

# electroindustry

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## Better Building Performance

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### A New Paradigm for Building Performance

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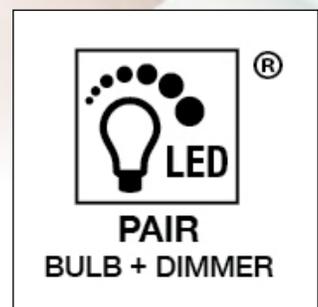
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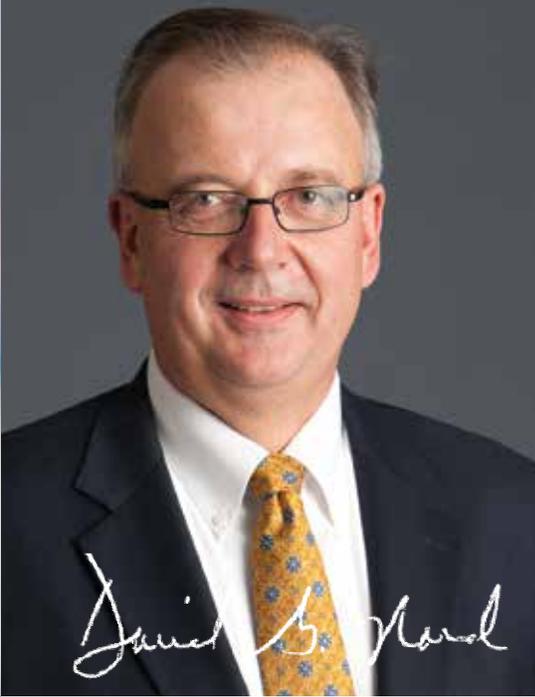
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Most people don't give a second thought to how buildings are managed—except when things like lighting and HVAC fail. Yet buildings are where people spend 90 percent of their time, be it at work, home, school, or leisure activities. The fact that we don't think about the buildings we occupy is a compliment to those who manage them. Now there are new tools to help building managers do an even better job of optimizing safety and performance.

The Internet of Things (IoT) enables managers to collect and analyze multisystem real-time data to improve efficiency, operation, comfort, safety, and productivity. For this vision of data-optimized buildings to come to fruition, however, systems and their components need to speak the same language. The free and unobstructed exchange of data needs to be universally understood across systems, platforms, and industries. This machine-to-machine interoperability at an enterprise level requires data in a more or less universally accepted format.

Traditionally, building management systems (BMS) transmitted signals telling each subsystem (e.g., lighting and HVAC) how to function. Without significant levels of standardization and interoperability, the traditional BMS model required an extensive amount of site-specific setup and troubleshooting to make subsystems work together, even at a rudimentary level. This labor-intensive approach inhibits adoption and falls short of the potential of a modern BMS.

With a common data format, structure, and syntax across the built environment, data can be stored, analyzed, and leveraged for services such as energy, asset, and property management; optimizing space; personal comfort and safety; productivity; and indoor positioning. Along with additional services not yet realized, interoperability may finally fulfill the promise of the intelligent building and create a more compelling return on investment for building owners and facility managers that NEMA companies can capitalize on.

Several organizations and universities are developing industry- and function-agnostic platforms to define and standardize values, descriptions, and syntax that will facilitate data exchange among disparate systems, much like plug and play. Initiatives like BACnet Web Services and Haystack Web Services are working on common delivery mechanisms that use familiar formats like JSON and XML, while Brick, Haystack, and ASHRAE 223P are working on common syntax or tags that can be used across industries and functions. Hubbell, like other NEMA Members, is actively engaged in many of these IoT efforts.

As the representative of multiple different building systems and infrastructure manufacturers—lighting, life safety, distribution equipment, motors and drives, metering, electric vehicle charging, and more—NEMA is in a solid position to guide these efforts toward a common data standard. To this end, NEMA is pursuing a new Section in collaboration with its High Performance Buildings Council. The tentatively named Building Management System Sections will expand the traditional NEMA focus from a device-level to a system-level focus. A scope was developed by the BMS general interest task team and circulated to all NEMA Sections for review. Feedback will be incorporated and the revised scope will be sent to Codes & Standards by the end of May for approval.

If you look at the six electrical Divisions in NEMA, all are demonstrating a trend toward system-level thinking and innovative design, in addition to their legacy product-specific safety and performance efforts. This is where the electrical world is headed, and I encourage all Member companies to get involved and support these exciting new opportunities. ☎

David G. Nord  
Chairman, NEMA Board of Governors

# Reimagining the Building Space as a Strategic Asset



In 1879, Thomas Alva Edison emerged with his incandescent light bulb, but it wasn't the first. Rather, it was an improvement on Warren de la Rue's light bulb from 50 years earlier. Lighting continues to evolve, from bulbs to luminaires to today's light-emitting diodes (LEDs).

Traditionally, building and real estate holdings are categorized as a current or fixed asset. Instead, what if a building could be an intangible asset, one aligned with the trajectory of a digital business strategy? The key is to reimagine a building as a strategic asset

that contributes to the bottom line, instead of as a cost center.

Lighting's inherent physical infrastructure makes it the ideal platform for connected building systems and for realizing the benefits of the Internet of Things (IoT). Digital lighting systems provide a foundational role to map indoor spaces. It can be connected to HVAC controls and other edge devices to create a sensory network capable of capturing rich spatial and occupancy

data. By converting to energy-efficient LED systems, a building's operations can realize an immediate cost savings that continues to provide positive ROI while delivering even more valuable IoT applications.

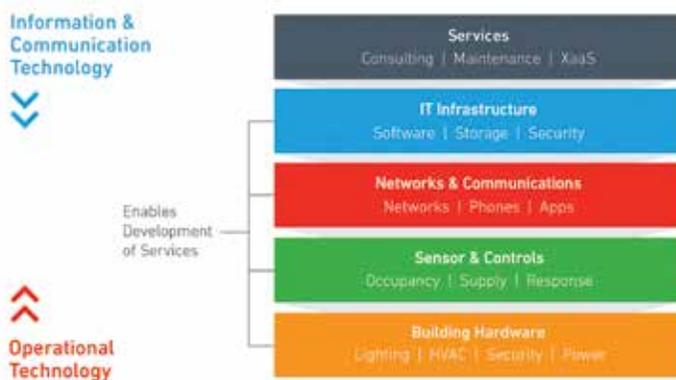
## STEPS TO CREATING BUILDING VALUE

Lighting as the basis for an IoT platform has several components. At the base level of the technology stack, physical infrastructure connects lighting, HVAC, security, and power systems. The next step integrates sensors and controls to measure occupancy and energy supplied as well as provide demand response. To be competitive, a facility needs to look beyond these simple connections. By adding a wired or wireless network, telephony, and apps, the building starts to create business value such as location-based services.

Moving further up the technology stack requires an IT infrastructure to provide software, storage, and security. Implementing steps one through four makes it possible to create services such as consulting, maintenance, and software as a service—creating a digitally enabled, connected, and IoT building. Top-down entrants in the smart building space are learning how IoT can benefit a business in addition to how the building benefits from IoT infrastructure. Ignoring the foundation of proper building hardware results in not realizing LED lighting's contribution to IoT ROI and a diminished IoT infrastructure, which could include sporadic sensor placement and high-maintenance battery management.

The sensory network provided by the combined IoT technology offering will impact not only the building but the occupants and the business as well. When combined with a building's data, the aggregate insights from indoor positioning can be utilized for wayfinding, smart service, individual comfort settings, and business improvements. What would Thomas Edison think of lighting's evolution today? ☺

## Elements of a Fully-leveraged Building as a Strategic Asset



## Welch Charting a New Energy Future: The Smart Building Acceleration Act

The building sector uses more than 40 percent of the nation's energy, presenting a critical opportunity for increasing energy efficiency. While improving energy efficiency in the building sector has traditionally proved challenging, emerging energy monitoring and control technologies are easing the transition to smart buildings that dramatically reduce energy use.

To accelerate the transition to these cost-saving smart buildings, I introduced the bipartisan Smart Building Acceleration Act (HR 5069), which would speed the adoption of smart technologies in the private sector and in key federal agencies, including the Department of Defense, the Department of Energy, the Department of Veteran Affairs, and the General Services Administration.

