

## Phase I Ex Ante Review Findings

**Table-1: Project Information**

<b>IOU</b>	PG&E
<b>Application ID</b>	1018-03
<b>Application Date</b>	05/29/13
<b>Program ID</b>	PGE2223
<b>Program Name</b>	Heavy Industry Energy Efficiency Program (HIEEP)
<b>Program Year</b>	2013
<b>Itron Project ID</b>	X374
<b>IOU Ex Ante Savings Date</b>	8/9/2013
<b>ED Measure Name</b>	Lighting and Controls
<b>Project Description</b>	Linear fluorescent and HID lighting retrofit with occupancy sensor installation
<b>Date of ED Review(s)</b>	09/18/13
<b>Primary Reviewer / Firm</b>	Sepideh Shahinfard / Itron
<b>Review Supervisor / Firm</b>	Charles Ehrlich / Itron
<b>ED Project Manager</b>	██████████ / California Public Utilities Commission, Energy Division
<b>ED Policy Authorization (as needed)</b>	
<b>Type of Review (Desk, On-site, Full M&amp;V, Tool)</b>	Desk Review
<b>ED Recommendation</b>	The ex ante savings are conditionally approved pending submission of the revised savings using correct RUL baseline, excluding the occupancy sensor savings, and submitting the second baseline (EUL – RUL) savings.

## **Measure Description**

The project involves replacing T-12 fluorescent, incandescent, and HID fixtures to T8 fluorescent fixtures in several buildings of a manufacturing facility. The proposed T8 fixtures are equipped with occupancy sensors whereas the pre-existing conditions appear to be controlled manually. The administrative and research buildings are operating 10 hours a day, 5 days a week, for a total operating hours of 2,600 hrs/yr. However, most of the buildings are occupied 24 hours a day, 7 days a week, for a total of 8,760 hrs/yr.

The total kWh and peak demand kW savings associated with this project (including interactive effects) are 1,239,393 kWh, 144 kW, and -178 therms. The total project cost and claimed incentive amount for this project are \$300,000 and \$84,590 accordingly.

## **Summary of Review**

The Investor-Owned-Utility (IOU) submitted the following documents for Data Request (DR) 6860 on 6/17/2013 for this Phase I review:

- Transmittal Memorandum for DR 6860;
- Savings calculations spreadsheet;
- Spec sheets;
- Commitment agreement;
- PCIP report;
- Site maps; and
- Response to ED's data request email.

This phase I review looks closely at the proposed lighting measures and their baselines to verify both the calculation methodology and assumptions employed in the saving calculations spreadsheet. Three rows show normal replacement of two-lamp 96" T17 Power Groove fixtures with T8 fixtures (row 10 in "6 Klin Dry End & Powder" and rows 16 and 18 in "Heavy Duty Garage" tabs of Attachment A). The pre-existing fixtures are used as the baseline for these measures. The DEER lighting disposition stipulates that for any fixture-by-fixture linear fluorescent replacement other than 48" fixtures, the baseline should be 1<sup>st</sup> generation T8. Therefore, PG&E is required to change the baseline for these measures to 96" T8 fixtures. PG&E classifies various measures involving the replacement of incandescent fixtures with T8 fixtures as early retirement measures and uses pre-existing fixtures as the baseline. These measures should be classified as normal replacement baseline type since these fixtures have less than one year of remaining useful life. Therefore, PG&E is required to change the baseline to the appropriate DEER or code baseline. Three measure rows show T12 baseline (Row 27, 28, and 44 in the "Administration Bldg" tab, and row 13 "Engineering Bldg" tab of Appendix A)

that should be revised to T8. Many of the pre-existing and proposed fixtures Wattage values (all measure rows in “Engineering Bldg” tab, and all measure rows in “██████████ Center” tab of Appendix A) are either not found or differ from values in several recent versions of the Standard Fixture Wattage Table. These measures should be revised to use fixture Wattage values supported in either the most recent Standard Fixture Wattage Table or the DEER lighting workbooks.

For the areas that are not occupied at all times, the 2008 Title 24, Section 131, A.1(C) requires that an approved automated control system must be installed. Replacing the T12 fixtures with T8 fixtures triggers the Title-24 alteration requirements which specify that the mandatory control requirements to be installed along with the new fixtures, Unless a building-wide energy management system which fulfills the Title-24 requirement is also to be installed, the proposed controls are deemed to meet the mandatory requirements and as a result the savings claimed for installing occupancy sensors are not approved.

ED’s review finds that the PG&E early retirement claim of replacing HID fixtures with T8 fixtures is acceptable. PG&E indicates that LPD calculations have been done to estimate the second baseline savings, but the second baseline savings for the project were not submitted. ED request PG&E to either use the LPD calculations and submit the second baseline savings, or use DEER default code baseline to estimate the savings. Pulse start metal halide lamps can be used as the default code baseline. Also, ED requests PG&E to calculate the weighted average RUL of these fixtures based upon the default 1/3<sup>rd</sup> of the DEER EUL for metal halide fixtures, based upon the known date of manufacture, or based upon the last date when the ballasts were replaced.

## **Review Conclusion**

The ex ante savings are conditionally approved pending submission of the revised savings using correct baseline, excluding the occupancy sensor savings, and submitting the second baseline savings.

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

ED requests that the IOU undertake the recommended steps and submit the following information due on **10/14/2013** (or 14 days from submittal date to IOU):

1. Revise the savings calculation spreadsheet to use supported fixture Wattage values from the most recent Standard Fixture Wattage table, DEER lighting disposition, or DEER default code, and please indicate the Fixture Code that was selected.
2. Revise the savings to exclude the occupancy sensor savings for measures where the entire fixture is replaced or moved.

