

## **Ex Ante Review and Prospective Review Findings**

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

<b>IOU</b>	PG&E
<b>Application ID</b>	2K12085717
<b>Application Date</b>	5/1/12
<b>Program ID</b>	Not Available
<b>Program Name</b>	Customized Incentive Program
<b>Program Year</b>	2012
<b>Itron Project ID</b>	X132
<b>IOU Ex Ante Savings Date</b>	4/25/12
<b>ED Measure Name</b>	Compressed Air
<b>Project Description</b>	Compressed air system modifications
<b>Date of ED Review(s)</b>	6/5/12
<b>Primary Reviewer and Firm</b>	Keith Rothenberg/Energy Metrics
<b>Review Supervisor and Firm</b>	Leonel Campoy/Itron
<b>Type of Review (Desk, On-site, Full M&amp;V, Tool)</b>	Desk
<b>ED Recommendation</b>	Ex ante savings estimates are not approved, pending fulfillment of data request for more information.

## **Measure Description**

Add a new 200 HP Variable Frequency Drive (VFD) air compressor, compressor controls, no-loss drains, a 500 gallon receiver and a four-inch distribution line to an existing compressed air plant. The new VFD compressor will be operated as the plant's "trim" air compressor.

## **Summary of Review**

The documentation reviewed includes an application dated 5/1/2012, a description of the project, two MS Excel™ calculation files, and one MS Excel™ file with photographs.

The documentation provided is high level, lacking important details about the proposed project. There are several measures described in the documents but all measures are grouped together and may need to be separated to correctly define the baseline, cost basis, EUL, RUL, etc.

The estimated project impacts are calculated using a customized model that has been developed by the IOU for specific compressed air project measures. The IOU has previously submitted this model to ED and at that time ED requested that the IOU provide documentation to support the model. The embedded Technical Requirements documents in the calculation spreadsheets provide some of the originally requested information. However, those documents do not describe the actual formulas calculations and engineering principles behind the estimation methods.

The application cites a 2008 report that determined the average airflow for the "peak" production season. The 2008 report was not submitted for ED's review. The submitted documentation does not provide adequate justification that the 2008 report findings remain relevant to current operations and accurate as the baseline for this project. The submitted calculation seems to define two periods of operation: peak season production and non-peak season production, along with estimates of average compressed air consumption requirements for each period. A calculation is performed for a single average airflow for each period and extrapolated over the entire year to derive the project impacts. It is unclear if this is an appropriate approach for this project.

The incentive application documents an annual savings impact of 755,125 kWh, peak demand reduction of 132.09 kW with an incentive amount of \$81,170.25. The estimated project cost is \$175,000.

## **Review Conclusion**

Due to the lack of information provided, the ED does not approve the ex ante energy savings claims for this project, pending submission of the additional information and data requested.

## **Summary of ED Requested Action by the IOU**

In order to complete an ex ante review the ED requests that the IOU submit the following documentation due on 06/22/2012 (or 14 days after receipt of this EAR):

1. ED notes that several measures are combined for this project—a new compressor, new compressor controls for all existing compressors, no loss drains, addition of storage and a new 4” compressed air distribution line. The different measures may have different baselines, different cost bases, different EULs, etc. Justify why the measures should not be separated or separate the measures and address these items individually.
2. Describe the location and configuration of the air compressors, storage vessels and controls for the existing and proposed systems. Provide the approximate age, type and condition of the existing compressors.
3. The project impacts are calculated using a customized model that has been developed by the IOU for specific compressed air project measures. The calculation tool appears to have been developed for estimating the energy savings and demand reductions associated with air compressor retrofits, no loss drains, and cycling air dryers. One tab in the Excel workbook appears to reference AIRMaster+ performance specifications but does not contain a description of how the AIRMaster+ data is used. The IOU has previously submitted this model and at that time ED requested that the IOU provide documentation to support the model. ED has not received documentation for this calculation tool describing the methodology it uses or the basis of the analysis performed. Please provide supporting documentation for the model.
4. The submitted calculation seems to define two periods of operation: peak and non-peak seasonal production, and corresponding estimates of average air flow for each period. A calculation is performed for a single average airflow for each period and extrapolated over the entire year to derive the project impacts. Please describe and justify how using single average value for systems that have highly variable demand and non-linear performance relationships is appropriate for estimating the energy impacts for this project.
5. The documentation states “currently all compressors are operated in the on mode” and “the proposed air flows are distributed among the most efficient machines as their algorithms will be able to determine which machines to use based on demand in the facility”. It appears that a large portion of the energy savings impacts are predicated on improving the control of the compressed air system. Please provide a concise description of how the compressed air plant is currently controlled and how it will be controlled after the project is implemented, including whether the proposed control system will include measurement of air compressor power, system pressure and system air flow. Also describe how the calculation tool models the proposed control sequence.
6. The documentation refers to a report by ECOS Air in 2008 that establishes the average airflow during the peak season used in the current IOU analysis. This report has not been

provided. Please provide this report, any available raw data collected for the report and justification that it is still relevant to current operation and accurate as the baseline for this project.