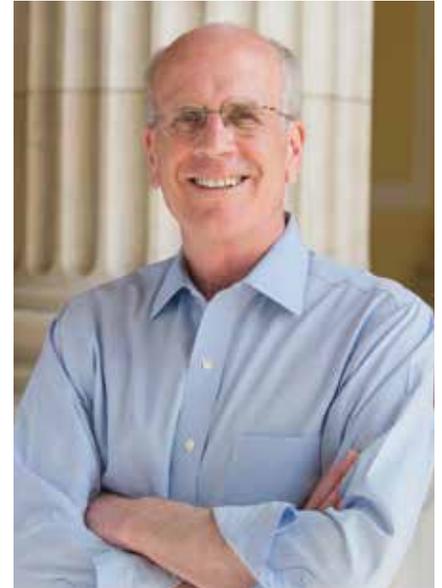
Investments in energy efficiency save money, create jobs, and improve the environment. By expanding the use of smart technology, this bill would result in lower energy use and lower energy bills for taxpayer-funded buildings around the country.

The Smart Building Acceleration Act facilitates the transition to smart buildings by supporting research and by documenting the costs and benefits of emerging technologies in private-sector and federal government buildings.

Specifically, the bill:

- requires a survey and evaluation of privately owned smart buildings to assess the effectiveness of various advanced building technologies;
- establishes a demonstration project to implement smart building retrofits in certain federal buildings and to quantify costs and benefits; and
- directs research and development toward reducing barriers to the adoption of smart building technology.

The United States is lagging behind on energy efficiency. But there is an enormous opportunity to upgrade our energy infrastructure. It is my hope that the Smart Building Acceleration Act charts a new energy future where energy efficiency and renewable technologies are put to work creating jobs, saving money, and improving the environment. ☺



Congressman Welch is chief deputy whip and a senior member of the House Energy and Commerce Committee and the House Committee on Oversight and Government Reform.

June 26, 2018 | Park Hyatt Washington, DC

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## Supporting IoT with Artificial Intelligence and Machine Learning

Like any machine system, connected products need constant tweaking and incremental improvements to maintain efficient operation. Today, this is typically solved using data analytics and diagnostic feedback loops to inform on necessary optimizations after they occur. But when product companies want to move beyond reactive support toward the ability to predict product issues, they adopt machine learning (ML).



Join Josh Pederson, director of product marketing at Ayla Networks, June 18, 1–2 pm EST, as he discusses ML technology and the concept of device profiling to best predictively support IoT device fleets across a host of industries and applications.

Register now at [www.IoTNOWwebinars.org](http://www.IoTNOWwebinars.org).

### BOOK-A-SPEAKER

## Speaking of the Electroindustry



Sue Bunning, industry director of positron emission tomography at the Medical Imaging & Technology Alliance (MITA), a division of NEMA, presented on the “Current Environment of Nuclear Medicine Reimbursement” on March 16 at the American Pharmacists Association Annual Meeting & Exposition in Nashville. She also will speak on “What You Need to Know about Nuclear Medicine

Reimbursement” at the conference for the American Society of Nuclear Cardiology in May in Baltimore.

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\*Online registration ends on November 7. You may cancel your registration with a full refund by October 31.

No refunds after October 31; however, name substitutions are allowed.

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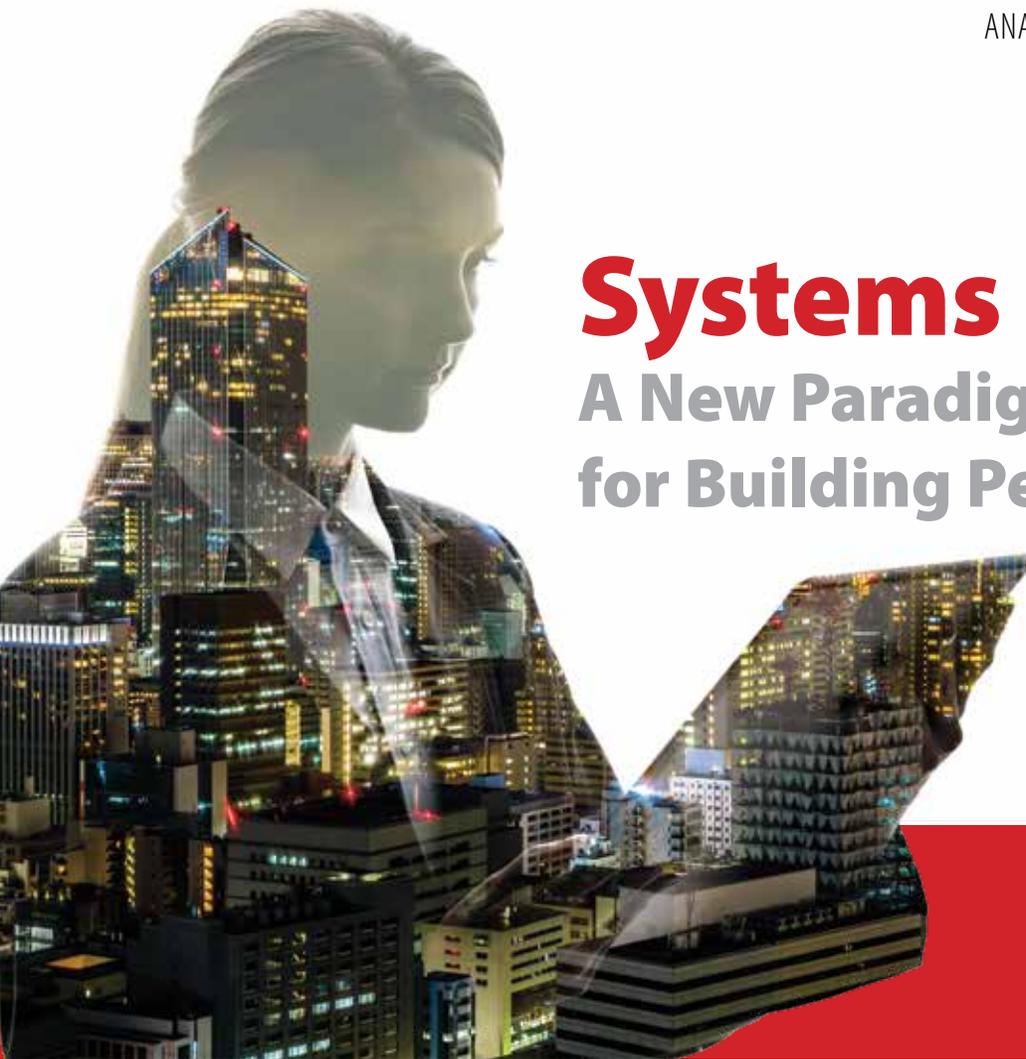
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\*\*Reservations must be made no later than October 22, 2018.

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# Systems Efficiency: A New Paradigm for Building Performance

**D**espite decades of progress in equipment efficiency, total energy use by commercial buildings in the United States continues to rise.

Driving ever greater advances in building energy efficiency—along with improvements in overall building performance and resilience—will depend on the market’s ability to embrace integrated, system-level solutions. Traditional approaches to energy efficiency have focused on individual equipment or envelope components, or on the whole building. Often underemphasized is the potential for better performance of building systems.

## Challenging Conventional Wisdom

From 2015 to 2017, the Alliance to Save Energy led the Systems Efficiency Initiative (SEI), with NEMA as a key participant. The SEI provided a forum for exploring the energy savings potential of a systems approach and developing strategies to move the market in this direction. The scope of the initiative included individual building systems; and interactions between systems, other buildings, and the electrical grid.

The SEI report *Going Beyond Zero: A Systems Efficiency Blueprint for Building Energy Optimization and Resilience* offers a broad set of recommended actions to gain systems-level energy savings.<sup>1</sup>

SEI defines building system energy efficiency as the ratio of (a) the services or functions provided by a building system to (b) the amount of energy that system consumes directly, taking into account the thermal load imposed on other building systems. In a systems-efficient building, multiple building systems are designed, installed, and operated to optimize performance collectively to provide a high level of service or functionality for a given level of energy use.

Several factors make a systems approach increasingly critical. Building energy use continues to rise, despite declines in commercial building energy intensity (energy/floor area), due in part to the rapid increase in miscellaneous electrical loads (MELs) and their associated additional cooling demand. By 2035, the U.S. Department of Energy (DOE) predicts that miscellaneous end uses will use as much energy as all other building end uses combined.<sup>2</sup>

**Mikelann Scerbo,**  
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& Public Policy,  
Legrand

**Jeffrey Harris,**  
Consultant

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Future improvements in equipment efficiency will continue to be essential in slowing load growth but won't be enough to halt it. As building components start to approach technical and economic limits for further efficiency gains, a systems approach will become increasingly important for opening new paths to optimize energy use.

