Cost-Benefit Analysis - Inputs, Assumptions, and Summary

Last Updated:	September 4, 2025	Modeled for: City of xxxxxxxx

Model Inputs & Assumptions

Note: cells shaded yellow are modifiable. Critical cells are shaded in **green.**

Currency Used in Model	US Dollars	*Source: Company*
Currency Conversion Rate (USD to CAD)	0.7200	*Source: Bank of Canada*
Model Attributes		
Total Number of Fixtures for Controls	**5,400 fixtures**	*Source: Customer*
Share of Poles Owned by Utility	**0.00%**	*Source: Customer*
Number of Fixtures for LED Retrofit	**5,400 fixtures**	*Source: Customer*
Transmission/Distribution Electric Utility (TDU)	**SCE**	*Source: Various rate plans, Updated 2025*
Energy Retailer *(Select "None" if sourced from TDU)*	**None**	*Source: Various rate plans, Updated 2025*
Municipal Roadway Classification Model Used	**Fullerton**	*Source: Company*
Fixture Inventory Model Used for Modeling	**Fullerton**	*Source: Supplied or Open Data data sets*
Metered Streetlighting Current Status	Metered Streetlight Rate Available	*Source: Customer*
Installation of Smart Lighting Controls	**Installed after LED Retrofit**	*Source: Customer*
Planned Lighting Control Method	Photometric + Standards Dimming	*Source: Company*
Roadway Classification Model Used	ANSI RP-8-22	*Source: ANSI RP-8-22 Annex K/ U.S. DOT FHWA Roadway Lighting Handbook 2012*
Streetlight Ownership	**Municipal**	*Source: Customer*
Current Lighting Type Installed	**LED**	*Source: Customer*
Include LED Retrofit Project Financing Costs	**No**	*Source: Customer*
Streetlight Asset Re-Purchase Included	Pole Buyback Not Included	*Source: Customer*
Primary LED Retrofit Date	June 1, 2016	*Source: Customer*
Wiring Method (*Serial option available for SCE customers only*)	**Parallel**	*Source: Customer*
Current Photocell Control	**Fixture**	*Source: Customer*
Estimate Commissioned Wattages from San_Jose Model	**Yes**	*Source: San_Jose Fixture Data Set*
Include Emergency Maintenance Costs	**Yes**	*Source: Company*
Smart Lighting Solution Components		
Include Installation Costs	Yes	
Include Pedestrian/Cyclist Lighting Control Sensors	No	*Source: Company*
Include Cost of Device 2 Energy Analytics Solution	**Yes**	*Source: Customer*
Include Smart City-as-a-Service (*placeholder for future functionality*)	No	*Source: Customer*
Include Device 3 Solution	**No**	*Source: Customer*
Include Device 3 Pro Solution	**Yes**	*Source: Company*
Company Product Warranty Period	5 years	*Source: Company*
Include Cost of Company Onsite Project Manager	**Yes**	*Source: Customer*
Frequency of Onsite Management	71%	*Source: Company*
Number of Active Installation Crews	4	*Source: Company*
Smart Lighting Pricing to Customer		
Device 1 Price to Customer	**$ USD**	*Source: Company*
Device 4 Price to Customer	**$ USD**	*Source: Company*
Pedestrian/Cyclist Sensor + Bracket Price to Customer	$ USD	*Source: Company*
Device 2 Price to Customer	**$ USD**	*Source: Company*
Device 1 SaaS per unit per month	**$ USD**	*Source: Company*
Device 1 SaaS per unit per month	**$ USD**	*Source: Company*
Pedestrian/Cyclist Sensor SaaS per unit per month	$ USD	*Source: Company*
Device 2 Installation Cost per Unit	**$ USD**	*Source: Company*
Wire Theft SaaS Cost per Unit per month	**$ USD**	*Source: Company*
