

Evaluation of Continuous Energy Improvement Pilot

Executive Summary

In 2013, Efficiency Vermont (EVT) launched the Continuous Energy Improvement (CEI) pilot, which sought energy savings from large commercial and industrial utility customers through changes in energy management practices. The pilot sought lasting reductions in energy-use intensities (MWh/unit of output) by encouraging participants to adopt energy management planning, to make changes in operations, maintenance, and behaviors (OM&B), and to track and measure progress towards energy savings goals.

The pilot enrolled 11 organizations in two cohorts. The first cohort formed in late 2013 and included some of the state's largest commercial and industrial energy customers. The second cohort formed in late 2015 and included utility customers from the dairy industry. In 2016 the Vermont Public Service Department (PSD) contracted with Cadmus to evaluate the pilot's energy savings, persistence, and cost-effectiveness.

To perform the evaluation, Cadmus estimated energy savings, conducted interviews with CEI program managers, and conducted a cost-effectiveness analysis. For each facility, Cadmus estimated a baseline consumption model and predicted consumption (the adjusted baseline consumption) as a function of weather, production, and facility closures during the reporting period. Cadmus estimated each facility's electricity, oil, or propane annual savings by subtracting metered consumption from the adjusted baseline consumption. We obtained an estimate of CEI savings by subtracting savings from capital projects not incentivized by the CEI program from the facility savings estimate.

Key Findings

Evaluated Savings

Utility customers achieved significant energy savings by implementing CEI. In 2016, Cohort 1 and Cohort 2 participant facilities saved 3-5% of electricity consumption. This compares favorably to the savings of SEM or CEI programs of other utilities. With continued assistance from EVT, Cohort 1 facilities increased their electricity savings during the pilot's second year

Savings Realization Rate

The pilot electricity savings realization rate in 2016 was 98%, indicating that on average the evaluation and EVT estimated similar savings for the CEI pilot. However, as discussed below, there were five facilities for which Cadmus was not able to evaluate savings because of data unavailability so the realization rate may not have validity for the unevaluable facilities.

Evaluated Monitoring, Targeting, and Reporting Models

In general, EVT's baseline consumption models appear to be well specified and to accurately estimate energy savings for both cohorts. Cadmus tested many model specifications and often chose different ones than EVT, but the pilot, cohort, and individual facility savings realization rates were close to 100%, suggesting that EVT's monitoring, targeting, and reporting (MT&R) models are yielding accurate savings estimates.

Cadmus was unable to evaluate CEI energy savings in 2016 for five facilities, either because data required for evaluation such as facility production were unavailable, or the facilities implemented changes during the baseline or reporting periods that rendered the statistical models invalid. By collecting the required data or resetting the baseline period, it should be possible to estimate savings for these facilities in future years.

Cost-Effectiveness

The CEI pilot was cost effective in 2016 assuming a one-year CEI measure life and for 2015-2016 assuming a CEI measure life of two or more years. Assuming a one-year measure life, the cost per kWh of savings was approximately \$0.10 for 2016 and \$0.17 for 2015-2016. Assuming a two-year measure life, the cost per kWh of savings was approximately \$0.05 for 2016 and 0.09 for 2015-2016. The CEI electricity savings and delivered fuel savings used to calculate cost effectiveness only include savings from the evaluated facilities. The administrative program costs were the costs of administering the program to all participant facilities.

CEI Savings Persistence

EVT's CEI pilot is expected to have a lasting effect on participants' energy consumption. Persistence for projects implemented in 2016 and still in place in 2018 was 100% overall, indicating customers are committed to retaining energy efficiency improvements over time.

Recommendations

EVT should continue to engage customers for more than one year. Cadmus does not recommend any significant changes to EVT's savings verification process. EVT should continue to use best practices for estimating savings through individual facility baseline models. EVT should consider including control variables for holidays and closures.

For unevaluable facilities, Cadmus recommends that EVT reset the baselines or attempt to collect data required for evaluation. EVT should not submit savings claims for facilities that it is aware need to be re-baselined.

Results from the measure persistence analysis support a change in the assumption of a CEI measure life from one to two years. However, EVT should continue to measure the energy savings of Cohort 1 and Cohort 2 facilities to assess savings persistence. Furthermore, EVT should continue to evaluate the persistence of individual CEI measures and determine the extent to which savings and measure persistence correlate. Future analysis of energy savings and measure persistence should inform updates to measure life assumption for the CEI pilot.