A systems approach also can achieve significant non-energy benefits: reduced carbon emissions, improved grid reliability and building operating resilience, water savings, extended equipment life, and increased occupant comfort and productivity. The quantifiable non-energy cost benefits of systems efficiency have been estimated to range from 25 to 50 percent of the total benefits of energy efficiency.<sup>3</sup>



**Figure 1.** Automated interior solar shades and light shelves in the TELUS Garden Office Tower in Vancouver adjust throughout the day. Photo courtesy of Canada Green Building Council<sup>9</sup>

Across the many types of buildings, systems, and system-efficiency approaches, a common thread is the central role of sensors and controls. System-level efficiency is driven by the collection, monitoring, and communication of data from the emerging Internet of Things, cloud-based analytic platforms that manage and interpret data along with artificial intelligence to monitor and predict system operations and prescribe automated responses. This integral role of sensors and controls calls for a higher level of attention to issues of data privacy and cybersecurity.

### Unpacking the Layers

Building systems strategies can reduce energy consumption through improved connectivity and controls, thermal exchanges, and multisystem

integration. These strategies are most easily applied in new construction but also can be implemented in existing buildings during renovations or systems upgrades. The following examples unpack the layers of systems efficiency solutions, ranging from individual building systems to multibuilding opportunities.

#### LAYER ONE: BUILDING SYSTEMS EFFICIENCY

##### *Example: Lighting Efficiency*

The traditional view of systems efficiency focuses on individual building systems, like lighting or HVAC. This level of focus continues to offer significant potential for energy savings. Energy used for lighting, for example, represents about 10 percent of commercial building electricity use.<sup>4</sup> Although energy-efficient lighting components are critical for reducing energy use, effective lighting and daylighting system design and controls offer significant additional energy savings.<sup>5</sup>

A 2013 study of a high-performance office building in New York City documented lighting energy savings of 56 percent from daylight dimming controls and setpoint tuning in the daylighted spaces, compared to a code-compliant (ASHRAE 90.1-2001) building with scheduled on/off controls.<sup>6</sup> Furthermore, a 2015 study in two General Services Administration (GSA) federal office buildings with updated LED lighting and controls documented measured savings of 32 to 33 percent of lighting energy.<sup>7</sup>

Conversely, poorly controlled daylight strategies can increase unwanted solar heat gain that adds to a building's cooling load. This underscores the importance of appropriate glazing choices and shading devices, which balance the energy benefits of daylighting as a key component of a systems approach.

In the TELUS Garden Office Tower in Vancouver, British Columbia (Figure 1),<sup>8</sup> automated interior solar shades and light shelves are controlled with a network that communicates with the building management system for daylight harvesting and glare control. The shades adjust throughout the day according to seasonal schedules to block solar heat gain in the summer and exploit it in the winter, reducing the building's demand for cooling, heating, and electric light while enhancing exterior views.

For more on building management systems, see "What's in a Name? Integrating Systems Within Building Management Systems," page 11.

**LAYER TWO: SYSTEMS-EFFICIENT BUILDINGS***Example: Cross-System Interactions*

The next level of systems efficiency involves the integration and optimization of multiple building systems. Integrated controls, often combined with a building management system (BMS), better manage energy consumption. They increasingly function on a distributed rather than a centralized basis. For example, lighting is zoned to respond to the needs of occupants in the immediate area, rather than to a central control module.

Advanced lighting control systems also can provide real-time information on energy use and illumination levels to facilitate energy management. For example, some occupancy sensors control both lights and receptacles for plug-in MELs. Open-system protocols can facilitate the integration of MEL local controls with the BMS, using shared occupancy sensors to turn off or put in “sleep” mode computers, printers, lighting, and zoned HVAC.

The coordination among building systems can be supported through integrated project delivery (IPD). IPD captures additional performance benefits through collaboration among design and construction teams to consider interactions between systems.

*Example: DC Power*

The incorporation of direct current (DC) power distribution creates additional opportunities for systems-efficient buildings by avoiding conversion losses when going from DC to AC (alternating current) to DC. A growing number of appliances and equipment in commercial buildings are either native DC-powered or use DC power for internal components such as sensors, controls, and variable speed motors.

Estimates of energy savings from DC distribution vary. A recent literature review shows model-estimated energy savings ranging between two and 14 percent, while measured savings range from two to eight percent.<sup>10</sup> The variation in savings depends on building types and end uses served by DC distribution, the presence of battery storage and on-site photovoltaic (PV) power, DC voltage levels and their associated line losses, and the overall power system configuration.

On-site power from a PV array (Figure 2), fuel cell, or battery storage increases savings opportunities and enhances the resiliency of a building as an emergency-ready power source. The National Renewable Energy Laboratory (NREL) is developing a DOE-sponsored tool to estimate the costs and benefits of DC power for specific building applications.<sup>11</sup>

**LAYER THREE: NEIGHBORHOOD EFFICIENCY***Example: A Shared Energy System*

Looking beyond an individual building, a systems approach can encourage the integration of multiple buildings into a shared energy system. District energy systems (DES) for heating and cooling can reduce heating and cooling energy in urban buildings by as much as 30 to 50 percent by balancing thermal loads among multiple buildings and operating larger turbines or boilers at an optimal level, often as part of a combined heat and power (CHP) system.<sup>13</sup>

For facilities with simultaneous heating and cooling needs, the load diversity among buildings may provide a free resource when the circulating loop is combined with building-level heat pumps and, in some cases, is supplemented by seasonal thermal storage using shared geothermal wells or nearby bodies of water.



**Figure 2.** As depicted in this artist's rendering of the penthouse of the renovated American Geophysical Union headquarters in Washington, D.C., the direct current electrified grid will enable most devices in the building to use solar power from the PV installation on the roof without conversion losses. Image courtesy of the American Geophysical Union<sup>12</sup>

**LAYER FOUR: ENERGY ECOSYSTEM***Example: Buildings-to-Grid Integration*

The increasing attention on buildings-to-grid (B2G) integration reflects the growing recognition of the efficiency opportunities and other benefits offered by this level of systems approach. The DOE vision of a fully integrated, transaction-based B2G ecosystem would optimize systems efficiencies, reliability, and cost-effectiveness at both the building and grid scale, while paving the way for more effective integration of renewable resources and electric vehicles.<sup>14</sup>

The growth in distributed generation combined with demand response, microgrids, advances in battery storage, sensing and controls, wireless connectivity, and big data analytics is making it even easier for building systems to act as distributed energy assets to strengthen the utility grid's efficiency and reliability.

*Continued on page 10*

Continued from page 9

## Five Steps to Systems Efficiency

NEMA advances systems efficiency at many levels, including advocacy for grid modernization and ongoing work to develop Standards that define lighting systems and provide performance ratings.

A combination of research, development, and demonstration (RD&D); pilot projects; public leadership policies; incentives; and regulations is required to demonstrate the benefits of systems efficiency, incentivize a systems approach in consumer behavior and design choices, and ultimately improve energy savings and energy productivity.

**1 RD&D.** Lawrence Berkeley National Laboratory's Beyond Widgets project is an example of RD&D that has resulted in the development and validation of common packages of energy conservation measures for lighting or HVAC systems in smaller buildings.<sup>15</sup> At the state level, New York pioneered the application of packaged CHP solutions to building-scale projects as well as larger, industrial installations. The private sector is also taking steps to advance systems solutions: the Air Conditioning, Heating, and Refrigeration Institute and ASHRAE are developing new approaches to measuring and rating the performance of HVAC systems.<sup>16</sup>

**2 Pilot projects.** Pilot projects in the systems arena have ranged from demonstrations of advanced lighting and daylighting controls to the new CHP system serving a district energy loop in the nation's capital.<sup>17</sup> A field demonstration of the DC-powered Sustainable Colorado office building<sup>18</sup> shows how a systems approach to intelligent buildings allows the merging of power, data, and control into a single unified platform.

**3 Leadership by the public sector.** Leadership can demonstrate the feasibility of system concepts and open new markets that reduce risk and encourage innovation. The GSA has helped lead the way in applying integrated design concepts to new construction and major renovation,<sup>19</sup> emphasizing collaboration across many disciplines (architects, engineers, sustainability experts, and facility operators) to introduce a systems perspective.

**4 Incentives.** Building energy rating and recognition programs can familiarize designers and builders with systems solutions. The Leadership in Energy and Environmental Design

(LEED) rating system encourages an integrated design process and credits on-site renewable energy and CHP.

