



Improving Building Design With Division 25 Specifications

Life Is On

Schneider
Electric

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Join one of the largest growing markets

23%

compound annual growth rate

The smart building market is expected to record a compound annual growth rate of over 23 percent by 2024.¹

Smart building demand is driving new technology.

Tomorrow's "smart city" will reduce operating costs and improve efficiencies to make life easier for occupants and business owners. It sounds like science fiction, but it's happening now. The smart building market is projected to skyrocket, with a predicted compound annual growth rate of 23 percent from 2019 to 2021.¹

As a result of this anticipated growth, building owners and managers are rethinking their current business models to include smart building technologies such as connected sensors, which generate real-time data and analytics for predictive maintenance and energy management.

The purpose of this e-book

Like many consulting engineers, you may be asking yourself, "Why smart buildings and why now?" This e-book answers this question by sharing the key trends driving smart building specifications. It will explain how Division 25 specifications help building owners and managers get what they want now – increased value and the platform to expand for future technology. Most importantly, this e-book will answer many of the most common questions surrounding Division 25, including, "Where do I start?"

ONE

Trends in smart building technology

44%

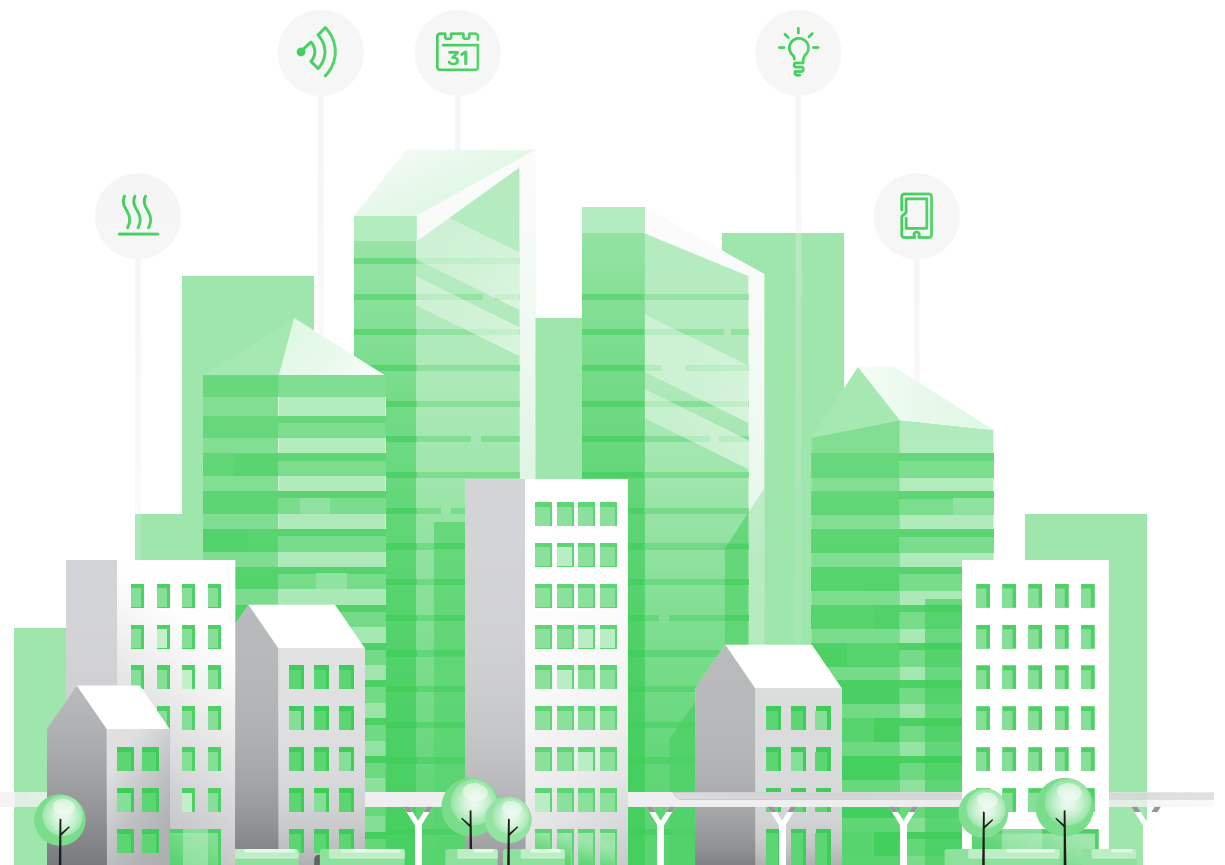
of office workers worldwide do not think their offices are smart enough.¹

Smart building occupant perceptions are changing.

Innovation drives new construction trends. But, without occupancy demand, why should you innovate? Next to actual construction, occupant well-being drives most of the costs for today's smart building. In particular, workplace construction is now being specified to meet increasing demands from a younger generational workforce, who are expected to make up 75 percent of the workforce by 2025.²

At home, this younger generation tells "Alexa" to automatically control room temperature, adjust the lighting, or close the window blinds. Not surprisingly, today's workforce expects similar "smart comforts" at the office, such as a smartphone application that allows them to locate an available conference room and automatically adjust the room's lighting and climate controls.

Employees expect their workplace building to automatically recognize them and provide time-saving conveniences to help them do their jobs better. Given the level of digital connectivity available in today's smart building, building owners can help employers meet these expectations.





