

Ex Ante Review Findings

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

IOU	PGE
Application ID	2K12088077
Application Date	06/05/2012
Program ID	TBD
Program Name	Energy Efficiency – Demand Response
Program Year	2012
Itron Project ID	X086
IOU Ex Ante Savings Date	TBD
ED Measure Name	Boiler Economizer
Project Description	Install a new stack gas economizer. It will recover waste heat from the flue gas to pre heat the feedwater entering the boiler.
Date of ED Review(s)	06/13/2012
Primary Reviewer and Firm	Kunal Desai/Itron Inc
Review Supervisor and Firm	Joseph Ball/Itron
Type of Review (Desk, On-site, Full M&V, Tool)	Desk Review
ED Recommendation	ED approves 29,245 therms for the proposed project (PGE 2K12088077).

Measure Description

Install a new stack gas economizer on boiler. The proposed economizer will recover waste heat from the flue gas to pre heat the feed water entering the boiler. The stack gas temperature is estimated to be cooled from 392°F to 273°F.

Summary of Review

The documents reviewed by ED are: Application package, email communications and early review decision request. The project cost is estimated at \$180,000, although contractor quotes or estimates were not included in the paperwork submitted for ED review. The IOU submitted energy impacts for this measure are estimated to be 36,557 Therms/year savings and the incentive is \$36,557.

The current measure involves installation of new stack gas economizer on the boiler. The existing boiler has an 87 MMBtu/hr capacity and 81% efficiency. Steam is produced at 72,000 lb/per in the boiler. Stack temperature was measured at 392°F along with the feed water temperature at 215°F. The boiler operates 24 hours a day throughout an 80 day cycle (1,920 hours per year). No supporting documentation for operating hours is provided for ED review. Energy savings calculations in PDF version are submitted for ED review. Energy savings calculation methodology accounted for heat recovery from the stack flue gases to the boiler feed water. It was noted that heat exchanger effectiveness was not accounted for in the calculation. ED used a conservative effectiveness of 80% to revise the savings estimate.

The revised energy savings from the boiler economizer/heat recovery measure is estimated to be 29,245 Therms/year.

Review Conclusion

ED approves the adjusted savings for the proposed project (PGE 2K12088077). The final energy savings estimates for CPUC reporting purposes were modified to account for heat exchanger effectiveness in transferring heat from flue gases to the boiler feedwater. The revised energy savings from the boiler economizer/heat recovery measure is estimated to be 29,245 Therms/year.

ED recommends that **in the future the IOU provide the following documents for smaller projects involving the installation of a stack economizer:**

1. Provide detailed measure description for the project and a schematic line diagram showing the water and gas loops.
2. Provide nameplate/design information, such as boiler capacity, efficiency, design stack temperature, HHW supply and return temperatures, feedwater pump capacity and flow, steam temperature and pressure when applicable, steam production. Include a pre-

installation photograph of the location where a stack economizer will be installed and a post-installation photograph of the installed equipment.

3. Provide “live” fully functioning (unlocked and hard-coded) Savings calculation Spreadsheets or energy model for the measures
4. Provide cut sheet of the proposed equipment that shows specifications, for example, make and model number of the economizer and the economizer effectiveness. size, etc.
5. Copy of most recent combustion efficiency test conducted by the customer, if available. This data should have the current exhaust temperature for verification. Photographs of gauges that show the feedwater and steam temperatures should be included.
6. Provide all cost quotes/cost estimations/cost invoices.

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 claim for the boiler economizer is acceptable
Project Cost Basis (Full Cost, Incremental Cost)	Full cost	Full cost acceptable
RUL (Early retirement projects only, otherwise N/A (not applicable))	N/A	N/A
EUL	Not provided	10 years for non residential economizers based on DEER 2008 database
First Year kWh Savings	N/A	N/A
First Year Peak kW Savings	N/A	N/A
First Year Therms Savings	36,557	29,245
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 (RUL thru EUL Period)	N/A	N/A

Description	IOU Proposed Ex Ante Data	ED Recommendations
Peak kW Savings (RUL thru EUL Period)	N/A	N/A
Therms Savings (RUL thru EUL Period)	36,557	29,245
Annual Non-IOU Fuel Impact (RUL Period)	N/A	N/A
Annual Non-IOU Fuel Impact (RUL thru EUL Period)	N/A	N/A
Net-to-Gross Ratio	Not provided	Assessment not required

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: Add on Measure claim is acceptable
	ED Recommendation: Add on Measure
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Full cost
	ED Assessment: Full project cost acceptable
	ED recommendation: Full cost
RUL (required for early retirement projects only, otherwise n/a)	IOU Proposal: N/A
	ED Assessment: N/A
	ED recommendation: N/A

Ex Ante Review Findings

Reviewed Parameter	Analysis
EUL	IOU Proposal: Not Provided
	ED Assessment: 10 years for non residential economizers based on DEER 2008 database
	ED Recommendation: 10 years
Savings Assumptions	IOU Proposal: Energy savings calculation in pdf version provided
	ED Assessment: Energy recovery calculations from stack gas temperatures did not account for heat exchanger effectiveness.
	ED Recommendation: ED used 80% heat exchanger effectiveness and adjusted the savings estimate accordingly.
Calculation Methods/Tool review	IOU Proposal: Energy savings calculation in pdf format provided
	ED Assessment: Energy savings methodology is acceptable. Typically “live” and fully unlocked energy savings spreadsheet is recommended for ED review.
	ED Recommendation: ED used 80% heat exchanger effectiveness and adjusted the savings estimate accordingly.
Pre- or Post-Installation M&V Plan	IOU Proposal: Not provided
	ED Assessment: Not accessed
	ED Recommendation: Conduct post-installation inspection according to program rules.
Net-to-Gross Review	IOU Proposal: Not provided

Ex Ante Review Findings

Reviewed Parameter	Analysis
	ED Assessment: Net to gross interview is not warranted
	ED Recommendation: None