

Ex Ante Review Findings

Project Information

IOU	Pacific Gas and Electric Company
Application ID	2K11070332-X037
Application Date	9/7/2011
Program ID	ETAP
Program Name	Energy Technology Assistance Program
Program Year	2011
Project ID	Not Available
IOU Ex Ante Savings Date	Not Available
ED Measure Name	HVAC Controls Project
Project Description	Install wireless HVAC controls
Primary Reviewer and Firm	Dale Tutaj/KEMA
Review Supervisor and Firm	Joseph Ball/Itron
Date of ED Review	02/22/2012
Type of Review	Desk Review
ED Recommendation	Not Approved; pending requested additional data to verify energy savings estimate

Measure Description

The key energy savings measures implemented as part of this wireless HVAC controls project are as follows:

1. Installed VFDs on air supply and return fans
2. Retrofitted Vigilent DART™ VFD controls to adjust the air supply and return fan speeds depending on the needs of the conditioned space. This system was installed in two buildings with constant air volume (CAV) systems, and primarily saves energy by reducing fan speed.
3. Installed new Cypress EnviroSystem Wireless Pneumatic Thermostats in three buildings where better zone-level control is desired. This system will allow for night setback and occupancy override of temperate setpoints. Savings for this portion of the project result from a reduction in fan speed and a reduction in heating and cooling loads during unoccupied periods by setting back temperature setpoints.

Summary of Review

Documents provided for review include the following: ETAP Audit Report and 2011 Program Application. This project involves a retrofit of existing HVAC control systems and the installation of VFD controls on air supply and return fans. This project involves a total of five (5) buildings, however, due to constraints

by the existing HVAC systems and the desired controllability, two different wireless controls technologies have been used. Total energy savings claimed for this HVAC controls project are 74,235 kWh/yr and 5,613 therms/yr.

The review focused primarily on ETAP Audit Report to determine the reasonableness of projected savings estimates. Energy savings are based on two savings calculations. The inputs for the savings estimates are based on data collected on-site, conversations with facility staff, and secondary sources. Equipment monitoring was not conducted.

Overall, the provided documentation explains inputs and assumptions used to determine savings estimates. However, without reviewing the savings calculations, it is not possible to substantiate the energy saving estimates of this project. Additional documentation will be needed to complete the ex-ante review for this project.

Review Conclusion

Not approved, pending fulfillment of requested data and subsequent opportunity for ED to re-evaluate the project and the savings analyses.

Summary of ED Requested Action by the IOU

The supporting documents provided were insufficient to substantiate the energy savings estimate of this project. So, ED requests that the IOU provide additional data for the completion of the ex-ante review of this project. The additional data request for this project is as follows:

- Provide “live” fully functioning (unlocked and hard-coded) ETAP Savings Spreadsheets for both sets of measures: DART VFD controls and wireless pneumatic controls.
- Provide description of existing controls, and baseline assumptions.
- Provide nameplate information of the chiller which includes model number, type, manufacturer, and efficiency (COP), performance curve, age and capacity of the chiller.
- If boiler/furnace flue gas reports are available, then use that combustion efficiency to determine the system efficiency.
- For one of the boilers an efficiency of 88% was assumed based on “actual” boiler efficiency. Clarify if this is nameplate combustion efficiency, flue gas combustion efficiency, or system efficiency. If this is not the system level efficiency, then provide an estimate of what the system efficiency is.
- It is unclear how the full load airflow of supply and return fans was determined. Air balance reports were mentioned as a data source. Please identify which method was used to determine full load airflow values, such as performance curves, direct measurement, fan affinity laws, rules-of-thumb, etc.
- Provide air balance reports
- The post-case fan schedules are provided, however, it is unclear what the baseline fan controls are. Were fans turned off in the evening manually or left to operate through the night. Provide detailed in situ baseline operating equipment and conditions.

