IoT and sustainability

How will incorporating smart technology into the design of your next project improve its sustainability?

Sustainability continues to impact the buildings we design and build, and we anticipate it will continuously grow across markets for many years to come. According to the ENR Top Green Buildings survey, market growth in the United States for green design revenue rose 3.8 percent in 2015. And, the Dodge Data and Analytics' World Green Building Trends 2016 report shows that 33 percent of all new construction projects are green buildings. This activity is expected to continue in the next few years, particularly in new commercial and institutional construction.

Among the triggers driving the growth in future green building is lower operating costs. The study found that a new green building can decrease operating costs by 21 percent over five years and a green retrofitted building can decrease operating costs by 14 percent during that time frame.

The increasing demand for sustainable buildings is occurring at a time when the adoption rate of advanced technologies is on the rise in the commercial industry — and this is just the beginning. The Internet of Things (IoT) introduced people to the benefits of connectivity, and utilizing sensors and smart devices, commercial spaces are able to become more efficient than ever before.

"As the demand for green design rises, the cost of data is coming down," explains Rob Martens, Allegion futurist and vice president of strategy. "The cost of sensors has been dramatically reduced in recent years, and the cost of transmitting and processing the information that these smart devices collect has also decreased. This means there are more opportunities for building designers to incorporate next generation technology to improve energy consumption, environmental impact and the overall wellbeing of employees."

Ultimately, as architects realize the potential of blending the demand for green buildings with the vast availability of

technology, they are able to deliver buildings that can boost total cost of ownership for the customer.

Designing for optimal efficiencies

Let's face it: facilities waste a lot of energy. In fact, commercial buildings in the U.S. are one of the biggest users of energy. There is a lot potential to decrease energy costs, and designing with building automation in mind can help significantly.

Self-assessing and self-monitoring buildings bring a big value by detecting common sources of energy waste and saving critical assets. It's achieved by sensors and software that collect data throughout a facility and respond in real time to variety of circumstances. When you think about how many aspects of a building's ecosphere of services can be connected to a network, from lighting and temperature to water use and recycling, the possibilities are extensive. An open window or propped-open door can send the HVAC into overdrive. And how often do employees leave without powering off lights and electronics? The more connected devices, the more data available to provide greater value to the end users.

It all starts with the swipe of a credential, alerting the system to turn on the lights, adjust the temperature to a comfortable setting and unlock specific openings. Then, throughout the day the facility monitors resources, sending an alert if an

abnormality is detected — from a running faucet to carbon dioxide or smoke detection. At the end of the day, these operations are reversed and the facilities enters "efficiency mode." These routines, or series of actions, are common in many buildings today.

Why stop there? With next generation technology, architects can design an office, hospital or institutional facility with sensors in the floor to detect weight to show if someone is in the space. If it is vacant, the system will automatically respond by limiting HVAC and switching electronics into power-saving mode.

Sensors could also tell you how many people are in the various wings of the facility and collect that data over time to identify trends. A university, for example, might find that on Fridays there are fewer classes in building A and that a portion of the facility isn't being used. Not only will fewer resources be wasted during the day, but at the end of the day, the janitorial staff receives updates alerting them to which spaces were used and are in need of attention. Or which recycling bins are full and need emptied.

IoT devices collect massive amounts of data that can be analyzed and acted upon to automate systems and change human behaviors. From understanding how people interact with a building to the differences in air quality in various rooms, smart systems can provide the information needed to continually improve building efficiency and sustainability.

Improving wellbeing

The emphasis of green buildings isn't just on improving the environmental impact or energy savings, but also the wellbeing of the people inside.

According to the World Green Building Council's report Building the Business Case, employers, building owners, designers, developers and investors throughout the world have found that office design affects the health and wellbeing of occupants in many ways. The report offers eight best practices that lead to healthy, green offices, such as indoor air quality, daylighting, comfortable temperatures and reduced noise. The study found that employers that take action to improve the quality of the workplace are rewarded with more productive and loyal personnel. Keeping these features in mind will help architects design

buildings that are energy efficient and conducive for employee productivity — improving the overall investments for building owners.

For example, additional sensors might be added to the windows to maximize the use of natural light — triggering actions like adjusting the shades and dimming the overhead lights during direct sunshine. Even the overall look and feel can contribute to the health of the office.

Design considerations

"Technology makes it easier for us to do more with less, and the construction industry is just one of many areas where trends in sustainability and innovation are blending together to achieve amazing benefits," says Martens. "We've seen it in the rise of electric cars and the tiny homes trend. And now the commercial space has begun to reap the benefits."

More and more companies are taking an active role in ensuring their properties function in a way that reduce resources and improve employee wellbeing, which in turn improve total cost of ownership. As the demand for more efficient buildings rises, so does the availability of next generation technology. This leaves the architect with a unique opportunity to take advantage of the market.

"What else can your building do?" asks Martens. "We live in a connected world, so use your imagination. Then seek out experts in related industries to figure out how to make it possible. Partner with people in cooling, lighting and access control to learn what's available."

Collaboration and early planning are essential to the construction of a flexible, functional and sustainable building. In order for all of the building systems to integrate and work together, the architect needs to work hand in hand with the engineering team, systems integrator, construction manager and owner to understand the possibilities of the space and how the systems will integrate to provide the desired experiences. Allegion architectural hardware consultants are also available to help.

Allegion has a team of more than 150 specification writers located around the world who would be happy to assist on your next project. Contact an Allegion specification writer, or check out the iDig Hardware blog for information and updates on door hardware codes.

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