3. Provide the estimated RULs of the early retirement measures and EULs for all measures in calculation spreadsheet using DEER methodology and determine an overall average EUL for the project.
4. Provide the second baseline savings for the early retirement measures.
5. Submit itemized contractor invoices and estimated costs for the baseline fixtures where normal replacement is the baseline type to support the full and incremental measure costs.
6. Submit the post-installation verification and measurement data collected by the implementation team along with trued-up final savings estimates. As part of the post-installation survey, de-lamping of the fixtures needs to be verified.

**Table 1-2 Review Findings**

Reviewed Parameter	Analysis
<p><b>Project Baseline Type</b> (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)</p>	IOU Proposal: Normal Replacement for linear fluorescent fixtures. Early retirement for HID and incandescent fixtures.
	ED Assessment: Normal Replacement for linear fluorescent and incandescent fixtures. Early retirement for HID fixtures.
	ED Recommendation: The incandescent fixture don't have sufficient remaining useful life, therefore measures involving replacing the incandescent fixtures with linear fluorescent fixtures are normal replacement measures.
<p><b>Project Baseline Technology</b> (in situ equipment, Title 24 (specify year), other code or other efficiency level (specify), industry standard practice - ISP)</p>	IOU Proposal: Title 24 baseline for normal replacement measure and <i>in situ</i> equipment for early replacement measures. LPD calculations have been done for second baseline of the early retirement measures (but were not provided).
	ED Assessment: Title-24 or DEER default for normal replacement. In situ equipment for early retirement. The baseline for replacing incandescent with T8 fixtures can't be the in situ equipment and LPD calculations should be revised using code baseline to estimate the savings.
	ED Recommendation: Provide LPD calculation to estimate savings for incandescent to T8 retrofit.
<p><b>Project Cost Basis</b> (Full Incremental, or Both. Note: For early retirement projects, include RUL through EUL cost basis treatment)</p>	IOU Proposal: Full cost
	ED Assessment: Both full cost and incremental cost is required
	ED recommendation: Submit itemized contractor invoices and estimated costs of the hypothetical baseline measures to support the incremental measure costs
<p><b>RUL</b> (required for early retirement projects only, otherwise N/A)</p>	IOU Proposal: More than 1 year
	ED Assessment: Incandescent lamp RUL is less than 1 year. Use DEER methodology and determine an overall average RUL of the HID fixtures.
	ED recommendation: Submit the estimated RUL of the HID fixtures
<p><b>EUL</b> (for each measure)</p>	IOU Proposal: Not provided
	ED Assessment: Individual fixture replacements are identified as well as their annual operating hours, however, there is no EUL calculations incorporated into the Approved Savings spreadsheet.
	ED Recommendation: Use the calculation spreadsheet to estimate individual line item EUL values using the DEER methodology and determine an overall savings-weighted EUL.
<p><b>Savings Assumptions</b></p>	IOU Proposal: The savings calculation spreadsheet used 2 <sup>nd</sup> generation T8

Reviewed Parameter	Analysis
	fixtures as the baseline for T12 to T8 retrofit. For HID replacement, the exiting fixtures were used as the baseline.
	ED Assessment: The Wattages of the many of the proposed fixtures should be corrected using either the Standards Fixture Wattage Table or the DEER. Retrofitting T5 to T8 is not an eligible measure. Installation of an automatic control is required by code.
	ED Recommendation: Revise the savings impacts using values from either the most recent Standard Fixture Wattage Table or the DEER. Revise the savings to exclude occupancy sensor savings.
<b>Calculation Methods/Tool review</b>	IOU Proposal: Savings were calculated using an engineering spreadsheet.
	ED Assessment: Calculation method is acceptable.
	ED Recommendation: None
<b>Pre- or Post-Installation M&amp;V Plan</b>	IOU Proposal: Complete lighting audit of the site was performed. A second audit after installing will be performed to verify the fixture replacements and control additions. Selected areas may be data logged to record the actual controls savings. The default value of 15% savings has been used in the PCIP estimate. Project cost will be verified with vendor and contractor invoices.
	ED Assessment: The post-installation verification should be completed upon installation of the new fixtures.
	ED Recommendation: M&V Plan should consider data logging fixture operation to verify hours of use for pre- and post-installation conditions and this may result in more savings for areas where controls are not required to be installed per code.
<b>Net-to-Gross Review</b>	IOU Proposal: Not provided
	ED Assessment: An NTG assessment is not warranted.
	ED Recommendation: An NTG interview is not recommended.

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

Description	IOU Ex Ante Claim	ED Recommendations
<b>First Year kWh Savings</b>	1,239,393	TBD
<b>First Year Peak kW Savings</b>	144	TBD
<b>First Year Therms Savings</b>	-178	TBD
<b>kWh Savings (RUL Period)</b>	1,239,393	TBD
<b>Peak kW Savings (RUL Period)</b>	144	TBD
<b>Therms Impact (RUL Period)</b>	-178	TBD

*Phase I Ex Ante Review Findings*

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<b>Description</b>	<b>IOU Ex Ante Claim</b>	<b>ED Recommendations</b>
<b>kWh Savings</b> (RUL thru EUL Period)	Not provided	TBD
<b>Peak kW Savings</b> (RUL thru EUL Period)	Not provided	TBD
<b>Therms Savings</b> (RUL thru EUL Period)	Not provided	TBD
<b>Annual Non-IOU Fuel Impact</b> (RUL Period)	N/A	TBD
<b>Annual Non-IOU Fuel Impact</b> (RUL thru EUL Period)	N/A	TBD
<b>Project Costs for Baseline #1</b> (RUL or EUL)	Full cost - \$300,000	TBD
<b>Project Costs for Baseline #2</b> (EUL minus RUL period)	Not provided	TBD
<b>Project Incentive Amount</b>	\$84,639	TBD