Here is one example of a smart building scenario that uses connected building management systems (BMS) with closed-circuit TV (CCTV) video monitoring:

Jennifer pulls up to her office garage. The CCTV recognizes Jennifer's license plate and opens the garage door for her. As Jennifer pulls into the garage, the CCTV sends a signal to the BMS to adjust the climate control and lighting in Jennifer's office according to her set preferences, and the BMS sends a signal to the elevator so Jennifer doesn't have to wait. These seemingly minor, time-saving conveniences can increase Jennifer's overall job satisfaction and productivity.

This scenario is a use case for Division 25. Here, smart building connectivity increases the occupant's perception of value. Employers such as Ford³ and Microsoft⁴ are revamping their campuses with similar smart comforts to help recruit tech-savvy employees. Building owners and landlords also know they must provide these smart comforts for the workforce.

Key stakeholders are realizing new value in smart buildings.

Energy efficiency has taken a backseat to the smart comforts desired by building occupants. Building owners now realize employers want workspaces with smart solutions that increase employee productivity, resulting in fewer complaints and reduced absenteeism.

Additionally, building owners must meet employer demands for technology that help ensure occupant safety in today's post COVID-19 world, including:

- Providing contactless doors, coffee machines, bathrooms, and climate controls to prevent the spread of illness
- Increasing control over humidity, air circulation, and overall indoor air quality (IAQ) to increase safety and occupant well-being
- Monitoring occupancy levels in real-time to determine if desks, offices, and rooms accommodate safe distancing
- Setting capacity thresholds for room, floor, or building levels to know when occupancy limits are exceeded
- Analyzing how occupants are using individual and collaborative spaces to adapt the workplace mix of floor spaces

Today's smart building can meet these demands and also provide the analytics key stakeholders need to optimize occupant comfort, productivity, and safety. This data empowers building owners to make informed decisions about energy, costs, and manpower. It gives them a bird's-eye view of how much electricity the HVAC is using, how much square footage employees are occupying, or when to cut back power to avoid a brownout.

These analytics help building owners and employers answer key questions, such as:

- How can we remotely address climate control, lighting, and other controls to save costs when the building is not occupied?
- What systems do we have in place that can help employees quickly return to productivity after extended periods of remote work?
- Do we have the infrastructure to keep occupants safe in the event of an emergency?

Smart buildings are powered by intelligent building management systems – known as iBMS. This “intelligence” goes beyond traditional BMS to take systems out of their disciplinary silos so they communicate with each other for increased efficiency and reduced costs. Powered by iBMS, smart buildings can deliver these cost benefits to building owners, landlords, and facility managers. Division 25 gives engineers the platform they need to facilitate iBMS and integrate the appropriate CSI MasterFormat Divisions. These integration conversations must take place before the design phase begins to ensure smart building success.

TWO

Transform building system designs from siloed to integrated



\$127.09

Billion USD

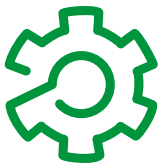
The projected global smart building market size by 2027.⁵

Engineers have limited resources to meet smart building demands.

According to a report from research firm Precedence Research, the global smart building market continues to rise.⁵ This indicates that smart building specifications will soon be the norm, rather than the exception. Yet for many engineers, especially those from mechanical disciplines, smart building specifying is relatively unknown territory.

One of the biggest smart building hurdles for engineers is the fact that key “controls” conversations are not taking place between electrical, mechanical, IT, OT, and other divisions before design. As a result, engineers are forced to integrate systems that haven’t been vetted in an iBMS atmosphere. This, in turn, causes data integration roadblocks between all the divisions and endangers the entire smart building project.

Addressing these challenges requires:



Integration skills

that go beyond mechanical, electrical, and plumbing (MEP), such as integrating sensor capabilities with electrical power management systems (EMPS)



Multi-disciplinary knowledge

to implement an iBMS that connects data for security, fire prevention, climate controls, and lighting, and overall integration for power, space utilization, and wellness



