

## **Phase I Ex Ante Review Findings**

**Table Error! No text of specified style in document.-1: Project Information**

<b>IOU</b>	PG&E
<b>Application ID</b>	2K13143401
<b>Application Date</b>	01/03/13
<b>Program ID</b>	PGE21021
<b>Program Name</b>	Commercial Calculated Incentives (NRR-Core)
<b>Program Year</b>	2013
<b>Itron Project ID</b>	X313
<b>IOU Ex Ante Savings Date</b>	TBD
<b>ED Measure Name</b>	Lighting Retrofit
<b>Project Description</b>	Replacing metal halide and high pressure sodium fixtures with LED, T5 and T8 fixtures
<b>Date of ED Review(s)</b>	05/28/13
<b>Primary Reviewer and Firm</b>	Sepideh Shahinfard/ Itron
<b>Review Supervisor and Firm</b>	Joseph Ball/ Itron
<b>Type of Review (Desk, On-site, Full M&amp;V, Tool)</b>	Desk Review
<b>ED Recommendation</b>	Ex ante savings are conditionally approved; pending submittal of revised savings estimates trued-up to the post-installation measurement and verification, using correct baseline for exterior lighting, correcting fixture wattages and incorporating peak coincidence demand factor.
<b>ED Project Manager</b>	██████████ / California Public Utilities Commission, Energy Division
<b>ED Policy Authorization</b>	

## **Measure Description**

The project involves interior and exterior lighting retrofits of an industrial warehouse and manufacturing area located in Climate Zone 3. The lighting retrofits include replacing metal halide and high pressure sodium fixtures with T5, T8 and LED fixtures. The exterior lighting fixtures are equipped with photocell control. The interior lighting fixtures operate 8,760 hrs/yr and some of the fixtures (1136 out of 2326 fixtures) are equipped with occupancy sensors.

## **Summary of Review**

The Investor Owned Utility (IOU) submitted the following documents for Data Request (DR) 2736 on 03/19/13 for this review:

- Specification sheets for proposed fixtures;
- Revised Calculations spreadsheet;
- Usage data;
- PG&E review form;
- Lighting plans;
- PG&E email response to ED data request; and
- Project application package.

This review looked closely at the proposed lighting measures and their baselines to verify both the calculation methodology and assumptions employed in the saving calculations spreadsheet. Only one measure row was found using a 450 watt metal halide baseline (Row 20 in the “Calcs” tab, AGC AESC Calcs Rev1 workbook) that should be revised to 506 watts. For the proposed fixtures Wattage values ED found that two rows (Row 60 and 61 in the “Calcs” tab, AGC AESC Calcs Rev1 workbook) should be revised to use fixture Wattage values supported in either the most recent Standard Fixture Wattage Table or the DEER lighting workbooks.

ED noted that the assumption of 45% savings for occupancy sensor kWh saving calculations was not sufficiently supported and that a 15% operating hours reduction factor and zero kW savings could be used for the initial savings estimates unless measurement data are obtained to substantiate the actual reduction in hours of use, and as long as the Title 24 mandated controls requirement were separately met. Furthermore, PGE is required to verify the lighting controls savings and lighting operating hours through measurement of all the fixtures over a two-week duration pre- and post-retrofit. In addition, the peak demand reduction calculations are missing a Peak Coincident Demand Factor (CDF) multiplier. Therefore, ED requests PG&E to revise the savings calculation to include Peak coincidence demand factor.

In response to ED parallel review comments PG&E revised the second baseline calculations for outdoor lighting from Title 24 LPD method to a baseline of pulse start metal halides. The second

baseline savings calculation for outdoor lighting should be done using 2011 Title 24 calculation of allowed lighting power method, section 147 (d). Therefore, ED requests PG&E to update the second baseline savings for outdoor lighting using Title 24 outdoor lighting calculation method.

### **Summary of ED Requested Action by the IOU**

In order for ED to finalize ex ante savings claims, ED requests that the IOU undertake the recommended steps and submit the following data and documentation after the post-install inspection, M&V, and IR report are completed:

1. Incorporate the Peak Coincident Demand Factor multiplier into the peak demand reduction estimates.
2. Revise the savings calculation spreadsheet to use supported fixture Wattage values from either the most recent Standard Fixture Wattage table or the DEER and indicate the Fixture Code that was selected.
3. Submit the collected post-installation verification and measurement data, along with tried-up savings estimates.
4. Provide the estimated EULs for the measures in the calculation spreadsheet using DEER methodology and determine an overall average EUL for the project.
5. Submit itemized contractor invoices for the installed measures — breaking out equipment and labor costs— and DEER baseline costs to support the incremental measure costs.

**Table 1-2: Project Overview**

Description	IOU Proposed Ex Ante Data	ED Recommendations
<b>Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures)</b>	Early Replacement	Early Replacement
<b>Project Cost Basis (Full Cost, Incremental Cost)</b>	Full Cost: \$2,504,986	Both Full (baseline #1) and Incremental measure costs (baseline #2) are required
<b>RUL (Early retirement projects only, otherwise N/A (not applicable))</b>	Not Provided	2.6 years for interior lighting and 5.7 years for exterior lighting using 1/3 of rated life of ballast
<b>EUL</b>	Not Provided	Provide average EUL across all fixture retrofits
<b>First Year kWh Savings</b>	7,541,647.5	TBD
<b>First Year Peak kW Savings</b>	892.5	TBD
<b>First Year Therms Savings</b>	-25,715.3	TBD
<b>kWh Savings (RUL Period)</b>	7,541,647.5	TBD
<b>Peak kW Savings (RUL Period)</b>	892.5	TBD
<b>Therms Impact (RUL Period)</b>	-25,715.3	TBD
<b>kWh Savings (RUL thru EUL Period)</b>	1,336,938.6	TBD
<b>Peak kW Savings (RUL thru EUL Period)</b>	136.4	TBD
<b>Therms Savings (RUL thru EUL Period)</b>	-3,695.8	TBD
<b>Annual Non-IOU Fuel Impact (RUL Period)</b>	N/A	N/A
<b>Annual Non-IOU Fuel Impact (RUL thru EUL Period)</b>	N/A	N/A
<b>Net-to-Gross Ratio</b>	None	NTGR received a score of 0.83

