050

SEPTEMBER 2022

ENERGY MANAGEMENT SYSTEM WITH AUTOMATED SYSTEM OPTIMIZATION

OPPORTUNITY

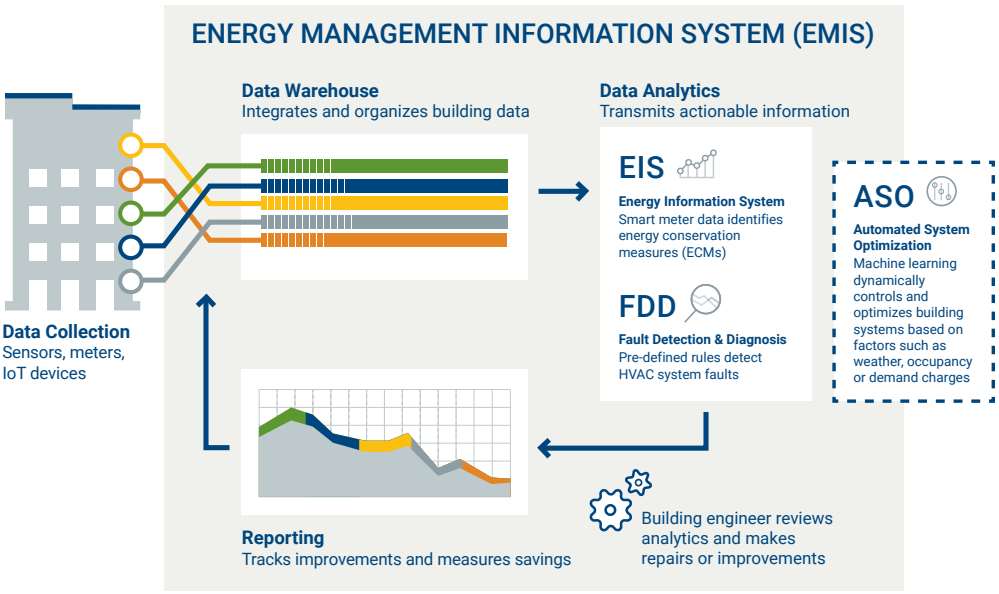
How much energy can be saved with smarter building control?

UP TO 30% ENERGY USE IN COMMERCIAL BUILDINGS CAN BE SAVED WITH SMARTER BUILDING CONTROL[1]

TECHNOLOGY

How does an energy management information system (EMIS) with automated system optimization (ASO) work?

Aggregates historical and real-time data with machine learning and thermal modeling to optimize building performance



Adapted from LBNL (Kramer et al. 2020)[2]

M&V

Where did Measurement and Verification occur?

NATIONAL RENEWABLE ENERGY LABORATORY assessed the impact of an EMIS with ASO provided by Prescriptive Data at four testbeds representative of a range of GSA facility types and operating conditions.

RESULTS

How did the EMIS with ASO perform in M&V?

5-11%
WHOLE-BUILDING ENERGY SAVINGS[3]
from controlling AHU fan speeds based on weather and occupancy

95%
ACCURATE
PREDICTED DEMAND WAS WITHIN 5% OF MEASURED DEMAND[4]

VISIBILITY INCREASED
WITH MULTIPLE DATA STREAMS[5]

INTEGRATED DASHBOARD REVEALED OPERATIONAL ISSUES[6]

POSITIVE USER ACCEPTANCE[7]

GSA Market Analysis for Automated System Optimization

Portfolio potential for cash-flow positive facilities based on % savings*

	5% Annual Cost Savings	7.5% Annual Cost Savings	10% Annual Cost Savings	12.5% Annual Cost Savings
Cash-flow positive facilities (total out of 504)	90	223	322	424
Total Building Area (sf)	30,488,470	77,028,119	106,211,953	139,233,885
Gross Annual Cost Savings ($/yr)	$4,538,021	$12,467,287	$19,949,064	$28,689,424
Annual Subscription Cost ($0.10/sf/yr)	$3,048,847	$7,702,812	$10,621,195	$13,923,389
Net Annual Cost Savings after SaaS ($/yr)	$1,489,174	$4,764,475	$9,327,869	$14,766,035

* Break-even point depends on utility costs, annual savings, and geographic region. Does not include installation cost due to varying expenses of integration.

DEPLOYMENT

Where does M&V recommend deploying an EMIS with ASO?

BUILDINGS WITH HIGH ENERGY COSTS

An EMIS with ASO can simplify building management and should be considered for deployment across the portfolio. Prioritize buildings with high energy costs.

[1]Commercial Buildings Integration Program, U.S. Department of Energy (https://www.energy.gov/eere/buildings/about-commercial-buildings-integration-program, accessed 9-2022) [2]Kramer, H, Lin, G, Curtin, C, Crowe, E, Granderson J. Proving the Business Case for Building Analytics. Lawrence Berkeley National Laboratory, October 2020 [3]Sean Pachuta, Jesse Dean, Alicen Kandt, Khanh Nguyen Cu Field Validation of a Building Operating System Platform. NREL, August 2022, p.iv [4]Ibid, p.iv [5]Ibid, p.33 [6]Ibid, p.33 [7]Ibid, p.32

GSA

The Center for Emerging Building Technologies enables GSA to make sound investment decisions in next-generation building technologies based on their real-world performance. **www.gsa.gov/cebt**