

CASE STUDY

Preliminary Financial Feasibility Analysis: City-Owned Street Lighting Upgrades

City Of Alhambra

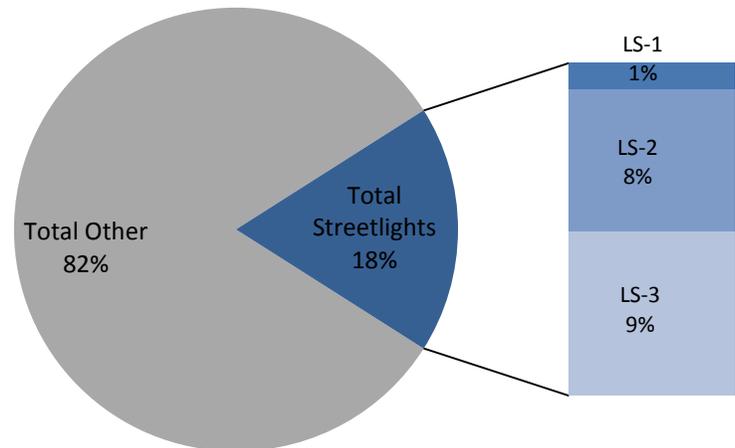
December 2012

Executive Summary

An analysis of the City of Alhambra's utility bills has shown that street lighting constitutes a significant portion (**18%**) of the city's total electricity bill costs. Further, city-owned streetlights (SCE LS-2 and LS-3 rate bills) represent **92%** of the total streetlight utility bill costs and **97%** of total streetlight energy consumption.

Upgrading Alhambra's city-owned street lighting systems by replacing existing equipment with more energy efficient technologies, such as Light Emitting Diode (LED) or induction fixtures, presents a compelling opportunity to reduce energy bills, maintenance costs, and greenhouse gas emissions while enhancing the overall performance and efficiency of the street lighting systems.

Electricity Utility Bill Cost Breakdown



The below chart provides a top-level financial summary for the City of Alhambra:

Project Summary:	LED Upgrade	Induction Upgrade
One-time project cost ¹	\$2,741,980	\$2,340,304
Utility rebate	\$183,506	\$156,053
Project cost after rebate	\$2,558,474	\$2,184,251
Energy cost savings	\$139,394	\$118,821
O&M cost savings ²	\$141,048	\$141,048
Annual cost savings	\$280,442	\$259,869
Financial Metrics:		
Simple payback period	9.1 years	8.4 years
Return on Investment (ROI)	11%	12%
Net Present Value (NPV)³	\$784,085	\$913,504
Adj. Internal Rate of Return	4.7%	5.3%
Savings to Investment Ratio	1.29	1.39

A Special Note on Financial Metrics:

Net Present Value (NPV), Adjusted Internal Rate of Return (AIRR), and the Savings to Investment Ratio (SIR) all take into account the Time Value of Money and are therefore highly regarded metrics for investment decision-making.

NPV: Typically, any positive net present value (NPV>=0) indicates a worthwhile investment.

AIRR: This represents the return on investment after accounting for the timing of cash flows.

SIR: The Savings to Investment Ratio shows the amount of savings in present value dollars that are expected for every \$1 invested today.

1 Uses the lowest pricing estimate of three short listed contractors for the City's given city-owned streetlight inventory.

2 Operations and maintenance (O&M) cost savings based on longer life of replacement fixtures (e.g. avoided relamping costs).

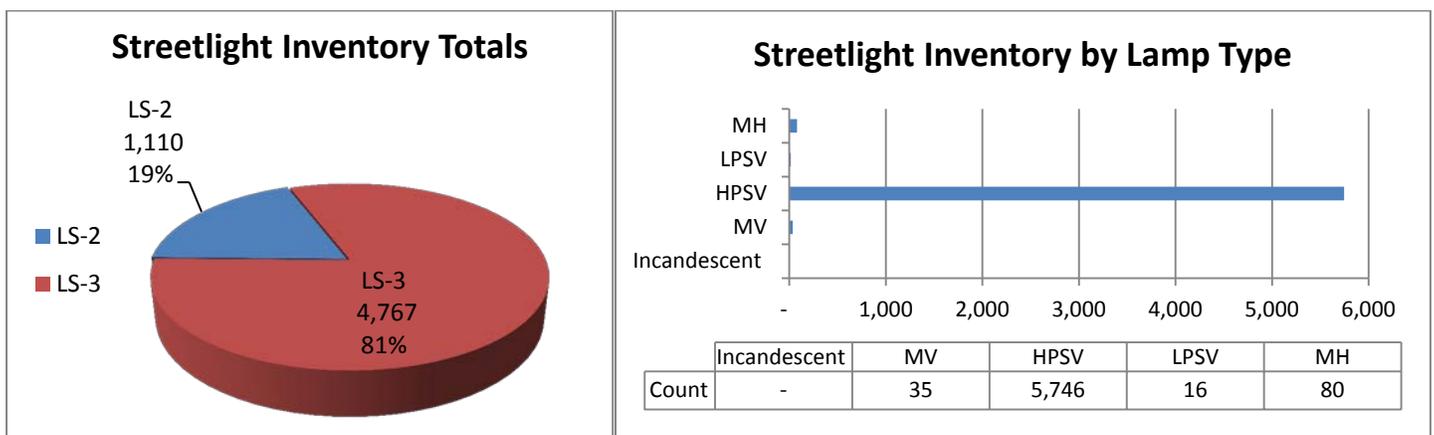
3 NPV calculation assumes project cost paid upfront (no financing) and annual savings conservatively held constant over 15-year period (i.e. no electricity rate or O&M cost escalations, which would generate greater future cost savings). Time period based on assumed LED/Induction useful life of approximately 15 yrs. If pilot program financing used, NPV calculation is irrelevant due to no upfront capital outlay from the city (i.e. cash flow positive at any discount rate.)

