

## Phase 1 Ex Ante Review Findings

Table 1-1: Project Information

<b>IOU</b>	PG&E
<b>Application ID</b>	SFEW0124
<b>Application Date</b>	TBD
<b>Program ID</b>	(Defaulted to PGE2201 - High Performance Office Lighting)
<b>Program Name</b>	SF Energy Watch
<b>Program Year</b>	2013
<b>Itron Project ID</b>	X354
<b>IOU Ex Ante Savings Date</b>	TBD
<b>ED Measure Name</b>	LED Lighting Retrofit
<b>Project Description</b>	Retrofit of CFL and LF Fixtures with 2x2 LED Fixtures
<b>Date of ED Review(s)</b>	6/25/2013
<b>Primary Reviewer / Firm</b>	Ben Cheah - Leonel Campoy / Itron
<b>Review Supervisor / Firm</b>	Joseph Ball / 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
<b>ED Recommendation</b>	The ED adjusted <i>ex ante</i> energy savings estimates of 55,311 kWh and peak demand savings of 20.39kW are approved; subject to further minor adjustments for the HVAC IE effects and the CDF factors after three ineligible measures are removed.

## **Measure Description**

The installation of 493 2x2 LED troffers. Each LED fixture uses 35 watts, for a total installed wattage of 17.255 kW. The annual hours of operation for each fixture is 2,640 hours, as allowed by DEER for the building type Large Office (OFL).

The baseline units, which were completely removed, included 224 CFL fixtures (average rating of 26 watts) and 699 linear fluorescent fixtures. The fixture configurations included the following:

- 3L 2ft 17W T8s (Total fixture wattage of 47W)
- 1L 4ft 32W T8s (Total fixture wattage of 31W)
- 1L 3ft 25W T8s (Total fixture wattage of 23W)
- 2L 3ft 25W T8s (Total fixture wattage of 44W)
- 2L 4ft 32W T8s (Total fixture wattage of 59W)
- 2L 2ft 17W T8s (Total fixture wattage of 31W)
- 3L 4ft 32W T8s (Total fixture wattage of 83W)

The entire baseline system is controlled by occupancy sensors in non-open office areas, as well as building-wide time clock/nighttime sweep.

These fixtures resulted in a total baseline demand usage of 39.52 kW. Each baseline fixture used an assumed hours of operation of 2,640 hours, as allowed by DEER for the building type Large Office (OFL). No occupancy controls will be removed or installed as part of this retrofit. The retrofit was selected as a replace on burnout (ROB).

The estimated project cost will be \$104,516, with an incentive of \$17,811.20. The peak kW savings are 20.39 kW, and kWh savings are 65,835 kWh.

## **Summary of Review**

PG&E submitted the following documents for Data Request (DR) 4816 for this Phase 1 review:

- 13-04145\_CLP\_Energy Savings Report\_TPS Review\_6\_21\_13.docx;

These are in addition to the following documents already received by ED:

- 13-04145\_CLP\_Energy Savings Report\_TPS Review\_6\_3\_13.docx
- 13-04145\_MODIFIED\_LIGHTING\_CALCULATOR\_V3\_1\_6\_3\_13.xlsx
- 13-04145\_WS\_for ED\_final Rev C.xlsx
- HPRLED2x2 15-47-22.pdf

ED reviewed the documentation provided in the *TPS reviews*, the *Modified Lighting Calculator v3.1*, and the *Large Commercial Incentive Application*. Per DEER requirements for establishing default code baselines, 4ft LF measures should have a code baseline of 2<sup>nd</sup> generation T8 lamps, with electronic, NLO ballasts. The *Modified Lighting Calculator v3.1* for this project shows the baseline used for the 1L, 4ft, 32 watt T8 fixtures was the actual installed lamps, which are 1<sup>st</sup> generation T8 lamps. In this case, the total fixture wattage for both are 1<sup>st</sup> generation and 2<sup>nd</sup> generation (1L 4ft 32W T8s) are 31W, so this is a non-issue.

The *Modified Lighting Calculator v3.1* makes no mention of control types, and lists both pre- and post-retrofit hours as 2,640 per DEER requirements for a Large Office (OFL). The *Large Commercial Incentive Application* confirms that no occupancy controls were installed as part of the retrofit, but does not confirm whether or not occupancy controls were present prior. *13-04145\_CLP\_Energy Savings Report\_TPS Review\_6\_21\_13.docx* confirmed the presence of occupancy sensors and timeclocks as baseline control types. No modification in HOU was made for the lighting controls. Based off the *Modified Lighting Calculator v3.1*, “Executive/Private Offices” under the “Large Office” building type should see a 16% reduction in lighting hours due to the installation of lighting controls.

The *Modified Lighting Calculator v3.1* does not confirm the EUL of the post-retrofit 2x2 LED fixtures. Per DEER EUL methodology, the EUL will be capped at 15 years.

As noted in the *TPS Review*, the *Modified Lighting Calculator v3.1* calculates the incentive at \$18,828.08 due to a \$100/kW incentive adder. Additionally, the Peak Demand savings are listed as 28.72 kW, which excludes the proper coincident demand factor of 0.71 being applied in the calculator.

