

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

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

<b>IOU</b>	PGE
<b>Application ID</b>	1468-13.1
<b>Application Date</b>	10/2/2013 (3P Evaluation Report date)
<b>Program ID</b>	PGE2187
<b>Program Name</b>	2010-2012 3P Monitoring Based Persistence Commissioning Program
<b>Program Year</b>	2013
<b>Itron Project ID</b>	X433
<b>IOU Ex Ante Savings Date</b>	10/3/2013
<b>ED Measure Name</b>	MBCx
<b>Project Description</b>	EEM-1: Implement optimum start sequence of AHU-1 EEM-2: Install occupancy sensors in core restrooms for lighting control
<b>Date of ED Review(s)</b>	10/31/2013
<b>Primary Reviewer / Firm</b>	C.D. Nayak/DNV KEMA
<b>Review Supervisor / Firm</b>	Amit Kanungo/DNV KEMA
<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 and will be verified during the post-installation M&V as suggested in this report.

## Measure Description

This project site is a [REDACTED] sq. ft. court house that comprises of court rooms, administrative offices, and other support areas. The building HVAC system currently consists of one air handling unit (AHU) with cooling provided through direct expansion (DX) system and heating provided via hot water (HHW) coil. The hot water is supplied to the heating coil from one 1,200 MBtuh natural gas fired boiler. The AHU has an economizer and has VFDs on its supply and return fans; the AHU is scheduled to operate from 5 am to 7 pm (Mon – Fri).

The proposed energy efficiency measures for this project involve implementing optimum start sequence of AHU-1 and installing occupancy sensors on the lighting fixtures in core restrooms. The optimum start measure will reprogram the AHU operation from 5 am to 7 pm (Mon – Fri) to 7 am to 7 pm (Mon- Fri), reducing operating hours of the AHU from 14 hrs a day to 12 hrs a day. Installing occupancy sensors on the lighting fixtures (T-8 fluorescent lamps and electronic ballasts) in four restrooms of the building will turn off the lights in the rest rooms when the spaces are not occupied.

The project report proposes the following savings:

EEM-1(optimum start): 6,300 kWh, and 1,500 therm, and

EEM-2 (lighting controls): 3,263 kWh

It appears from the project report that the claimed savings calculation for EEM-1 used \$1 per therm savings, and \$0.09 per kWh as respective incentive rates. Similarly, for EEM-2, the claimed savings calculation used \$0.03 per kWh as incentive rate

## Summary of Review

The Investor-Owned-Utility (IOU) submitted the following documents for this Phase 1 review:

- Draft pre-installation project report;
- Energy savings and IOU incentive summary;
- Energy savings calculations for individual measures; and
- IOU technical reviewer’s pre-installation review report.

The proposed measures are eligible under the program rules. The proposed savings were estimated with custom spreadsheet calculation (for EEM-1) and with BOA tool (for EMM-2), and used the existing operating conditions and schedules as the baseline. ED reviewer found that the calculation methods and in situ baseline for these system optimization measures selected for savings estimates are appropriate.

The ED reviewer observed from the project report that while the proposed schedule of AHU will be from 7 am to 7 pm, there will a new optimum start program that will allow the AHU to come ON up to 2 hours prior to the proposed AHU schedule. However, this early start will occur only

when required and will be utilized to bring the building space to the temperature setpoint. The heating setpoint will be 69 °F and the cooling setpoint will be 75 °F.

The post-RCx M&V will include collecting the EMS information on the new programmed schedule and trending the daily start time to verify the actual daily AHU operation duration. For EEM-2, the project implementer will verify the installation and operation of the proposed ceiling mounted occupancy sensors during post-installation walk-through.

The proposed total project incentive is not capped with the measure cost.

### **Review Conclusion & Summary of ED requested IOU Actions**

The ex-ante savings are conditionally approved and will be verified during the post-installation M&V period. The implementer is required to collect trends for morning AHU start-up times at least for 8 weeks to document system start up at different OAT conditions. Further, the implementer needs to check if the weather data used in EEM-1 calculation are consistent with the project site (CZ12), and both baseline and proposed calculations should factor-in AHU-1 non-operation during the holidays.

**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: Not provided.
	ED Assessment: System Optimization. Therefore, existing equipment and conditions are acceptable as the baseline.
	ED Recommendation: No change.
<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: In situ.
	ED Assessment: In situ.
	ED Recommendation: No change.
<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: Full cost is appropriate for system optimization. The project reports estimates the total project cost as \$13,000 (EEM-1: \$5,000, EEM-2: \$8,000)
	ED recommendation: No change.
<p><b>RUL</b> (required for early retirement projects only, otherwise N/A)</p>	IOU Proposal: N/A
	ED Assessment: N/A
	ED recommendation: N/A
<p><b>EUL</b> (for each measure)</p>	IOU Proposal: EEM-1: 3 years, EEM-2: 8 years
	ED Assessment: The EUL information given with the project documents is appropriate per PG&E’s RCx project submittal guidelines, Version 1.2, November 15, 2010.
	ED Recommendation: No change
<p><b>Savings Assumptions</b></p>	<p>IOU Proposal: The following assumptions have been made for EEM-1 and EEM-2:</p> <p>EEM-1: The calculation has assumed fixed SAT at 57 °F, RAT at 72 °F, and reheat temperature at 74 °F. Cooling and heating efficiencies are assumed at 1.5 kW/ton and 80%, respectively.</p> <p>EEM-2: For the existing restroom lighting fixtures, BOA calculation tool has assumed the existing lighting power density (LPD) as 1.2 W/sf. The BOA tool</p>