Integration experience

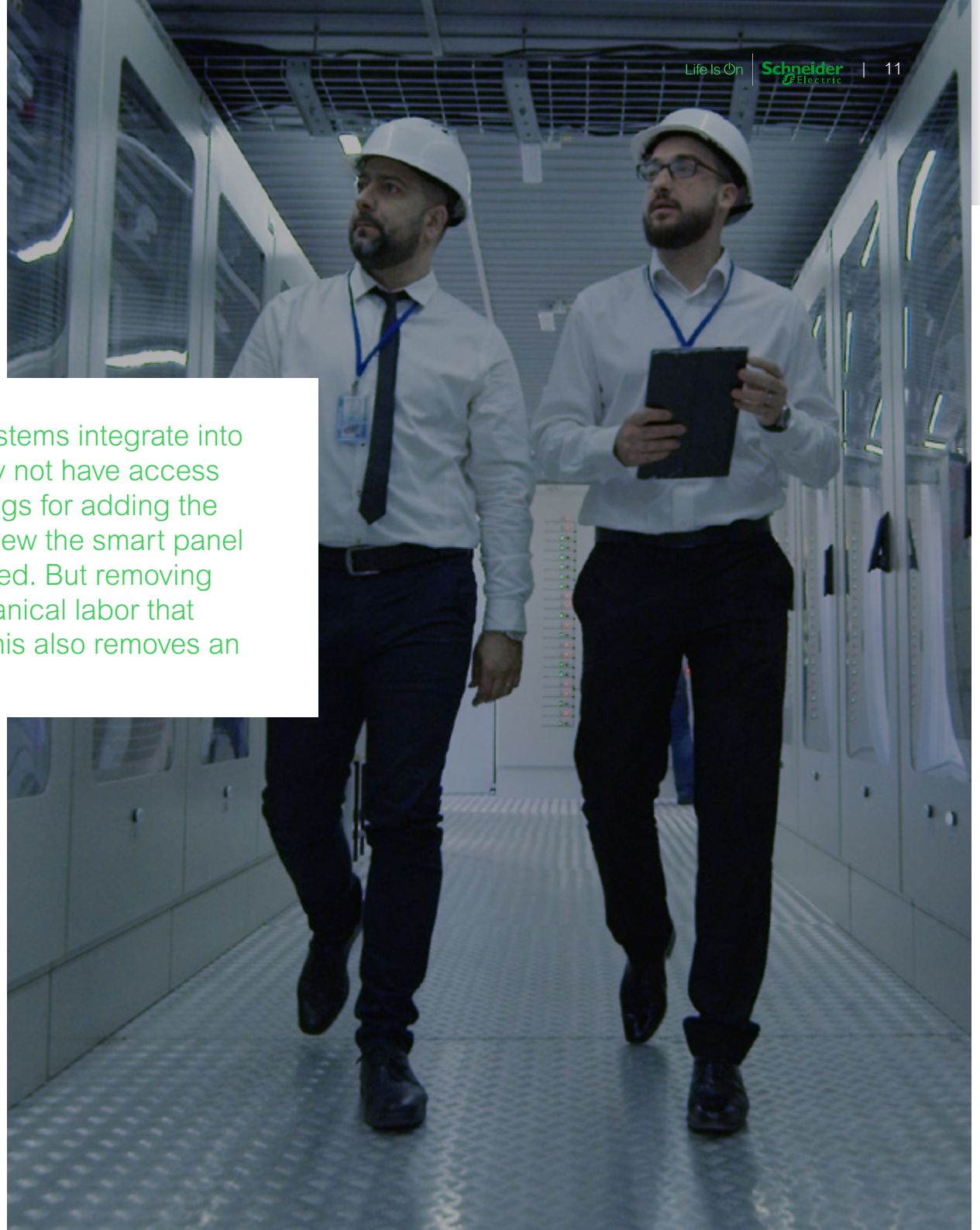
to navigate the overwhelming volume of smart building options and make all the systems work together to turn data into action

Given the complex requirements for a successful smart building specification, many engineers view these projects as high risk. There's a perception that more complexity in a project invites more opportunities for system failures. Engineers may also be wary of potential oversight risks, such as an architect who may misinterpret the building owner's instructions for specific features.

Consider this potential scenario as an example:

A building owner requests that the lighting systems integrate into a smart panel. But the general contractor may not have access to data that shows the long-term energy savings for adding the smart panel. So the general contractor may view the smart panel as out of his budget scope and have it removed. But removing the smart panel may require additional mechanical labor that actually increases the overall project costs. This also removes an opportunity to increase overall building value.

A common challenge for engineers and contractors is a lack of data to demonstrate the added-value of smart building technologies, and how to convey this value to key stakeholders.

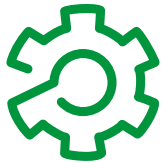


Division 25 can help engineers overcome these challenges.

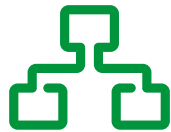
Division 25 provides the connectivity knowledge that engineers need to successfully complete a smart building project. Project success begins with reaching out to a vendor with the Division 25 and iBMS knowledge to ensure MEP, IT, OT, and BMS work together as intended.

This Division 25 partner should have documented proof, such as use cases, to show that they understand what will happen when different BIM disciplines are connected. The vendor should have the protocol knowledge and infrastructure experience to deliver the stakeholder's desired results: increased building value and the ability to add value with future smart features.

This Division 25 partner can give engineers:



Guide specifications for required smart building components within each of the systems (divisions) that comprise the integrated infrastructure



The bandwidth to ensure mechanical, electrical, IT, and OT disciplines all communicate with each other



