Case Study

Advancing Software-enabled Load Flexibility and Demand Response in Commercial Buildings

Outcomes

16%

Reduction of HVAC energy demand and related charges

14%

Demand reduction during demand response (load shed) event

51 kW

(28%) - Demand reduction (load shift) during morning peak

23 kW

(13%) - Demand reduction (load shift) during evening peak

Overview

Southern California Edison asked AESC to investigate a novel building control software for commercial demand flex and response – furthering California's resource adequacy, future load management initiatives, and load shed & shift strategies. As emerging technology consultants, we provided pilot implementation support and Measurement and Verification (M&V) for the project.

What We Did

- Normalized Metered Energy Consumption (NMEC)
- Daily Peak Hour Demand Analysis
- Load Shift
- Load Shed
- Reduced HVAC Demand

Main Takeaways

1. Identified new energy saving strategies for building controls (load shift)
2. Optimized equipment for load shed events
3. Provided in-depth M&V

1. Identified new energy saving strategies for building controls (load shift)

One of the major barriers to implementing demand response strategies is an unoptimized building control system. This can be true for owners of small to medium sized buildings who often are unable to easily institute advanced BAS optimization strategies while proactively participating in new demand response offerings. However, building control software, with load flexibility capabilities, can automatically monitor building parameters, implementing energy reductions during critical points of the day.

This project demonstrated a 28% and 13% demand shift reduction in the peak morning and evening periods, respectively—thereby avoiding the most expensive time-of-use rates and lessening the burden on the grid.

2. Optimized equipment for load shed events

Utility demand response strategies often dictate or incentivize load shedding events, where customers are called upon to curtail or “shed” building load for a period. Notice of these shed events vary and can range from a day-ahead to as little as 15-minutes.

Through this project we were able to demonstrate the capabilities of an advanced building control software to accept and effectively respond to load shedding events. We simulated an hour-ahead signal for a load shedding event resulting in a 14% reduction compared a previously observed evening peak.

3. Provided in-depth M&V

Conducting technology pilots for demand response can be an expensive and complex undertaking. Any performance data measured must go through rigorous statistical tests to ensure accurate conclusions. AESC efficiently managed this challenge as the project M&V lead.

We approached this project with IPMVP Option C to account for the multiple interactive effects. We also followed the Investor Confidence Project (ICP) Large and Standard Energy Efficiency protocols, ensuring this project would be engineered robustly with predictable financial returns.

Learn more at

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About AESC

Founded in 1994, Alternative Energy Systems Consulting, Inc. (AESC) is an energy consultancy that drives solutions in energy efficiency, renewable energy, distributed energy resources, and custom software implementation.