**5 Regulations.** Building codes can further incentivize a systems approach. For example, most model codes allow tradeoffs in lighting power density among spaces in the building to achieve an overall building average. These tradeoffs, however, do not provide full credit for lighting controls that contribute to overall system performance. A promising new direction is outcome-based regulation of building energy performance.<sup>20</sup> In particular, NEMA LSD 62-2012 *Systems Approach for Lighting* addresses "energy savings by shifting the regulatory focus from appliance standards to lighting systems standards as incorporated into building energy code."<sup>21</sup>

Optimizing systems efficiency in new and existing buildings will require addressing system performance and multisystem interactions throughout design, construction, and building operation. Policymakers, designers, and building owners need to prioritize systems efficiency, with controls and sensors as critical enablers, to achieve the next level of efficiency in buildings and enhance the energy reliability and resilience of buildings. ●

- 1 ase.org/sites/ase.org/files/ase-sei\_going\_beyond\_zero-digital-vf050317.pdf
- 2 https://www.energy.gov/sites/prod/files/2016/06/f32/BTO%20MELs%20Workshop%20Introduction%20%28June%203%202016%29%20FINAL.pdf
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- 13 wedocs.unep.org/handle/20.500.11822/9317
- 14 https://www.energy.gov/eere/buildings/buildings-grid-integration-0
- 15 https://cbs.lbl.gov/beyond-widgets-for-utilities
- 16 Richard Lord, "Future HVAC Efficiency Improvements," 2013, ahrinet.org/App\_Content/ahri/files/Advocacy/ACEEE-AHRI\_HVAC\_Systems\_Initiative\_rev%203.pdf
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- 20 https://www.wbdg.org/resources/outcome-based-pathways-achieving-energy-performance-goals
- 21 https://www.nema.org/standards/pages/systems-approach-for-lighting.aspx?#download

# What's in a Name?

## Integrating Systems Within Building Management Systems

That's a nice building management system (BMS) you have there, or is it a building automation system (BAS)? What's the difference between a BMS and BAS?

There is no difference—BMSs and BASs are the same. Each is an integrated system of hardware and software to automatically monitor and control building systems such as HVAC, lighting, power, fire, access control, and security to optimize the building's occupant comfort, energy performance, safety, and security. BMSs and BASs may be installed in any size building and integrated with many types of building systems. They provide a strong foundation for intelligent buildings that inspire occupant productivity and deliver optimal energy and operational efficiency.

Automation Servers  
Integrate Sensors, Actuators, Meters and Electrical Equipment  
Into Enterprise Level Building Management Systems



Figure 1. BMS connected devices may include sensors, monitors, actuators, and controllers. All images courtesy of Schneider Electric

Wayne Stoppelmoor,  
Manager, Industry  
Standards,  
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Barry Coflan, Senior  
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Buildings Council.

Mr. Coflan develops  
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and smart  
home systems.

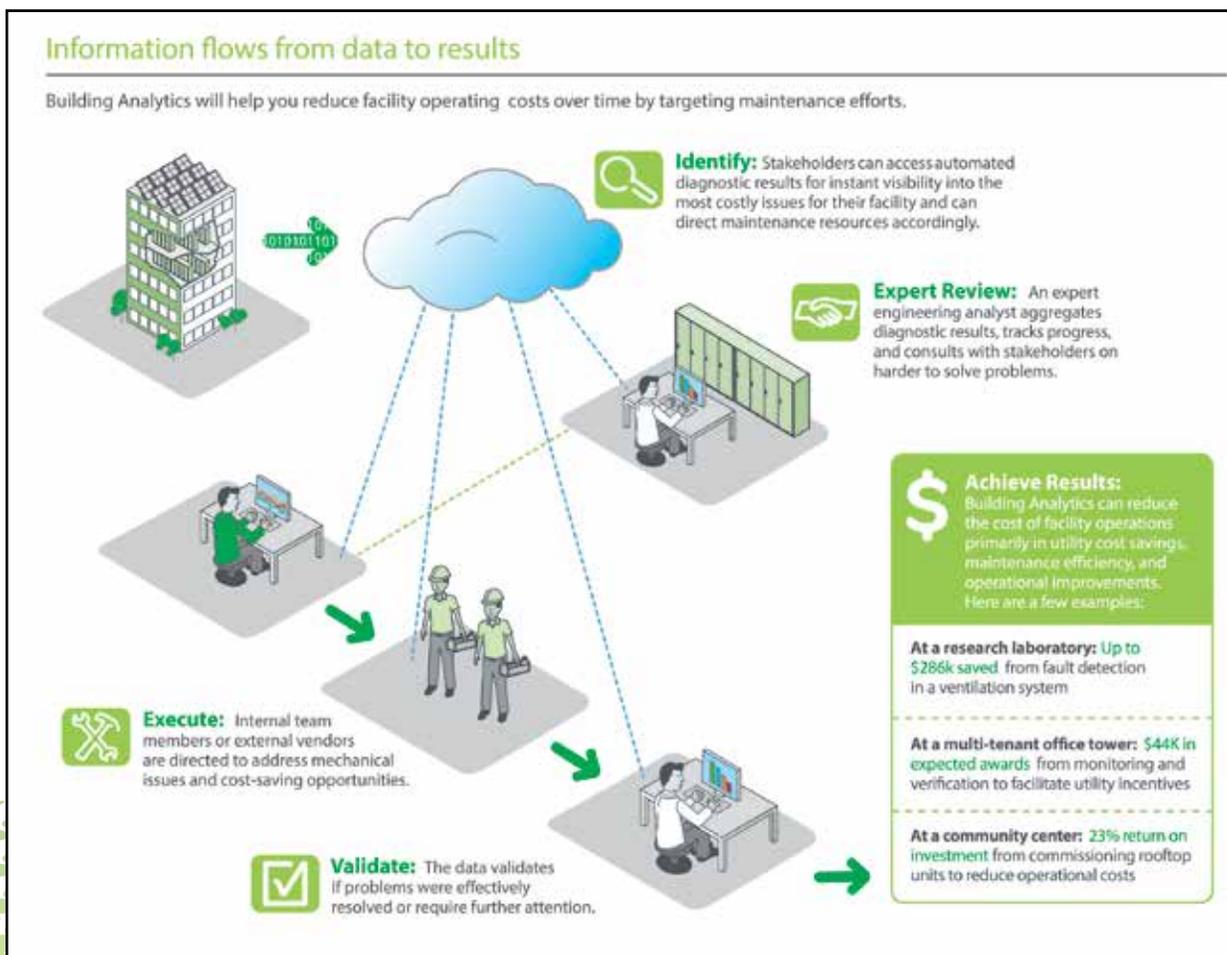
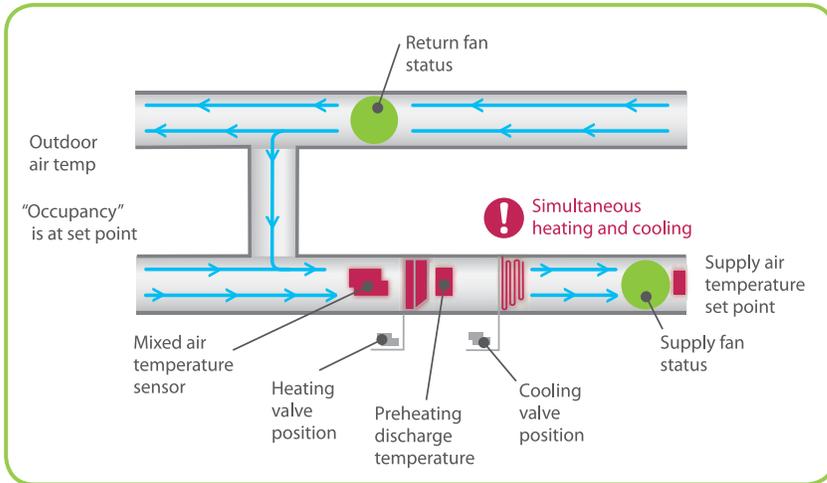


Figure 2. FDD data identify faults in building systems, allowing the system to prioritize actionable resolutions to the faults based on cost/energy avoidance, comfort, and maintenance.

Continued on page 12

Continued from page 11



**Figure 3.** An FDD system can detect preheat and cooling coils operating simultaneously.

A BMS utilizes an enterprise-level software platform and connected devices (see Figure 1) to manage building operation. It receives input data such as air and water flow pressures, voltages, currents, temperature, humidity, and carbon dioxide to determine how the building is performing as compared to set parameters. It then provides control outputs to control damper and valve actuators, pumps, fans, motors, variable speed drives, chillers, boilers, and cooling towers.

A BMS will typically include graphical displays on a computer-generated dashboard that provide building performance information to facility operators.

### Energy Management

What about a building energy management system (BEMS)? Is that a BMS also? No, a BEMS is an integrated platform of hardware and software for monitoring, trending, and reporting energy usage.

