Ex Ante Review Findings

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

IOU	PG&E
Application ID	NC0124586
Application Date	10/20/2011
Program ID	
Program Name	Savings By Design
Program Year	2011
Itron Project ID	X335
IOU Ex Ante Savings Date	Pending
ED Measure Name	Whole Building
Project Description	The project includes a [redacted] square foot data center in [redacted], CA. Savings are claimed for a proposed design as compared with the criteria of the 2012 Energy Efficiency Baselines for Data Centers.
Date of ED Review(s)	6/3/2013
Primary Reviewer and Firm	Doug Maddox, James J. Hirsch & Associates
Review Supervisor and Firm	Nikhil Gandhi/ Strategic Energy Technologies, Inc.
Type of Review (Desk, On-site, Full M&V, Tool)	Desk Review
ED Project Manager	[redacted], California Public Utilities Commission, Energy Division
ED Policy Authorization (as needed)	
ED Recommendation	Conditionally approved; pending clarifications and corrections as recommended by ED.

Measure Description

Energy savings for this building were accomplished by a number of improvements relative to the criteria defined in the document "Energy Efficiency Baselines for Data Centers" dated November 30, 2011. The key parameters for the baseline and proposed models are as follows:

Table 1-2: Key Parameters

Parameter	Baseline	Proposed
Air management scheme	Hot aisle/ cold aisle, ducted return	Hot aisle/ cold aisle, fully enclosed
Supply/ return air temperatures	64 F/ 74 F	75 F/ 97 F
Supply fan speed control	None	Variable speed drives
Data center equipment load	1,160 kW	1,160 kW
Total supply fan air flow	379,200 cfm	240,000 cfm
Total supply fan kW	251.5 kW	115.5 kW
Air economizer	No	Yes
Humidification	Yes	No
Chiller Rated Efficiency	0.542	0.568
Cooling tower set point	80 F	70 F
Chilled water set point	44 F	45 F
Number of chilled water pumps	1	2
Number of condenser water pumps	1	2
Cooling tower approach	16.5 F (modeled) 10 F (required)	16.5 F
Chilled water pump total kW	21.1 kW	29.4 kW
Condenser pump total kW	22.8 kW	29 kW
Cooling tower fan max kW	33.6 kW (modeled) 13.4 kW (required)	10.1 kW

Summary of Review

The following documents submitted by the Investor Owned Utility (IOU) were used in this review:

- XXX_CNC_2012 Live Calcs.xlsx – Energy calculation workbook
- XXX Report.pdf – Summary report

The baseline assumptions and analysis methods for this project were generally found to be consistent with the requirements of the document "Energy Efficiency Baselines for Data Centers". Two discrepancies that were identified are as follows:

1. Cooling tower approach was modeled at 16.5 F in the baseline, whereas the required value is 10 F.

2. Cooling tower fan power was entered as 50 hp in the baseline. The baseline document specifies a requirement of 60 gpm/hp, which translates to 20 hp for the project. The resulting baseline fan electric power should change from 33.6 to 13.4 kW.

3. In the proposed building, the chilled water and condenser water pumps are modeled as running continuously, even when cooling is provided entirely by the air-side economizer. Please confirm that this is the intended sequence of operation.

In addition to the issues listed above, there are some discrepancies between the report document and the analysis workbook. The report document lists the building area as [redacted] square feet, whereas the workbook has it at [redacted] square feet. The Report document describes the HVAC systems as nine new 40-ton units and five existing units (14 total). The workbook lists twelve 40 ton units for the proposed building.

Review Conclusion

The issues described above may have a significant impact on measure savings, and thus need to be addressed before the project is approved.

Summary of ED Requested Action by the IOU

ED requests and recommends the following:

1. Provide clarification and corrections for discrepancies described in the Summary of Review above.
2. Submit itemized list of incremental construction costs for the key components that distinguish the proposed building from the baseline.
3. Determine effective useful life (EUL) for each component and calculate the weighted average EUL for the project.

4. Submit a post-installation verification plan describing how the key parameters listed in Table 1-2 will be verified.

Table 1-3: 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)	New Construction	Accept
Project Cost Basis (Full Cost, Incremental Cost)	Incremental Cost	Need itemized incremental costs.
RUL (Early retirement projects only, otherwise N/A (not applicable))	N/A	N/A
EUL	Not provided	Need values.
First Year kWh Savings	2,873,132	TBD
First Year Peak kW Savings	160	TBD
First Year Therms Savings	N/A	N/A
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 Period)	N/A	N/A
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	TBD

Table 1-4: Detailed Review Findings

Reviewed Parameter	Analysis
Project Gross Savings Baseline (for early retirement projects only, include RUL through EUL baseline)	IOU Proposal: Energy Efficiency Baselines for Data Centers, November 30, 2011.
	ED Assessment: As described in Summary of Review, problems were found with cooling tower definition.
	ED Recommendation: Correct problems and re-submit
Project Cost Basis (for early retirement projects only, include RUL through EUL cost basis treatment)	IOU Proposal: Total project incremental cost provided
	ED Assessment: Itemized incremental costs are needed.
	ED recommendation: Submit report with list of key components and incremental costs for each.
RUL (required for early retirement projects only, otherwise n/a)	IOU Proposal: Not applicable
	ED Assessment: Not applicable
	ED recommendation: None
EUL	IOU Proposal: None provided
	ED Assessment: N/A
	ED Recommendation: Use 2008 published DEER EUL values.
Savings Assumptions	IOU Proposal: Baseline and proposed values for specific measures are listed above in the Measure Description
	ED Assessment: Measure assumptions are reasonable
	ED Recommendation: Accept
Calculation Methods/Tool review	IOU Proposal: Baseline and proposed energy were evaluated using a spreadsheet tool.
	ED Assessment: Measure values are correctly implemented in the models. Baseline model has issues as described in Summary of Review.
	ED Recommendation: Correct baseline model issues.
Pre- or Post-Installation M&V Plan	IOU Proposal: None provided
	ED Assessment: Plan should verify key parameters listed in Summary of Review.
	ED Recommendation: Post-installation M&V plan needs to be submitted.
Net-to-Gross Review	IOU Proposal: Note stated
	ED Assessment: NTG interview may be warranted.
	ED Recommendation: TBD