The following analysis details the expected costs, savings and incentives, as well as providing an attractive financing option available through the pilot program.

Please note that all estimates provided in this analysis are preliminary and may change upon verification of actual streetlight inventory. Estimates are also dependent on type of technology or product installed, city-specific contractor quotes, and other assumed rates and factors.

A. Streetlight Inventory

Based on initial information provided by the City of Alhambra, the streetlight inventory used in this analysis consists of **5,877** high-intensity discharge (HID) lamps, of which the majority are high pressure sodium vapor (HPSV) lamps (98%). The majority of Alhambra’s city-owned streetlights are also metered, or SCE’s LS-3 rate type (81%).

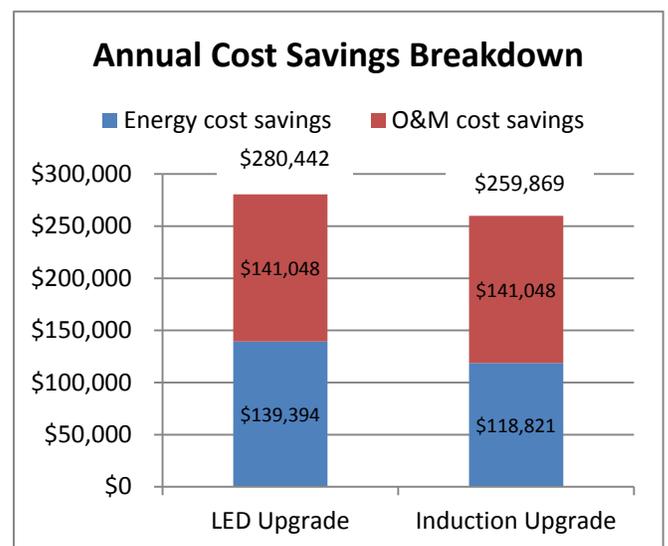


B. Savings Opportunities

Based on the streetlight inventory and utility bill rates, the following savings opportunities have been identified:

LED Upgrade

- **Lower energy bills (63% bill reduction)**
 - Energy Savings*: 2,293,821 kWh/yr.
 - Utility Bill Savings: \$139,394
- **Lower O&M costs** (57% reduction)**
 - Longer life, lower maintenance costs
 - Avoided O&M costs: \$141,048
- **Lower greenhouse gas (GHG) emissions**
 - 688 metric tons of CO₂e emissions avoided – the equivalent of taking 132 cars off the road annually!



Annual Savings Opportunities of \$280,442

*Estimated energy savings based on upgrade to LED lamps. Actual savings may vary depending on type of technology and product selected.
 **Assumes O&M expenses of \$3.50/light/month for HPS and \$1.50/light/month once upgraded to LED or Induction.

C. Expected Utility Rebate Incentive

The pilot program short list contractors use utility-approved fixtures, which qualify for additional savings through utility rebate incentives. The below chart shows the expected utility rebate for the City of Alhambra:

SCE ELP Tier		Core Incentive			LED Upgrade	Induction Upgrade
Tier	"adder"	Lighting	Total	<i>Est. Incentive</i>	<i>Est. Incentive</i>	
0	Non- ELP	\$0.00	\$0.05	\$0.05	\$114,691	\$97,533
0	Valued	\$0.03	\$0.05	\$0.08	\$183,506	\$156,053
5	Silver	\$0.06	\$0.05	\$0.11	\$252,320	\$214,572
15	Gold	\$0.09	\$0.05	\$0.14	\$321,135	\$273,092
20	Platinum	\$0.12	\$0.05	\$0.17	\$389,950	\$331,612
Total kWh Saved:				2,293,821	1,950,657	

Rebate amount is based on calculated annual energy savings (in kWh) and varies based on participation in Southern California Edison's Energy Leader Partnership (SCE ELP).