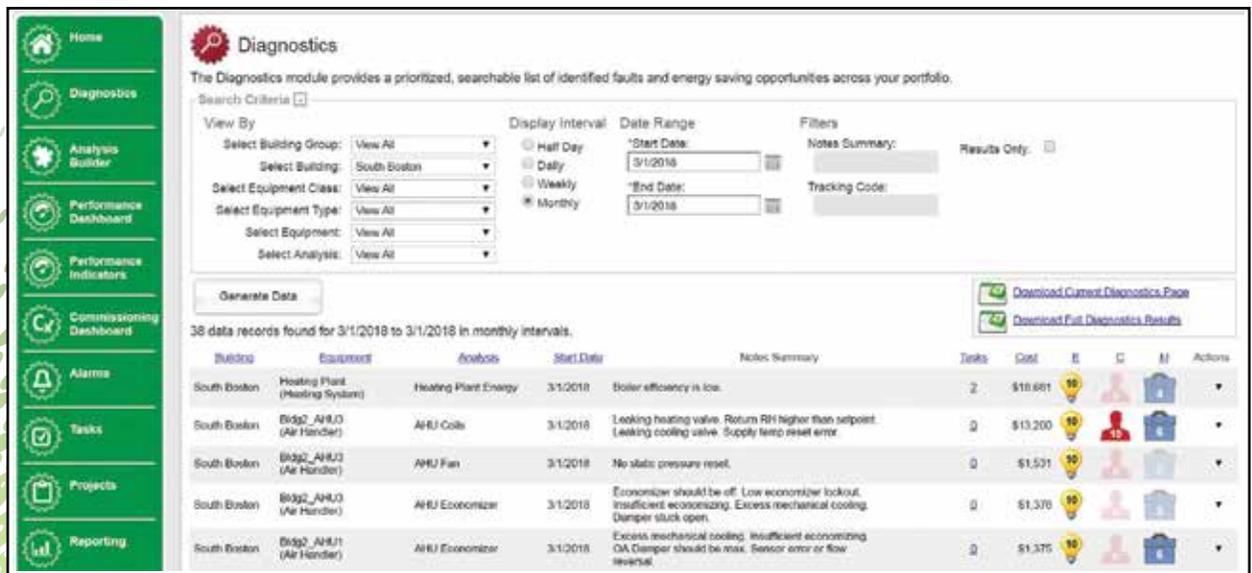
Because of its focus on energy, a BEMS may include linked packages that assist in reducing energy consumption. One such package is fault detection and diagnostics (FDD), which may also be called building analytics. An FDD system is a cloud-based software platform (Figure 2) that utilizes building analytic algorithms to convert data provided by sensors and monitors to automatically identify faults in building systems and provide a prioritized list of actionable resolutions to those faults based on cost/energy avoidance, comfort, and maintenance impact.

The FDD system assigns dollar values to identified faults to demonstrate the additional energy cost impact of not repairing the fault. An FDD dashboard goes beyond a BMS’s dashboard in that it shows not only what is happening but also why it is happening and repairs that should be made to reduce the building’s energy costs and improve occupant comfort.

An FDD system can detect preheat and cooling coils operating simultaneously (Figure 3), leaking and malfunctioning cooling valves and coil valves, faulty control codes, ineffective air flow balance, and other energy wasters. By repairing identified faults, FDD systems typically have a payback of less than two years.

### The NEMA Connection

NEMA staff and Members are exploring the possibility of creating a BMS Section to assist Members in the BMS industry. The concept was discussed at the NEMA High Performance Buildings Council’s (HPBC) meeting during NEMA’s Annual Meeting in November 2017.



**Figure 4.** An FDD dashboard shows not only what is happening but also why it is happening.

NEMA staff then developed a scope and value proposition that was presented during a general interest meeting in April with several potential section members in attendance. There was enough interest in moving forward with creating a BMS Section that a small task group of likely section members revised the scope with anticipation of submitting it for approval from NEMA's Section Affairs Committee.

In the building construction market today, integrating electrical power, BMS, energy efficiency, and electrical fault detection is technically feasible and creates substantial benefits for individual customers. To go beyond individual customers to achieve broad-scale market adoption will require that organizations such as NEMA develop new Standards and education programs for the building ecosystem.

A particular challenge faced by a NEMA BMS Section is breaking down siloed construction divisions that are organized around technologies (e.g., HVAC, electrical, and lighting). To meet this objective, the proposed section could expand NEMA's traditional focus from a device-level focus to a system-level focus in the building management systems environment. This would entail working with NEMA Members to develop Standards, guidelines, and education programs to inform the market of the benefits of adopting them widely across the trades and subcontractors.

This approach offers an opportunity to unleash the influential power of NEMA to benefit its Member companies and their customers, as well as design firms, trades, and the building industry as a whole. This work will provide a far more efficient and resilient interconnected environment.

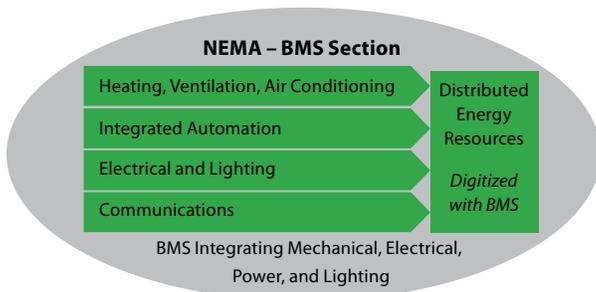


Figure 5. Construction sectors in the building management systems environment.

## Learn more

about the NEMA Building Systems Division on page 18.

Items under consideration for inclusion in the NEMA BMS Section scope include:

- Identification, definition, education, and standardization of topics related to building control systems with various deployment scales. This may include characteristics and requirements for hardware, software, and system attributes as they relate to factors critical for the entire building.
- The topics addressed by the section will be inclusive of small, medium, and large buildings as well as single and multisite campuses.
- Coordination with NEMA's HPBC in its efforts to promote the adoption of technologies and systems that increase the energy efficiency, safety, resilience, sustainability, productivity, building security, comfort, and other emergent benefits for private/public commercial, industrial, institutional, and multifamily residential buildings.
- Development of guidelines for integrating devices and systems (e.g., meters, smart devices, lighting, and low-voltage power distribution) into a BMS.
- Maintaining the intersection of BMS with traditional energy distribution and distributed energy resources at the forefront.
- Integration with demand response; time of use; electric vehicle charging; renewable energy production; operation, information, IoT and edge technologies, and other emerging technologies.
- Work with mechanical, electrical, and plumbing (MEP) firms to develop guidelines/standards for assisting MEP firms with the integration of mechanical and electrical systems with a BMS.
- Education and promotion through various avenues (e.g., white papers, blogs, and social media) to the parties (i.e., consultants, contractors, vendors, manufacturers, and end customers) involved in the design, installation, and operation of a building.
- Generation of proposals to expand the construction divisions to remove barriers to efficient cooperation between construction groups so that information flows effectively between the groups.

Items to be excluded from the NEMA BMS Section scope include duplicative protocol development, protocol/platform mandates, non-systems-related device requirements, and cybersecurity standard development. 📌

Lighting is a main contributing factor in employee-centric workplace environments. Photo courtesy of ASID



Eric Lind, Vice President, Global Specifications, Lutron Electronics Company, Inc.

## WELL: From Good to Smart in Building Design

Mr. Lind is a member of the Illuminating Engineering Society.

Not so long ago, energy use was a primary measure of building performance. Efficient operation of a building typically revolved around managing the energy impact of building lighting and HVAC.

Although energy use is still a significant aspect of building operation, the evolution of smart light-emitting diode (LED) technologies, building systems connected through the Internet of Things (IoT), and advanced daylighting practices are significantly reducing energy use while simultaneously enhancing the capabilities of lighting and shading solutions. Smart technology is essentially redefining the way we think about commercial building performance.

This is no surprise to neuroscientists and psychologists who for years have theorized sustainable building design can also have a positive effect on productivity, health, and cognitive function. Lighting and thermal conditions are often specifically identified as main contributing factors in more desirable, employee-centric workplace environments.

Today, manufacturers can provide smart building systems that deliver detailed information about how the building is used over the course of the day, arming

facility managers and building owners with data that can help improve the entire building environment, boost employee satisfaction and retention, and increase building value. Because lighting—both electric light and daylight—impacts every space in a building, smart IoT lighting and shading solutions can play a pivotal role in creating the right environment.

### People-Centric Environments

Appropriate lighting and control solutions—especially those that integrate easily with other building systems—can not only improve operational efficiencies but also contribute toward certifications, such as the WELL Building rating system,<sup>1</sup> that help to guide the design process and improve built environments for the people who live and work within their walls.

The WELL rating system was launched in 2014 to “advance buildings that help people work, live, perform and feel their best.” It reflects performance-based measures that mirror the impact of the built environment on human health and provides a model for design and construction that integrates wellness features into the built environment.