Reviewed Parameter	Analysis
	<p>also estimated a negative heating savings (-18 therms/year), which is not considered in the final project energy savings estimation.</p> <p>ED Assessment: ED reviewer verified the assumptions made in the submitted savings calculation for AHU savings and found them reasonable. Further, the ED reviewer considers the assumed LPD for restroom fixtures reasonable.</p> <p>ED Recommendation: No change.</p>
<b>Calculation Methods/Tool review</b>	<p>IOU Proposal: The submitted calculation for EEM-1 was estimated based on custom spreadsheet calculation, and the proposed savings for EEM-2 was calculated with PG&amp;E’s BOA tool.</p> <p>EEM-1: The baseline calculation considered 14 hr/day operation (Mon-Fri) and 13 hr/day (Mon-Fri) in the proposed condition. Both baseline and proposed case calculations have considered free cooling for OAT between 50 to 55 °F.</p> <p>ED Assessment: The calculations developed for the proposed savings appear to have adopted a reasonable approach. It appears that while EEM-1 calculation considered AHU-1 non-operational during the weekends, it did not consider the same for holidays. Further, ED reviewer observed that EEM-1 calculation has utilized the weather file for CZ03 while the project site is located at CZ12.</p> <p>For EEM-2, the claimed savings are estimated based on BOA tool. The ED reviewer verified the input used in this savings estimation, such as, the lighting power density, and the affected lighting power with the proposed occupancy sensors.</p> <p>ED Recommendation: No change.</p>
<b>Pre- or Post-Installation M&amp;V Plan</b>	<p>IOU Proposal: It appears from the project documents that the existing operating conditions and schedules were considered for the submitted savings estimation, and no pre-installation M&amp;V was done for this project.</p> <p>The implementer plans to conduct a post-installation M&amp;V and to collect the EMS screenshot to verify the post-case AHU schedule. The implementer also plans to trend the morning start time of AHU-1 to verify the AHU’s actual optimum start sequence and the total average daily operating duration. For EEM-2, the implementer plans to verify the installed ceiling mounted occupancy sensors in four restrooms and their operation.</p> <p>ED Assessment: ED reviewer considers the proposed post-installation M&amp;V strategy adequate. The project implementer should collect at least 8 weeks of trends for the AHU start time, and document that along with hourly OAT conditions during that period. The trend period should coincide, to a reasonable extent, with the OAT range the project site sees throughout a year. For EEM-2, the implementer should verify the installed occupancy sensors and their operation.</p> <p>ED Recommendation: No change.</p>

Reviewed Parameter	Analysis
Net-to-Gross Review	IOU Proposal: TBD
	ED Assessment: TBD
	ED Recommendation: TBD

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

Description	IOU Ex Ante Claim	ED Recommendations
<b>First Year kWh Savings</b>	9,563 kWh EEM-1: 6,300 kWh EEM-2: 3,263 kWh	TBD
<b>First Year Peak kW Savings</b>	N/A	TBD
<b>First Year Therms Savings</b>	1,500 therm EEM-1: 1,500 therm EEM-2: Nil	TBD
<b>kWh Savings (RUL Period)</b>	N/A	N/A
<b>Peak kW Savings (RUL Period)</b>	N/A	N/A
<b>Therms Impact (RUL Period)</b>	N/A	N/A
<b>kWh Savings (RUL thru EUL Period)</b>	9,563 kWh EEM-1: 6,300 kWh EEM-2: 3,263 kWh	TBD
<b>Peak kW Savings (RUL thru EUL Period)</b>	N/A	N/A
<b>Therms Savings (RUL thru EUL Period)</b>	1,500 therm EEM-1: 1,500 therm EEM-2: Nil	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>Project Costs for Baseline #1 (RUL or EUL)</b>	Full costs - \$13,000 EEM-1 - \$5,000	TBD

*Phase I Ex Ante Review Findings*

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<b>Description</b>	<b>IOU Ex Ante Claim</b>	<b>ED Recommendations</b>
	EEM-2 - \$8,000	
<b>Project Costs for Baseline #2</b> (EUL minus RUL period)	N/A	N/A
<b>Project Incentive Amount</b>	\$2,165 EEM-1: \$2,067 EEM-2: \$98	TBD