

Managing Energy at Multiple Nationwide Facilities: Making the Impossible, Possible

Managing energy at one facility is difficult. Managing energy at multiple facilities nationwide can seem impossible.

Energy managers at businesses such as retail chains, grocery stores, and real estate investment trusts nationwide face an enormous challenge.

Implementation of an Enterprise Energy Management (EEM) program across multiple sites often means having to deal with many utility companies, diverse technology, and complex logistical challenges. These challenges can leave energy managers wondering if attempting to control energy costs on a national scale is even a worthwhile investment of time and resources.

AUTHOR

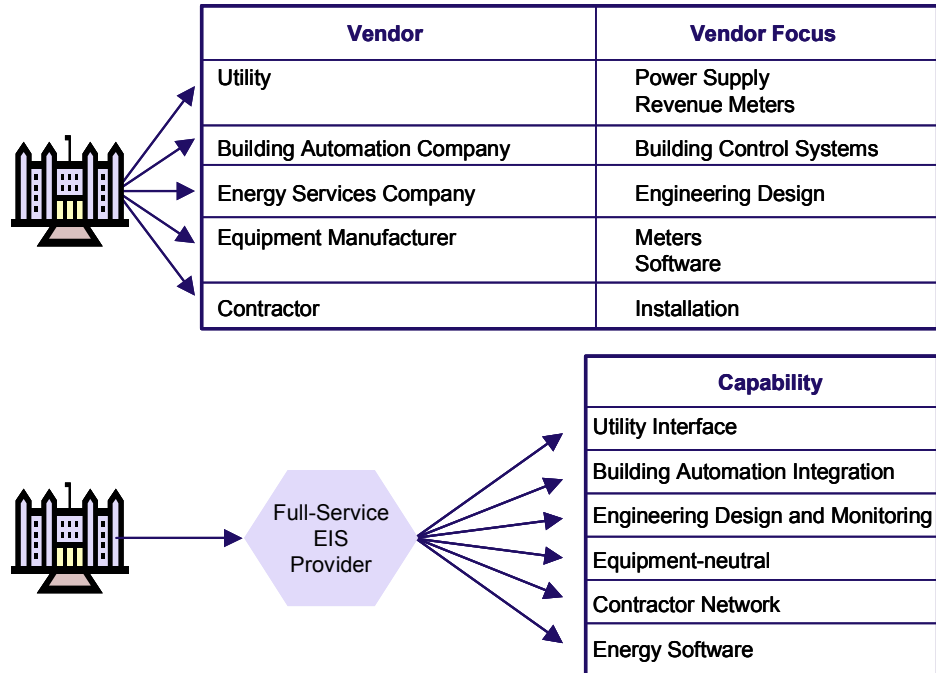
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The answer is yes. By working with an experienced energy information system (EIS) provider, businesses with a network of nationwide facilities gain not only visibility into remote operations, but also the ability to manage and standardize those operations' previously uncontrollable energy issues. The key is teaming with an EIS provider that has an understanding of the complex nature of a national business. Such a provider knows that an effective national energy program is more than software and more than hardware. It is a turnkey solution comprised of a network of utility partners, an experienced staff of hands-on energy experts, rich experience in metering and meter integration, and technology



inherently built to support the needs of a geographically diverse corporation.

Corporate View of Enterprise Energy Management

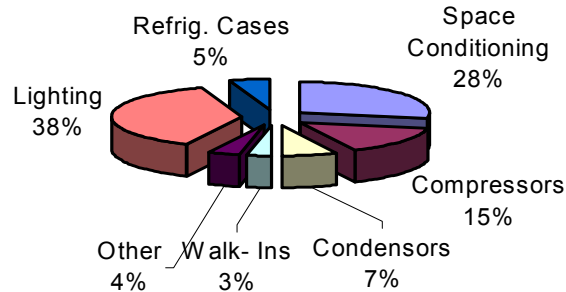


In one simple example, the opportunities become clear. Because corporate energy policies typically mandate cost reduction, it is not uncommon for management to establish a goal of reducing energy expenses by an arbitrary amount (10 percent). How those reductions are to be met is not always clear. Teaming with a qualified EIS provider allows the smart utilization of limited capital resources.