5-Year Extended Warranty for device 1 or Sensors	$ USD	*Source: Company*
5-Year Extended Warranty for Device 2	$ USD	*Source: Company*
Non-Maintenance Operational Efficiency Benefit	33%	*Source: Company*
Carbon Credit Cost per Tonne	$30.00	*Source: CARB*
Ratio of Streetlights to Lighting Control Cabinets/Meters	**Fixture to Meter Ratio: 42:1**	*Source: Electrical Safety Authority, 2015*
Economic Assumptions		
Term for All-SaaS Offering	**3.83 years**	*Source: Company*
Margin on All-SaaS Offering	**0.00%**	*Source: Company*
Cash Flow Term for ESCO Contract	**3.83 years**	*Source: Calculated*
Benefits Used for ESCO Contract Payments	All Benefits	*Source: Company*
ESCO Finance Rate / Cost of Money	**4.95%**	*Source: ESCO*
ESCO Assumes SaaS Payments	**Yes**	*Source: ESCO*
ESCO Share of Serial Project Capital Requirements	**0%**	*Source: ESCO*
Cost of Serial-to-Parallel Rewiring Project (per Pole)	**$8,500.00**	*Source: Customer*
Customer Benefits All SaaS	**0.00%**	*Source: Company*
All SaaS Cost per Fixture per Month		*Source: Calculated*
	Yes - All-SaaS Offer is Viable	
Pole Repurchase Cost	$369.00	*Source: Customer Utility*
Smart City Solution Margin (*placeholder for future functionality*)	30%	*Source: Company*
Pole Asset Life	50 years	*Source: Company*
Retained Utility Bill Benefits by Customer	**0%**	*Source: ESCO*
device 1 Controller Installations per Hour	4.00 per hour	*Source: Company*
Pedestrian/Cyclist Sensor Installations per Hour	2.00 per hour	*Source: Company*
Device 2 Installations per Hour	0.33 per hour	*Source: Company*
Fixtures Installed per Hour	2.00 per hour	*Source: Company*
Pilot Project Margin of Error	0%	*Source: Company*
Work Hours per Week	37.5	*Source: Company*
Photometric Calculations		
LED Retrofit Energy Reduction, Unmetered (kWh)	38.04%	*Source: Company*
LED Retrofit Energy Reduction, Metered (kWh)	27.07%	*Source: Company*
Smart Lighting Photometric Dimming Adjustment %	8.11%	*Source: City of San_Jose, Total Rated vs. Commissioned Fixture Wattage Data*
Smart Lighting Dimming per Roadway Classification %	48.82%	*Source: City of San_Jose, Fixture - Roadway Classification Data*
% Intersections and Crosswalks	26.87%	*Source: City of San_Jose, Fixture - Roadway Classification Data*
Average Rated Wattage per Fixture (LED)	72.6 watts	*Source: Company*
Average Rated L70 Fixture Life - LED	60,000 hours	
Average Rated L70 Fixture Life - HPS	15,000 hours	*Source: Customer*
Average Rated Luminous Efficacy - LED	142.6	*Source: Customer*
Average Rated Luminous Efficacy - HPS	104.0	*Source: Customer*
Recommended Sensor Pilot Project Size (100.0% data accuracy)	0 controllers	*Source: Statistical Calculation*
Model Variance Checking		
Estimated Rated LED Wattage by Roadway Classification Model	391,980 watts	
Estimated Rated LED Wattage by Fixture Classification Model	391,847 watts	
Variance between Calculated Roadway Class and Fixture Energy Models	0.03%	
Estimated Rated Wattage per Fixture by Roadway Classification Model	72.6 watts	
Estimated Rated Wattage per Fixture by Fixture Classification Model	72.6 watts	
City Actual Rated LED-Converted Wattage	210,508 watts	
Variance between Fixture Actual and Estimated Energy Consumption	46.28%	
Calculated Rated Roadway vs Fixture Classification Energy Variance	0.03%	