- The source of the minimum flow fraction for both groups of buildings (400 and 800; and then 1300, 1400, and 1500) are higher than expected at 50% and 80%, respectively. Please explain how these values were determined.
- Nameplate information of all affected equipment (chiller, pumps, boilers, air supply fans, and air return fans).
- Describe the age, condition, operability and RUL of relevant existing controls and affected equipment. Provide information such as recent maintenance records that supports conclusions surrounding equipment condition.
- The ETAP Audit Report contains estimated project costs for scenarios that differ from the project cost in the application. Please submit itemized invoices. Provide the EULs of the VFD and the EMS system and the sources of the EUL.

Project Overview

Description	IOU Proposed Ex Ante Data	ED's Recommendations
Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion)	Pre-existing equipment	TBD; Existing equipment with add-on measures is sufficient, unless existing controls and the affected systems were in need of replacement in the coming years
Project Cost Basis (Full Cost, Incremental Cost)	Full Cost-\$62,450	TBD
RUL (Early retirement projects only, otherwise n/a)	N/A	TBD; need to identify the condition, age, RUL, any chiller or boiler plant issues of pre-existing (EMS or VFD) controls, including an assessment of recent maintenance
EUL	Not Provided	Review of 2008 DEER documentation indicates: EULs for both VSD of supply fan motors and energy management systems are 15 years
First Year kWh Savings	74,235	TBD
First Year KW Savings	0	TBD
First Year Therms Savings	5,613	TBD
Total kWh Savings (RUL Period)	N/A	TBD
KW Savings (RUL Period)	N/A	TBD
Total Therm Impact (RUL Period)	N/A	TBD
Total kWh Savings (EUL – RUL Period)	N/A	TBD

Description	IOU Proposed Ex Ante Data	ED's Recommendations
KW Savings (EUL – RUL Period)	N/A	TBD
Total Therm Savings (EUL – RUL Period)	N/A	TBD
Total non-IOU Fuel Impact (RUL Period)	N/A	N/A
Total non-IOU fuel Impact (EUL – RUL Period)	N/A	N/A
Net-to-Gross Ratio	Not available	Assessment not completed, but may be warranted

Detailed Review Findings

Reviewed Parameter	Analysis
Project Gross Savings Baseline (for early retirement projects only, include RUL through EUL baseline)	IOU Proposal: Existing conditions
	ED Assessment: To be reviewed when further information is available
	ED Recommendation: Provide description, RUL, age, and condition of all pre-existing building controls and affected equipment
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Appears to be the full cost
	ED Assessment: Could not assess because application documents and itemized invoice were not provided. For early retirement of any pre-existing controls, then incremental costs will be needed.
	ED recommendation: Provide all itemized invoices of program measures
RUL (required for early retirement projects only, otherwise n/a)	IOU Proposal: N/A
	ED Assessment: TBD

Reviewed Parameter	Analysis
	<p>ED Recommendation: Provide description, RUL, age, and condition of all pre-existing building controls and affected equipment</p>
EUL	<p>IOU Proposal: Not Provided</p>
	<p>ED Assessment: 15 years based on 2008 DEER for VSDs and EMS systems</p>
	<p>ED Recommendation: 15 years</p>
Savings Assumptions	<p>IOU Proposal: Savings were projected based on a bin analysis.</p>
	<p>ED Assessment: Data provided is insufficient to support savings claims.</p>
	<p>ED Recommendation: Requested additional data to verify the savings estimate such as HVAC equipment data, baseline controls and new controls strategy. Please see the data request for details.</p>
Calculation Methods/Tool review	<p>IOU Proposal: Savings were projected based on a bin analysis.</p>
	<p>ED Assessment: Inadequate information to verify the calculation method.</p>
	<p>ED Recommendation: Provide "live" fully functioning calculations</p>
Pre- or Post-Installation M&V Plan	<p>IOU Proposal: No M&V plan was provided</p>
	<p>ED Assessment: An assessment could not be performed</p>
	<p>ED Recommendation: If the savings review and inputs are reasonable, no M&V is recommended. Balancing the savings estimate uncertainty and the project size, it is likely that M&V efforts are not warranted.</p>

Reviewed Parameter	Analysis
Net-to-Gross Review	IOU Proposal: Not provided
	ED Assessment: An assessment was not performed.
	ED Recommendation: A NTG assessment may be warranted