

ENTERPRISE INTERNET OF THINGS:

*What Is It, and How Will It
Improve Energy Management?*



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**ENERGY
MANAGER
TODAY**

Those charged with a facility's energy management are beginning to hear the phrase "Internet of Things" (IoT) increasingly more often within the industry, and many are asking how to use the concept of the "Enterprise IoT" to leverage the data in their buildings and find opportunities for improvement.

In simple terms, Enterprise IoT can be defined as the many sensors that produce data within a smart building's infrastructure. Physical objects such as wireless sensors within lighting, HVAC or security systems have embedded computing capabilities that, when connected to a central system, can result in operational efficiencies and reductions in energy. Most large commercial buildings - warehouses, office buildings, sports complexes, retail space, convention centers, etc. - encompass a variety of systems that require energy and can be connected via a wireless network.

Enterprise IoT comprises wireless networks, devices and sensors that are controlled by intelligent software. This combination of technology allows companies to collect data, analyze what is happening across a building or portfolio of buildings and make ongoing improvements that have a tremendous impact on cost cutting, while at the same time increasing operational efficiency.

Easiest Place to Start: Lighting, HVAC, Plug Load

"Enterprises looking at building automation tend to begin with a focus on controlled lighting, as that is the most prevalent network in the building," says Mandeep Khera, VP of marketing and channels for Daintree Networks, a provider of smart building control and operation solutions. "If the solution you choose provides actionable data, you may discover that you have your lights going full blast when nobody is in the area, or that you are not dimming the lights during the day and making use of daylight harvesting. That wastes a ton of energy. Or you might learn that the lights are too low in certain areas, causing difficulties for workers."

The beauty of Enterprise IoT is that devices such as light fixtures are no longer simply light fixtures. "We do not see light as a binary function device anymore, but as a node for data communication that can help facility managers and building owners learn more about their energy usage," says Ben Pouladian, president of Deco Lighting, a provider of lighting fixtures and systems.

The next area on which companies tend to focus is HVAC. With a wireless control system monitoring activity, energy managers may find that they are blasting the AC in specific areas,

Technology Advancements Drive Smart Building Growth

According to a report from Research & Markets, technology advancements are responsible for the growth of smart building solutions that make use of big data and Enterprise IoT. These advancements allow facility managers to make more impactful decisions about energy use.

Modular, low-cost IoT solutions will win in the short- to medium-term, while on a long-term basis, data-driven analytics will continue to propel the energy management market forward, the report states.

With low-cost IoT solutions becoming more prevalent, the commercial and industrial IoT market is beginning to move out of the “early adopter” phase and is poised for a surge in growth, says a recent article in The News.

or even in the whole building, when it is not occupied. Next generally comes a system for analyzing plug loads, allowing the company to look at all the machines in a facility, including printers, copiers, or heavier machinery that are plugged into outlets. Many of these stay on all day, every day, even when nobody is using the machine.

“This is the low-hanging fruit, the area where most enterprises begin,” says Khera. “From a pure energy savings point of view, these are the biggest three. However, none of these exist in a vacuum. They may be the obvious places to start, but remember to consider how the systems will build upon each other and work together in the future.”

Developing a Long-term Energy Plan Requires Integration

While lighting, HVAC and plug load may be the obvious first steps, think before you start, warns Noah Goldstein, research director with Navigant. “You want your retrofit to fit into a general energy management strategy. Don’t just think, ‘lights first, then we’ll finish and move onto HVAC.’ Think about your 10-year energy plan and then make decisions about your retrofits that fit into that plan.”

Goldstein believes companies aren’t thinking often enough about how to integrate systems for long-term benefits. The challenge of such long-term thinking is that the conversation about systems integration also involves the

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—Kevin Garabedian, VP of Administrative Services and Facility Operations for Universal Music Group

integration of decision-making and the integration of action, he says. “Most facility or energy managers have largely been working on a single system at a time and not necessarily working with any other part of the organization. Generally, IT and operations exist separately. When facility managers install new lighting systems, for example, they may not even be working with the IT team. They may not realize that, moving forward, there is not sufficient infrastructure to support a continual addition of new wireless systems. And both IT and operations must integrate with the C-suite. The challenge of IoT is that it necessitates greater decision-making.”