Modeled for: City of xxxxxxxx
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Smart Lighting Control and LED Streetlighting Cost-Benefit Summary - Page 1 of 2

Annual Operating Costs - US Dollars - What does the customer pay today, and what would they pay after LED retrofit and Company Smart Lighting controls are installed?

Dusk-to-Dawn (100% HPS)		**Dusk-to-Dawn (100% HPS)**	
Category	Utility-Owned Unmetered[1]	Customer-Owned Unmetered - Parallel	Customer-Owned Metered - Parallel
Electricity Costs	$1,203,466 per year	$689,955 per year	$425,939 per year
Maintenance Costs	$706,615 per year	$1,372,369 per year	$1,372,369 per year
Non-Maintenance Operating Costs	$87,953 per year	$87,953 per year	$87,953 per year
Carbon Credit Costs	$13,418 per year	$13,418 per year	$11,235 per year
Totals	$2,011,452 per year	$2,163,694 per year	$1,897,495 per year

Dusk-to-Dawn (100% LED)		**Dusk-to-Dawn (100% LED)**	
Category	Utility-Owned Unmetered - Parallel[1,5]	Customer-Owned Unmetered - Parallel	Customer-Owned Metered - Parallel
Electricity Costs	$1,013,245 per year	$500,973 per year	$316,473 per year
Maintenance Costs	$705,376 per year	$379,759 per year	$379,759 per year
Non-Maintenance Operating Costs	$87,953 per year	$87,953 per year	$87,953 per year
Carbon Credit Costs	$8,314 per year	$8,314 per year	$8,194 per year
Totals	$1,814,889 per year	$976,999 per year	$792,378 per year

company Smart Lighting Control (100% LED)			
Category	Utility-Owned Unmetered - Parallel[1]	Customer-Owned Unmetered - Parallel	Customer-Owned Metered - Parallel
Electricity Costs	$1,013,245 per year	$500,973 per year	$160,248 per year
Maintenance Costs	$705,376 per year	$379,759 per year	$243,557 per year
Non-Maintenance Operating Costs	$58,929 per year	$58,929 per year	$58,929 per year
Carbon Credit Costs[4]	$3,853 per year	$3,853 per year	$3,853 per year
Totals	$1,781,404 per year	$943,514 per year	$466,587 per year

Annual Operating Benefits - US Dollars - What would the monthly budget benefits be after LED retrofit and company Smart Lighting controls are installed?

LED Retrofit Project Savings			
Category	Utility-Owned Unmetered[1,5]	Customer-Owned Unmetered[1]	Customer-Owned Metered
Utility Bill Savings	$191,460 per year	$188,982 per year	$109,466 per year
Maintenance Savings	$1,239 per year	$992,610 per year	$992,610 per year
Non-Maintenance Operating Savings	$ per year	$ per year	$ per year
Carbon Credit Savings	$5,104 per year	$5,104 per year	$3,041 per year
Net Opex Savings	$197,802 per year	$1,186,695 per year	$1,105,117 per year

company Smart Lighting Project Savings			
Category	Utility-Owned Unmetered[1]	Customer-Owned Unmetered[1]	Customer-Owned Metered
Utility Bill Savings	$ per year	$ per year	$340,725 per year
Maintenance Savings	$ per year	$ per year	$136,202 per year
Non-Maintenance Operating Savings	$29,025 per year	$29,025 per year	$29,025 per year
Carbon Credit Savings	$4,461 per year	$4,461 per year	$4,461 per year
Net Opex Savings	$33,485 per year	$33,485 per year	$510,412 per year

LED Retrofit Annual Energy Bill Benefits - US Dollars - What would the benefits be for inputs into an ESCO contract that are clearly measurable?			
Category	Energy Bill Savings	Energy Savings (kWh)	GHG Savings
LED Retrofit Utility Bill Savings[3]	$188,982 per year	1,000,697 kWh per year	170.1 tonnes
Retained Utility Bill Savings by ESCO	$188,982 per year	1,000,697 kWh per year	170.1 tonnes
Retained Utility Bill Savings by Customer[6]	$ per year	0 kWh per year	0.0 tonnes
ESCO Contract Payback on 4.95% Return	5.83 years		

