

Phase III Ex Ante Review Findings

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

IOU	PG&E
Application ID	2K1170141C
Application Date	09/07/2011
Program ID	PGE21262
Program Name	UC/CSU/IOU Partnership Program
Program Year	2011
Itron Project ID	X039
IOU Ex Ante Savings Date	TBD
ED Measure Name	Lighting retrofit
Project Description	Retrofitting various lighting fixtures including MH and HPS with LED fixtures throughout the campus
Date of ED Review(s)	04/20/13
Primary Reviewer and Firm	Sepideh Shahinfard/ Itron
Review Supervisor and Firm	Joseph Ball/ Itron
Type of Review (Desk, On-site, Full M&V, Tool)	Desk Review
ED Recommendation	Conditionally Approved; pending submission of revised saving calculations using correct baseline, excluding unqualified measures, as well as submission of saving estimations for the RUL through EUL period (2 nd baseline)

Measure Description

The project involves replacing T8, T12, incandescent, CFL, high pressure sodium, metal halide, and mercury vapor fixtures in several locations throughout the campus with LED and T5 fixtures. The proposed elevator LED lighting fixtures are equipped with occupancy sensors. Also, the proposed LED fixtures replacing the wall packs, pathway, west remote and EFH buildings are bi-level LED fixtures.

Summary of Review

The Investor Owned Utility (IOU) submitted the following documents in response to Phase II EAR:

- Revised Saving calculation spreadsheet “2K1278686C Att 2 - Revised XXX Phase 3 PA Calculations”
- Response to phase II EAR requested actions “2k1170141C Ex Ante X039 Response_3.20.13”
- DEER EUL summary table “2K1278686C Att 1 - DEER EUL Summary 10-1-08”
- Pages from Title 24 “2K1278686C Att 3 - Pages from Title 24, 2008”

The ED Phase I and II review focused on whether the proposed project baselines are appropriate. ED requested that PG&E address Title 24 lighting alteration requirements, outdoor lighting requirements, adjust the savings calculations, and provide missing documentation for the Phase III Ex Ante Review. The present review looked closely at the proposed lighting measures, their baselines, and lighting controls to verify both the calculation methodology and the assumptions employed in the savings calculation spreadsheet and the recommended follow-ups.

In their response to the Phase II EAR, PG&E indicated that for the early retirement fixtures the existing baseline will be used for both RUL and RUL through EUL periods since the pre-existing fixtures complies with 2008 Title 24 requirements. ED concludes that the project baseline for early retirement fixtures do not meet the 2008 Title 24 lighting requirements. Therefore, PG&E is required to submit saving estimates for both RUL and after RUL to EUL period using the correct baseline. Also, the measures involving the replacement of halogen PAR, incandescent lamps and compact florescent lamps do not qualify as a "custom impact" measure type as per program guidelines and IOU policy. For the replace on burnout fixtures the baseline should be changed to 2008 Title 24 approved baseline fixtures.

The following list details the IOU response to initial ED data requests and ED’s Phase III replies with follow-up requests, if applicable:

- EFM 1 (elevator lights): This measure involves replacing T8, T12, CFLs, and incandescent lights in elevators throughout the campus with LED lighting. The proposed LEDs are equipped with occupancy sensors. The measures involving the replacement of incandescent lamps and compact florescent lamps do not qualify as a "custom impact" measure type as per program guidelines and IOU policy. For linear fluorescent lightings, ED finds that PG&E replacement on burnout (ROB) claim was acceptable. However, the saving calculations should be revised using the first generation T8 as the baseline. In addition, ED noted that the assumption of reducing operating hours to 70% for occupancy sensor saving calculations was not sufficiently supported and that a 15% level could be used for the initial savings estimates pending measurement data to substantiate the actual reduction in hours of use, and as long as the Title 24 mandated controls requirement were separately met.
- EFM 2 (wall pack lights): This measure involved replacing high pressure sodium, mercury vapors, and CFL exterior lights with bi-level LEDs. The measures involving the replacement of compact florescent lamps do not qualify as a "custom impact" measure type as per program guidelines and IOU policy. For HID lamps, ED finds that PG&E early retirement claim was acceptable. Therefore, PG&E is required to submit the savings for both RUL and RUL through EUL periods. In addition, ED noted that the assumption of the proposed LED using 47 watt during 10% of the time, and 8 watt during 90% of the time used in saving calculations of bi-level LEDs was not sufficiently supported and that a 15% level could be used for the initial savings estimates pending measurement data to substantiate the actual reduction in hours of use, and as long as the Title 24 mandated controls requirement were separately met.
- EFM 3 (pathway lights): This measure involves replacing high pressure sodium pathway lighting with bi-level LEDs. ED finds that PG&E early retirement claim was acceptable. Therefore, PG&E is required to submit the savings for both RUL and RUL through EUL periods. In addition, ED noted that the assumption of the proposed LED using 47 watt during 10% of the time, and 8 watt during 90% of the time used in saving calculations of bi-level LEDs was not sufficiently supported and that a 15% level could be used for the initial savings estimates pending measurement data to substantiate the actual reduction in hours of use, and as long as the Title 24 mandated controls requirement were separately met.

- EFM 4 (halogens to T5s): This measure involves replacing of fifty (50) MR16 halogen light bulbs with seven (7) T5 fixtures in various buildings throughout the campus. This measure does not qualify as a "custom impact" measure type as per program guidelines and IOU policy. PG&E is required to submit the revised saving calculation to exclude this measure.
- EFM 5 (west remote): This measure involves replacing high pressure sodium in west remote parking lot with bi-level LEDs. ED finds that PG&E early retirement claim was acceptable. Therefore, PG&E is required to submit the savings for both RUL and RUL through EUL periods. In addition, ED noted that the assumption of the proposed LED using 47 watt during 10% of the time, and 8 watt during 90% of the time used in saving calculations of bi-level LEDs was not sufficiently supported and that a 15% level could be used for the initial savings estimates pending measurement data to substantiate the actual reduction in hours of use, and as long as the Title 24 mandated controls requirement were separately met.
- EFM 6 (EFH): This measure involves replacing thirty (30) metal halide fixtures with twelve (12) induction lights equipped with motion sensors in gym building. PG&E claims that this measure is an early retirement measure with existing lighting power density (LPD) slightly below 2008 Title 24 lighting power density requirement. ED found that PG&E early retirement claim was acceptable. However, the pre-existing fixtures do not meet 2008 Title 24 lighting power density requirements and PG&E is required to submit the savings estimates for RUL-EUL period. Also, PG&E is required to provide documentation that twelve (12) 315 watt induction lights provide enough lighting to replace thirty (30) metal halide lights.

ED revised the saving calculations and made the following changes to the IOU saving calculation workbook (See ED Revised Calculations “2K1278686CEDRevisedCalculations”):

- Excluded all ineligible measures including incandescent, CFLs, and PAR halogen lights.
- Changed the baseline for replace on burnout fixtures to first generation T8s.
- Revised some of the pre-existing fixture wattages based on the Standard Fixture Wattage Table.

- Used 15% reduction in operating hours method to quantify the occupancy sensors savings.

Summary of ED Requested Action by the IOU

ED requests PG&E to submit the following documentation after IR has been completed to allow ED to complete the ex ante review:

- Provide both the full and incremental measure costs.
- Provide saving estimation for both RUL and EUL-RUL periods for eligible measures that are qualified for early retirement.
- Revise the saving calculations to include only custom measures or accept ED revised calculations.
- Revise the saving calculations for EFM-1 to use the correct baseline or accept ED revised calculations.
- Determine the appropriate HVAC interactive effect factors, and incorporate into both the energy savings and peak demand reduction estimates.
- Incorporate peak coincidence demand factors into the peak demand reduction estimates.
- Clarify whether the proposed measures have already been installed or not.
- Provide the estimated EULs for the measures in calculation spreadsheet using DEER methodology and determine an overall average EUL for the project.
- Submit the collected post-installation verification and measurement data, along with trued-up final savings estimates.

