

Final Phase II Ex Ante Review Findings

Table 1-1: Project Information

IOU	Pacific Gas and Electric (PG&E)
Application ID	2K13175623
Application Date	04/22/2013
Program ID	PGE21011
Program Name	Commercial Calculated Incentives
Program Year	2013
Itron Project ID	X356
IOU Ex Ante Savings Date	5/24/2013
CPUC Staff Measure Name	Interior and Exterior LED Lighting Retrofits
Project Description	Replace linear fluorescent lighting systems, T8 and T5, with LED lighting systems in a distribution warehouse.
Date of CPUC Staff Review(s)	6/23/2013 & 12/29/2013
Primary Reviewer / Firm	Leonel Campoy & Terrence Redd / Itron
Review Supervisor / Firm	Joseph Ball / Itron
CPUC Staff Project Manager	██████████ / California Public Utilities Commission, Energy Division
CPUC Staff Policy Authorization (as needed)	
Type of Review (Desk, On-site, Full M&V, Tool)	Desk
CPUC Staff Recommendation	Final ex ante savings are approved on 12/31/2013 at the following CPUC staff-adjusted values using the default DEER 2011 hours of use for the usage groups with less than 8,688 annual operating hours: 618,519 kWh, 81.59 kW, and -58 therms

Measure Description

The project will remove existing T8 and T5 lighting systems, both high and low bay fixtures, replacing them with LED lighting in a large distribution warehouse.

Summary of Review

The Investor-Owned-Utility (IOU) resubmitted the following documents in response to the Phase I Review on 6/26/2013 for this Phase II review:

- Bill of Materials (PDF Document Attachment 1);
- Energy Savings Calculations (XLS Workbook Attachment 2);
- Operating Hours (PDF Document Attachment 3);
- Email and Phone Logs (PDF Document Attachment 4);
- IR Reviews (XLS Workbook)

CPUC staff looked at the evidence for the claimed annual operating hours for each usage group, the post-implementation inspection report (IR), and the final savings true-up. The following comments highlight the CPUC staff's findings from our review of the documentation submitted above.

CPUC staff found little supporting evidence for the annual operating hours for each lighting usage group. CPUC staff has recognized the three (3) day holiday annual shut down that reduces the annual operating hours from 8,760 to 8,688. IOU did not supply sufficient lighting logger data or EMS schedules to validate the annual hours of use for those locations that operate less than 8,688 hours annually. CPUC staff revised the calculations using the DEER default hours for each usage group where the annual operating hours are less than 8,688 (this plant's full year operating hours).

CPUC staff did not find any evidence that the project installed lighting controls in office and multipurpose areas identified by 2008 Title 24, Section 131(d). However, due to the reduction in lighting fixtures, not installing the mandated automatic shutoff controls will only impact the energy savings far less than 10% of the CPUC staff calculated claimed savings.

Because certain LED fixtures are not yet approved for use in statewide incentives programs, they were deleted in the revised calculations resulting in reduction in both energy and peak demand claims. Additionally, the customer has deleted all exterior lighting measures from this application. CPUC staff was unable to verify the material, labor, and disposal costs of the affected measures, since the "Bill of Material" lacked sufficient details that would otherwise be found on the contractor's itemized project invoice.

Based on the new information provided CPUC staff modified the calculation tool to provide more accurate energy and demand savings. Each revision in the revised calculation workbook is identified with “CPUC Staff” in an effort to present the analysis uniformly.

Between the original CMPA project data submission and this final phase II post-install review the project savings has been revised as shown in the table below.

Description	Original CMPA Savings Claim	Phase I IOU Ex Ante Claim	Phase II IOU Ex Ante Claim	Final CPUC Staff Approved Ex Ante Savings
First Year kWh Savings	1,058,457	1,277,708	1,062,267	618,519
First Year Peak kW Savings	130.0	157.2	133.1	81.6
First Year Therm Savings	-56.9	-56.9	-81.8	-58.0
Project Incentive Amount	\$ 97,672	\$78,671	\$66,426	\$57,645

Review Conclusion

Final ex ante savings are approved on December 31, 2013 at the following CPUC staff-adjusted values using the default DEER 2011 hours of use for the usage groups with less than 8,688 annual operating hours: 618,519 kWh, 81.59 kW and -58 therms. The adjusted savings calculations, entitled “CPUC Staff_2K13175623 - Revised Energy Savings Calcs.xls” workbook, can be retrieved from the CMPA website.