Smart Lighting Annual Energy Bill Benefits - US Dollars - What would the benefits be for inputs into an ESCO contract that are clearly measurable?			
Category	Energy Bill Savings	Energy Savings (kWh)	GHG Savings
company Smart Lighting Utility Bill Savings[2,4]	$340,725 per year	874,649 kWh per year	148.7 tonnes
Retained Utility Bill Savings by ESCO	$340,725 per year	874,649 kWh per year	148.7 tonnes
Retained Utility Bill Savings by Customer[6]	$ per year	0 kWh per year	0.0 tonnes
ESCO Contract Payback on 4.95% Return	3.83 years		

Smart Lighting + LED Retrofit Annual Energy Bill Benefits - US Dollars - What would the benefits be for inputs into combined ESCO contract that are clearly measurable?			
Category	Energy Bill Savings	Energy Savings (kWh)	GHG Savings
LED Retrofit + Smart Lighting Utility Bill Savings[2,4]	$529,707 per year	1,875,347 kWh per year	318.8 tonnes
Retained Utility Bill Savings by ESCO	$529,707 per year	1,875,347 kWh per year	318.8 tonnes
Retained Utility Bill Savings by Customer[6]	$ per year	0 kWh per year	0.0 tonnes
ESCO Contract Payback on 4.95% Return	5.08 years		

[1] *Unmetered rate plans calculate energy costs based on wattage ratings per fixture in utility rate schedules*
[2] *Assumes that streetlighting is currently on an unmetered utility energy plan and company will enable migration to a metered plan*
[3] *Unmetered customer-owned assets*
[4] *Assumes metered energy from company Device 2 advanced metering added to customer solution*
[5] *Requires pole and fixture asset municipally-owned*
[6] *In the event that an ESCO contract provides for sharing of a percentage of benefits during the ESCO contract repayment period*

Annual Economic Benefits - US Dollars $ - What are the energy bill, maintenance, operational efficiency, and GHG footprint benefits?

Estimated Current Streetlight Costs (100% LED)	**Current Costs**	**Costs After company Smart Lighting**	**Savings%**
Estimated Current Electricity Costs	$500,973	$160,248	68.0%
Estimated Current Maintenance Costs	$379,759	$243,557	35.9%
Estimated Non-Maintenance Operating Costs	$87,953	$58,929	33.0%
Wire Theft Costs (estimated 228 incidents per year)	$675,000	$405,000	40.0%
Estimated Current Carbon Offset Costs	$8,194	$3,733	54.4%
Estimated Total Current Costs of Streetlighting	**$1,651,878**	**$871,466**	**47.2%**
Estimated GHG Footprint	**273.1 tonnes**	**124.4 tonnes**	**54.4%**
Company Project Benefits	**Savings %**	**Savings $**	
Metered Energy	11.17%	$184,500	
Over-Lighting Correction	1.35%	$22,256	
Standards-Based Roadway Lighting	8.11%	$133,969	
Energy Savings	**20.63%**	**$340,725**	
Regular Maintenance + Emergency Maintenance	8.25%	$136,202	
Operational Efficiencies	1.76%	$29,025	
Device 3 Savings (estimated 91 avoided pole incidents per year) Carbon	40.00%	$270,000	
Credit Offset Savings	0.27%	$4,461	
Total Annual Savings	**47.24%**	**$780,412**	
Estimated Annual GHG Savings	**54.4%**	**148.7 tonnes**	
Net 20-Year ROI (Customer Financed)		**$12,805,793**	
Company Smart Lighting Project Break-Even (Customer Financed)		**3.67 years**	

Billed Annual Energy Consumption - kWh[4] - What is the kWh usage currently, and after LED retrofit and Company Smart Lighting controls?

Dusk-to-Dawn (100% HPS)			
Category	Utility-Owned Unmetered	Customer-Owned Unmetered	Customer-Owned Metered
Billed Electricity Consumption	2,630,927 kWh per year	2,630,927 kWh per year	2,202,857 kWh per year
Dusk-to-Dawn (100% LED)			
Category	Utility-Owned Unmetered	Customer-Owned Unmetered	Customer-Owned Metered
Billed Electricity Consumption	1,630,229 kWh per year	1,630,229 kWh per year	1,606,571 kWh per year
company Smart Lighting Control (100% LED)			
Category	Utility-Owned Unmetered	Customer-Owned Unmetered	Customer-Owned Metered
Billed Electricity Consumption	1,630,229 kWh per year	1,630,229 kWh per year	755,580 kWh per year

Annual Energy Benefits - kWh - What are the expected kWh savings after LED retrofit and Company Smart Lighting controls are installed?

