

# Choosing Your New Intelligent System

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You may be one of the countless facility managers or engineers noticing that it's time to upgrade your aging electrical infrastructure. Maybe you're planning to design and build a new facility or add on to your existing system. Any of these cases present an opportunity to add intelligence to your distribution system, but where do you begin?

It can be intimidating to try to find out what smart capabilities are available for today's top-of-the-line electrical equipment. The last decade has brought to market a myriad of advancements in electrical distribution systems. While it is tempting to ask, "How can I add smart capabilities to my system," the recommended approach would be to ask, "What smart capabilities would best meet my facility's needs and priorities?"

## 1. Identify priorities

The first step to getting the right smart system is to clearly define the priorities for your facility. If growth is a priority, then you may need a line of equipment that is modular and able to be easily expanded as the facility needs grow. Maybe an upgrade is needed, but the priority is minimizing facility downtime while installing the new distribution equipment. You will want a system that helps to minimize that installation and commissioning time. Many companies are working to reduce their energy consumption and become more efficient, which would drive the need to have a system that has highly intelligent monitoring capabilities combined with autonomous features that can respond in real time to minimize energy losses and maximize efficiencies. Define what is important to your facility and use that to drive the intelligent features to be incorporated into the new system.

## 2. **Safety first**

Safety must be considered with any new or upgraded systems. Consider designs that increase safety during installation as well as reduce installation and commissioning time. Today, equipment designs are modular, compact, and lightweight for ease of installation. Minimizing downtime for installations and modifications is also important. More designs include finger-safe characteristics to minimize shock hazards, as well as replacing the many bolted connections with simple spring-loaded component installation to reduce the potential for loose connections that require checking and retorquing. We are also seeing increased use of Wi-Fi and Bluetooth® technology to allow personnel to interact with the equipment using mobile apps. Personnel can safely work on the equipment without ever entering the arc flash or shock boundaries. Many advancements in electrical equipment designs and capabilities are driven by — or at least have an impact on — personnel safety.

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## 3. **Power system and facility automation**

Consider the integration of power systems and facility automation systems that protect and monitor the power distribution. Make decisions in real time based on changing variables since these smart systems have a bidirectional flow of data. Applying smart IoT technology means that a wide variety of power data can be collected, reported, and analyzed, allowing facility managers to make proactive decisions or even program automated decisions based on system variables. Predictive analytics are advancing power systems for improved asset health and performance and provide facility managers with information to extend the life of the electrical equipment.

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## 4. **Microgrids and integration of renewable energy sources**

There are also options to incorporate an innovative cloud-computing platform design to monitor, optimize, and control the electrical distribution system to include the use of a microgrid. With the use of algorithms and machine learning technology, the smart microgrid can make power usage decisions based on peak hours and load shedding of inefficient loads to improve overall efficiency and reduce utility costs. Smart technologies will need to monitor, in real time, the available renewable energy capacity compared to the facility's demands. These systems can be programmed to prioritize loads that will be seamlessly transferred to a renewable source when the capacity is available and similarly switched back to the utility as needed to maintain continuity of power while maximizing the use of the off-grid power.

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## 5. **Integration of energy storage capabilities**

A microgrid can also include some energy storage capacity. Improvements in electrical energy storage technologies will continue, making the microgrid a beneficial option. One benefit would be to use stored energy during peak hours when the utility charges a higher cost. A microgrid can work with a battery energy storage system during off-peak hours and then use stored power from the battery system during peak hours. The savings can increase if there is a feature to charge the energy storage device using renewable resources.

## 6. Building Automation Systems (BAS)

Building Automation Systems (BAS) cannot only protect and monitor the power distribution but also make decisions in real time based on changing variables. Occupancy sensors can be used to detect when personnel are in an area, adjust lighting and provide power to equipment during use, and then automatically remove power when the lights or equipment are not needed, reducing inefficiencies of idle systems. Lighting can also be programmed to mimic the daylight cycle to create a more natural feel in an office building. The system can sense how much natural light is shining into the space, dim the lights accordingly, and then increase the light when sunlight decreases to maintain a consistent lighting level and optimize energy efficiencies. RFID technology can be implemented into personnel badging so that the system knows when personnel are in the area. Smart lighting can use that data in the event of an emergency to use luminaires to show personnel the shortest path to safety. Your distribution equipment could sense when personnel are within the arc flash boundary and take action to minimize the hazard during that exposure.

These are just a few examples of capabilities that can be considered, but every facility has unique priorities and interests that will drive which smart capabilities will be most beneficial. The flexibility and seemingly endless possibilities make this an exciting time for the electrical industry. Just a few years ago, a facility would have to pick and choose which of these priorities to integrate into their design because of limited availability in specific make and models of equipment. Today, it is no longer a question of how to add smart technologies, but rather a decision on which smart technologies will be incorporated into your system. Thankfully, major manufacturers like **ABB** have integrated vast combinations of these smart technologies into their latest lines of equipment, such as their **ReliaGear™** smart power distribution equipment, allowing the implementation of many of these features through a one-stop-shop approach.

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