7. ED notes that the addition of a new 4” distribution line is being credited with a 10 psig reduction in compressor operating pressure. Please describe the existing and proposed pressure operation for the compressed air system. Explain how the new 4” line will allow a 10 psig reduction in compressor operating pressure. Is the compressed air system usage expected to increase with the addition of a new distribution line? Discuss if this project involves a capacity expansion and if so consider this in the baseline determination.
8. Given the uncertainty about many aspects of the compressed air system operation and the magnitude of the projected savings impacts (755,125 kWh, 132.09 kW) it may be prudent to perform pre/post implementation measurements and analysis. Describe any proposed pre or post installation verification and/or measurements for the project.
9. If applicable, provide a more detailed M&V plan including the source and duration of the data collection, adjustments for seasonality in production, adjustments for ISP (if applicable), include a statement regarding whether or not the frozen ex ante claims will be based upon the final M&V or engineering calculations alone.
10. ED is likely to request additional information as the details of this project become more clearly defined.
11. ED requests that PG&E continues to keep ED informed of progress and next steps on this project.
12. ED requests to be informed of any future site visits including the post-installation inspection, in case it chooses to send a representative on-site.
13. ED requests the opportunity to review the requested data, analysis and calculations prior to the freezing of ex ante savings impacts for this project.

**Table 1-2: Project Overview**

Description	IOU Proposed Ex Ante Data	ED Recommendations
<b>Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New Construction, System Optimization, Add-on Measures)</b>	Not provided	IOU to describe the baseline for the project. Different measures may have different baselines. Consider if this project involves a capacity expansion.
<b>Project Cost Basis (Full Cost, Incremental Cost)</b>	Full cost estimated to be \$175,000	Provide cost basis for the project. Different measures may have different cost basis treatment.
<b>RUL (Early retirement projects only, otherwise N/A (not applicable))</b>	Not provided	Describe the baseline for each measure and address RUL if applicable.
<b>EUL</b>	Not provided.	Provide EUL for the project. Different measures may have different EULs.
<b>First Year kWh Savings</b>	755,125	TBD
<b>First Year Peak kW Savings</b>	132.09	TBD
<b>First Year Therms Savings</b>	0	TBD
<b>kWh Savings (RUL Period)</b>	Not provided	Provide if applicable
<b>Peak kW Savings (RUL Period)</b>	Not provided	Provide if applicable
<b>Therms Impact (RUL Period)</b>	0	0
<b>kWh Savings (EUL thru RUL Period)</b>	755,125	TBD
<b>Peak kW Savings (EUL thru RUL Period)</b>	132.09	TBD
<b>Therms Savings (EUL thru RUL Period)</b>	0	TBD
<b>Annual Non-IOU Fuel Impact (RUL Period)</b>	NA	NA

*Ex Ante Review*

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<b>Description</b>	<b>IOU Proposed Ex Ante Data</b>	<b>ED Recommendations</b>
<b>Annual Non-IOU Fuel Impact (EUL thru RUL Period)</b>	NA	NA
<b>Net-to-Gross Ratio</b>	Not provided	Assessment not completed

**Table 1-3: Detailed Review Findings**

Reviewed Parameter	Analysis
<b>Project Gross Savings Baseline</b> (for early retirement projects only, include RUL through EUL baseline)	IOU Proposal: The baseline has not been clearly defined.
	ED Assessment: Several measures are combined for this project-a new compressor, new compressor controls, no loss drains, addition of storage and a new 4” compressed air distribution line. The different measures may have different baselines. In particular this project may involve a capacity expansion.
	ED Recommendation: Define the baseline for each measure.
<b>Project Cost Basis</b> (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: The total estimated cost has been provided
	ED Assessment: Several measures are combined for this project. The different measures may have different cost bases.
	ED recommendation: Define the cost basis for each measure. Some measures may have a full cost basis and others an incremental cost basis.
<b>RUL</b> (required for early retirement projects only, otherwise n/a)	IOU Proposal: Not addressed
	ED Assessment: TBD pending the baseline description for each measure
	ED recommendation: Define the baseline for each measure and determine whether a RUL is relevant to this project.
<b>EUL</b>	IOU Proposal: Not provided
	ED Assessment: Several measures are combined for this project. The different measures may have different EULs.
	ED Recommendation: Separate the measures and provide an EUL for each measure.
<b>Savings Assumptions</b>	IOU Proposal: The documentation refers to a report written in 2008 that establishes the average airflow during the peak season used in the current IOU analysis. The submitted calculation seems to define two periods of operation-peak production, off peak production, and estimates an average air flow for each period. A single calculation is performed for each period and extrapolated over the entire year to derive the project impacts.
	ED Assessment: The 2008 report used as the basis of the compressed air usage may not adequately describe current plant operations. A compressed air system may have highly variable demand and non-linear performance relationships, and the approach used in this project may be inadequate for

<b>Reviewed Parameter</b>	<b>Analysis</b>
	<p>estimating the energy impacts.</p> <p>ED Recommendation: The 2008 report was not submitted. Please provide this report along with any available raw data and justification that it is still relevant to current operation, and accurate as the baseline for this project. Describe how using average values for systems that have highly variable demand and non-linear performance relationships is appropriate for estimating the energy impacts.</p>
<b>Calculation Methods/Tool review</b>	<p>IOU Proposal: The project impacts are calculated using a customized model that was developed for specific compressed air project measures.</p>
	<p>ED Assessment: The IOU has previously submitted this model and at that time ED requested that the IOU provide documentation to support the model. ED has not received documentation for this calculation tool describing the methodology it uses or the basis of the analysis performed.</p>
	<p>ED Recommendation: Provide supporting documentation for the model.</p>
<b>Pre- or Post-Installation M&amp;V Plan</b>	<p>IOU Proposal: Not addressed</p>
	<p>ED Assessment: Given the uncertainty about many aspects of the compressed air system operation and the magnitude of the projected savings impacts (755,125 kWh, 132.09 kW) it may be prudent to perform pre/post implementation measurements and analysis.</p>
	<p>ED Recommendation: Describe any proposed pre or post installation verification and/or measurements for the project.</p>
<b>Net-to-Gross Review</b>	<p>IOU Proposal: Not addressed</p>
	<p>ED Assessment: TBD</p>
	<p>ED Recommendation: TBD</p>