## **Review Conclusion**

The ED adjusted *ex ante* energy savings estimates of 55,311 kWh and peak demand savings of 20.39kW are approved; subject to further minor adjustments for the HVAC IE effects and the CDF factors after three ineligible measures are removed. If post-installation inspection is conducted and the IOU adjusts the savings values, the IOU may submit post-installation documentation for this project if the final values differ by more than five percent from the ED approved *ex ante* value.

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

ED requests that PG&E undertake the following steps once the project implementation has taken place and the lighting retrofits verified:

1. Ensure that final project and measure costs are based on itemized contractor invoices. The costs should be segregated between labor, material, and disposal costs. For the fixture removal line items in the PA Approved calculations workbook, the measure costs

should reflect at least labor and disposal costs. The final project cost to be reported shall be the incremental installed costs. The IOU may use DEER baseline costs to calculate incremental project cost.

2. Submit documentation that supports the usage of using DEER operating hours for lighting with timeclocks and occupancy sensors, or utilize a reduction in 16% for operating hours.

**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) Note: For early retirement projects only, include RUL through EUL baseline)</p>	IOU Proposal: Replace on Burnout.
	ED Assessment: Accepted
	ED Recommendation: None
<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: Baseline of 224 pin-based CFLs (26w each) and 699 Linear Fluorescent Fixtures (varying fixture configurations). The entire baseline system is controlled by occupancy sensors in non-open office areas, as well as building-wide time clock/nighttime sweep.
	<p>ED Assessment: The 1L 4ft 32W T8's have a 1<sup>st</sup> generation baseline listed. Per DEER requirements for establishing default code baselines, 4ft LF measures should have a code baseline of 2<sup>nd</sup> generation T8 lamps, with electronic, NLO ballasts.</p> <p>Baseline lighting controls are reported as occupancy sensors with timeclocks. Annual HOU are reported as 2,640 hours based on DEER requirements for a Large Office. Based on the <i>Modified Lighting Calculator v3.1</i>, the reduction in HOU for a large office, activity area type "Executive/Private Office", is 16%.</p>
	<p>ED Recommendation: In this instance, both the 1<sup>st</sup> generation and 2<sup>nd</sup> generation 1L 4ft 32W T8 lamps have a total fixture wattage of 31W, so this is a non-issue.</p> <p>In regards to the HOU, a reduction of 16% in the HOU should be reported, based, changing the HOU to 2,218 for both pre- and post-retrofit savings.</p>
<p><b>Project Cost Basis</b> (Full Incremental, or Both. Note: For early retirement projects,</p>	IOU Proposal: Total Project Cost is \$104,516.
	ED Assessment: Incremental project costs are applicable, not full project costs, since this is an ROB, Normal Replacement project.

Reviewed Parameter	Analysis
include RUL through EUL cost basis treatment)	ED Recommendation: Incentives should be based on incremental project costs.
<b>RUL</b> (required for early retirement projects only, otherwise N/A)	IOU Proposal: N/A
	ED Assessment: N/A
	ED Recommendation: N/A
<b>EUL</b> (for each measure)	IOU Proposal: N/A
	ED Assessment: Following DEER methodology, the EUL will be capped at 15 years for the 2x2 LED fixtures.
	ED Recommendation: 15 years
<b>Savings Assumptions</b>	IOU Proposal: Peak Demand Savings – 20.39kW. Energy Savings – 65,835kWh.
	ED Assessment: Modification to pre- and post- HOU have been proposed, from 2,640 HOU to 2,218 HOU to account for the 16% occupancy sensor reduction factor.
	ED Recommendation: Energy Savings revised to 55,311 kWh.
<b>Calculation Methods/Tool review</b>	IOU Proposal: <i>Modified Lighting Calculator v3.1</i>
	ED Assessment: Modifications to the <i>Modified Lighting Calculator v3.1</i> will be discussed with the DMQC.
	ED Recommendation: Accepted
<b>Pre- or Post-Installation M&amp;V Plan</b>	IOU Proposal: Not provided
	ED Assessment: Not assessed
	ED Recommendation: Provide post-installation M&V plan
<b>Net-to-Gross Review</b>	IOU Proposal: N/A
	ED Assessment: N/A
	ED Recommendation: N/A

**Table 1-3 Energy Savings Summary**

Description	IOU Ex Ante Claim	ED Recommendations
<b>First Year kWh Savings</b>	65,835	55,311
<b>First Year Peak kW Savings</b>	28.72	20.39
<b>First Year Therms Savings</b>	-376.17	-316.07

*Phase 1 Ex Ante Review Findings*

---

<b>Description</b>	<b>IOU Ex Ante Claim</b>	<b>ED Recommendations</b>
<b>kWh Savings</b> (RUL Period)	N/A	N/A
<b>Peak kW Savings</b> (RUL Period)	N/A	N/A
<b>Therms Impact</b> (RUL Period)	N/A	N/A
<b>kWh Savings</b> (RUL thru EUL Period)	N/A	55,311
<b>Peak kW Savings</b> (RUL thru EUL Period)	N/A	20.39
<b>Therms Savings</b> (RUL thru EUL Period)	N/A	-316.07
<b>Annual Non-IOU Fuel Impact</b> (RUL Period)	N/A	N/A
<b>Annual Non-IOU Fuel Impact</b> (RUL thru EUL Period)	N/A	N/A