How technology is impacting sustainability
The integrators role in creating more energy efficient buildings

The market for sustainable, efficient buildings remains constant in the commercial building industry, and client demand is the driving force, according to the Dodge Data and Analytics' World Green Building Trends 2016 report. It appears that owners have realized the many benefits—especially the appeal of lower operating costs. The report 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.

This presents an opportunity for integrators to collaborate with architects to optimize building design. 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 by utilizing sensors and smart devices, commercial spaces are becoming more efficient than ever before.

Understanding the relationship of today's technological trends, tools and challenges and how they relate to the design of a facility has become more important. It's not just about the technology but how it is applied to enhance the overall building experience. Rob Martens, futurist and president of Allegion Ventures, introduced this concept as enhanced design. It's the fusion of technology, design, form and function through next generation planning methods.

Thinking about spaces in a way that merges digital and physical worlds by incorporating technology into design can improve energy consumption. It takes collaborative effort between architects and integrators. By combining their strengths and knowledge, they can realize the potential of blending the demand for green buildings with the vast availability of technology. Together, they can deliver buildings that can boost total cost of ownership for the customer.

Planning for optimal efficiencies
Commercial buildings in the U.S. are one of the biggest users of energy. Planning for building automation upfront can help significantly decrease this.

Self-assessing and self-monitoring buildings detect common sources of energy waste and save critical assets. It's achieved by sensors and software that collect data throughout a facility and respond in real time to variety of circumstances. 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 more connected devices, the more data available to provide greater value to the end users. For example, if an employee leaves a window or door propped open, the building reacts before the HVAC goes into overdrive. And if someone leaves for the evening without powering off lights and electronics, the system knows to power down following inactivity after a specified time.

Working with an architect, discuss the possibilities and understand the building's needs and factors that might impact energy efficiency. Find out what features the client would like to see. It's incredible what is achievable with the swipe of a credential. It triggers 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.

However, that's just the beginning of what you can deliver to your clients. With next generation technology, integrators can assist architects in their design of an office, hospital or institutional facility by recommending features like sensors in the floor that detect weight 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 how many people are in the various wings of the facility and collect that data over time to identify trends. A commercial office that has implemented hoteling, for example, might find that less people have selected desks along the east-facing wall because it's too warm on sunny days. Traditionally, the facilities team would manually respond to make those spaces more comfortable. Or employees would crank up the air. Using sensors, building automation regulates the AC only in the areas impacted by the warmth and lowers the blinds during direct sunlight. The system adjusts throughout the day depending on the climate conditions. Not only will fewer resources be wasted during the day, but staff can better utilize their time. Additionally, without this information being collected, the facility might not realize that work spaces were going unused, wasting resources.

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.

Today, most systems that aggregate all this data from connected devices and sensors are only scraping the surface of efficiency gains. That said, there's been a huge breakthrough in the way we analyze and respond to data sets called machine learning, and it's expected to make energy savings even more prolific in coming years. Google announced it used machine learning to cut data center energy usage by 40 percent, saving a tremendous amount of money each year. Using good quality data—data that has been tagged, categorized and associated to real-world situations—it is capable of controlling HVAC systems, adjusting fans in real-time without the need for human intervention. Google may be one of the first to use machine learning to change the way they operate, but it's on the horizon for other companies.

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. As an industry, we need to take an active role in ensuring properties function optimally to reduce resources and improve total cost of ownership. As the demand for more efficient buildings rises, so does the availability of next generation technology. This poises the integrator and architect to take advantage of the market.

Ask yourself: What else can the building do? What more can integrate to enhance resource utilization? You don't need to have all the answers. Seek out experts in related industries to figure out how to make it possible. Partner with people in cooling, lighting, access control and related industries to take advantage of the market. Collaborating opens up more possibilities for the customers. It also positions you as the guide on the path to designing more efficient spaces.

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, integrators and architects need to work hand in hand with the engineering team, construction manager, owner and other key stakeholders to understand the possibilities of the space and how the systems will integrate to provide the desired experiences. Allegion consultants are also available to help.