Phase III Ex Ante Review Findings

Table 1-1: Project Information

IOU	Pacific Gas and Electric Company
Application ID	NC0117606
Application Date	3/10/2011
Program ID	PGE21042
Program Name	Savings by Design
Program Year	2011
Itron Project ID	X063
IOU Ex Ante Savings Date	3/8/2012
ED Measure Name	Central chiller plant upgrades
Project Description	Installed three (3), 150 ton high efficiency VFD chillers in repurposed lab space
Date of ED Review(s)	3/16/2012, 4/15/2012, 3/18/2013
Primary Reviewer and Firm	Dale Tutaj/DNV KEMA Steven Gates, James J. Hirsch & Assoc.
Review Supervisor and Firm	Joseph Ball/Itron
Review Type (Desk, On-site, Full M&V, Tool)	Desk review
ED Recommendation	Revised savings of 417,113 kWh and 57 kW approved. Assuming a sales tax rate of 9.25%, the incremental project cost is $123,338.

Measure Description

This project was originally described as the conversion of office space into lab space, together with associated IT and networking equipment. The increased loads necessitated the installation of new chillers with redundancy, and other associated HVAC equipment.

A request for additional clarification revealed that the project actually consists of the expansion of a data center. While the expansion will require both new air handlers and chillers, only the chillers are included in this project. High-efficiency air-cooled VFD screw chillers are proposed in place of screw chillers minimally compliant with Title 24. The two existing air-cooled chillers are replaced with three new 150 ton chillers. The third new chiller is redundant; however because the proposed chillers are most efficient when operated at part load, all three chillers will run simultaneously.

Energy savings are expected to arise from:

1. Improved part load efficiency due to VFD technology
2. Improved part load efficiency due to better chiller design; most notably the ability to take maximum advantage of low outdoor ambient temperatures.

The original proposed savings were 78 kW and 685,545 kWh annually, at an incremental cost of $659,800. . For the phase II EAR ED revised the ex ante savings to be 57.0 kW and 417,113 kWh annually;

Summary of Review

Phase II EAR covers all the documents reviewed. The new documents reviewed include the following:

- EnergyEfficiencyOIR-Post-2008_DR_ED_168_EEGA1999Supp02.doc – PG&E's formal EEGA DR response.
- Post-field Report - 118331 XXXXXXX Bldg K Chiller_rev2.xls .
- MEASURE CASE XXXXXXX -K Chillers PO 125210-001.pdf.

BASE CASE XXXXXXX K Chiller Replacement_Trane Proposal.pdf The new project documents provided were complete and adequate. In the phase II review of this project ED approved the energy savings estimate of 417,113 kWh and 57 kW. ED did not approve the incremental cost of $333,869, or $741 kW/ton, and asked for additional documentation. In the review, ED stated: "Incremental project cost of $333,869 not approved, pending additional information regarding the incremental cost of the screw chillers only, exclusive of other HVAC

costs associated with the increased capacity of the data center." By "incremental cost", ED wanted a comparison of the cost of the air-cooled VFD chillers used, vs. the cost of the same type of screw chillers that would be minimally compliant with Title 24.

Documentation on incremental cost was provided on 3/4/2013 in the file "EEGA1999Supp02 NC0117606 TMPM Design New Chiller.zip". The incremental cost of the three air-cooled screw chillers with VFDs, compared to less efficient screw chillers without VFDs, is documented to be $112,896, excluding tax.

Note that this incentive calculation does not include sales tax on the incremental cost. Assuming a sales tax rate of 9.25%, the incremental cost is $123,338.

Review Conclusion

Final ex ante savings of 417,113 kWh and 57 kW are approved. Assuming a sales tax rate of 9.25%, the incremental project cost is $123,338.

Summary of ED Requested Action by the IOU

None

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)	New construction	New Construction
Project Cost Basis (Full Cost, Incremental Cost)	Incremental cost	ED estimated incremental project cost is $123,338.
RUL (Early retirement projects only, otherwise N/A (not applicable))	N/A	N/A
EUL	Not provided	Review of 2008 DEER documentation indicates an EUL of 20 years for high efficiency chillers in non-res, HVAC applications
First Year kWh Savings	417,113	Accept
First Year Peak kW Savings	57.0	Accept
First Year Therms Savings	0	0
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

Description	IOU Proposed Ex Ante Data	ED Recommendations
Net-to-Gross Ratio	Not provided	None at this time.

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: New construction, major renovation
	ED Assessment: New construction is appropriate
	ED Recommendation: No changes
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: $750,000 for HVAC and Controls. Baseline cost of $416,131 based on R.S. Means data.
	ED Assessment: The incremental cost of the three air-cooled screw chillers with VFDs, compared to less efficient screw chillers without VFDs, is documented to be $112,896, excluding tax.
	ED recommendation: With an assumed sales tax rate of 9.25%, the incremental project cost is $123,338.
RUL (required for early retirement projects only, otherwise n/a)	IOU Proposal: N/A
	ED Assessment: N/A
	ED recommendation: N/A
EUL	IOU Proposal: Not provided
	ED Assessment: Review of 2008 DEER documentation indicates an EUL of 20 years for high efficiency chillers in non-res, HVAC applications
	ED Recommendation: 20 years based on 2008 DEER
Savings Assumptions	IOU Proposal: Savings were projected based on bin-analysis
	ED Assessment: The load profile was flat throughout the year, which is reasonable for a data center.
	ED Recommendation: Accept
Calculation Methods/Tool review	IOU Proposal: Savings were projected using a bin analysis
	ED Assessment: Resubmitted savings calculations are reasonable.
	ED Recommendation: Accept
Pre- or Post-Installation M&V Plan	IOU Proposal: M&V plan was not provided but post-installation data collected from BMS were provided.
	ED Assessment: Project already completed when selected. Post-installation data for loads was gathered by BMS, reviewed and determined adequate.

Reviewed Parameter	Analysis
	ED Recommendation: None.
Net-to-Gross Review	IOU Proposal: Not provided
	ED Assessment: NTG not assessed
	ED Recommendation: None