How Intelligent Is Your Restaurant?

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Exploring the ways in which smart buildings contribute to your bottom line

Restaurants are the most energy intensive commercial buildings in the United States, according to the U.S. Energy Information Administration. They consume nearly three times the energy of the average commercial building per square foot, states Sustainable Foodservice. Special equipment, lengthy hours and extreme kitchen temperatures create much of the demand.

So how do you, as a professional facility director or facility manager, curb excessive waste and improve your bottom line? You can do so by addressing one of the biggest money hogs: your HVAC system. HVAC accounts for more than 40 percent of your building's energy costs. Reducing this number will significantly contribute to both your bottom line and your sustainability objectives.

IoT and Cloud Computing Basics

The Internet of Things (IoT) is the internet working of physical devices that are connected to the internet, like your iPhone. IoT devices are commonly referred to as smart devices, and these smart devices can work together to create smart buildings. Smart buildings use automated processes to control operations like HVAC and lighting. Gartner estimates that 20.8 billion connected things will be in use worldwide by 2020.

Cloud computing is one of the most common forms of data storage used today. Instead of having massive servers housed in your restaurant, you can remotely store and analyze data using cloud computing.

The birth of IoT and cloud computing enable us to build predictive, proactive systems that make restaurants more energy efficient than ever before. Not only that, but these systems are intelligent enough to keep customers, kitchen staff and servers more comfortable and productive.

Creating Smarter Buildings

Cloud computing has been a real game changer, allowing sensors to be placed in each zone of your building. Each sensor collects numerous data points regularly, which are then stored and analyzed in a meaningful timeframe. A truly smart solution will not only factor in air temperature, but also humidity and geographical orientation. IoT and cloud computing enable restaurant automation, which is truly restaurant intelligence.

A smart building recognizes user habits and routines. For example, it may begin cooling down the dining room before rush hour in anticipation of warm-bodied diners. The kitchen, too, will likely be cooled down in advance to prepare for the gas ranges and ovens firing up. This ensures a comfortable experience for patrons and employees alike. The result is a smart solution that enables restaurants to function more efficiently and save more energy, improving your bottom line.

Regardless of whether you manage one facility or hundreds, it's important to see and understand how restaurants behave. Smart building software enables you to gain insight into your buildings, whether you're standing in the kitchen or flying across the country. A smart system can allow you to view your restaurants from your smartphone, tablet or computer. Ever initiate a service call that ended up addressing the wrong piece of equipment? This left you feeling frustrated because you wasted valuable time and money. Smart solutions are all about cutting down on the guessing game and providing real insight into what's working and what's not.

Optimizing HVAC Usage

Knowing your restaurant's HVAC usage is key. A typical HVAC unit consumes 1 KW of power per ton of cooling. It's worth noting that older units are less efficient. Gaining insight into your monthly energy bill, as well as the status of your equipment, can provide savings opportunities. Ignoring necessary service calls can result in emergency visits, shorter equipment life and disruptive restaurant downtime. A smart solution will measure numerous data points to help monitor the health of your HVAC system.

To put the cost of a healthy HVAC system into perspective, U.S. companies typically spend about $2 per square foot per year on utilities, including electricity and gas. According to National Grid, that number is higher for U.S. restaurants, averaging an annual $3,750 per square foot on electricity and natural gas combined. Additionally, businesses typically spend $20 per square foot per year on building maintenance (including rent and health of building). Lastly and most importantly, businesses spend about $200 per square foot per year on the people in the building.

We tend to focus on the electric and gas spend, but that $200 per person is where the bulk of a restaurant's cost occurs. The overall health of a restaurant is predicated by the people. What makes people in your restaurants happy and more efficient? Comfort is a big driver. Light, air quality and thermal comfort are three main components that lead to happy employees and patrons.

If there's poor light or lack of sunlight, we don't feel energized. If there's poor air quality— meaning carbon dioxide levels are over the recommended threshold—people feel sluggish and tired, resulting in lower productivity. As humans, we naturally produce carbon dioxide. Ideally, indoor carbon dioxide levels should be kept at about 600 parts per million (ppm). Anything above 1,000 ppm is deemed less healthy and can contribute to grogginess.