Table 1-2 Review Findings

Reviewed Parameter	Analysis
Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures, Major Renovation) Note: For early retirement projects only, include RUL through EUL baseline)	IOU Proposal: Early Replacement of all interior lighting measures
	CPUC Staff Assessment: Early Replacement baseline. Two baseline calculations are required. Under this project the in situ lighting equipment uses less energy than code as the RUL period (1 st baseline) and the EUL minus RUL (2 nd baseline) are both calculated using the existing in situ energy consumption
	CPUC Staff Recommendation: None
Project Baseline Technology (in situ equipment, Title 24 (specify year), other code or other efficiency level (specify), industry standard practice - ISP)	IOU Proposal: In-situ lighting fixtures for both the RUL and RUL through EUL periods due to regressive Title 24 LPD baselines.
	CPUC Staff Assessment: The in-situ T8 and T5 lighting systems are acceptable as the baseline for the RUL period. The LPD analysis provided concluded that the existing area LPD values are lower than the Title 24 maximum allowed area category LPD values. Hence, the in-situ equipment is used as the baseline for the RUL through EUL period to avoid regressive baselines. CPUC Staff corrected the demand values used in the LPD analysis and the conclusion remains valid.
	CPUC Staff Recommendation: None
Project Cost Basis (Full Incremental, or Both. Note: For early retirement projects, include RUL through EUL cost basis treatment)	IOU Proposal: Incremental project cost of \$833,567
	CPUC Staff Assessment: The” Cost Analysis” tab and the “Approved Calcs” tab in the calculations workbook sufficiently define the price of the interior LED fixtures.
	CPUC Staff Recommendation: The IOU did not follow previous CPUC Phase I EAR guidance, which stated: “Upon project completion, use itemized contractor invoices to finalize both the project and measures costs broken down into detailed categories such labor, materials, disposal, etc. ED will closely review the submitted unit costs for consistency.”
RUL (required for early retirement projects only, otherwise N/A)	IOU Proposal: RUL =5, with no supporting descriptions
	CPUC Staff Assessment: RUL = 2.6, using the default DEER methodology of one third of the measure calculated EUL for each measure line item to determine the individual line item RUL values and overall average RUL values for the interior lighting measures.
	CPUC Staff Recommendation: 2.6 years
EUL (for each measure)	IOU Proposal: EUL =5, Stated, not calculated
	CPUC Staff Assessment: EUL = 7.8, using EUL values for each line item using the DEER calculation methodology: The minimum of either 15 years or 50,000 hour service life for the LED systems as indicated in the submitted

