

## Ex Ante Review Findings

### Project Information

IOU	PG&E
Application ID	2K11067610-X038
Application Date	5/18/11
Program ID	
Program Name	PG&E Customized Incentive Program / ETAP
Program Year	2011
Project ID	TBD
IOU Ex Ante Savings Date	1/17/2012 (The project application review has the completion date as 1/17/2011 – likely a typo)
ED Measure Name	TBD
Project Description	Wireless Lighting Controls
Date of ED Review	2/17/2012
Primary Reviewer and Firm	Phani Pagadala/Itron
Review Supervisor and Firm	Kris Bradley/Itron
Type of Review	Desk review
ED Recommendation	Conditional Approval - Additional Information Requested

### IOU Project Description

This project involves the installation of wireless occupancy and daylighting controls on one hundred forty one (141) existing eight-lamp F40T5 fixtures at one of the county buildings.

The baseline for the measure is 141 existing fixtures with photosensors to control 2 lamps out of the 8 lamps based on irradiance levels from the skylights.

The post-installation lighting fixtures will have wireless daylighting controls with the ability to control all the 8 lamps via the ballast with each ballast controlling 2 lamps, based on available ambient light from skylights; additionally, the post-installation conditions also include the installation of 71 occupancy sensors with wireless interface modules that have the ability to control all the 141 fixtures during periods of non-occupancy.

A pre-installation inspection was completed on 08/25/2011 by an IOU consultant. The savings estimates, as submitted by the installation contractor, were reduced based on the technical review.

The Project Application Review claims an annual savings impact of 32,981.8 kWh, 7.61 kW demand reduction with an incentive amount of \$2,410.09.

### Summary of Review

The application documentation received includes a project application review of the proposed project prepared by a third party consultant dated 1/17/2011 (the review was likely completed on 1/17/2012 – the date as entered in the project application review is assumed to be a

typographical error). Included within the application packet that was reviewed were the project application, savings estimates documentation, ETAP audit report, installation contractor documentation, ballast specifications, and project financing documents. One MS Word file, containing project financial data was provided, but this was found to not be applicable to the project in question and therefore excluded from the review.

The project application review documentation presents a reasonable approach to providing a preliminary estimate of the impacts of the project. However, the ED review has identified the following issues concerning this project, and pending clarification and related possible updates to the ex ante impact calculations and estimates, a complete review is not yet possible.

- Information on the RUL, condition and the age of the existing photocells was not provided within the documentation. The ED recommends that pertinent information about the existing equipment conditions be provided to support appropriate project baseline selection.
- The watts per fixture value that was used in the calculations was adjusted to 75% (216 watts) of the full value (288 watts) to account for burned out lamps.. The ED assumes that the actual count of burned out bulbs equates to 25% of the existing fixtures, but the project documentation does not provide this information. The ED thereby recommends that the burn out ratio be based on inspected lamp failures and not based on a facility wide average.
- Also the age, condition and RUL of the existing T5 fixtures being controlled may be relevant. If the existing lamps and fixtures fail or burn out before the EUL of the new controls, the resultant savings from the new controls may not be realized through their EUL period. Conversely the replacement of the failed fixtures and lamps may impact the savings estimates due to reduced number of burn outs. The replacement and maintenance schedules of the existing fixtures may thus have a bearing on the savings estimates; hence the ED requests that the IOU provide the age, condition, maintenance and replacement schedules of the existing fixtures.

## Review Conclusion

Conditional Approval – Review not completed at this time, pending fulfillment of requested data and subsequent opportunity for ED to re-evaluate the savings estimates.

Description	IOU Proposed Ex Ante Data	ED's Recommendations
Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction)	Early replacement implied through the use of the existing controls and fixtures as the	TBD; Need additional information on the age, condition and RUL of the existing controls and fixtures to validate

Description	IOU Proposed Ex Ante Data	ED's Recommendations
	baseline	baseline selection; this includes determination of the applicability of early replacement
Project Cost Basis (Full Cost, Incremental Cost)	Full cost	Cost matrix provided appears reasonable. However, the additional incremental cost consideration to replace the existing controls in absence of the program may need to be factored-in.
RUL (Early retirement projects only, otherwise n/a)	Insufficient documentation provided	Provide RUL & condition of <i>in situ</i> equipment.
EUL	Not provided	8 years based on DEER for Daylighting Controls and Occupancy Sensors.
First Year kWh Savings	Daylighting and Occupancy Controls: 32,981.8 kWh;	TBD
First Year Peak kW Reduction	Daylighting and Occupancy Controls: 7.61 kW;	TBD
First Year Therms Savings	NA	TBD; There would likely be HVAC interactive effects due to the installed space type. Please provide pertinent information to support any interactive effects.
Total kWh Savings (RUL Period)	Not provided	TBD
Total Peak kW Reduction (RUL Period)	Not provided	TBD

Description	IOU Proposed Ex Ante Data	ED's Recommendations
Therms Impact (RUL Period)	NA	TBD
Total kWh Savings (EUL – RUL Period)	Not provided	TBD
Total Peak kW Reduction (EUL – RUL Period)	Not provided	TBD
Total Therms Savings (EUL – RUL Period)	NA	TBD
Total non-IOU Fuel Impact (RUL Period)	NA	NA
Total non-IOU fuel Impact (EUL – RUL Period)	NA	NA
Net-to-Gross Ratio	Not stated	Assessment not completed