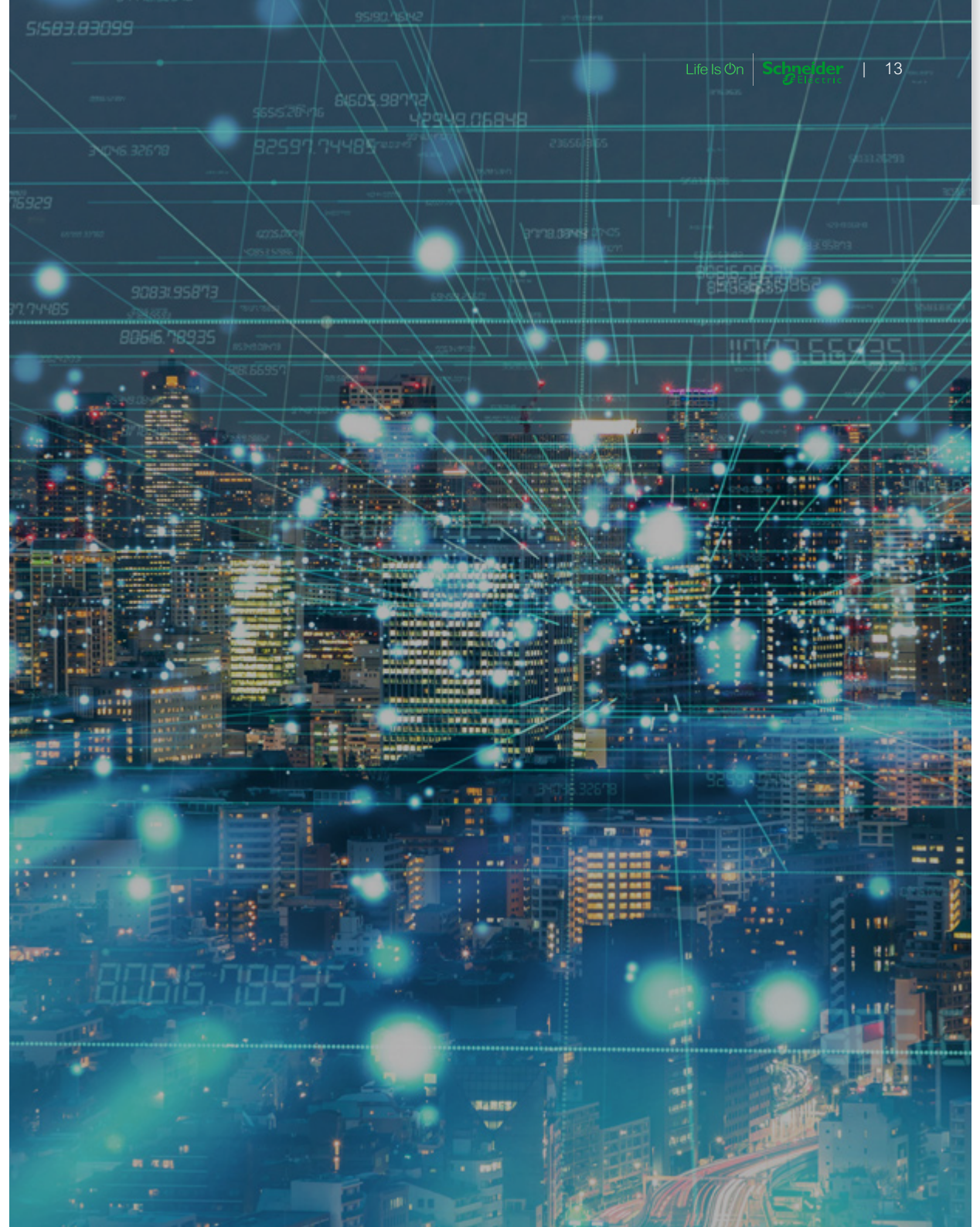
The ability to provide building owners with analytics, which can help owners address wasted maintenance costs, energy efficiency, and occupant complaints

This oversight can clear the confusion when engineers are bombarded with stakeholder technology requests that do not sit in standard mechanical or electrical divisions. For example, a request may involve integrating the building's HVAC (Division 23) and window shade controls (Divisions 8 and 12) to work with electrical and security systems (Divisions 26 and 28). But connecting these verticals requires skills that go beyond these divisions.

Division 25 bridges these vertical gaps, such as incorporating daylight harvesting sensors, lighting and blind control systems, and light occupancy sensors to function per security badge access and energy-savings settings. The Division 25 vendor then coordinates all of these verticals and report findings directly to third-party stakeholders, including architects and general contractors.

Once these verticals are working together, engineers can:

- Reduce redundant systems (saving labor and materials)
- Increase usable floor and wall space (for expansion capability)
- Minimize IT and OT risks traditionally associated with integration
- Increase energy efficiency and reduce energy costs
- Save overall capital costs by creating a single, integrated system



THREE

Why specify with Division 25

30%

IoT-driven smart technology can reduce building operating costs by 30 percent.⁶

Division 25 is reducing building costs and increasing value.

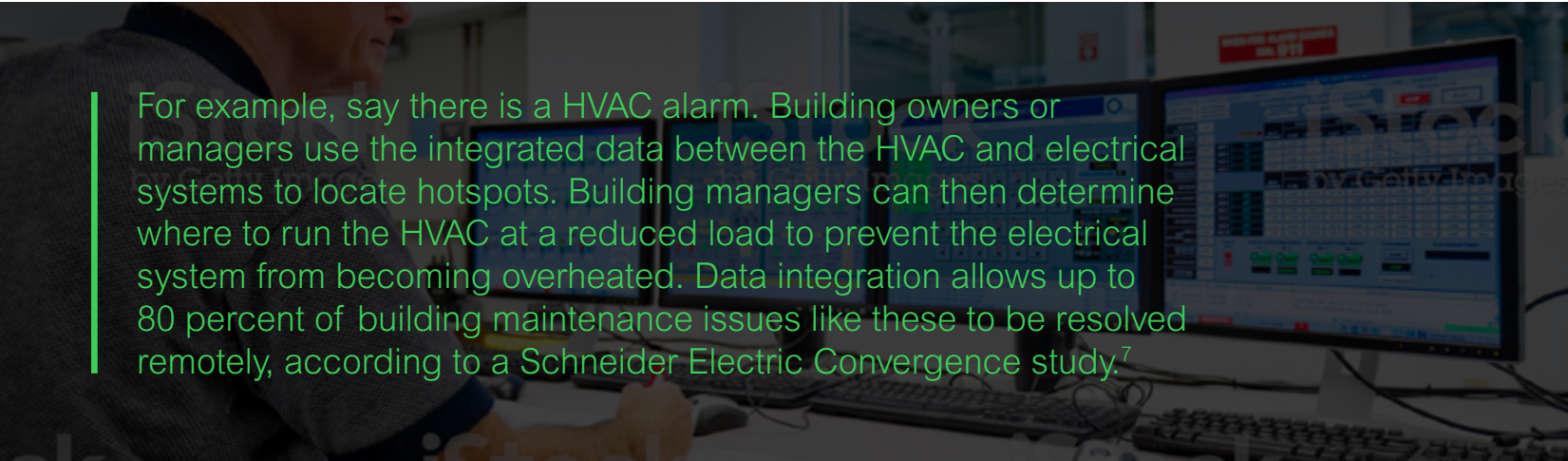
There's a common misconception that BMS allows building owners to maintain the functionality of building systems, even when they decide to remove and replace different components. Unfortunately, when specifiers start integrating these systems, they run into roadblocks because the original specified components have been replaced and the new components are not equipped to share data when integrated.

