Addressing HVAC Pain Points for Multisite Operators

Improve facility performance and reduce energy consumption with real-time data on equipment performance and IoT-enabled facility automation

More Affordable Energy Management Solutions

Many businesses with a large number of distributed facilities find it challenging to manage critical operational costs, including energy, maintenance, and capital spending. Unlike large buildings with a dedicated team to manage operations, multisite operators often rely on limited corporate facilities staff with insufficient remote management capabilities and limited ability to effectively control and track performance. This is especially true for heating, ventilation, and air conditioning (HVAC) systems.

Although these issues can be addressed with traditional building automation systems (BAS), their high cost has historically been difficult to justify for small- to medium-sized buildings. The good news is building management solutions are becoming more affordable, thanks to the Internet of Things (IoT). Now it is easy and economical to automate facilities in pursuit of more efficient operations.

For multisite operators who would like to implement an IoT-based energy management program, Intel and EnTouch Controls outline key steps that are common across national chains, schools, commercial property operators, and other portfolios with relatively small buildings.

The High Cost of HVAC Systems

When launching an energy management program, HVAC systems should be a primary focus area. They are one of the largest operating-cost drivers, accounting for approximately 40 percent of business energy usage, 45 percent of annual maintenance cost, and as much as 10 percent of capital investment for facilities (Figure 1).

“The ROI for energy management is now measured in months, not years, and by using real-time data to proactively optimize facility performance, the benefits extend to customer comfort and experience, and can positively impact revenues and profitability.”

Greg Fasullo
CEO, EnTouch Controls

Figure 1. HVAC systems are a significant cost driver for many businesses.
Energy Management Considerations
An energy management program can pay off in a number of ways, including energy savings, less reliance on local personnel, reduced maintenance costs, and lower capital spending in the future.

Maximize Investment Return
Energy management is typically a powerful use case to justify a building automation project, producing energy savings on the order of 10 to 20 percent and a return on investment (ROI) in a year or less. As experience grows and additional use cases are implemented, long-term energy reductions of 35 percent or more are possible, as well as lower maintenance and new store construction costs.

To reap even greater benefit, it is a good idea to have one or two other use cases that can piggyback off the infrastructure needed for an energy management solution. For instance, some retailers take advantage of the wireless connectivity required for energy management to support in-store Wi-Fi for customers.

Establish Policy and Control Systems Remotely
Multisite businesses considering energy management should factor in the benefits from having the ability to enforce energy policy and track data remotely, as shown in Figure 2. This means HVAC scheduling and control does not rely on local personnel, and analytics can be used to alert about performance issues and identify improvement areas through benchmarking. IoT-based solutions provide these features, which previously required expensive facility automation.

Curb Maintenance Expenses
Energy management solutions can monitor HVAC performance and determine if its failure is imminent. By turning traditional preventative maintenance into data-driven predictive maintenance, building operators can schedule repairs as needed to avoid costly emergency repairs and the associated downtime that could negatively impact business.

Right-Size Capital Spending
When new locations are built, national chains will often copy plans from the last few sites without asking, “How many HVAC systems do we really need?” There is no way to know unless there is benchmarking data to determine how many systems are truly required to keep people comfortable. Many operators find that their energy efficiency programs have reduced the need for HVAC, and they can reduce the capacity of heating and cooling for new buildings, dramatically lowering capital construction costs.

Four Steps to a Successful Energy Management Program
The following steps are common to IoT-based energy management projects:

1. Establish Clear Goals
One of the first steps is to explore the possible energy management use cases to determine which ones are applicable for the business and operating environment. For example, office buildings may have conference rooms where lighting could be automatically turned off when the room is not in use, whereas restaurants may want to dim the lights in the dining area when ample sunlight is coming through the windows.

From the list of possible use cases, decide which ones to take on and in what order. Consider starting with a small pilot for the first one or two use cases in order to try out the energy management solution and see the likely energy savings firsthand. This understanding is valuable when trying to establish achievable program goals.

Practical Experience – Key Capabilities
From working with restaurateurs, EnTouch Controls found that turning down the HVAC units when the building is vacant is a relatively easy, yet high-return use case. This alone can lower energy usage by 5 to 10 percent, or about half the usual total energy savings from a project.

A typical national chain restaurant has five or six HVAC units: around three for the dining area, one for the bathrooms, and two or three for the kitchen. With this configuration, it is important to be on the lookout for a failing HVAC unit that is being masked by other units.
Control temperature remotely
The first step is to install HVAC controls that enable temperatures to be checked and scheduled remotely, and synchronize operation across the multiple HVAC systems. Surprisingly, many small- to medium-sized buildings have manual thermostats that are set and forgotten, have the wrong time (e.g., daylight savings time), or allow employees to make adjustments that cause wide temperature swings.

Program thermostats thoughtfully
The next step is to lock down schedules and temperatures, making sure the HVAC units are not fighting each other, as in one cooling while the others are heating. When possible, do not allow all the HVAC units to run simultaneously to avoid paying peak energy charges. Implement temperature overrides to keep employees from changing the temperature too often.

Monitor discharge air
Data from wireless sensors in discharge air vents can be used to tell if an HVAC unit is working properly or trending towards failure. Early detection of HVAC problems allows building operators to dramatically lower maintenance costs and avoid lost business due to equipment failure.