5 Things to Consider When Creating an Energy Plan

When considering a long-term energy strategy that involves system integrations, consider the following elements:

Compliance:

As environmental concerns intensify, building owners and corporations must carefully scrutinize their energy management and monitoring solution to ensure it fully complies with all mandates and regulations. These include automated demand response, plug load circuit control, daylighting, and multi-level lighting controls. All states in the US are working toward introducing legislation that will require buildings meet ASHRAE Standard 90.1 (Energy Standard for Buildings Except Low-Rise Residential Buildings).

California, for example, has set out energy efficiency standards in the state’s Code of Regulations Title 24. The California Energy Commission recently updated Title 24 Energy Efficiency standards, requiring businesses to implement technologies that enable highly efficient and zero-net-energy buildings with systems that are integrated with advanced

communications capabilities. The standards ensure that better windows, insulation, lighting, ventilation systems, and other features that reduce energy consumption are installed in businesses. The new standards lower the threshold for when alterations must comply with standards and allow fewer exceptions. For example, now Title 24 requires lighting alterations to comply with the most recent standards when 10% of the luminaires are replaced, down from 50% in the previous Title 24 version.

Taking advantage of Enterprise IoT by installing wireless control systems helps ensure that building owners and companies meet these standards.

And it makes sense to implement these solutions now when a building is being built or upgraded to save money in the long-term.

Six months before the new Title 24 was to be enforced in California, Universal Music Group was planning to move its headquarters to a different building. Because the company was moving just before the new standards were enforced, they originally considered ducking under the new standards, thinking they would save money on new installations. "After discussing it at a corporate level, we thought, 'We'll be here for at least 10 years. We want to invest the money now; it's better for employees and for us in the long-range,'" says Kevin

Garabedian, Universal Music Group's VP of Administrative Services and Facility Operations.

As standards look to become ever more stringent in coming years, energy efficiency needs to be viewed as a facilities management and IT investment that helps optimize building operations. Companies may do well to avoid disparate systems that cannot interoperate and therefore cannot be leveraged for adjacent energy cost saving opportunities.

Wireless:

Wireless control solutions have the capability to transform a building into a connected, intelligent facility that responds automatically to various needs. The end result is unprecedented visibility, automated fault detection and centralized monitoring and control that empower the facility manager. Making use of Enterprise IoT requires wireless systems, as the sheer number of wired devices would make their integration impossible.

Using wireless systems, Bluestone Energy designed and installed a comprehensive solution for Computershare's Canton facility, a three story, 215,000 square foot office building. In addition to a retrofit of the lighting for their garage, Bluestone implemented setback

and scheduling of the RTUs and fan powered boxes (FPBs) via a new Building Automation System. This system significantly reduced cooling, heating and fan energy and eliminated short-circuiting that was occurring from supply to return. The project had a simple payback of less than half a year, and resulted in an annual energy savings of 2,500,000 kWh.

In another decade, buildings without advanced wireless controls will be as rare as analog cellphones from the nineties, believes Sachin Andhare of Daintree Networks. “As for the wireless controls payback, the typical range is between one to four years based on the application. The declining hardware prices will reduce the payback period even further and take wireless network control solutions to the next level,” he says.

“And installing a wireless system is easier and less problematic than putting in a wired system,” says Garabedian. “There’s no, ‘We forgot to run a wire,’ or, ‘We forgot to put in a conduit.’”

When the Universal Music Group installed wireless systems in its new headquarters building, Garabedian found that, while the hardware for its wireless system was more expensive than those for a wired system, the labor was less. The total installation cost no more than installing a wired system, he says.

A wired control system for something like lighting can be efficient in and of itself, but wireless controls that allow all building systems to work together can bring as much as 70% energy savings across the board, according to Daintree.

Open Standards:

By choosing open standard-based lighting control systems, organizations provide themselves with the ability to easily upgrade to other related devices, such as thermostats, plug-loads, fans, CO2 sensors, and more. The flexibility of open standards provides the ability to add new devices into the existing control system. There’s no need to buy a separate system to manage each additional device.