The structure of WELL certification revolves around seven concept areas. Light is one; the others are air, water, nourishment, fitness, comfort, and mind. Within each concept area are features that define basic preconditions that must be met to achieve compliance, as well as additional features that expand the opportunity for an improved workplace environment and higher levels of WELL certification (gold and platinum).

One study, a before-and-after examination of how workplace design impacts health, wellness, employee satisfaction, and work performance in the American Society of Interior Designers (ASID) headquarters in Washington, D.C., provides further evidence to support the beneficial aspects of smart building design.<sup>2</sup>

In that project, smart lighting and shading solutions contributed to the following four features of the WELL Light concept:

- **Visual lighting design.** This feature defines required average light levels of 215 lux/20 fc on the horizontal plane and requires the appropriate brightness and contrast ratios on different surfaces within spaces to avoid dark or excessively bright spots in a room. Tunable lighting helps designers meet the required contrast ratios. Independently controlled zones of light no larger than 500 square feet are also required. Digitally addressable ballasts and drivers can accommodate these zoning requirements without the need for complex wiring and make post-installation adjustments easier.
- **Circadian lighting design.** Lighting that mimics natural daylight has the ability to improve employee engagement. Circadian lighting may help improve—or at least not disrupt—sleep cycles and influence a variety of physiological conditions.
- **Solar glare control.** An automated, motorized shading solution is the best method for achieving the solar glare control feature, which cannot be met with the implementation of static glare inhibitors.
- **Daylight modeling.** The fourth precondition, daylight modeling, is also most effectively met with the use of automated shades and daylight-responsive lighting control.

The ASID headquarters was the world's first space to achieve both WELL Platinum and LEED Platinum certifications. The lighting design effectively supports an emerging model for sustainability and contributes to the positive results ASID reported in its research, including:

- Twenty-five percent of employees attribute circadian lighting at the new office space for their enhanced sleep quality.
- Employee collaboration has increased by nine percent, and employee absenteeism has seen a 19 percent improvement.
- ASID has saved more than 76 MWh in lighting energy over the first 15 months of occupancy, equal to \$7,636 in cost savings.
- ASID saves, on average, 78.2 percent of the energy it would use each day if the lights were left on fully by using daylighting, tuning, occupancy sensors, and personal control systems.

## Interacting with Manufacturers

Smart lighting and shading solutions, in combination with building rating systems and enlightened building professionals, can play an increasingly pivotal role in creating the right environment. As more devices, systems, and services connect within the building network, the number of value-added applications and opportunities also grows exponentially.

Smart control solutions include sensors, smart fixtures and controls, automated shading solutions, and system software and apps that take the guesswork out of day-to-day control. The right control software helps customers better analyze information to understand how employees and other building occupants interact with their spaces, and an intuitive graphical user interface can ensure the ability to easily monitor and adjust system settings in response to changing building needs.

Data and data management are changing the way we interface with the world around us and impacting the spaces where we live, work, and play. Building owners and managers will count on manufacturers that embrace interconnectivity.

In referring to the redesign of the House of Commons in 1944, Winston Churchill said, “We shape our buildings, and afterwards our buildings shape us.” His words profoundly resonate today as we understand the impact of our surroundings on the rest of our lives. 🌐

<sup>1</sup> <https://www.wellcertified.com>

<sup>2</sup> <https://www.asid.org/impact-of-design/asid>

## NEMA Hosts Congressional Grid Innovation Series



Congressman Jerry McNerney (D-California)

To help policymakers and their staffs stay current with rapidly changing electrical grid technologies, NEMA has partnered with the Edison Electric Institute and the GridWise Alliance to host a series of educational events in collaboration with the House Grid Innovation Caucus.

The series highlights innovative technologies—technologies manufactured by NEMA Members—that make the electrical grid more flexible, reliable, efficient, secure, and resilient. It also addresses policy barriers that inhibit its widespread adoption.

The first briefing, held in March, focused on reinvesting in American infrastructure in the context of President Trump’s and Congress’s priorities. NEMA’s Patrick Hughes spoke about the importance of investing in modern energy systems to make the nation’s electrical infrastructure safer, more reliable, and highly efficient. He noted that by incorporating the latest innovations such as energy storage, smart meters, microgrids, and

advanced transmission technologies, we can modernize the grid while simultaneously creating quality manufacturing jobs.

Digging deeper into energy storage, the second briefing in the series was held on April 27. Siemens’s Bobby Bailie represented NEMA on a panel that discussed the current state and future of energy storage systems and their benefits. Congressman Jerry McNerney (D-California), co-chair of the House Grid Innovation Caucus with Congressman Bob Latta (R-Ohio), spoke about exciting new trends in the electroindustry and the role of Congress in encouraging grid innovation.

Throughout 2018, NEMA will continue to host briefings on emerging topics, such as maintaining the cybersecurity of the grid. To learn more about this educational series, contact Patrick Hughes, senior director of government relations and strategic initiatives, at [patrick.hughes@nema.org](mailto:patrick.hughes@nema.org).



Siemens’ Bobby Bailie, Business Development Director for Energy Storage. Photos by Patrick Hughes

## Transportation Division Drives Talks on Capitol Hill

NEMA’s newly established Transportation Systems Division spent part of its inaugural meeting speaking with staff at Senate and House offices, as well as officials from the U.S. Department of Transportation. The group held 14 meetings with members of key committees to build relationships and drive home the message that connected, electric transportation infrastructure should be a top priority in Congress and the Administration’s push for renewed investment in America’s infrastructure.

From left: Bryan Mulligan, Applied Information, Inc.; Ray Deer, Peek Traffic Corporation; Dave Woodward, Philips Lighting; Craig Updyke, NEMA; Joe Dudich, Eberle Design, Inc.; Jean Johnson, NEMA; Steve Griffith, NEMA. Not pictured: Asaf Nagler, ABB; Harrison Wadsworth, Siemens; and Patrick Hughes, NEMA. Photo by Patrick Hughes



## I-Code Development Process for 2021 Gets Underway

Nearly 1,200 code change proposals were submitted to the International Code Council (ICC) for the 2018 Group A code cycle that includes the International Building Code (IBC), International Fire Code (IFC), and several other ICC codes (collectively known as I-Codes) containing requirements related to electric, alarm, and emergency communication products. Proposed changes were discussed and voted on during public hearings in April.

While nearly every sector of the electroindustry will be affected by proposals approved during this first round of hearings, many of them focused on specific systems:

- Energy storage systems
- Solar photovoltaic (PV) systems
- Electric vehicle supply equipment

- Fire, smoke, and CO detection and alarm systems
- Emergency, fire service, and mass notification communication systems
- Emergency lighting and control systems

The deadline for public comment submittal is July 16, 2018. A second round of hearings will be held in October in Richmond, Virginia, where eligible governmental members will vote on the changes recommended for approval. This action will close the Group A code cycle.

The ICC Group B code cycle will commence in 2019. Group B codes include the International Residential Code (IRC) and the International Energy Conservation Code (IECC). The complete set of the 2021 I-Code editions is expected to be published in August 2020. ☪



Andrei Moldoveanu

Technical Director, NEMA

## B Codes Reflect Zeal to Address Building Performance

NEMA's incursion into building codes assessment began with the 2011 International Green Construction Code (IGCC). A couple of International Construction Codes (ICC) review cycles later, and guided by the NEMA High Performance Buildings Council's Codes and Standards Review Committee (CSRC), an understanding of the benefits of Members' participation has increased.

Unlike the *National Electrical Code*® (NEC) process, with which most NEMA Members are familiar, the ICC approval process involves two marathon sessions during which a committee of building officials first hold hearings for all submitted proposals; second hearings address comments related to the first ones' resolutions. A final vote of all the ICC members ends the review cycle in what is known as the government approval process.

The proposal year for ICC's B codes is 2019. Three codes are involved: the International Energy Conservation Code (IECC), which reflects the eagerness to address a pressing global need;

the International Buildings Code; and the International Residential Code. Proposals for Group B codes are due in January 2019, after which hearings will be scheduled.

The CSRC established a good process to maximize the chances NEMA Section proposals get a favorable reception. In addition to an internal approval process, the CSRC reviews all proposals to ensure proper coordination between them. Not only does it work with NEMA field representatives, who attend the hearings with interested Members, but it also has cultivated relationships with other trade organizations and associations to provide mutual support of non-conflicting interests. This allows NEMA Members to introduce, explain, and expand their proposals before the all-important final governmental ballot.