Reviewed Parameter	Analysis
	<p>spec sheets divided by each line item annual operating hours. If the measure will have occupancy sensor controls, the annual operating hours should be reduced accordingly.</p> <p>CPUC Staff Recommendation: 7.8 years</p>
Savings Assumptions	<p>IOU Proposal: Use the in-situ lighting fixtures for both the RUL and the RUL through EUL periods along with site specific annual operating hours for each usage group and fixture line item on the “Approved Calcs” tab in the energy savings workbook. The savings calculation spreadsheet addressed a \$0.05 kWh incentive rate.</p> <p>CPUC Staff Assessment: The annual operating hours are self-reported and the documentation does not elaborate on either their source or derivation. The claimed annual operating hours exceed the DEER operating hours for both the unconditioned storage and small office building types.</p> <p>CPUC Staff Recommendation: CPUC staff revised the savings calculation spreadsheet to more accurately address the calculation involving the removal of exterior lighting measures, using a 2013 PG&E \$0.08 kWh incentive rate and DEER default hours of use for the various usage groups.</p>
Calculation Methods/Tool review	<p>IOU Proposal: Savings were calculated using an engineering spreadsheet.</p> <p>CPUC Staff Assessment: Spreadsheet method acceptable; however, some errors were found. For future IR reviews the IOU should provide a comprehensive summary tab in calculation approach. CPUC staff identified the “space conditioning” status for usage groups including offices, break rooms, guardhouses, and rest rooms that may be space conditioned adjacent to those designated as “Areas 100/200”, and linked separate calculation tabs appropriately so the calculation methodology can be followed.</p> <p>CPUC Staff Recommendation: See CPUC Staff staff-corrected spreadsheet entitled: “CPUC Staff_2K13175623 - Suggested Energy Savings Calcs.xls”</p>
Pre- or Post-Installation M&V Plan	<p>IOU Proposal: Not provided</p> <p>CPUC Staff Assessment: The documentation did not present a post-implementation M&V plan. As directed in the Phase I review, PG&E did not verify the self-reported annual operating hours through data collection and/or by verifying the lighting schedules through the existing EMS, time clocks.</p> <p>CPUC Staff Recommendation: None</p>
Net-to-Gross Review	<p>IOU Proposal: Not Provided</p> <p>CPUC Staff Assessment: This project involved installation of LED lighting at a large retailer’s distribution center and removal of L5s & L8s which had been installed within the last five years. The highest Program Influence score was 9, for their Account Rep. The highest Non-Program Influence score was 10, for Standard Practice in Your Organization & Compliance with Your Company’s Normal Maintenance or Retro-commissioning Practices. (Subject</p>

Phase II Ex Ante Review Findings

Reviewed Parameter	Analysis
	<p>made the comment that LEDs decrease maintenance costs significantly due to their much longer life.) The Relative Importance Score was 7 for the Program and 3 for Non-Program. The Decision was made before they learned of the Rebate. They are installing LEDs everywhere they can get rebates, nationwide. The customer gave a 6 to the likelihood that they would have installed exactly the same equipment without the Program.</p> <p>CPUC Staff Recommendation: The NTGR is 40.8%, depicting partial free-ridership</p>

Table 1-3 Energy Savings Summary, Project Costs & Incentive

Description	IOU Ex Ante Claim	CPUC Staff Recommendations
First Year kWh Savings	1,062,267 kWh (direct lighting impacts) and 981 kWh (indirect HVAC IE impacts)	617,769 kWh (direct lighting impacts) and 750 kWh (indirect HVAC IE impacts)
First Year Peak kW Savings	133.13 kW (direct lighting impacts) and 3.86 kW (indirect HVAC IE impacts)	82.23 kW (direct lighting impacts) and -0.64 kW (indirect HVAC IE impacts)
First Year Therms Savings	-82 Therms	-58 Therms
kWh Savings (RUL Period)	1,062,267 kWh (direct lighting impacts) and 981 kWh (indirect HVAC IE impacts)	617,769 kWh (direct lighting impacts) and 750 kWh (indirect HVAC IE impacts)
Peak kW Savings (RUL Period)	133.13 kW (direct lighting impacts) and 3.86 kW (indirect HVAC IE impacts)	82.23 kW (direct lighting impacts) and -0.64 kW (indirect HVAC IE impacts)
Therms Impact (RUL Period)	-82 Therms	-58 Therms
kWh Savings (RUL thru EUL Period)	1,062,267 kWh (direct lighting impacts) and 981 kWh (indirect HVAC IE impacts)	617,769 kWh (direct lighting impacts) and 750 kWh (indirect HVAC IE impacts)
Peak kW Savings (RUL thru EUL Period)	133.13 kW (direct lighting impacts) and 3.86 kW (indirect HVAC IE impacts)	82.23 kW (direct lighting impacts) and -0.64 kW (indirect HVAC IE impacts)
Therms Savings (RUL thru EUL Period)	-82 Therms	-58 Therms
Annual Non-IOU Fuel Impact (RUL Period)	N/A	N/A
Annual Non-IOU Fuel Impact (RUL thru EUL Period)	N/A	N/A
Project Costs for Baseline #1 (RUL or EUL)	Total Project Cost \$870,628	Full Measure Costs \$870,628
Project Costs for Baseline #2 (EUL minus RUL period)	Incremental Project Cost \$866,307	Incremental Measure Costs \$833,567
Project Incentive Amount	\$66,426	\$57,645