Maximizing Productivity

You're already spending about $200 per square foot per person annually—it makes sense to ensure your employees are set up for maximum productivity. According to National Grid, restaurants tend to operate with narrow profit margins and typically have a pretax income that is 4 to 7 percent of their total revenue. So achieving only a 20-percent reduction in energy costs will translate directly into an additional 1-percent profit.

Smart buildings can improve overall health, the environment and the bottom line. Featuring more sensors and processing power, smart buildings give you more benefits in terms of people and energy efficiency. Let's take a look at The Edge, a high-tech office building located in Amsterdam. The Edge was designed by Deloitte and is known as the world's greenest and most intelligent building in the world, according to Bloomberg. The Edge has more than 40,000 sensors, with 28,000 sensors dedicated to lighting alone. The building has an app that recalls employee preferences in terms of temperature and light. There are no fixed work stations. Instead, the app recommends an ideal place for each individual to sit based on their personal preferences, knowing that they'll be most productive in that setting.

The beauty of modern IoT is that you don't have to spend as much money or time as Deloitte did on The Edge. Today, many sensors and actuators communicate wirelessly and inexpensively. This allows you to place sensors that measure carbon dioxide, light, temperature, humidity and additional data points in every part of the building.

A Proactive Approach

Most control systems and energy management systems today are reactive. They take in data without making observations or predictions. IoT and cloud computing systems use algorithms to observe cause and effect within buildings. Machine learning analyzes the data and uses it to create control strategies that are tailored to each building's specific needs.

Much like driving in rush hour when you're alternating between the gas and the brakes, using a programmable thermostat is purely reactive. The air conditioner only comes on when the building is too warm. As it turns out, running the air conditioning reactively is more costly than if your system had been turned on an hour beforehand to proactively cool the area. This reactive (push the brakes, then the gas) methodology is inefficient, causing you to waste gas. Your programmable thermostat is also reactive, causing you to waste energy.

On the other hand, a smart system is like driving while looking ahead. Just like seeing a car merging into your lane about 50 feet in front of you allows you to slowly change your speed, making small temperature adjustments allows your HVAC system to run smoothly and efficiently.

Even older buildings can be readily retrofitted with smart solutions. Modem technology allows you to retrofit existing equipment with smart sensors, getting rid of the need for costly remodels. The benefits of more granular comfort, improved air quality and greater energy efficiency in your buildings provide value for facility managers. Not only are you able to see into what's working and what's not, but the overall efficiency of your buildings should improve, thus improving your bottom line.

A New Style of Management The birth of loT and cloud computing allows us to build predictive, proactive systems that make restaurants more energy efficient. These same smart systems are intelligent enough to keep customers, kitchen staff and servers more comfortable and productive. Increased comfort and reduced energy costs are a no-brainer.

Whether you oversee one restaurant or hundreds, it's important to understand how your restaurants behave. You cannot manage what you don't monitor. A smart system enables you to see into your building from anywhere on the planet, thanks to cloud computing and loT. You can readily view multiple locations right from your smartphone. This is notably more efficient than calling all your local restaurant managers to make needed adjustments.

As a restaurateur, facility director or manager, you are tasked with meeting sustainability goals and reducing overhead. Since restaurants are the most energy intensive commercial buildings in the United States, it's important to think through ways to cut costs and increase efficiency. Finding smart ways to meet these goals while increasing occupant comfort is sure to be a win among your customers, employees and boss. Traditional energy management systems have been around for decades. While they can optimize energy usage based on calendars and scheduling, they are not predictive. With the technology available today, smart buildings allow restaurants to function more efficiently, save more energy and improve your bottom line.

Deepinder Singh co-founded 75F in 2012. He designed some of the world's fastest core networks for service providers like AT&T, NTT and Verizon. With almost 25 years of experience in electronics and computing, his key goal in every endeavor is to simplify operational complexity and make products intuitive.