

A Comprehensive Look at Comprehensive Design Programs

Bing Tso, SBW Consulting, Bellevue, WA
Arlis Reynolds, National Grid USA, Waltham, MA
Chad Telarico, KEMA, Geneva, NY
Chris Dyson, KEMA, Madison, WI
Aaiysha Khursheed, Itron, San Diego, CA

Evaluation Purpose

This poster presents the methodology and findings for impact and process evaluations of Massachusetts large commercial new construction programs that use a custom comprehensive design analysis (CDA) approach. CDA projects feature multiple interacting energy efficiency measures, such as lighting systems and controls, chiller and EMS upgrades, demand control ventilation, and VAV upgrades, and aim to reduce building energy consumption by 20% or more.

Methodology

The impact analysis used whole-building calibrated simulation models consistent with IPMVP Option D to estimate energy and demand savings for a stratified random sample of projects. Data sources to support the simulation included metering, trend data, customer records, billing data, and on-site interviews and observations. Determining verified savings for such projects required detailed review of original program-generated simulation models and program documentation, collecting multiple rounds of comprehensive on-site data, calibrating the model and interpreting the results.

The process evaluation featured in-depth interviews with program staff, participating customers, participating market actors (such as architects and design firms), and a sample of non-participants to determine the effectiveness of the CDA approach in reaching and influencing major new construction projects, as well as how to better design and implement CDA programs. Researched topics included: which types of non-residential new construction projects are best suited to a CDA approach, the optimal point in the construction planning process for the program to engage, utility account executives' role in identifying good CDA candidates, key barriers to CDA program participation, and the best ways for program staff to recruit and shepherd customers through the process.

Findings

The CDA track appears to be successfully providing energy savings, with kWh savings realization rates of 91% ($\pm 14\%$ at 90% confidence) statewide for 2008-09 Massachusetts projects. These high realization rates are consistent with previous impact evaluations dating back to 1998. Summer and winter peak demand reduction realization rate were lower than predicted (about 60%). Main reasons for discrepancies were measures that were not implemented or not performing as proposed. The evaluation did not find systemic issues with particular measures that would point towards the need for suggested program changes.

Participants are very satisfied with the CDA program track and over 80% plan on “absolutely” using this approach for future new construction or major renovation projects. However, a key concern was low program participation levels. The process evaluation provided a number of recommendations for increasing participation including using a wider variety of marketing methods, making utility account executives more knowledgeable about the CDA program and how to promote it, increasing outreach to the building design community, and improving tracking of the new construction market. The process evaluation also recommended reducing the cost of energy modeling studies and front-loading more of the program incentives.