

NAVIGANT

ENERGY

Custom Baseline Treatment

November 2011 SAG Meeting

11/29/11

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Agenda

- » Introduction
- » Evaluation Approach for Baseline Selection
- » Evaluation vs. Program Baseline Selection Approach
- » Production Adjustments
- » Conclusions
- » Recommendations

Evaluation Goals

- » Derive a single representative year estimate of energy and peak demand savings.
- » Baseline determination and analysis is an integral and extremely important part of custom impact evaluation.
- » The selected baseline should best support estimates that represent actual grid-level impacts.

Key Steps for Evaluation Baseline Selection

- » Selection of predominant baseline condition over the EUL of the installed measure.
- » Selecting baseline using a consistent approach across all evaluated projects.
- » Thorough review of the pre existing conditions to support baseline selection.

Evaluation Baseline Selection Approach

If the retrofit is an early replacement...

- » The continued use of the existing equipment is established based on preponderance of evidence. Age of equipment, equipment condition at time of replacement, customer reports on alternative actions, and so forth.
- » Replacement is established to not be required and unlikely to have occurred over the next several years.
- » The most appropriate baseline is the pre-existing equipment in this case, as this might be expected to be the predominant baseline condition throughout the EUL.

Note, the program and evaluation do not use a dual baseline approach...

- » Would require additional savings calculations
- » Would increase in M&V costs for the program and the evaluation

Evaluation Baseline Selection Approach

If existing equipment is at or near the end of its useful life...

- » The remaining useful life of the existing equipment is established based on preponderance of evidence.
 - Age of equipment, equipment condition at time of replacement, maintenance records, customer reports on alternative actions, and so forth.
- » Replacement is either imminent or expected in the next several years.
- » The most appropriate baseline is code or market baseline in this case, as this is expected to be the predominant baseline condition throughout the EUL.
- » For the replace-on-burnout and natural turnover cases, baselines should be based on the efficiency of alternative new equipment or code requirements and not the existing in situ equipment.

Program vs. Evaluation Baseline Selection

Comparison between the program and the evaluation baseline selection approach

- » For most cases in PY3 evaluation (90% of the evaluated projects) the evaluation and program are in agreement on baseline selection.
 - For DCEO PY3 evaluation, the evaluation selected baseline condition was in agreement with the program for 16 of the 17 evaluated projects.
- » Evaluation uses the same baseline as the program when evidence available to the evaluation does not reject the program baseline condition or support an alternative.
- » The program and evaluation do not generally use differing approaches for selecting baseline or differing approaches for estimating program savings.
 - Both the program and the evaluation are tasked with deriving a single representative year of savings.
 - Savings should best represent expected long-term impacts to the grid over the EUL of each measure.

Program vs. Evaluation Baseline Selection

PY3 differences in baseline selection

- » In PY3 evaluation, the program selected baseline condition was adjusted for four projects (from a total of 33 evaluated projects).
- » These adjustments had a significant effect on the total realized savings for just two projects.
- » For these two projects...
 - The evaluation applied a replace on burn out (ROB) or natural turnover approach
 - The program applied the pre-existing system as the baseline
- » For DCEO PY3 evaluation, the program selected baseline condition was adjusted for one project (from a total 17 evaluated projects).
 - The evaluation applied a replace on burn out (ROB) or natural turnover approach
 - The program applied the pre-existing system as the baseline
- » **Evaluators considered several factors beyond just the age of the existing equipment to determine the baseline condition.**

Evaluation Baseline Selection Approach

In each case, to determine the predominant baseline condition an investigation is conducted to verify

- » the EUL of the measure (from DEER or other standard industry sources), providing context for evaluation of the age of the existing equipment
- » the age of the existing equipment
- » assess remaining useful life for the existing equipment
- » whether there is an efficiency increment among new equipment available in the market
- » the working condition of the existing equipment
- » recent maintenance records needed
- » other (technologies) options considered by the customer and typical energy efficiency or equipment retrofit practices by the facility
- » steps considered in the absence of the program incentives including when the existing equipment would have been replaced in the absence of the program
- » typical industry practice is researched for measures as needed
 - requires primary and secondary data collection
 - establishes an appropriate market baseline (standard practice)
- » ability of the existing equipment to meet service requirements, such as cooling loads or airflow (cubic feet per minute) requirements of a production system
- » coordination with the NTG team to ensure consistency in project treatment (i.e., no double-counting of penalties against the program)

Production Adjustments -- Introduction

- » Changes in production have a direct impact on total energy usage and energy savings.
- » Production levels or related equipment and system services are normalized when conducting impact calculations.
- » Ensure consistent treatment for interim baseline and post-retrofit energy usage estimates.
 - Note that pre- and post-retrofit measured data is affected by production levels.
 - Therefore proper use of measured data also involves normalization.

Production Adjustments

Evaluation Guidelines for Production Adjustments

- » Savings calculations for early replacement projects will use post-retrofit production levels, as long as the pre-retrofit system maximum production level is not exceeded.
 - Also, it must be determined whether or not customer operations might reasonably have been extended for the pre-existing baseline to meet the higher production level.
 - If extended hours of operation are not reasonable then the production level might be capped based on the pre-existing system production RATE.
- » Savings calculations for early replacement projects are based on the post-retrofit production level if the post-installation production level is lower than the pre-retrofit production level.
- » Savings calculations are based on the post retrofit production levels for all replace on burnout or natural replacement projects.
- » **By following these guidelines the evaluation treats all projects with production changes in a consistent manner.**

Conclusions

- » The program and evaluation are in agreement with the baseline selection for a majority (90%) of projects.
- » The baseline condition was adjusted for four (from a total of 33) projects in the PY3 evaluations and these adjustments had a significant effect on the total realized savings for just two projects.
- » Evaluators consider several factors beyond just the age of the existing equipment to determine the baseline condition. Preponderance of evidence-based.
- » Evaluators follow a consistent baseline selection approach across all evaluated projects.
- » Changes in production between the pre-retrofit and post-retrofit periods are accounted for consistently in the evaluation.

Recommendations for the Program

- » Perform thorough review of pre existing equipment, facility operating conditions and standard industry practices before selecting the baseline condition.
- » Installed equipment should show an efficiency increment (cutting edge technology) compared to the standard efficiency equipment available in the market.
- » For the replace-on-burnout and natural turnover cases, baselines should be based on the efficiency of alternative new equipment or code requirements and not the existing in situ equipment.
- » Program should follow evaluation approach for production adjustments to address all cases in a consistent manner.

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