“In the next two decades, we will see a dramatic increase in the sophistication of these systems, so we believe companies should install smart energy building management systems that use open standards. This helps ‘future-proof’ the company’s building systems, allowing them to easily upgrade to new devices. Companies need to remember that the investments they’re making now can really effect them in future years,” says Derek Proudian, chairman and CEO of Daintree Networks.

In a commentary in Information Week, Sasa Marinkovic noted that connected

computing offers great potential. But before that can happen, there must be a vast improvement in “interoperability and communications protocols, common processing and programming interfaces, and tools to dissolve the barriers between diverse computing platforms, devices, and operating systems.”

Providers that don’t offer open solutions can lock you in, preventing you from using the capabilities you need in your IoT scenario. A strong provider should work with your existing technology, without requiring you to rip and replace what you have, suggests a Microsoft blog post.

Operational Efficiencies:

Using the actionable data provided by Enterprise IoT can result in an endless variety of operational efficiencies. Think about peak time usage: most utilities are now using a demand response fee structure, charging higher rates during peak times. For utility customers who aren’t looking closely at their data and not shedding loads, they may be wasting a significant amount of money on energy. For example, during peak usage, a building doesn’t necessarily need 100% of its LED lights on full power. “Most users can work very comfortably at 10 or 15 percent of LED lights,” Khera says. Additionally, by looking at machine use in manufacturing, a company might realize they can run the machines at different

times of the day or night in order to avoid the peak times. In an office situation, a worker might need to make 2,000 copies, but it may not be necessary to make those during peak time. “If you have the right platform, you can program it to turn off the plug loads with the printers so users will have to make a conscious decision to print right then or wait,” Khera explains.

Another vital use of connected systems throughout a facility is for predictive maintenance. It is better to know in advance when to change lights or update other devices. If a surprise problem arises, the company must arrange for an extra maintenance trip, which costs more and is an inconvenience that interrupts productivity.

Operational efficiencies such as these make a facility or energy manager’s work run significantly more smoothly.

Reporting:

More and more facility managers in commercial and industrial buildings have been rolling out building energy management systems (BEMS) which are able to take advantage of Enterprise IoT, and as they do so, they are searching for better and easier ways to analyze and make use of the information that they are now able to gather. When investigating BEMS, look beyond dashboards and

Driving Enterprise IoT In Smart Buildings

Daintree ControlScope Enabling The Smart Building



Pragmatic and Proven IoT Solutions For Enterprises

Daintree Networks is simplifying the way commercial buildings manage, monitor, and optimize energy use. We are the only company leveraging wireless open-standards to manage multiple building applications including Lighting, HVAC, Plug-Loads, Fans and more.



graphs to see whether enhanced analytics are easy to access and read. In addition, consider consultants who can provide audits and turn data into actionable recommendations and solutions.

Recommendations on Moving Forward

“Building energy management systems will be demanded more; they will enable higher level decision making based on all the systems being tied together,” says Noah Goldstein, research director with Navigant.

As companies start thinking about integrating their wireless systems, they need to begin pushing vendors and suppliers, recommends Goldstein. “Be proactive. Tell them, ‘I want an integrated system rather than what you’ve got on the shelf. I think that if vendors are pushed and they know it’s something they can sell in the market, they will develop and supply it.’”

As you begin working on your long-term energy management goals, become well versed on the IT side of facility management. Work with IT to ensure that the underlying technology is capable of being deployed across all building types and spaces. This may include large or small commercial office buildings,

warehouses, or retail locations, across a handful or many thousands of such buildings. The IoT network infrastructure must also be sufficiently pervasive in and around the building to ensure that devices can be added easily, both during initial deployment and later during expansion, without requiring significant support.

Consider putting some training programs in place, both for facility managers and their teams as well as for the C-suite. It is important to have meetings between the IT department and facility managers. By telling IT what you are considering and asking how it will affect them, it allows for the opportunity to make sure the plans will work, that security ramifications are considered, and that backup plans are in place.

Additionally, work to understand the relationship you have with all your utilities, across all your locations. Many utilities offer free programs to help facilities improve energy efficiency, so make certain you’re taking advantage of those offerings

“Find a system that is cost-effective and that will bring you a payback in the near term, but also one that in the future will allow you to take advantage of the next generation of applications and services,” says Proudian.

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