- Five Criteria for Selecting an EIS Provider**
- Relationships
 - Technology
 - Services
 - Equipment-neutral
 - Support

Reducing energy expense begins with an understanding of how and when energy is consumed. Reductions in usage can occur through implementation of energy efficiency improvements. At a higher level, however, establishing and managing energy according to corporate best practices also means commodity negotiation, efficient use of power, and implementation of capital improvement projects as avenues to cost reduction.

Typical Grocery Store Electricity Consumption



To make the example more specific, the previous chart reflects energy use at a typical grocery store. Competitive pressures in the grocery industry result in slim net profit margins of approximately 1 percent. In such an environment, any reductions in operating expense that have no reciprocal impact on revenue yield substantial bottom line results. For example, a 20 percent reduction in energy and maintenance and repair can raise the net profit margin of a grocery store by 40 percent. It is relatively easy to achieve that 20 percent impact by submetering key energy consuming units to uncover abnormal consumption patterns attributable to inefficient equipment or control settings that exceed established operational norms.

A grocery store with monthly energy expenses of \$150,000 and an ability to implement a 10 percent reduction in energy and maintenance expense could translate this effort into an approximate \$180,000 annual improvement in the bottom line. This is equivalent to an increase in same-store sales of \$1,500,000 per month.

Clearly, effectively implemented EEM programs can provide businesses with much needed consistency and efficiency in

operations. EEM holds the promise of reducing energy costs and minimizing equipment downtime.

To understand how energy expense savings can be realized in almost any business, it is important first to examine the complexity of energy management and the reason why few companies succeed by going it alone.

Before a company can reduce energy expenditures, it must gather a huge quantity of data in a timely manner. Simply collecting the data can be difficult and time-consuming. Even if all the data can be assembled, most businesses lack the resources to assimilate it into usable information. This kind of data requires detailed and intensive analysis and distillation before it can be reduced to actionable intelligence.

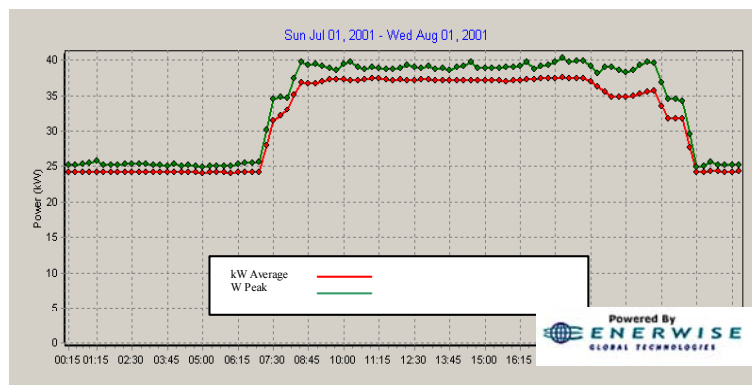
Key Benefits of a National EEM Program

- Visibility
- Manageability
- Standardization
- Cost Reduction

The need to aggregate and assimilate the data collected from each site in a way that is easily understood by both headquarters and, where necessary, local sites, makes even this basic challenge that much more daunting. Often headquarters and local sites have different business needs for the data and different technology platforms with which to access it. A Web-based architecture is ideally suited to meet the diverse needs of a national business, but it is not always in place. Because most organizations do not have the time and resources available to develop and support an energy information system, the low overhead solution associated with an application service provider (ASP) model is best suited to the needs of most multi-site businesses. The ASP model shifts the burden of system development, data-warehousing, telecommunications and infrastructure support from the business to the EIS provider and allows the company's energy manager to focus on identifying anomalies and optimizing energy usage.

Because multi-site operations often monitor as many as hundreds of facilities nationwide, the ability to easily monitor multiple sites and manage by exception is critical for these businesses. Energy managers must be able to quickly spot exceptions across multiple facilities, and understand the contributing factors as well as the effects of those anomalies. When an anomaly is detected, energy managers must be able to explore the cause in detail and determine the magnitude of the impact. This is especially difficult because businesses rarely, if ever, have energy experts on site at local facilities. If multidimensional energy analysis is not available in a user-friendly format, the potential cost savings fall victim to the black hole of the unknown.