LED Retrofit Energy Savings (Pro-Rated to Retrofit Fixtures)			
Category	Utility-Owned Unmetered	Customer-Owned Unmetered	Customer-Owned Metered
Gross Electricity Savings	1,000,697 kWh per year	1,000,697 kWh per year	596,285 kWh per year

Company Smart Lighting Energy Savings (All Fixtures)			
Category	Utility-Owned Unmetered	Customer-Owned Unmetered[1]	Customer-Owned Metered[2]
Gross Electricity Savings	0 kWh per year	0 kWh per year	874,649 kWh per year

LED Retrofit Project Costs & Benefits - US Dollars	
Pre-LED Retrofit Energy Costs	$689,955
Pre-LED Retrofit Maintenance Costs	$1,372,369
Pre-LED Retrofit Non-Maintenance Operating Costs	$87,953
Pre-LED Carbon Credit Costs	$13,418
Post-LED Retrofit Energy Costs	$500,973
Post-LED Retrofit Maintenance Costs	$379,759
Post-LED Retrofit Non-Maintenance Operating Costs	$87,953
Post-LED Carbon Credit Costs	$8,314
LED Retrofit Annual Benefits (Energy, Maintenance, Operations, and Carbon Credit Savings)	$1,186,695
Costs per Fixture (Installed)	$1,012.50
Annual Benefits per Fixture	$219.76
Energy-Only Retrofit Project Benefits	$188,982
Non-Energy Retrofit Project Benefits	$997,714
Estimated LED Retrofit Project Cost	$5,467,478

Company Smart Lighting Project Costs - Installed after LED Retrofit - US Dollars			
Company Project Costs	**Quantity**	**Unit Price**	**Extended Price**
Device 1 Controllers	5,400 units	$69.00	$372,600
Motion Sensors w/Mount	0 units	$118.75	$0
Device 2 Advanced Energy Metering	129 units	$1,119.00	$144,351
Device 3 Wire Theft Detection @ 91 avoided pole incidents per year	516 units	$120.00	$61,920
Cloud Licenses + Wire Theft Pro	6,045 licenses	$8.91	$53,885 per year
Installation Cost (Estimated, 11.6 Weeks, 4 Active City Crews)	6,045 units	$258.96	$1,565,428
Company Onsite Project Management @ 71% of Deployment Period	8.3 weeks	$37,846	$37,846
Total Project Cost			$2,236,030
Total Excluding Installation Cost			$670,602
Annual Benefits			$780,412
Total Cost per Fixture (Installed)			$414.08
Annual Benefits per Fixture			$144.52

Project Payback Periods - Excluding Financing Costs - All Benefits	
Company Project Payback Period (City Self-Financed, 12 Month Ramped Installation)	3.67 years
LED Retrofit Project Payback Period (City Self-Financed, 12-Month Ramped Installation)	4.61 years
company Smart Lighting + Retrofit Payback Period (City Self-Financed, 12 Month Ramped Installation)	3.92 years
company Smart Lighting Retrofit Annual Benefit Increase	65.8%

Project Payback Periods - Including Financing Costs - All Benefits	
Company Smart Lighting Project Payback Period (Financed/Cost of Money at 4.95%, Compounded Monthly)	3.83 years
LED Retrofit Project Payback Period (Financed/Cost of Money at 4.95%, Compounded Monthly)	5.83 years
Company Smart Lighting + Retrofit Payback Period (ESCO Financed at 4.95%, Compounded Monthly)	5.08 years
Company Smart Lighting Retrofit Payback Period Acceleration (ESCO Financed at 4.95%, Compounded Monthly)	12.9%