2. Investigate Data Sources
After the use cases have been identified, determine which data sources are needed for implementation. Some of the data sources will be readily available while others will need to be captured. For example, it may be necessary to add a wireless sensor that fits over the wiring in an electrical panel in order to measure energy consumption.

Here are some data sources worth considering:
- **Utilities**: Electrical panels, doors (open/closed), water, gas
- **Systems**: Thermostats, motion sensors, lighting, doors (open/closed)
- **Temperature**: Air, hot water tanks, discharge air vents, dishwashing, refrigeration
- **Environmental**: CO₂, weather (sunrise/sunset/clouds)

Practical Experience – Data Collection
IoT-based energy management solutions address several data collection issues, including connecting to data sources and sending too much data across the network. Data filtering may be needed because each site could generate as many as 60,000 data points per hour.

These issues can be overcome with an IoT gateway that connects to all types of building systems, filters and aggregates data in the facility, establishes a secure connection to the cloud, and provides control and monitoring across the building.

3. Explore Analytics Models
One of the reasons for implementing energy management is to gain a better understanding of how the facility consumes energy, where and when energy is being wasted, and ways to maximize energy savings. This can be accomplished with data analytics that offer actionable insights based on energy usage, HVAC performance, guest comfort, environmental metrics (e.g., temperature, humidity, and CO₂), and other factors. Building operators should be able to easily visualize and interpret the findings from the analytics software on a mobile app.

When evaluating analytics, investigate the types of questions the tool was designed to answer, such as:
- Which building locations (e.g., heat maps) are most challenging to regulate?
- Is one HVAC running all day? Are all the systems balanced?
- Should one HVAC system run longer than the others because it is more efficient?
- Does the schedule need to be revised because employees are adjusting the thermostat frequently?
- How is energy being consumed in the building (Figure 3)?

![Figure 3. Learn more about energy consumption patterns.](image)

4. Act on Analytics
Getting the most from an energy management solution will require some dedicated talent. This may be the responsibility of corporate facilities staff or could be outsourced to a cloud-based service provider, similar to the way email and other critical but nondifferentiated services are typically outsourced.

Energy usage and HVAC metrics should be reviewed on a monthly or quarterly basis. This includes comparing actual energy consumption and HVAC maintenance costs to program objectives, and reviewing whether any of the HVAC systems need repair or should be replaced.

Energy Management Made Easy
EnTouch Controls provides a complete software and service solution, specifically developed to serve the needs of multisite businesses. Their Intel® IoT Gateway-based platform gives building operators real-time intelligence and control over energy, HVAC, and lighting systems as well as other key facility systems from refrigeration to hot water.

A core part of the offering is the gateway platform that collects building data from throughout a facility. These gateways are fully application-ready and preprogrammed by EnTouch Controls, simplifying deployment and commissioning.

This energy management solution is a turnkey, managed service (Figure 4)—from implementation to real-time proactive response to lifecycle asset management. It can be incorporated into a building owner’s custom project or
accessed via the cloud. EnTouch Controls offers a support suite that includes a command center queue and an alerting rules engine. The case management system integrates with facility management software (often referred to as CMMS) to seamlessly interoperate with existing facility workflow and vendor dispatch.

All this is accomplished with a full suite of software and services, called EnTouch 360®:

**Implementation Suite** enables economical, high-quality deployments across a large number of remote facilities.

**Support Suite** includes the tools to manage data from multiple sites, process alerts and provides remote technical support and case management to track issue resolution.

**Analytics Suite** produces customized reports with comparisons between facilities and quickly identifies poorly performing equipment and facility issues.

**Energy Optimization Suite** synchronizes operation across the multiple HVAC systems to reduce peak energy usage and documents compliance (e.g., OpenADR and Title 24 certifications) with regional utility demand response programs.

**Enterprise APIs** enable “single pane of glass” reporting for EnTouch Controls partners, allowing them to fully customize and integrate the solution into their existing services.

### New Energy Management Alternative

For small- to medium-sized buildings, managing HVAC systems is critical to reducing power consumption. This is now easier with IoT-based energy management solutions that have a payback of one year or less in many cases. In addition, these solutions reduce the burden on local personnel, curb HVAC maintenance expenses, and help determine the HVAC requirements for future buildings. Intel and EnTouch are giving multisite operators an affordable way to understand and reduce their energy consumption.

### About EnTouch Controls

EnTouch Controls is a market-leading provider of IoT solutions for facility asset and energy intelligence for multisite businesses. The company’s award-winning EnTouch 360 Software and Analytics platform provides national chains and other large, multisite enterprises with real-time data, intelligence, and controls that improve operational efficiencies, in particular around HVAC, lighting, refrigeration, and energy consumption. The platform enables operators to achieve sustained reductions in energy, maintenance, and capital costs while simultaneously improving facility comfort. Nationally recognized for its ongoing commitment to sustainability and their innovative Internet of Things (IoT) approach, EnTouch supports over 4,000 locations in diverse industries, including retail, restaurant, grocery, real estate, healthcare, and hospitality.

For more information about solutions from EnTouch Controls, visit [entouch360.com](http://entouch360.com).

To learn about smart building solutions from Intel, visit [intel.com/iot/smartbuilding](http://intel.com/iot/smartbuilding).