Annual Cost Savings	Gross Project Costs (\$)	Rebates/ Incentives (\$)	Net Project Costs (\$)
Exterior LED wall wash luminaries	984	-	-	\$159	\$6,216	\$108	\$6,108
Exterior LED outdoor pole/arm-	5,909	-	-	\$953	\$12,956	\$650	\$12,306
Exterior Screw-in PAR/Reflector	5,661	-	-	\$914	\$9,601	\$623	\$8,978
Interior LED fixture replacement	140,942	11	-	\$15,369	\$75,020	\$8,142	\$66,878
Exterior LED fixture replacements	69,429	10	-	\$7,571	\$92,730	\$4,445	\$88,285
Lighting controls - occupancy	4,171	-	-	\$455	\$2,613	\$209	\$2,404
Interior LED fixture replacement	184	0	(1)	\$31	\$170	\$30	\$140
Interior linear fluorescent retrofits	6,473	3	(24)	\$1,099	\$5,975	\$679	\$5,296
Interior compact fluorescent	82	0	-	\$14	\$76	\$13	\$63
Exterior LED wall-mounted area	5,084	1	-	\$871	\$4,692	\$637	\$4,055
Exterior linear fluorescent retrofits	3,542	-	-	\$607	\$4,780	\$-	\$4,780
Exterior compact fluorescent	2,140	0	-	\$367	\$1,975	\$161	\$1,814
>= 500 watts Wall or Ceiling	18,257	10	(69)	\$3,098	\$4,125	\$600	\$3,525
< 500 watts Wall or Ceiling	7,588	5	(29)	\$1,287	\$6,875	\$700	\$6,175
Total Financials if you bundle all	438,429	80	(581)	\$55,321	\$416,647	\$40,248	\$376,399
Install or repair supply fan VFD	60,958	-	-	\$8,215	\$29,739	\$6,705	\$23,034
Install, repair or optimize return fan	32,272	-	-	\$4,349	\$17,884	\$3,550	\$14,334
HVAC - energy management	111,969	-	10,577	\$19,955	\$250,495	\$30,731	\$219,764
HVAC Energy Management	101,671	(1)	1,649	\$11,673	\$150,020	\$19,827	\$130,193
Tie Into Central Plant	33,242	5	-	\$3,568	\$14,578	\$6,474	\$8,104
Optimize sizing of cooling equipment - retrocommissioning	16,001	0	-	\$1,718	\$4,572	\$2,907	\$1,665
HVAC - energy management system (EMS)	7,688	-	926	\$1,666	\$42,430	\$1,384	\$41,046
HVAC - energy management system (EMS)	15,990	1	-	\$1,744	\$86,408	\$2,487	\$83,921
HVAC - energy management system (EMS)	19,194	0	3,952	\$5,108	\$104,487	\$6,837	\$97,650
Total Financials if you bundle all	398,985	5	17,104	\$57,996	\$700,613	\$80,902	\$619,711
als if you bundle all Lighting &	837,414	85	16,523	\$113,317	\$1,117,260	\$121,150	\$996,110

Investigate Funding Options

- Utility On-Bill Financing Programs
- Low Interest Loans Available from CEC
- Grants
- City Budget Requests
- Don't forget to take into account utility rebates and incentives

RECOMMENDATIONS

- KEEP THE AGENCY BOARD INFORMED
 - Utilize Sub-Committees or Progress Reports.
 - Develop champions on the elected board if possible
 - Let them take credit
- FOLLOW UP WITH DOCUMENTATION OF ENERGY SAVINGS
 - Celebrate your success
 - Lay the groundwork for future projects.
- CONSIDER ALTERNATIVE APPROACHES TO PROJECT DELIVERY
 - National Joint Powers Authority – one option

SHARE RESULTS

April 2015

-10%

Lower consumption than last month.

131,041 kWh

Your facility's total consumption over the past month.

-11%

Lower consumption than last April.