Why is this data integration so important? When building systems are connected as intended in the Division 25 specification, the iBMS-integrated data from these systems can be used to detect potential faults or anomalies in equipment and operations.

Division 25 ensures each smart building device is enabled to share data through an IoT platform. It provides the infrastructure for these components to function together to increase efficiency and reduce energy costs.

The generated analytics from this connectivity helps stakeholders:

- Reduce building occupant complaints by 33% or more⁷
- Minimize energy costs by as much as 20%⁷
- Reduce unscheduled maintenance by 29% or more⁷



For example, say there is a HVAC alarm. Building owners or managers use the integrated data between the HVAC and electrical systems to locate hotspots. Building managers can then determine where to run the HVAC at a reduced load to prevent the electrical system from becoming overheated. Data integration allows up to 80 percent of building maintenance issues like these to be resolved remotely, according to a Schneider Electric Convergence study.⁷

Division 25 is giving stakeholders the value they want.

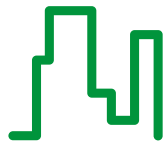
Each building stakeholder has his or her own smart building “ideal.” The building owner may want the ability to use a voice-enabled, smart device to turn down the lights and lower the blinds in a conference room. The building manager may want motorized relays for meters, so that each breaker can automatically turn on or off, and automatically send alerts about how much power is being used at any given interval. Or the landlord may request built-analytics to help achieve the WELL Building Standard® for occupancy comfort to provide more perceived value to potential tenants.

Division 25 provides the flexibility to fulfill a wide range of smart building feature requests like these, while providing:



Resiliency

Smart building infrastructures can be expanded as tech-savvy building occupants drive new technology needs.



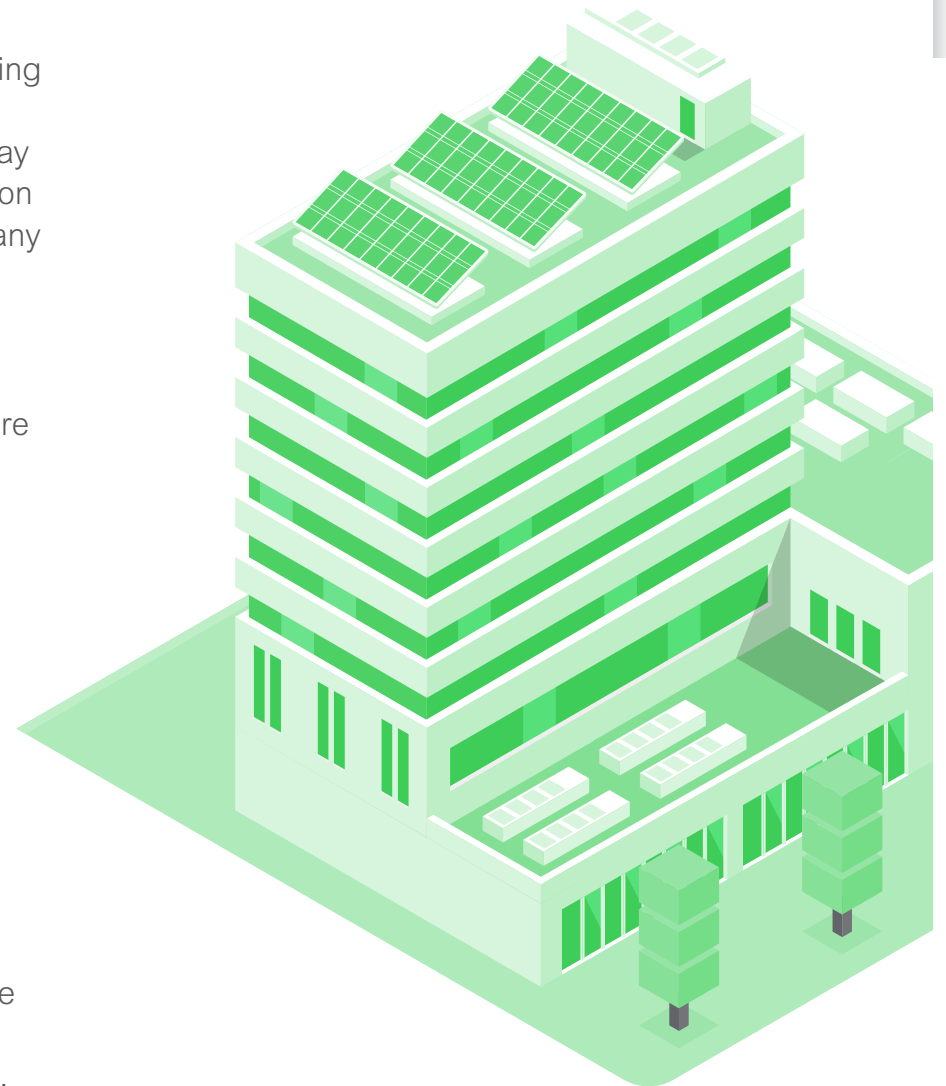
Risk mitigation

Stakeholders can use analytics to test multiple building system functions, document test results, and validate documentation via IoT capability.