**Table 1-3: Detailed Review Findings**

Reviewed Parameter	Analysis
<b>Project Gross Savings Baseline</b> (for early retirement projects only, include RUL through EUL baseline)	IOU Proposal: Existing fixtures are used as the first baseline. Title 24 LPD method is used for second baseline savings calculations of the interior lighting. Pulse start metal halide fixtures are used as the second baseline for exterior lighting.
	ED Assessment: Baseline is acceptable for all interior lighting fixtures. However, a few fixture wattages used in the estimates did not match those found in the Standard Fixture Tables. The second baseline used for exterior lighting is not acceptable and should be revised to use T24 approved outdoor lighting calculation method.
	ED Recommendation: Correct the baseline fixtures wattages using either the most current Standard Fixture Wattage Table or the DEER lighting workbook. Change the second baseline savings calculation for outdoor lighting fixtures based on T24 calculation of allowed lighting power method.
<b>Project Cost Basis</b> (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Full Cost
	ED Assessment: Both Full and Incremental measure costs are required
	ED recommendation: Provide itemized invoices breaking out material and labor costs.
<b>RUL</b> (required for early retirement projects only, otherwise n/a)	IOU Proposal: Not provided
	ED Assessment: 2.6 years for interior lighting and 5.7 years for exterior lighting using 1/3 of rated life of ballast
	ED recommendation: 2.6 years for interior lighting and 5.7 years for exterior lighting using 1/3 of rated life of ballast
<b>EUL</b>	IOU Proposal: Not Provided
	ED Assessment: Individual fixture replacements are identified as well as their annual operating hours. However, there are no EUL calculations incorporated into the Revised Savings spreadsheet.
	ED Recommendation: Use the calculation spreadsheet to estimate individual line item EUL values using the DEER methodology and determine an overall EUL.
<b>Savings Assumptions</b>	IOU Proposal: For interior lighting, the savings calculation spreadsheet used existing equipment as the first baseline and Title 24 LPD calculation method for the second baseline. For exterior lighting, the savings calculation spreadsheet used existing equipment as the first baseline and pulse start metal halide as the second baseline.
	ED Assessment: The wattages of the existing and proposed fixtures should be corrected using either the Standards Fixture Wattage Table or the DEER. The peak demand reduction estimates are missing the peak coincident demand factor in the kW reduction calculations. Second baseline savings calculations

Reviewed Parameter	Analysis
	<p>for exterior lighting should be corrected using T24 outdoor lighting calculation method. Post-installation measurement and verification data should be submitted to verify the operating hours and occupancy sensor savings.</p> <p>ED Recommendation: Revise the savings impacts using values from either the most recent Standard Fixture Wattage Table or the DEER. Incorporate the CDF factor into the peak demand reduction estimate. Submit collected post-installation verification and measurement data, along with tried-up final savings estimates. Correct the second baseline savings calculations for outdoor lighting.</p>
<p><b>Calculation Methods/Tool review</b></p>	<p>IOU Proposal: Savings were calculated using an engineering spreadsheet.</p> <p>ED Assessment: Calculations are mostly acceptable. The peak demand reduction calculations need to incorporate a peak demand coincidence factor. The spreadsheet estimates peak demand savings for the occupancy sensor control line items. The peak demand impacts should be zeroed unless supported with primary M&amp;V data. A 15% reduction in the operating hours should be used for the initial savings estimates pending measurement data to substantiate the actual reduction in hours of use.</p> <p>ED Recommendation: Incorporate a CDF factor into the peak demand reduction calculations. Use T24 outdoor lighting calculation method to calculate the second baseline savings for outdoor lighting.</p>
<p><b>Pre- or Post-Installation M&amp;V Plan</b></p>	<p>IOU Proposal: The site pre-inspection is completed. Post-installation inspection and verification is planned.</p> <p>ED Assessment: The post-installation verification should be completed upon installation of the new fixtures.</p> <p>ED Recommendation: M&amp;V Plan should consider data logging fixture operation to verify hours of use for pre- and post-installation conditions.</p>
<p><b>Net-to-Gross Review</b></p>	<p>IOU Proposal: Not provided</p> <p>ED Assessment: An NTG assessment has been conducted. This project was all about saving money via reduced energy costs, reduced maintenance, and receiving the rebate (10), and payback (10). External factors and green initiatives were not relevant on account of customer being a private company and not having a public retail market. However, as the customer was not a lighting expert, the recommendations of the design engineer were important (7/10). The likelihood of this project being done at the same time without the rebate was at most, a 3, if not a 0, depending on the price of energy. The price has gone from 8 cents to 9 cents per kWh this year, but would require a price of 13 cents to justify doing the project on its own. They might have considered doing the project in 5 years if the price of energy went up to 13 cents. Without the program, they would have replaced failed fixtures with</p>

*Ex Ante Review Findings Report*

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<b>Reviewed Parameter</b>	<b>Analysis</b>
	LED fixtures over the next 15 years. ED Recommendation: NTGR = 0.83