

Phase II Ex Ante Review Findings

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

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|----------------------------|---|
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| IOU | Pacific Gas and Electric Company |
| Application ID | 2K11070332 |
| Application Date | 9/7/2011, Savings revised and submitted 5/15/2012 with change of scope |
| Program ID | ETAP |
| Program Name | Energy Technology Assistance Program |
| Program Year | 2011 |
| Project ID | X037 |
| 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/DNV-KEMA |
| Review Supervisor and Firm | Joseph Ball/Itron & Kunal Desai/Itron |
| Date of ED Review | 02/22/2012 & 5/25/2012 |
| Type of Review | Desk Review |
| ED Recommendation | Energy savings estimates cannot be verified, thus this project's ex ante savings will be the Phase 2 energy savings estimate with a GRR of 0.9 applied. |

Measure Description

The IOU DR response, which received on 2/24/2012, indicated a large scope creep. The original scope involved HVAC systems retrofits at four buildings; however, the revised scope indicated the project had been reduced to one building only.

With the change of scope, the key energy savings measures implemented as part of this wireless HVAC controls project are for the installation of Cypress wireless pneumatic thermostats replacing existing pneumatic controls in one building at a community college. Energy savings are realized by a more ideal dead band condition. The existing controls had a cooling and heating setpoint of 70°F. After implementation, the heating and cooling setpoints are 70°F and 74°F, respectively. The hours of operation during Spring and Fall sessions are 6am to 8pm, Monday through Friday and 6am to 4pm on Saturday and Sunday. The air handlers are constant volume, with the economizer based on outside air temperature (OAT). Existing controls consisted of pneumatic thermostats at the zone level (5 zones) and a time clock at the building level for the air handlers. This will result in a cooling energy savings of 3,537 kWh/yr and incentive amount of \$849.

Summary of Review

Documents provided for review are sanitized for confidentiality and include the following:

- 2K1170332C Customer Name HVAC Controls PA Review.pdf
- Ex Ante Data Request Response 2K1170332C_1.pdf
- 2K1170332C Att 1 - Approved Energy Savings Calcs.xls
- 2K1170332C Att 2 - Pneumatic Deadband Set Points.pdf
- 2K1170332C Att 3 - Control Set Point Emails.pdf
- 2K1170332C Att 4 - WPT-DB Cut Sheet.pdf
- 2K1170332C Att 5 - Final Submitted Energy Savings Calcs.xls
- 2K1170332C Att 6 - Trend Data.xlsx

The review focused primarily on the review of attachment 1 and the PA review documents to determine the reasonableness of projected savings estimates. Energy savings are based on weather based bin analysis. The inputs for the savings estimates are based on data collected on-site, conversations with facility staff, and general rules.

Post trend data was provided for approximately 24 hours (2/14/2012 10:14AM to 2/15/2012 10:59 AM). Trend points comprise temperature setpoints, zone temperature, branch pressure, and occupancy for four zones. Not enough data was collected to conduct a weather analysis, but the ED reviewer was able to verify the savings numbers.

Overall, the provided documentation explains the inputs and assumptions used to determine savings estimates.

The savings calculation, inputs, and assumptions are reasonable, with three exceptions:

- In the savings calculations, the economizer is fixed, bringing in the minimum required 20% outside air. However, the PA review document indicates that the economizer is functional and OAT-based. This would suggest that a greater portion of outside air would be brought into the system at cooler conditions, but savings calculations do not reflect this.
- The cooling load is constant with a fixed return air temperature of 74°F. However, it is expected that the load will vary with outside weather conditions.
- Do the existing thermostats and controls equipment have ability to have the deadband adjusted?

Review Conclusion

Since the energy Savings estimate cannot be verified, ED recommends applying the Gross Realization Rate of 0.9 to the project’s ex ante savings estimate of 3,500 kWh/yr and zero therms savings.

Summary of ED Concerns

The ED concerns for this project are listed below. ED recommends that for future similar projects, PG&E include these items in the project data for ED’s review.

1. Provide an explanation of economizer operation. If there is a functional economizer, account for it in savings calculations.
2. Account for weather conditions in the cooling load.
3. Provide explanation of existing controls capabilities, and whether or not dead band adjustment was possible
4. Provide itemized project cost estimates.
5. Provide any post-installation M&V plan and inspection results, when either becomes available.

Table 1-2: Project Overview

| Description | IOU Proposed Ex Ante Data | ED Recommendations |
|--|---|---|
| Project Baseline Type (Early Replacement, Normal Replacement, Capacity Expansion, New | In situ equipment implies early replacement | TBD; if the existing equipment had the capability to adjust the |

Ex Ante Review Findings

| Description | IOU Proposed Ex Ante Data | ED Recommendations |
|---|----------------------------------|---|
| Construction, System Optimization, Add-on Measures) | | deadband, then this is a rertocommissioning project |
| Project Cost Basis (Full Cost, Incremental Cost) | Full Cost-\$21,074 | TBD; for early retirement of any pre-existing controls, incremental costs will also be needed |
| RUL (Early retirement projects only, otherwise N/A (not applicable)) | N/A | TBD; need to identify the type of project |
| EUL | 11 years | Per DEER 2008 database, 11 years for thermostats. |
| First Year kWh Savings | 3,537 | TBD |
| First Year Peak kW Savings | 0 | TBD |
| First Year Therms Savings | 0 | TBD |
| kWh Savings (RUL Period) | N/A | TBD |
| Peak kW Savings (RUL Period) | N/A | TBD |
| Therms Impact (RUL Period) | N/A | TBD |
| kWh Savings (EUL thru RUL Period) | N/A | TBD |
| Peak kW Savings (EUL thru RUL Period) | N/A | TBD |
| Therms Savings (EUL thru RUL Period) | N/A | TBD |

Ex Ante Review Findings

| Description | IOU Proposed Ex Ante Data | ED Recommendations |
|---|----------------------------------|---------------------------|
| 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 available | Assessment 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: In situ equipment implies early replacement |
| | ED Assessment: To be reviewed when further information is available |
| | ED Recommendation: Provide description of existing controls, if capability to adjust deadband existed, then it is a retrocommissioning project, and existing conditions is the baseline. |
| 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. . |
| | ED recommendation: Depends on the type of project. |
| RUL (required for early retirement projects only, otherwise n/a) | IOU Proposal: N/A |
| | ED Assessment: TBD |
| | ED Recommendation: Provide description of the existing control |
| EUL | IOU Proposal: 11 years |
| | ED Assessment: Per DEER 2008 database, 11 years for thermostats is acceptable. |
| | ED Recommendation: None |
| Savings Assumptions | IOU Proposal: Savings were projected based on a temperature bin analysis. |
| | ED Assessment: Data provided is insufficient to support savings claims. |
| | 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. |
| Calculation | IOU Proposal: Savings were projected based on a bin analysis. |

Ex Ante Review Findings

| Reviewed Parameter | Analysis |
|---|--|
| Methods/Tool review | ED Assessment: Inadequate information to verify the calculation method. |
| | ED Recommendation: Awaiting responses |
| Pre- or Post-Installation M&V Plan | IOU Proposal: No M&V plan was provided |
| | ED Assessment: An assessment could not be performed |
| | ED Recommendation: If the IOU inspection report, 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. |
| Net-to-Gross Review | IOU Proposal: Not provided |
| | ED Assessment: An assessment was not performed. |
| | ED Recommendation: A NTG assessment not warranted |