Table 1-2: Project Overview

Description	IOU Proposed Ex Ante Data	ED Recommendations
Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures)	Early Replacement for EFM 2, EFM 3, EFM 5, and EFM 6 and Normal Replacement for EFM 1 and EFM 4	Early Replacement for EFM 2, EFM 3, EFM 5, and EFM 6 and Normal Replacement for EFM 1
Project Cost Basis (Full Cost, Incremental Cost)	Full cost – \$691,997	Provide both the full and incremental measure costs
RUL (Early retirement projects only, otherwise N/A (not applicable))	5 years	5 years for all ER claimed measures; N/A for NR claim
EUL	Not provided	TBD
First Year kWh Savings	733,297	616,022
First Year Peak kW Savings	26.66	22
First Year Therms Savings	Not Provided	TBD
kWh Savings (RUL Period)	733,297	TBD
Peak kW Savings (RUL Period)	26.66	TBD
Therms Impact (RUL Period)	Not Provided	TBD
kWh Savings (EUL thru RUL Period)	Not Provided	TBD
Peak kW Savings (EUL thru RUL Period)	Not Provided	TBD
Therms Savings (EUL thru RUL Period)	Not Provided	TBD
Annual Non-IOU Fuel Impact (RUL Period)	N/A	TBD
Annual Non-IOU Fuel Impact (EUL thru RUL Period)	N/A	TBD
Net-to-Gross Ratio	Not Provided	TBD

Table 1-3: Detailed Review Findings

Reviewed Parameter	Analysis
Project Gross Savings Baseline (for early retirement projects only, include RUL through EUL baseline)	IOU Proposal: Early Replacement for EFM 2, EFM 3, EFM 5, and EFM 6 and Normal Replacement for EFM 1 and EFM 4
	Early Replacement for EFM 2, EFM 3, EFM 5, and EFM 6 and Normal Replacement for EFM 1
	ED Recommendation: EFM 4 and part of EFM 1 are not custom measures and should be removed from the application and the savings calculations, and the baseline for EFM 1 should be changed to first generation T8s
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Full cost
	ED Assessment: Both full project and incremental project cost apply for all of the custom measures (either Early or Normal)
	ED recommendation: Provide both the full and incremental measure costs
RUL (required for early retirement projects only, otherwise n/a)	IOU Proposal: 5 years based on DEER EUL table
	ED Assessment: Accepted
	ED recommendation: 5 years based on DEER EUL table
EUL	IOU Proposal: Not provided
	ED Assessment: Pending submission of more information about the proposed fixtures
	ED Recommendation: Provide the EUL of the proposed fixtures
Savings Assumptions	IOU Proposal: The saving calculation spreadsheet used existing fixtures as the baseline for both early retirement and replace on burnout fixtures
	ED Assessment: The saving calculations for EUL- RUL period for early retirement fixtures were not provided. The baseline used for replace on burnout fixtures is incorrect. Some of the measures do not qualify under custom impact.
	ED Recommendation: Submit the EUL- RUL savings for early replacement measures. Use the ED-revised baseline (first generation T8s) for replace on burnout fixtures.
Calculation Methods/Tool review	IOU Proposal: Savings were calculated using an excel spreadsheet.
	ED Assessment: Calculation method is acceptable
	ED Recommendation: The spreadsheet approach is acceptable but ED revised savings calculations spreadsheet needs to be revised using correct baselines, and dual baselines for ER measures. Also, the HVAC IE factor and peak coincidence demand factor should be included in the savings calculations.
Pre- or Post-	IOU Proposal: Not provided

Ex Ante Review Findings

Reviewed Parameter	Analysis
Installation M&V Plan	ED Assessment: None assessed
	ED Recommendation: TBD
Net-to-Gross Review	IOU Proposal: Not Provided
	ED Assessment: Not Assessed
	ED Recommendation: TBD