Phase III Final Ex Ante Review Findings

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

IOU	Pacific Gas and Electric
Application ID	1085-01.1
Application Date	07/16/2012
Program ID	PGE2182
Program Name	Boiler Energy Efficiency Program, Agricultural Calculated Incentives
Program Year	2012
Itron Project ID	X-139
IOU Ex Ante Savings Date	Not available
ED Measure Name	Boiler Replacement
Project Description	Install a new finned-tube feedwater economizer on the new low NOx boiler
Date of ED Review(s)	07/16/2012 & 08/27/12 & 03/26/13
Primary Reviewer and Firm	Kunal Desai / Itron
Review Supervisor and Firm	Joseph Ball / Itron
Type of Review (Desk, On-site, Full M&V, Tool)	Desk Review
ED Recommendation	ED approves the ex ante savings of 126,738 therms. ED suggests that for future projects post installation utility gas usage and production data should be utilized for savings true up.

Measure Description

The measure proposes to replace two existing boilers with one reconditioned, low NOx boiler to meet new NOx regulations, Boiler 2 (30,000 PPH) will be replaced with a new 70,000 PPH boiler and existing Boiler 1 (40,000 PPH) will be used as a backup boiler. The new 70,000 PPH boiler is proposed to be installed with a new finned-tube feedwater economizer to improve its combustion efficiency and thereby resulting in gas savings. Installation of the economizer boosts the boiler efficiency from 79 % to 83.5 % and helps the project comply with Title 20 baseline combustion efficiency of 80%. The natural gas savings for this project are a result of the economizer installation only.

Summary of Review

Documents provided for this final phase III review include the following: M&V analysis report draft_01, Energy savings calculation spreadsheet, Project invoices, Boiler permit certificate, Boiler tests, production data, and start up documentation. Energy Audit Report draft version 1.

The facility completed the installation of a new boiler economizer on a reconditioned boiler. The facility installed a refurbished boiler with a CataStak TM SCR system to reduce NOx emissions and to be in compliance with 2013 BAAQMD requirements. Incentives are claimed for the boiler economizer which provided energy savings. In the post installation monitoring and verification phase, the IOU installed data loggers to monitor boiler flue gas temperature before and after the boiler economizer. They also measured the average stack O2 percentage with spot measurement of 4 %. One month's worth of logger data was submitted for ED review. On ED's request production data for 2012, a boiler compliance certificate and boiler start up forms for 2013 were also submitted for ED review. Production data for 2010, 2011 and 2012 were reviewed;

IOU used full load efficiency at part load conditions. ED revised the energy saving calculations using part load efficiency for boiler operating at part load conditions (57%). "Energy Efficiency Baselines for Data Centers" document was used to look up part load efficiency of 57%. Part load efficiency of 80.37% was extrapolated from the document. ED modified the energy savings calculation and the revised energy savings for this project are 126,738 therms. However, the incentives are capped at 50% project cost. IOU submitted invoices for ED review. The total cost to install the economizer is $58,750. The cost breakdown is as follows, economizer piping and platform fabrication is listed at $23,750 and the invoice for boiler economizer was $35,000.

Review Conclusion

ED approves the ex ante savings of 126,738 therms. ED suggests that for future projects post installation utility gas usage and production data should be utilized for savings true up.

Summary of ED Requested Action by the IOU

No further documentation is required for this project.

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)	Add on Measure	Add on Measure acceptable
Project Cost Basis (Full Cost, Incremental Cost)	Incremental cost – $58,750	Full Cost - $58,750 Invoices were submitted for ED review.
RUL (Early retirement projects only, otherwise N/A (not applicable))	N/A	N/A
EUL	20 years	15 years for boiler economizers, similar to the waterside economizer.
First Year kWh Savings	N/A	N/A
First Year Peak kW Savings	N/A	N/A
First Year Therms Savings	135,500 Therms/yr	126,738 Therms/yr
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	135,470 Therms/yr	126,738 Therms/yr

Description	IOU Proposed Ex Ante Data	ED Recommendations
Period)		
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	A NTG assessment is not warranted

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: Add on Measure
	ED Assessment: Title 20 code was used as baseline for energy efficiency. Add on Measure baseline is acceptable
	ED recommendation; None
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Incremental cost of $58,750
	ED Assessment: Incremental cost of $58,750 is acceptable
	ED recommendation: None
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: 20 years
	ED Assessment: 15 years for boiler economizers, similar to the waterside economizer.
	ED Recommendation: 15 years
Savings Assumptions	IOU proposal: IOU assumed that the boiler will run at full efficiency even at part load conditions.
	ED Assessment: Boiler will have varying efficiency at full and part load conditions.
	ED Recommendation: IOU used full load efficiency at part load conditions. ED revised the energy saving calculations using part load efficiency for boiler operating at part load conditions (57%). "Energy Efficiency Baselines for Data Centers" document was used to look up part load efficiency of 57%. Part load efficiency of 80.37% was extrapolated from the document

Reviewed Parameter	Analysis
Calculation Methods/Tool review	IOU proposal: Live energy savings calculation spreadsheet is provided for ED review
	ED Assessment: Calculation Methodology not acceptable
	ED Recommendation: Part load efficiency in the base case should have been used. Estimated savings should be calculated from post-installation load backcast to the baseline condition.
Pre- or Post-Installation M&V Plan	IOU Proposal: M&V plan submitted. Logged data for boiler flue gas temperatures before and after the economizer were submitted
	ED Assessment: ED conducted a site visit to verify the installation of new boiler economizer. One month data logging was performed to monitor the boiler flue gas temperature. Results from the trends were used to true up energy savings.
	ED Recommendation: None
Net-to-Gross Review	IOU Proposal: Not provided
	ED Assessment: None
	ED Recommendation: None