NEMA staff has circulated the schedule and milestones for the new ICC B codes. All that's needed now is the Sections' review of their needs and opportunities to accelerate the penetration of new products and technologies in the markets governed by these codes. ☪

## Meter and Socket Manufacturers Team Up on Standards Solutions



Test participants were (from left) ANSI C12 Vice Chair Larry Kotewa, Elevate Energy; Brent Cain, Itron; Frank Boudreau, Landis+Gyr; Andrew Dudding, Sensus, a Xylem Brand; Shawn Glasgow, Milbank Manufacturing; Paul Orr, NEMA; and Mark Shoemaker, Durham Company. Photo by Greg Bennett, Milbank Manufacturing

A combined team from the NEMA Electrical Metering Group and the Meter Mounting and Test Equipment Group as well as the vice chair of ANSI C12 met at Milbank Works Manufacturing in April to continue discussions on temperature rise.

The undertaking is a collaboration between the metering subcommittees of the Accredited Standards Committee ANSI C12.1 Subcommittee on Electricity Metering, meter socket

manufacturers, and meter vendors. Its purpose is to develop a testing protocol and to conduct and evaluate such testing to determine the effect that certain variables may have on the temperature rise at various points on a simulated meter above ambient with regard to meter socket testing.

The attendees that visited Milbank are members of the Temperature Rise Interface Issue Working Group 2. The testing at Milbank was performed with a revised test plan using a different cable type and resistance temperature detectors (RTD) sensors for temperature measurements.

While the test was successful, the group had concerns about variability. One factor was related to the condition of a simulated test meter. The group looked at ways to eliminate variability. Three-phase testing was also mentioned and needs to be further investigated.

Conclusive findings from the testing will be proposed to relevant Standards, the *Code for Electricity Metering*, ANSI C12.1, and UL 414 *Safety Meter Sockets*. Ⓔ

## Building Systems Division: More than Components

The Building Systems Division is focused on creating synergy among its 10 Sections: Building Wire and Cable, Dry Battery, Electric Resistance Heating, Electrical Submeter, Fire, Life Safety, Security, and Emergency Communications Section, Health Care Communications and Emergency Call Systems, High Performance Wire and Cable, Low Voltage Distribution Equipment (LVDE), Power Electronics, and Residential and Commercial Controls.

In the increasingly connected world of building products and systems, we are addressing new interoperability and compatibility challenges. This includes exploring the possibility of establishing a Building Management Systems Section and hosting industry forum events to share knowledge and build stronger relationships between Members and key players in the supply chain.

Accordingly, we will likely see more of this intra-Division collaboration becoming operationalized as specific, but complementary, work by different Sections. For instance, a white paper outlining the benefits of energy monitoring

using submeters and a primer for codes and Standards related to electric heat are more expansive than they might have been just a few years ago. Likewise, inputs to the *National Electrical Code*® (NEC), International Code Council codes, and ASHRAE 90.1 are reflective of a systems view.

The Division is forming positions related to recent tariffs imposed on steel and aluminum imports, along with a review of the mooted 25 percent tariffs on imports for more than 1,300 finished goods from China. We are also active in the work of the NEMA High Performance Buildings Council.

Learning from the success of the Council's experience, we are intent on forming a Division-wide group from among the senior managers of the companies represented in the Division as we craft sector-wide plans to seize the many opportunities presenting themselves in this space.

For more information, contact [suzanne.alfano@nema.org](mailto:suzanne.alfano@nema.org). Ⓔ

**Suzanne Alfano, Industry Director, Building Systems, NEMA**

## New Standard for Cyber and Physical Security

**NEMA CPSP 2-2018** *Cyber Hygiene Best Practices* is new white paper that outlines industry best practices and guidelines for electrical equipment and medical imaging manufacturers. NEMA Industry Director Steve Griffith will share the strategies outlined in this white paper during his keynote at the IoT Global Innovation Forum “Electrical Manufacturers’ Role in Mitigating IoT Cybersecurity Risks,” July 10–11. NEMA CPSP 2-2018 is available as an electronic download at no cost.

**NEMA TS 8-2018** *Cyber and Physical Security for Intelligent Transportation Systems* is designed to allow agencies and other transportation infrastructure owners to implement security of surface transportation electronic systems. NEMA TS 8-2018 is available in hard copy and as an electronic download for \$56.

**NEMA TCB 2-2017** *Guidelines for the Selection and Installation of Underground Nonmetallic Raceways* features two new sections detailing

procedures for repairing broken conduit without removing existing conductors or cabling. According to Andrew Nause, chair of the NEMA 5TC Polymer Raceway Products Technical Committee, it also includes joining procedures for reinforced thermosetting resin conduit. NEMA TCB 2 is available in hard copy for \$61 and an electronic download at no cost.

### OTHER RECENTLY PUBLISHED DOCUMENTS

**ANSI C82.77-5-2017** *American National Standard for Lighting Equipment—Voltage Surge Requirements* is available in hard copy and as an electronic download for \$69.

**NEMA IOTP 1-2018** *Standby Power of Connected Devices and the Internet of Things* is new white paper available as an electronic download at no cost.

**NEMA LSD 79-2018** *Predicted Energy Savings from Lighting Systems* is new white paper available as an electronic download at no cost. 📄

Brian Marchionini, PMP

Senior Program Manager, NEMA

## NEMA Studies Impact of Direct Current in Buildings

Two recently published NEMA papers document the impact of direct current (DC) electrical distribution systems in commercial buildings.

**NEMA DCP 1-2018** *Direct Current in Buildings* summarizes the results of a survey with vendors, technical experts, research laboratories, standards development organizations, and other stakeholders that explores the existing landscape and future scenarios for DC in buildings. It also highlights potential benefits of using DC in buildings and opportunities in the next five to ten years.

There is some debate about the efficiency improvement of DC versus AC systems. While some stakeholders are not convinced that DC is worth the investment, others are interested in proactively developing these systems. This paper details examples of actions that could accelerate market adoption of DC power systems in buildings.

*DC Power Distribution in Buildings: A Review of Codes and Standards* is a review of relevant codes and standards related to the use of DC power in buildings. Usage includes sources, storage, loads, circuits, and components. It found that awareness and acceptance of DC distribution systems could be enhanced with codes and standards updates, and that by partnering with industry and government organizations, NEMA can accelerate awareness, acceptance, and deployment of DC distribution systems in buildings.

Both documents are available to NEMA Members in the Strategic Initiatives section of NEMA Workspaces. 📄

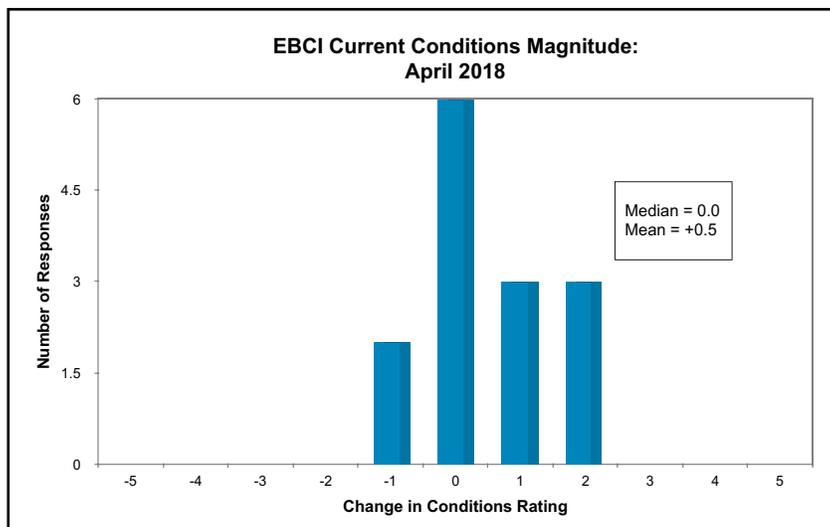
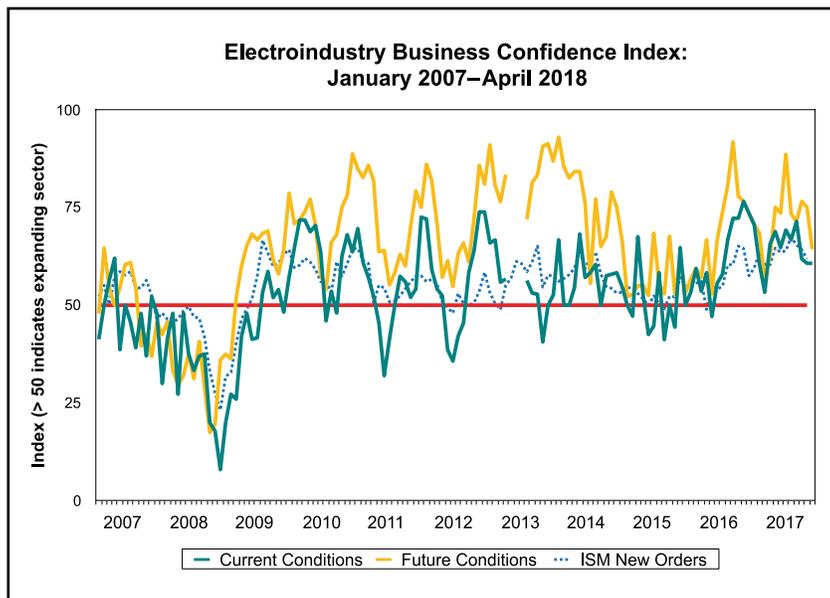
# Current Conditions Unchanged

|             | Current Conditions<br>(Compared to Previous Month) | Conditions Six Months From Now<br>(Compared to Current Conditions) |
|-------------|--|--|
| EBCI        | 60.7   | 64.3   |
| % Better    | 29%  | 36%  |
| % Worse     | 7%   | 7%   |
| % Unchanged | 64%  | 57%  |

Number of Respondents: 14

Values reflect the percentage of respondents expecting "Better" conditions, plus one-half of the percentage of respondents expecting "Unchanged" conditions.

