

Ex Ante Review Findings

Project Information

IOU	Pacific Gas and Electric
Application ID	2K12108487
Application Date	7/25/11
Program Number	
Program Name	Non-Residential Customized Retrofit
Program Year	2012
Project ID	2K12108487
IOU Ex Ante Savings Date	
Itron ID	X195
ED Measure Group Name	
IOU Measure Name	Turbocor Chiller Installation
End Use	Cooling
Date of ED Review	October 1, 2012
Type of Review	Desk Review
Primary Reviewer and Firm	Doug Maddox, James J. Hirsch & Associates
ED Recommendation	Conditional approval subject to post-installation verification and recommended corrections.

Measure Description

The measure replaces two 100 ton screw compressors with two 100 ton Turbocor variable speed drive compressors. The existing chillers are 13 years old, and have a remaining useful life of 7 years based on the DEER useful life of 20 years for a chiller.

Summary of Review

The measure analysis was performed using eQuest. The baseline model total energy consumption is ██████████, which is reasonably close to the 2011 utility bill value of ██████████. Similarly, annual peak demand for the baseline model is ██████████, which compares well with the ██████████ found in the 2011 bill data. Based upon a review of the eQuest input files, the model appears to be reasonable except for a couple of issues.

One potential issue that was discovered in the baseline model was the minimum allowable temperature of air entering the condenser, which was set at 75°F. This seems high relative to the eQuest default of 65°F for air cooled chillers. If this assumption is appropriate, then some documentation should be provided to support it.

An issue in the measure input file is the use of performance curves that were developed for a water-cooled version of the Turboacor chiller. This is generally not appropriate due to the higher condensing temperature of air-cooled chillers as well as the typically higher refrigerant-to-air temperature difference for air-cooled chillers. New curves need to be created that are specific to the air-cooled chillers.

Description	IOU Proposed Ex Ante Data	ED Recommended Changes
Project Baseline (Early Replacement, Normal Replacement, Capacity Expansion)	New Construction	Need to justify high value for minimum condensing temperature
Project Cost Basis (Full Cost, Incremental Cost)	Compressor cost \$164,000	Accept
RUL	7 years	None
EUL	20 years	None
kWh Savings through RUL	n/a	TBD
KW Savings through RUL per CPUC Definition	n/a	TBD
Therms Savings through RUL	n/a	TBD
kWh Savings through EUL	395,000	TBD
KW Savings through EUL	51.8	TBD
Therms Savings through EUL	n/a	n/a
Lifetime Savings kWh		
Lifetime Savings KW		
Lifetime Savings Therms	n/a	n/a
Secondary Impact kWh	n/a	n/a
Secondary Impact KW per CPUC Definition	n/a	n/a

Description	IOU Proposed Ex Ante Data	ED Recommended Changes
Secondary Impact Therms	n/a	n/a
Interactive Effects kWh	Not reported	n/a
Interactive Effects Therms	Not reported	n/a
Net-to-Gross Ratio	Not stated	

Detailed Review Findings

Reviewed Parameter	Analysis
Project Baseline	IOU Proposal: Existing air-cooled chiller, installed in 1999. Rated efficiency is 1.3 kW/Ton. Minimum condensing temperature was run at 75°F.
	ED Assessment: Minimum condensing temperature appears to be high. Documentation should be provided to support this, or change to the eQuest default of 65°F.
	ED Recommendation: Document or change.
Project Cost Basis	IOU Proposal: Incremental estimated costs are described in "2K12108487 – COM_2012 PG&E Review Form v1.2.xlsm" \$164,000 for compressors only
	ED Assessment: Seems reasonable.
	ED recommendation: Accept.
RUL	IOU Proposal: Existing chiller is 13 years old, and DEER EUL for chillers is 20 years. Hence, RUL is 7 years.
	ED Assessment: Correct
	ED Recommendation: Accept

Reviewed Parameter	Analysis
EUL	IOU Proposal: 20 years
	ED Assessment: 20 years
	ED Recommendation: Accept
Savings Assumptions	IOU Proposal: The measure efficiency is specified in the model as an electric input ratio of 0.2815. This corresponds to 1.0 kW/Ton.
	ED Assessment: Basic assumptions are reasonable
	ED Recommendation: Accept
Calculation Methods/Tool review	IOU Proposal: Analysis done using eQuest. For the Turbocor air-cooled chiller eQuest model performance curves were used that were developed for a water-cooled Turbocor chiller. Also, minimum condensing temperature for the baseline appears to be high, as described for the Project Baseline above.
	ED Assessment: Need to develop performance curves using air-cooled Turbocor performance data. Need to document or change minimum condensing temperatures used in model.
	ED Recommendation: Update model with appropriate curves and parameters as described above.
Pre- or Post-Installation M&V Plan	IOU Proposal: None.
	ED Assessment: Clarify whether the IOU intends to conduct post-installation M&V.

Reviewed Parameter	Analysis
	ED Recommendation: Suggest conduct post-installation verification.
Net-to-Gross Review	IOU Proposal: Not stated
	ED Assessment: None
	ED Recommendation: None.