Sustainability

Building owners can increase energy efficiency to meet LEED certification requirements to entice environmentally-conscious occupants.



Of course, building owners also want to reduce costs wherever possible. Electrical is one of the most significant cost factors for any building, especially with electrical fires being a common cause of building damage. Division 25 provides the electrical intelligence in the electrical power management system (EPMS) to “see” problems before they occur and transition from reactive maintenance to proactive cost-saving measures.

For example, thermal imaging picture-taking is commonly used to locate electrical hotspots. But what if a thermal picture is taken on a low-load day? Electrical intelligence enables continuous thermal monitoring, so hotspots are not missed. Building maintenance can then use the electrical system’s data to determine if the hotspots are being caused by vibrations, overloading, or outdated equipment.

The same electrical data can also be used to increase upstream and downstream efficiencies in the building’s EMPS. Stakeholders then have the information they need to increase energy performance and meet ASHRAE® standards for plug loads. With motorized relays connected via iBMS, the meters can automatically turn each breaker on or off, based on how much power they are using and by building occupancy.

Division 25 is increasing engineer capabilities.

Smart building design is significantly more complex than integrating a couple of controls with BMS. Today's engineer must become the master of an entire building enterprise of interconnected system layers.

Armed with Division 25, engineers can bring significantly more value to the smart building table. Building owners view engineers with Division 25 experience as more qualified than other engineers, even MEPs with electrical and mechanical cross-training. Engineers can use their Division 25 experience to open more project doors and build smart building integration credibility.

Engineers with Division 25 knowledge are perceived as being able to empower stakeholders to:



Increase their building's value and ensure that value continues to grow



Increase renter appeal with smart comforts or for an office building trying to appeal to a tech-savvy workforce



Increase energy savings and lower maintenance costs – with the analytics they need to maximize efficiency

Essentially, engineers with Division 25 experience are more qualified than their peers to equip smart buildings with infrastructure that ensures long-term value. Smart controls, when integrated via iBMS, are key to adding building value, from voice-activated climate controls to wireless trash cans that alert janitorial staff when they require emptying.

FOUR

Division 25 specification essentials



3.6
Billion Devices

Over 3.6 billion devices are expected to be installed in smart buildings by 2021.⁸

Engineers are looking for Division 25 support.

The first Division 25 specification can seem daunting, especially considering the hundreds of specification options available for a single smart building. Schneider Electric™ can serve as a Division 25 partner to narrow down the specification choices to options that will deliver the most value for key stakeholders. Schneider Electric has the iBMS experience to know which functionalities can successfully be integrated to increase energy efficiency, reduce costly redundancies, and increase the ability to add smart devices as needed per occupant demands.

Schneider Electric advocates for engineers who struggle to show electrical teams the value of connected systems. This includes preventing electrical teams from killing the installation of smart meters that initially seem cost prohibitive.

This advocacy includes helping stakeholders understand the ROI of installing an integrated switchboard with monitored circuit breakers and meters that will enable energy and alarm data to integrate with the iBMS. This integration eliminates duplicate power meters in Division 23 and 26, for cost savings without giving up performance. The integrated data can then be used to help qualify for the WELL Building Standard, LEED, and the ASHRAE 90.1 standard to calculate kW/ton on central cooling plants.

As a Division 25 partner, Schneider Electric helps engineers:

- Oversee all the system components that go into mechanical, electrical, IT/OT, BMS, and ensure these components are housed correctly within each vertical
- Make all the verticals work as intended and coordinate with each other, so they can report directly to third-party vendors
- Synthesize all the systems to explain their combined capabilities to building owners and implement the iBMS “glue” required for a Division 25 specification

Division 25 specifying encompasses all smart technology hardware, as well as hardware in a hierarchy of multiple systems. It also requires overseeing the roles and responsibilities of the various division contractors – and policing vendors to adhere to all system standards. Schneider Electric oversees these moving parts and ensure they are properly specified for an IoT integration platform via iBMS. Most importantly, Schneider Electric can ensure the complex “layers” of hierarchical systems work together as intended.

Engineers are beginning to integrate the smart building layers.