A score of 50 or higher suggests conditions appropriate to an expanding economy.



Current conditions facing the electroindustry, as measured by NEMA's Electroindustry Business Confidence Index (EBCI), held steady in April at an index value of 60.7, matching last month's reading exactly. The share of respondents reporting better conditions increased somewhat, but so did the share of those indicating worse conditions. Recent Census Bureau data point to a slight decline in the value of shipments in the broad electrical equipment sector even as orders activity ticked up, a situation touched upon in one respondent's comment.

The reported intensity of change in electroindustry business conditions remained unchanged from last month, with the mean value remaining at 0.5 in April. Similarly, the median value stayed at 0 for the third consecutive month. Panelists are asked to report intensity of change on a scale ranging from -5 (deteriorated significantly) through 0 (unchanged) to +5 (improved significantly).

The view six months out remains expansionary at 64.3, but this level marks a reduction in optimism from March's future component score of 75.0. The qualitative input from survey participants does not allude to any creeping pessimism—quite the contrary, in fact. Nevertheless, the proportion of panel members expecting better conditions declined this month while indications of unchanged or worse conditions both gained share compared to March.

Visit [www.nema.org/ebci](http://www.nema.org/ebci) for the complete report.

## NEMA and FME Call for Elimination of Tariffs

NEMA President and CEO Kevin Cosgriff and FME President Ineke Dezentjé Hamming-Bluemink of the Netherlands called on their governments and the EU to advance trans-Atlantic trade through the complete elimination of tariffs on EU–U.S. trade, simplification of customs procedures, greater cooperation on public procurement and trade in advanced technologies, elimination of regulatory divergences that require duplicative procedures and higher compliance costs, and creation of a level playing field for recognizing standards and results of conformity assessment.

Learn more at [www.nema.org/transatlantic-trade](http://www.nema.org/transatlantic-trade).

## Kyle Pitsor Leaves Solid Foundations for Energy, Trade, and Safety

A solid foundation is the basis of a strong future, and NEMA advocacy efforts are in superb shape thanks in large part to the bedrock laid by Kyle Pitsor. His commitment to Member services across an array of issues, from energy efficiency, to trade opportunities and electrical safety, has been his hallmark over the past 36 years.

Kyle’s tenure and NEMA’s growth have been nearly synonymous since former NEMA President Bernard Falk met him at the Commerce Department in 1982. NEMA had asked for a meeting to understand how its Members could get into the European utility markets.

“I was young, just a member of the team that briefed NEMA,” Kyle recalled. “Bernie wanted someone who understood trade. He recruited me at that meeting.”

As the first professional NEMA staffer on international trade, as industry director

for Lighting, Motors and Generators, and Batteries, and ultimately as vice president of Government Relations, Kyle shaped policies virtually touching all aspects of the electrical world. In many respect these priorities have been driving forces in the electroindustry and his career.

Ironically, he has been around long enough to see new issues reappear. During his first three years with NEMA, for example, voluntary restraint agreements were put into effect on foreign steel, which was demonstrated to compete unfairly against U.S. steel used in NEMA Member electrical transmission structures.

“Unfair trade allegations in steel are again a major trade concern in 2018!” he noted with a laugh.

As Kyle departs, NEMA energy policy work is growing stronger as it encompasses new technologies, many of which are built around systems and not solely products—



like smart grid, microgrids, energy storage, demand response, and distributed energy resources.

He is already planning the next chapter in his life as he intends to dedicate himself to historic preservation and land conservation.

Well done Kyle...and thank you. 🍷

### CAREER HIGHLIGHTS

|              |  |
|--------------|--|
| 1988         | Expansion of the 1979 General Agreement on Tariffs and Trade (GATT) Government Procurement Code in 1988 included publicly owned electric utilities, which opened \$20–25 billion in export markets for NEMA Members.   |
| 1989         | U.S.–Canada Free Trade Agreement removed tariffs, improved regulatory cooperation, and addressed technical barriers to trade.  |
| 1991         | Following the fall of the Berlin Wall, NEMA conducted a trade mission on market opportunities to Poland, Hungary, and the Czech and Slovak Republics.  |
| 1992         | Energy Policy Act of 1992 included NEMA energy–efficiency minimum requirements for electric motors and the first federal requirements for certain types of lighting products and distribution transformers.  |
| 1994         | North American Free Trade Agreement (NAFTA) built on the agreement with Canada and provided the basis for further integration of the U.S. electroindustry in North America.  |
| 1995         | NEMA first trade mission to Mexico established a relationship with CANAME.   |
| 1996         | Appropriations Act of 1996 placed a one-year moratorium on the ability of the Department of Energy to promulgate efficiency standards until it had conducted and implemented a process rule to improve rulemaking procedures.  |
| 2005         | Energy Policy Act of 2005 included the first tax incentive for energy-efficient technologies used in commercial buildings, supported more than \$1 billion in renovation, mandated the use of NEMA Premium® motors for federal procurement, and added NEMA products in the federal efficiency program. |
| 2007         | Energy Independence and Security Act of 2007 negotiated the provision to transition to more energy-efficient lighting for traditional light bulbs, and established smart grid technology and demonstration programs.   |
| 2009         | American Recovery and Reinvestment Act (ARRA) funded more than \$35 billion for electroindustry technologies, including smart grid and energy infrastructure.  |
| 2011         | Testified on lamp labeling.  |
| 2012         | Testified on building efficiency incentives.   |
| 2013         | Testimony resulted in OSHA referencing the most recent version of Z535 as a means of compliance for workplace warning labels.  |
| 2014–2016    | Oversaw efforts to enact building benchmarking and transparency in more than 25 cities.  |
| 2015–present | Successfully defended the three-year building code adoption cycle in multiple states.  |
| 2015–present | Expanded NEMA PAC to its highest level of support for candidates in terms of donations.  |
| 2017         | Testified on NAFTA modernization.  |
| 2018         | Testified on importance of public-private collaboration to improve grid cybersecurity.   |

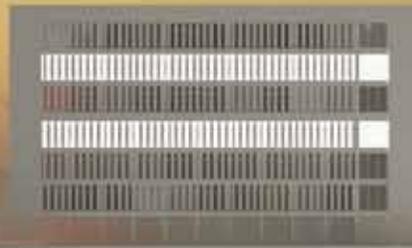
# Smart Building Solutions

Light, Shade, and Temperature Control  
for your space, your budget, and your performance requirements



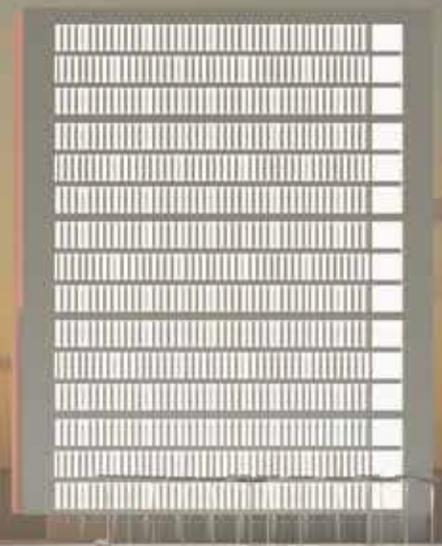
## Single spaces

Simple, automated control



## Whole floors

Centralized control for large  
areas and tenant spaces



## Entire buildings & campuses

IoT solutions enable 3rd-party  
integration (BACnet & open APIs)



Create the Right Environment

[Lutron.com/RightEnvironment](https://lutron.com/RightEnvironment)