Cost-Benefit Analysis of Monitoring-Based Commissioning

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A new report titled "Monitoring-Based Commissioning: Benchmarking Analysis of 24 UC/CSU/IOU Projects" is available.

Authored by Evan Mills, PhD, and Paul Mathew, PhD, of Lawrence Berkeley National Laboratory and sponsored by the buildings- and industrial-sector units of the California Energy Commission's Public Interest Energy Research (PIER) program, the report documents an in-depth benchmarking analysis of energy savings from a portfolio of 24 monitoring-based-commissioning (MBCx) projects designed to achieve energy and peak power savings in University of California and California State University buildings.

During the course of the analysis, the authors developed a quality-control/quality-assurance process for gathering and evaluating raw data from project sites and then selected a number of metrics to use for project benchmarking and evaluation, including appropriate normalizations for weather and climate, accounting for variations in central-plant performance, and consideration of differences in building types. The authors performed a cost-benefit analysis of the resulting data set and provided comparisons to projects from a larger commissioning "meta-analysis" database.

The authors identified 1,120 deficiency-intervention combinations. The most common location of deficiencies was HVAC equipment (65 percent of sites), followed by air-handling and distributions systems (59 percent), cooling plants (29 percent), heating plants (24 percent), and terminal units (24 percent). From those interventions flowed significant and highly cost-effective energy savings. For the MBCx cohort, source energy savings of 22 kBtu per square foot per year (10 percent) were achieved, with a range of 2 percent to 25 percent. Median electricity savings were 1.9 kwh per square foot per year (9 percent), with a range of 1 percent to 17 percent. Peak electrical-demand savings were 0.2 w per square foot per year (4 percent), with a range of 3 percent to 11 percent. The aggregate commissioning cost for the 24 projects was $2.9 million.

The authors observed a range of normalized costs from 37 cents per square foot to $1.62 per square foot, with a median value of $1 per square foot for buildings that implemented MBCx projects. Half of the projects were in buildings containing complex and energy-intensive laboratory space, with higher associated costs. A median simple payback of 2.5 years was

achieved for the portfolio.

The greatest absolute energy savings and shortest payback times were achieved in laboratory-type facilities. While impacts varied from project to project, on a portfolio basis, the authors found MBCx to be a highly cost-effective means of obtaining significant program-level energy savings across a variety of building types. Energy savings are expected to be more robust and persistent for MBCx projects than for conventionally commissioned ones.

The report can be downloaded at http://cx.lbl.gov/MBCx.html.