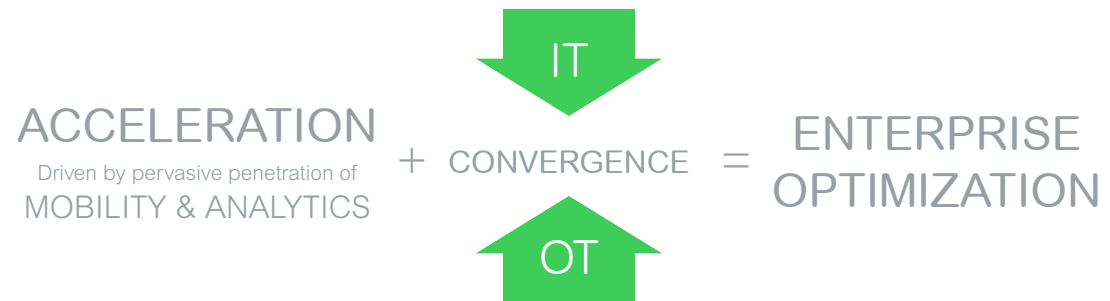
A truly “smart” building consists of multiple system layers, beginning with the electrical systems. Electrical serves as the backbone for all the building’s connected smart systems, providing the electrical intelligence to build additional layers in the Division 25 specification.

A Division 25 electrical system may include:

- A first layer of sensors that are connected to power meters, which in turn are connected to building equipment
- A second layer of smart meters, to pull in systems of meters, which can then be analyzed by an EMPS
- An integration of these layers into an iBMS, which allows the addition of other systems, such as security

Now, electrical is integrated with mechanical, IT/OT, cybersecurity, and other specified systems, to ensure they all work together as intended. This begins with the convergence of electrical and mechanical design, working toward interfaces such as BMS, room systems, access controls, electronic monitoring, video management, fire detection, or emergency lighting.

These systems must then interface with external software, native and third-party devices, or already-integrated door access, elevators, intercom, or other related devices. IoT mobility and analytics power this convergence, especially IT and OT, for enterprise-wide optimization.



At this point, ensuring cybersecurity is critical as these system layers converge with cloud-based applications. The appropriate information security management systems must then be selected for the required cloud apps, analytics, and infrastructure. These converging information security layers may include apps, analytics, and services, along with Edge Control and other connected products. Each of these systems are then tested and certified to enhance the security of all the connected products and create a secure framework for OT environments.

Eventually all of these layers create a “tree” of integrated, smart building systems and capabilities. Division 25 provides the roots for these connected building systems and enables the systems to grow. The iBMS should be able to look down from the top of this tree to assess the need for more control sensors and the systems needed to pull that data into the tree. Edge Control pulls together these connected products, along with cloud-based apps, analytics, and services.

Division 25 enables even more layers to be added for each specification of a higher level system. Each layer is building towards a more integrated system with additional smart building capability.

Each of these layers are modular enough for stakeholders to keep adding smart capabilities for increasing value through:



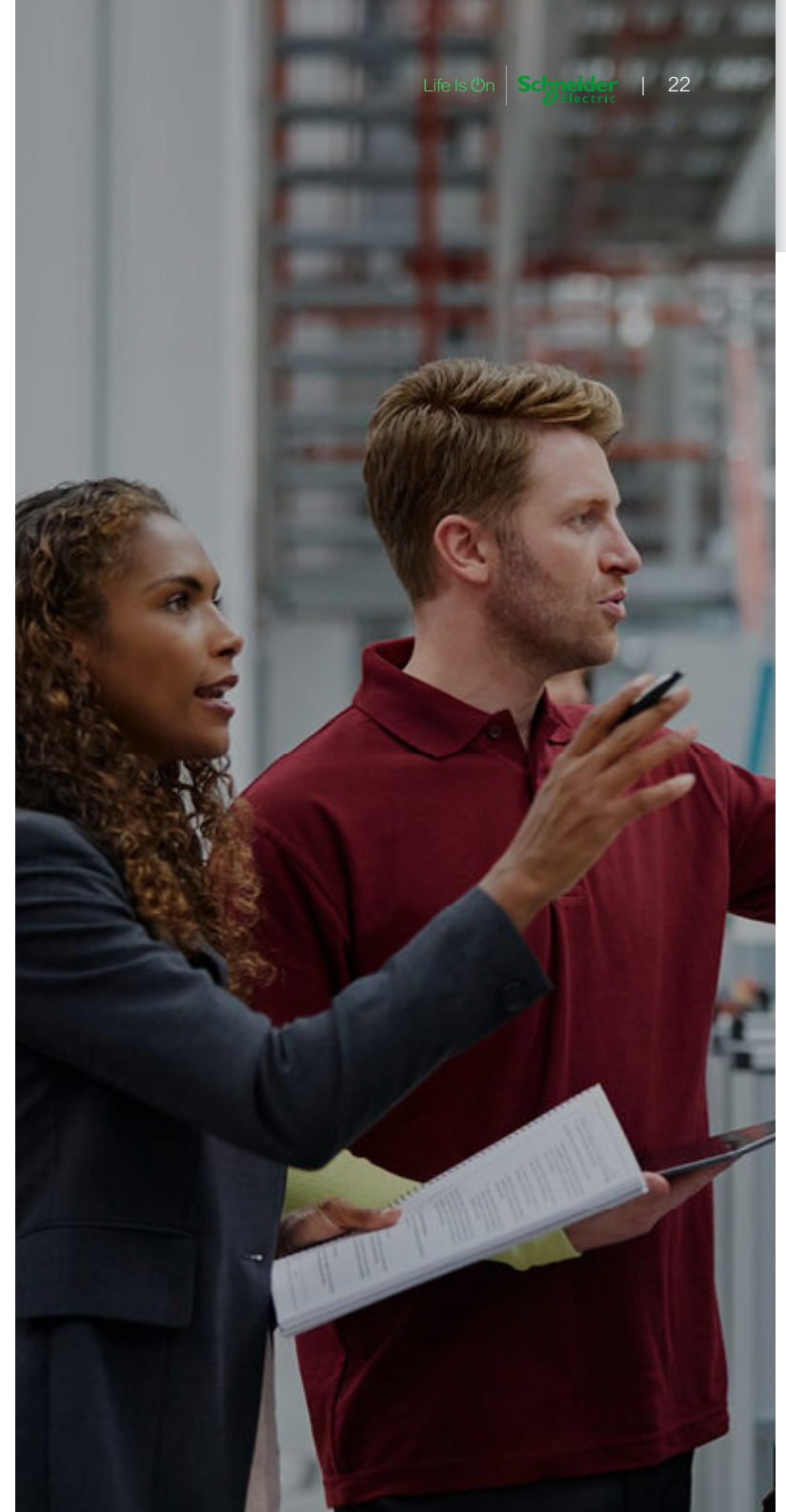
Measurable analytics, such as being able to solve building issues remotely and decrease unscheduled maintenance