Total site load is one way of identifying sites yielding the greatest savings opportunities and provides a means for developing a targeting strategy for corporate energy initiatives. Evaluation of total site energy load can be accomplished by accessing existing metering. A full-service EIS provider is able to work with utilities to access existing revenue meters, replace meters, or take other steps to minimize the capital expense associated with equipment installation.



Total load information can often identify immediate savings opportunities. The previous graph illustrates a store with very high off-peak usage. This factor suggests that lighting and/or space-

conditioning loads are not reduced during periods of non-occupancy. This single store could realize immediate savings by ensuring that existing control systems are functioning properly and aligned with site operating characteristics. If off-peak load can be reduced from 25 kW to 5 kW from 10:00 PM to 7:00 AM, this site could realize approximate annual savings of \$6,400. This initial savings is only the beginning of the benefits that can be realized through an EEM program.

By monitoring all sites simultaneously, energy managers can identify trouble spots and establish national benchmarking. Headquarters can look into operating behavior at remote locations, easily identifying excess consumption, and taking immediate action. They are able to compare facilities with similar layouts and energy-using equipment to determine best practices and implement changes that simultaneously improve performance at multiple locations. With a clear view of information from multiple sites, it is possible to easily identify anomalies and take corrective action.

Benchmarking facility energy usage against corporate models and industry norms reveals sites where energy consumption chronically exceeds preset corporate parameters. To identify more complex energy problems, submetering can then be implemented on a case-by-case basis to provide the greatest level of energy use information, and the most profitable area of focus. Advanced metering is able to provide insight into specific operating equipment. Armed with the additional information provided by submetering, management is able to support prioritization of capital improvement projects and validate savings derived through energy efficiency projects.

For example, retail store energy consumption is heavily weighted toward lighting and space conditioning. Energy-efficient lighting

and HVAC systems can substantially reduce both the demand charges and consumption charges yielding improved operational results. As illustrated in the following table, typical implementations of energy-efficient equipment have fast payback periods and strong returns on investment (ROIs) when appropriate sites are selected and installation and system maintenance are properly managed. By integrating an EIS system with a capital improvement project aimed at improving energy efficiency, businesses are able to determine if the dollars invested yield the anticipated ROI.

Typical Energy Efficiency Projects

Equipment Involved	Avg. Payback Period (yrs)	Avg. ROI (%)
Lighting, Motors & Drives	1.6	63
HVAC & Lighting	2.3	43
Motors & Drives	2.5	40
Lighting	2.5	40
Controls	2.6	38
HVAC, Motors & Drives	3.0	33
HVAC	3.9	26

Source: Energy Cost Saving Council

An EIS system helps businesses develop a firm understanding of historical (baseline) use against which improvements can be measured. This baseline information not only serves as one of the criteria headquarters can use to prioritize their site improvement schedule, but also determines whether the equipment is delivering the promised performance. It also provides the ability to monitor for established system maintenance and indicate when service is needed.

By fully using the capabilities of an EIS system to identify critical areas of focus and implement physical changes at targeted sites, organizations begin to reap the greatest financial benefits from an EEM program and gain control over energy expenditures.

Through an EEM program, corporate headquarters can focus on both the supply and demand sides of energy issues. Supply-side activities include the ability to negotiate supply contracts in deregulated markets. Procurement strategies will be most effective when headquarters has the ability to leverage aggregation of multi-site load, the mechanism used to leverage site generation and load management strategies. Having the ability to control site demand, on an individual or aggregate site basis positions national businesses to take advantage of financial incentives provided through regulated utilities, as well as enter into favorable procurement contracts.

Some of the systems available in the market provide an electronic report, which indicates operating conditions that exceed established parameters. On a daily basis, managers are able to access the system and, through a simple query, discover which sites consumed more energy than projected. Companies seeking to control consumption on a more frequent basis need a system flexible enough to trigger and alarm when conditions exceed certain thresholds. These alarm features are typically derived through software and access to meter information. The greater the frequency of information updates (e.g., hourly or 15-minute interval), the greater control the customer will be able to exert.

