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THE SMART GRID'S MISSING INGREDIENTS

Every day, we bear witness to the breathtaking pace of technological advancement in the modern world. Yet when we go home and turn on the light, the bulb is illuminated in much the same way it was 100 years ago: a distant power plant generates electricity, which travels through radiating networks of transmission lines, substations, and other equipment to deliver power to individual homes and businesses.

But times are changing fast. As utilities transform grids to meet the changing needs of today's population, they must embrace the rapidly-advancing Industrial Internet of Things (IIoT) and the right software to take full advantage of it to make the grid smarter, greener, and more reliable than ever.

It's no secret that the conventional, centralized grid needs serious upgrades to keep up with the shifting energy landscape. To effectively integrate increasingly sophisticated and diverse energy sources, such as grid and small-scale solar arrays, power storage batteries, or wind turbines, utilities are building out "smart grids." Among other things, making a grid "smart" entails transforming it into a network for distribution of information as well as electricity. While they receive power from the grid, households and other electricity consumers on smart grids are sending data about how they use energy to utilities and grid operators. This data enables utilities to quickly respond to weather changes and problems such as a big cloud coming in on a sunny day or even storm impacts, reducing the frequency of power outages.

But that's just the tip of the iceberg. In addition to preventing blackouts, a smart grid allows utilities to respond to changes in demand in real time, vastly increasing its efficiency. A smart grid helps utilities lower their operational costs, reduce peak loads, improve security, and increase the integration of small-scale, distributed energy resources (DERs) like solar panels.

While building smart grids is an important step for the future of utilities, it is not the final step. Smart grids generate huge

The same technology that links our phones to other smart devices is the key to unlocking a more intelligent, efficient, and reliable electrical grid.

volumes of data. The more DERs - each with its own owner and operator - that are connected to the grid, the more data it generates. As grids get smarter, they generate more data than utilities are used to handle. For example, a city wide installation of solar panels may generate data on how much energy it produces in real time, requiring real-time monitoring by utilities to coordinate that generation with power plants and other critical infrastructure on the grid.

In short, the smart grid isn't truly smart without the means to convert the data it generates into meaningful information for command and control. The IIoT and the cutting-edge technologies used to organize, analyze, and enable actions based on available data are the missing ingredients in a truly smart grid. And when it comes to new energy sources like solar and wind, utilities need to include in their IIoT solution advanced distributed energy resource management systems (DERMS) to step into a future that will be dominated by DERs and smart grids.

For consumers, the IoT is made up of internet-connected everyday devices from coffeepots to cars to thermostats, all of which generate comprehensive data on how they are operating. For utilities, the IIoT (made up of connected industrial equipment instead of coffeepots) allows operators to monitor and control their diverse grid assets while those same assets communicate with each other.
When IIoT-enabled DERs are added to a smart grid, advanced software and artificial intelligence can empower existing systems to communicate with each other and translate data from DERs into meaningful information that is also better protected from cyber-attacks. Once their internal systems are connected to the IIoT with the right DERMS functionality, utilities instantly gain a full picture of how their smart grid is operating, along with an organized, actionable view of the data that assets on that grid—including DERs—are generating.

Advanced DERMS bring additional benefits to utilities. For example, they enable real-time monitoring of critical equipment to prevent failures and malfunctions; they open new possibilities for real-time trading of electricity on an open market, which can balance out electricity demand, lower operating costs, and reduce greenhouse gas emissions.

The IIoT and advanced DERMS are essential to realizing one of the biggest promises of the smart grid:

Seamlessly integrating DERs in a way that benefits utilities and consumers alike. DERMS collect and synthesize data from each individual DER, creating a data network that connects all components of the grid, from power plants to solar arrays. In the same way that a mobile app allows an individual to respond to data generated by a smart thermostat, a DERMS app provides a comprehensive view of the grid and all of its many components, enabling utilities to better detect and respond to glitches or changes in demand.

As innovators design and create better technologies and new DERs, utilities can use smart grids in conjunction with IIoT-connected DERMS to successfully incorporate new energy sources into their existing practices with ease. With both a smart grid and best-available IIoT software to manage it, operators can continue to innovate, integrating new technologies and using their resources more efficiently. As customers continue to demand smarter technologies and distributed, diverse energy sources, this ease of control is crucial to building a stronger and more adaptable utility industry.

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About mPrest

mPrest is a global provider of mission-critical monitoring, control and big data analytics software. Leveraging the power of the Industrial IoT, mPrest's integrative "system of systems" is a proven catalyst for digital business transformation. Our management solution has been deployed in next-gen IoE (Internet of Energy) applications for power utilities, as well as innovative management applications for water utilities, smart cities, defense and HLS.

By connecting the dots across multiple disciplines, mPrest delivers unified situational awareness, sophisticated analytics, end-to-end IT/OT integration and process management. Featuring unprecedented interoperability and real-time data optimization, mPrest allows organizations to accelerate time-to-market, improve system performance and reduce operational costs.

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