For this analysis, the City of Alhambra's SCE ELP tier is assumed to be "Valued." A higher tier would result in a higher utility rebate incentive.

D. Estimated Project Cost

Under a competitive Request for Qualifications (RFQ), the program has selected a short list of qualified contractors to provide Street Lighting Services to municipalities across the region. City-specific quotes can be provided from these contractors for either turnkey upgrades (material + labor) or for installation (labor only) street lighting services.

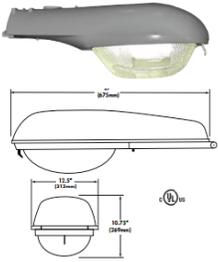
Project cost estimates are shown below for each of the three pilot program short listed contractors, Lighting Technology Services (LTS), Siemens, and Dynalectric:

Cost estimates by Contractor:	LTS	Siemens	Dynalectric	Lowest Total Cost	Lowest Avg. Unit Cost
Upgrade to LED	\$ 3,419,939	\$ 2,741,980	\$ 3,159,069	\$ 2,741,980	\$ 467
Upgrade to Induction	\$ 3,808,685	\$ 2,494,582	\$ 2,340,304	\$ 2,340,304	\$ 398
Installation only (LED or Induction)	\$ 1,337,379	\$ 440,775	\$ 587,700	\$ 440,775	\$ 75

Note: Cost estimates were calculated by multiplying each contractor's quoted unit price by Alhambra's city-owned streetlight inventory totals for each wattage category. Contractors will need to verify inventory to provide city-specific quotes, which may vary from those in the above table. Lowest average unit cost is lowest contractor's total cost divided by total inventory.

Product Offerings:

The below utility-approved fixtures offered by the pilot program's short list of qualified contractors were used in the energy savings calculations for this analysis:

LED Upgrade	Induction Upgrade
	
General Electric ERS1, ERS2, or ERS3* (5 year warranty)	Crystal Lighting CH29 or CH36* (10 year warranty)

Other utility-approved fixtures may also be available. Please let us know if there is a particular product desired. Your city can also choose to procure installation services only and the pilot program can help your city procure fixtures by piggybacking on another agency's contract.

*Model number varies by lamp wattage.

E. Energy Project Lease Financing Option

Under a competitive Request for Qualifications (RFQ), the pilot program has selected a dedicated lender. Participating cities benefit from favorable terms and conditions and receive standardized underwriting and processing. Financing provided by the pilot program is based on the project's estimated annual savings and the City Alhambra's verified credit rating. Within 5-7 days of receiving a simple financing the pilot program can provide an estimate of financing terms and conditions.

Energy Project Lease Financing benefits include:

- ✓ Provides upfront capital (not a reimbursement program)
- ✓ Adjustable terms, varies by project
- ✓ Low interest rates, varies by city

A Local Government borrowing capacity is based on:

- ✓ Project type/size
- ✓ Local government's budget
- ✓ Credit rating

The below charts show two possible borrowing options to fund the City of Alhambra's city-owned streetlight upgrades:

(1) Maximum Borrowing Option:		
This strategy allows a city to potentially finance other projects with surplus funds, while still maintaining net positive annual cash flow.		
Project:	LED Upgrade	Induction Upgrade
Expected Project Cost:	\$2,741,980	\$2,340,304
Maximum Borrowing Limit¹:	\$3,181,521	\$2,948,124
Maximum Lease Term ² :	15 years	15 years
Surplus funds:	\$439,541	\$607,820
Annual Retrofit Savings:	\$280,442	\$259,869
Annual Lease Payments:	\$276,236	\$255,971
Annual Net Cash Flow:	\$4,207	\$3,898

- Maximum Borrowing Limit determined by Annual Net Savings and Approved Interest Rate (3.5% assumed).
- Maximum lease term is based on expected useful life of lighting product, up to a maximum of 15 years.
- Surplus lease funds can be used to finance other improvement projects.
- Net positive cash flow generated
 - ❖ Annual savings **greater than** estimated lease payments

(2) Maximum Positive Cash Flow Option:

This strategy minimizes the city's annual lease payments, thereby maximizing the amount of cash flow from savings retained annually.

Project:	LED Upgrade	Induction Upgrade
Expected Project Cost:	\$2,741,980	\$2,340,304
Lease Amount:	\$2,741,980	\$2,340,304
Max. Lease Term (Years):	15	15
Surplus funds:	\$-	\$-
Annual Retrofit Savings:	\$280,442	\$259,869
Annual Lease Payments:	\$238,073	\$203,197
Annual Net Cash Flow:	\$42,370	\$56,672

- Lease amount is based on expected project cost, or maximum borrowing limit if less.
- Maximum lease term is based on expected useful life of lighting product, up to a maximum of 15 years.
- Net positive cash flow generated
 - ❖ Annual savings **greater than** estimated lease payments