

## **Phase II Ex Ante Review Findings**

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

<b>IOU</b>	PGE
<b>Application ID</b>	2K12134527
<b>Application Date</b>	12/14/12
<b>Program ID</b>	PGE21042
<b>Program Name</b>	Savings By Design (Customized Retrofit - Demand Response)
<b>Program Year</b>	2012
<b>Itron Project ID</b>	X263
<b>IOU Ex Ante Savings Date</b>	TBD
<b>ED Measure Name</b>	UPS Retrofit
<b>Project Description</b>	Replace three (3) existing UPS modules with new, more efficient units
<b>Date of ED Review(s)</b>	4/26/13
<b>Primary Reviewer and Firm</b>	Phani Pagadala/Itron
<b>Review Supervisor and Firm</b>	Joseph Ball/Itron
<b>Type of Review (Desk, On-site, Full M&amp;V, Tool)</b>	Desk Review
<b>ED Recommendation</b>	Conditional approval at ED recommended savings levels, subject to post-installation data collection and true up.

## Measure Description

This project involves the replacement of three (3) of the five existing Liebert UPS units in a Tier 2 data center. The facility proposes to replace these units with new, more efficient units which will save electricity by operating more efficiently than the existing units.

## Summary of Review

The IOU response to the Phase I EAR and subsequent conversations with the IOU, contained revised ex ante calculations and alternative cost quotes for the new UPS units. Based on ED's review of the alternate costs and savings estimates provided in the IOU response, ED recommends the IOU utilize *Eaton Powerwave* UPS system as the technical baseline for gross impact estimation. The ED review team has re-calculated the incremental measure costs and savings (for the customer-preferred *APC Symmetra - PX* UPS system) over those of the *Eaton Powerwave* UPS system, resulting in an incremental measure cost of \$112,000 with an energy savings of 121,384 kWh/yr and a peak demand reduction of 13.8 kW.

It must be noted that UPS-3 of the *Liebert NX* UPS system does not comply with the minimum efficiency standards prescribed in the '*Energy Efficiency Baselines for Data Centers*' and therefore the *Liebert NX* UPS system cannot be considered as a viable replacement option.

The IOU appropriately selected this project as normal replacement, which triggers an industry standard practice (ISP) equipment baseline. The IOU reviewers adjusted the baseline UPS unit efficiencies to the stipulated minimum values as listed in "Energy Efficiency Baselines for Data Centers". The savings were re-calculated by the IOU using the estimated UPS loads forecasted for the years 2013-2017 (using trend data for 2007-2012), and the manufacturer performance specifications. The reported savings, however, were for the year 2013 (first year savings).

ED re-calculated the savings using actual loading from the previous year (2012) for the initial calculation of first year savings, since that approach does not entail any uncertainty in savings due to forecasted values. ED recommends that the final savings should be trued-up based on actual post-retrofit load to be measured over a stable operational period (for about 2-4 weeks depending upon system stability).

Per the PA review, the UPS loading was anticipated to not vary with time of day or season and the DEER peak demand reduction was determined using the same assumptions. The peak demand period for this site occurs between 2:00 PM and 5:00 PM from July 17 through July 19. ED accepts this method of peak demand estimation.

The energy savings due to interactive effects were not calculated by the IOU reviewer. For UPS unit 3 which had a 20% part-load value, across all considered options, the IOU reviewers chose the efficiency corresponding to the part-load factor of 25%, (thereby setting a floor for the efficiency value).

**Review Conclusion**

ED conditionally approves the ex ante savings at the recommended levels and requests an opportunity to review the costs and savings estimates after the measure installation is completed. ED recommends the use of actual operating/trend data for a period of two-to-four weeks that represents stable and typical operation in order to re-calculate the savings that can be frozen, after the measure installation is complete.

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

ED requests that the IOU submit the following once the measure installation and the post-installation data collection activities are completed:

1. Submit revised savings calculations for true-up, and
2. Provide supporting documentation (final invoices) on the project’s actual measure cost estimates.

**Table 1-2: Project Overview**

Description	IOU Proposed Ex Ante Data	ED Recommendations
<b>Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures)</b>	Normal Replacement	Normal replacement is reasonable; use <i>Eaton Powerwave</i> UPS system as the project technical baseline.
<b>Project Cost Basis (Full Cost, Incremental Cost)</b>	Incremental cost	Incremental costs of \$112,000 (as compared to <i>Eaton Powerwave</i> )
<b>RUL (Early retirement projects only, otherwise N/A (not applicable))</b>	N/A	N/A
<b>EUL</b>	10-12 years (based on manufacturer interviews)	10-12 years
<b>First Year kWh Savings</b>	228,548 (per the revised calculation spreadsheet)	121,238
<b>First Year Peak kW Savings</b>	26.1 (per the revised calculation spreadsheet)	13.8

Description	IOU Proposed Ex Ante Data	ED Recommendations
First Year Therms Savings	Not provided	TBD; Confirm that there is no natural gas supplied to heating units at the data center
kWh Savings (RUL Period)	N/A	N/A
Peak kW Savings (RUL Period)	N/A	N/A
Therms Impact (RUL Period)	N/A	N/A
kWh Savings (EUL thru RUL Period)	N/A	N/A
Peak kW Savings (EUL thru RUL Period)	N/A	N/A
Therms Savings (EUL thru RUL Period)	N/A	N/A
Annual Non-IOU Fuel Impact (RUL Period)	N/A	N/A
Annual Non-IOU Fuel Impact (EUL thru RUL Period)	N/A	N/A
Net-to-Gross Ratio	Not provided	Not assessed

**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: Normal Replacement
	ED Assessment: Normal Replacement
	ED Recommendation: None. Use <i>Eaton Powerwave</i> UPS system as the project technical baseline.
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis)	IOU Proposal: First measure cost of \$386,000
	ED Assessment: Incremental measure costs will apply.
	ED recommendation: \$112,000 (compared to <i>Eaton Powerwave</i> ).

Reviewed Parameter	Analysis
treatment)	
<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>	IOU Proposal: 10-12 years (based on manufacturer interview)
	ED Assessment: Acceptable
	ED Recommendation: 11 years
<b>Savings Assumptions</b>	IOU Proposal: The savings were calculated using the estimated UPS loads (forecasted using trend data for 2007-2012) for the years 2013-2017 and the manufacturer performance specifications.
	ED Assessment: Forecasting of loads introduces uncertainty in the savings estimates. ED policy does not allow final savings to be calculated based on forecasted loads.
	ED Recommendation: ED recommends the use of the past year (2012) loading to calculate the project first year savings as a starting point.
<b>Calculation Methods/Tool review</b>	IOU Proposal: The IOU utilized a spreadsheet based approach.
	ED Assessment: The IOU methods appear reasonable.
	ED Recommendation: ED recommends the use of <i>Eaton Powerwave</i> UPS system as the baseline. ED recommends the use of actual post-installation operating data for savings true-up.
<b>Pre- or Post-Installation M&amp;V Plan</b>	IOU Proposal: The IOU intends to perform a post-installation verification.
	ED Assessment: ED approves the IOU post-installation verification activities. However, ED recommends the additions (provided below) to the current plan.
	ED Recommendation: Collect actual operating data for a period of at least two-to-four weeks for a 15-minute interval.
<b>Net-to-Gross Review</b>	IOU Proposal: Not provided
	ED Assessment: Not recommended
	ED Recommendation: None