Reduced energy costs and minimized wasted floor space with more centralized plant room designs and more iBMS interfaces, such as low voltage switch panels



Improved responsiveness and smart comforts for fewer comfort complaints and increased appeal to a younger generational workforce



FIVE

Get started with Division 25



\$75
million

Division 25 specified commercial buildings deliver up to \$75 million in energy savings.⁸

Why specify with Division 25?

Today's smart building capabilities have advanced far beyond using electrical data to monitor heating and air conditioning usage. Engineers must be able to successfully connect electrical with HVAC, lighting, fire prevention, card access, CCTV, metering software, network, CISCO®, IT/OT, and other functions with the iBMS to provide value to stakeholders. In other words, true iBMS is more than just an MEP conversation.

Division 25 can turn this data into analytics and then action. But first, specifiers need to ask themselves:

- What value do your customers want?
- What do your customers want to gain out of the building?
- Do your customers want elements such as resiliency, risk mitigation, and sustainability in the smart building?

Every building owner, facility manager, and landlord has their own priorities when it comes to smart building capabilities. But it is likely that all key stakeholders are looking for devices and connectivity that can reduce costs, increase efficiency, and add perceived value for building occupants. Division 25 enables engineers to deliver the value that stakeholders want today and the ability to increase that value tomorrow.

Division 25-specified smart buildings offer:

- Landlords the ability to provide smart devices and connectivity – especially office buildings that appeal to the workforce of the future
- Building owners the technology to quickly and accurately track cubic square feet usage by occupants – for significantly increased spatial optimization
- Facility managers the ability to maximize building efficiencies – for increased energy savings and lower maintenance costs
- Occupants the smart comforts that make them more productive – with fewer complaints and reduced absenteeism for their employers
- Key stakeholders the smart building analytics they need to really “see” their building capabilities – for increased oversight and value assessment

Why partner with Schneider Electric for Division 25 specifications?

Finding the right Division 25 ally is key to ensuring smart building specification success. Schneider Electric can help engineers narrow down the overwhelming amount of smart building options to deliver the most value for key stakeholders.

Here are three ways Schneider Electric can help:

1. Master System Integrator

Searching for a Division 25 master services integrator (MSI)? Schneider Electric can serve as your MSI that brings all necessary electrical, mechanical, OT/IT, security, and other required parties and vendors required for Division 25 specification success.

We can help you:

- Communicate with vendors to prevent them from loading their preferred equipment into the BMS
- Oversee personnel qualifications to ensure they have the appropriate skill sets to execute under Divisions 23, 26, 28, etc.
- Create a path of least resistance between all the divisions and one that saves costs and creates a value-added, high-performance building
- Collaborate with vendors to coordinate communication protocols into BMS



Here are three ways Schneider Electric can help:

2. Division 25 use cases

If a specification entails working with a specific amount of incoming power, Schneider Electric can provide a use case to determine how many panel boards will be required, along with circuit boards, and other necessary components. We can also provide device and connectivity testing as needed, compile all of this data per specific building specifications, and then provide this information in a line diagram.

Need a use case for intelligent breakers and smart meters? Schneider Electric can provide a use case to:

- Connect the systems via an integrated switchboard to allow energy and alarm data to be shared with the iBMS
- Eliminate duplicate power meters in electrical (Division 26) and HVAC (Division 23) – for total system cost reduction – without giving up performance
- Enable easier LEED data collection, simplify building accreditations, and help adhere to ASHRAE standards



Here are three ways Schneider Electric can help:

3. Continuous Division 25 support

Think of Schneider Electric as your first step to a successful Division 25 specification. Our free [PROficient Premier Access Portal](#) is your go-to resource for:

- The [Spec Designer](#) tool that uses simple “yes” and “no” questions to pull everything you need into a Division 25 use case or a use-specific SOP
- Value proposition presentations to explain the latest smart building technologies to owners and help them choose value-adding options
- Validated system architectures and designs that are proven by Schneider Electric to work in smart building infrastructures under Division 25
- Our [LayoutFAST Digital Design Tool](#) to enable you to select, configure, and insert vetted BIM models into your design, turning minutes of work into seconds
- On-call electrical distribution experts, who are ready to offer you engineer-to-engineer guidance by phone, email, or real-time chat

These are just a few ways Schneider Electric can help you qualify for more profitable Division 25 specifications. Let us help you use these resources to advance your expertise.

To learn more, visit our [PROficient Premier Access Portal](#) today.



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