## Detailed Review Findings

Reviewed Parameter	Analysis
<p><b>Project Gross Savings Baseline</b> (for early retirement projects only, include RUL through EUL baseline)</p>	<p>IOU Proposal: In-situ fixtures and photosensors</p>
	<p>ED Assessment: Possible early replacement of existing photosensors; however, no information on the age or RUL of the existing equipment was provided to make an informed recommendation. ED generally believes that use of the pre-existing system as the baseline thru the EUL is a reasonable and conservative approach to take because the pre-existing system is already an efficient solution that exceeds Title 24; actual LPD is 1.02 W/ft<sup>2</sup> (using whole building square footage) and T24 baseline LPD for office spaces is 1.00 W/ft<sup>2</sup>.</p>
	<p>ED Recommendation: The ED requests that the IOU provide more information on the age, condition and the estimated RUL of the existing photosensors and fixtures.</p>
<p><b>Project Cost Basis</b> (for early retirement projects only, include RUL through EUL cost basis treatment)</p>	<p>IOU Proposal: Total cost with a simple breakdown of costs from manufacturer.</p>
	<p>ED Assessment: The cost breakdown provided appears to be reasonable.</p>
	<p>ED recommendation: The total cost data provided is sufficient. If, however, early replacement is applicable, then new controls would be purchased in the absence of the program at the end of the RUL period. This additional incremental cost consideration may need to be factored-in.</p>
<p><b>RUL</b> (required for early retirement projects only, otherwise n/a)</p>	<p>IOU Proposal: None provided</p>
	<p>ED Assessment: Early retirement of the existing photosensors was not verifiable; RUL of the existing equipment is needed to verify the applicability of early retirement.</p>
	<p>ED Recommendation: The ED recommends that the IOU provide the age / condition, EUL and the estimated RUL of the of the existing photosensors.</p>
<p><b>EUL</b></p>	<p>IOU Proposal: None provided</p>
	<p>ED Assessment: EUL not identified in the documentation received.</p>
	<p>ED Recommendation: 8 years based on DEER for Daylighting Controls and Occupancy Sensors</p>
<p><b>Savings Assumptions</b></p>	<p>IOU Proposal: The IOU submitted calculations had the following assumptions:</p> <ul style="list-style-type: none"> <li>The watts per fixture value that was used in the calculations was adjusted to 75% (216 watts) of the full value (288 watts) to account for burned out lamps.</li> </ul>

Reviewed Parameter	Analysis
	<ul style="list-style-type: none"> <li>The IOU reviewer assumed a step function of photosensor operation for the post conditions and an average value of 4% (assumed area of skylights as a ratio of the overall roof area taken from satellite imagery) of the available solar radiation infiltrating through the skylights and that the lamps will be staged-off (via the ballasts) depending on the available interior irradiance levels. The hours in each mode (8 lamps ON, 6 lamps ON, etc.) were calculated based on this step function and the assumed 4% skylight area.</li> </ul> <p>ED Assessment: The IOU calculations assumed a fixture burn out ratio of 25% for the facility wide fixtures. The ED assumes that the actual count of burned out bulbs equates to 25% of the existing fixtures, but the project documentation does not provide this information.</p> <p>The use of 4% skylight area and the use of corresponding interior irradiance values as a function of the available TMY3 exterior irradiance levels is reasonable.</p> <p>ED Recommendation: Relevant savings analyses, possibly <i>RUL</i>, <i>RUL-EUL</i> or <i>first year</i> savings, as applicable are requested to be provided.</p> <p>The ED recommends that the burn out ratio be based on inspected lamp failures and not based on a facility wide average.</p> <p>If available, use the actual installed percentage of skylight area to more accurately estimate the savings.</p>
<p align="center"><b>Calculation Methods/Tool review</b></p>	<p>IOU Proposal: Spreadsheet analysis – provided in PDF format</p> <p>ED Assessment: The assumptions for the skylighting area appear conservative and reasonable. However, the burned out lamp counts should be used to re-evaluate the savings estimates. Calculations provided for installation of new occupancy sensors were reasonable.</p> <p>ED Recommendation: IOU savings methodology for new daylighting controls and occupancy sensors is acceptable with the exception of the provision of the live spreadsheet calculations and use of adjustments described above. ED requests the IOU to provide the “live” fully functioning spreadsheet calculations.</p>
<p align="center"><b>Pre- or Post- Installation M&amp;V Plan</b></p>	<p>IOU Proposal: Not described</p> <p>ED Assessment: The IOU does not intend to carry out any M&amp;V for this site. There was a pre-installation inspection as part of the Project Application Review</p>

Reviewed Parameter	Analysis
	<p>process.</p> <p>ED Recommendation:  The ED does not find merit in recommending full M&amp;V; however, use of site level information on the number of burned out lamps, possible usage of spot measurements to determine connected load values and actual area of skylights maybe sufficient for any revision of savings.</p>
<b>Net-to-Gross Review</b>	<p>IOU Proposal: None</p>
	<p>ED Assessment: Not addressed</p>
	<p>ED Recommendation: None</p>