For organizations that have in-house expertise capable of understanding the complexities of energy usage and determining effective courses of action, an EIS tool with exception monitoring and advanced analytics is critical. However, many multi-site businesses either do not have employees with specialized energy expertise or do not use those employees for multiple functions. Such businesses would be well served to partner with a full service EIS provider. Not only can the company benefit from data collection and analysis, but also the EIS provider can also provide

the hands-on services of energy experts to evaluate the data on a regular basis and provide specific recommendations. An EIS provider can use total site load information to identify appropriate sites for advanced metering equipment. Expert analysis of the information can prevent the installation of costly submetering equipment when the problem is as simple as turning the building lights off at the right times of the day or making sure that existing building automation systems are properly using set-back features.

For those sites with complex problems, the EIS provider can draw from experience with similar facilities to identify problem areas and recommend and assist in the implementation of solutions. Leveraging a team with real-world, hands-on energy management experience is often the fastest way for a corporate energy manager to identify problems and implement cost-saving solutions.

An EEM program goes beyond traditional energy efficiency programs and requires collecting energy usage information in the most complete and comprehensive manner. Traditional approaches do not fully solve this problem. Most vendors, for example, take a piecemeal approach, leaving a large portion of the burden of data acquisition on the company's shoulders. Generally, this is solved by one of three approaches: software only, hardware installations or utility partnerships. The software only approach creates a burden for the energy user and is appropriate only for the largest, most sophisticated business with automated meter reading (AMR) meters already in place. Installing purchased hardware provides the most data access control, but is expensive and slow to rollout nationwide. To reduce the administrative burden as well as costs, it is most efficient to capitalize on meter data already provided by the local utility company.

Existing relationships with the local utilities and a familiarity with their processes enable EIS providers to take a turnkey approach to obtaining the raw data and converting it into usable information. This process is most efficient when the EIS provider has a formal relationship with the local utility. The implementation cycle is reduced because the utility is working with a familiar partner. The EIS provider knows what information is available, as well as the format in which it will be received from the utility. Formal agreements with utilities typically include access to existing meter information, either directly through the utility-owned meter or through utility servers. In the event that the existing meter is not readable remotely, a defined plan should exist to either replace the meter, run a meter in parallel, or at minimum provide a pulse output. Gaining access to utility-owned meters is difficult, even in deregulated energy markets. The focus of the EIS provider should be a balance between cost minimization and speed of implementation. By working in partnership with the local utilities, companies can get nationwide sites up and running quickly. An experienced EIS provider will also develop an alternative implementation strategy in the event that more detailed metering information is needed. Implementation time for compiling total load information will vary depending on the metering solution. Timing for meter access can range from as little as one day to weeks, depending on the solution and the relationship with the local utility companies.

Enterprise Energy Management is a new dimension for many multi-site businesses. In the retail sector, energy was once viewed as a non-controllable expense, yet was the third greatest operating expense behind rent and personnel. Internal resources may not have the time or the experience to evaluate the significant amount of data available through a good EIS. For many multi-site institutions it is essential to form a partnership with an EIS provider that has an experienced staff of energy specialists capable

of evaluating the data provided from an EIS. Energy analysts become an extension of the company's operating team and are able to assist in creation of corporate standards through both internal benchmarking and their knowledge of industry best practices.

Energy management programs for companies with multiple facilities take many forms. A comprehensive Enterprise Energy Management approach looks at both operational improvements and facility modifications. Savings derived from programs will vary greatly depending on the unique operating characteristics of each company and their site-specific needs. The first step for most multi-site companies should be an understanding of their facilities total load characteristics. This is developed primarily through utility meter information with hardware used for submetering installed on a case-by-case basis. Such a hybrid approach enables businesses with multiple facilities to reduce hardware and software expenditures, reduce implementation costs and ease the administration of an EEM program while still achieving significant savings.

By selecting an EIS provider with the relationships, technology, services and hands-on support necessary to implement a nationwide program, energy managers are able to streamline energy usage and reduce operational costs with minimal effect on their resources. The right EIS provider can make managing energy costs on a national level a truly worthwhile investment.



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