TAKING THE ELECTRICAL GRID FROM RELIABLE TO RESILIENT

In the 1930s, the U.S. electricity industry, still in its infancy, took on an enormous challenge: expanding its power networks to deliver electricity to every corner of the country. This network expansion made electricity available to rural residents - who at the time comprised a majority of the population - allowing them to enjoy the comforts and opportunities of modern life.

The U.S. has a reliable electric grid, but utilities can now move forward and embrace technologies that can make the grid more resilient

Working with rural electricity cooperatives, private and municipal utilities steadily built out the mesh of power plants, substations and transmission lines that form the foundation of today's national electric grid, which now includes more than 8,000 power plants.

While the task was complex, the goal was simple: turning the lights on in every American household.

In retrospect, there's no doubt the power industry met its ambitious goal. Based on essentially the same technology used at the grid's inception, power utilities wired nearly the entire country and continue to deliver reliable electricity to Americans today.

The Challenges of a New Energy Era

Moving ahead several decades we see that modern energy utilities currently face new challenges: rapidly decentralizing networks, sharp changes in energy demand throughout the day, frequent extreme weather events, and cybersecurity threats. Customers' adoption of distributed energy technologies, such as smart meters, solar panels, electrical vehicles

and energy storage systems, compound these challenges. Today, savvy customers expect more from their energy utilities—more information, more convenience, and more choices.

In light of these new challenges, being reliable is no longer enough. Those in energy utility circles now talk about achieving "grid resilience" – that is, building a grid that not only reliably delivers power, but also quickly responds to and recovers from the inevitable and unpredictable disruptions inherent to the modern energy economy.

In the past, infrastructure upgrades, such as building a new power plant or replacing transmission lines, might have been enough to fix problems and overcome bottlenecks on the grid. But constructing a billion-dollar power plant is a slow, expensive solution to problems that demand much quicker responses. In addition to deploying new assets, utilities can also achieve better grid resilience by introducing intelligent management capabilities for their existing solutions using new smart technologies.

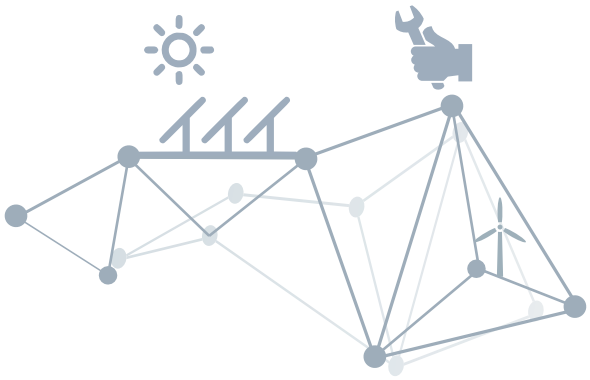
Digital Technology Is the Ultimate Resilience Enabler

Today's digital technologies enable far greater connectivity and control for energy utilities than in the past. By taking advantage of the Industrial Internet of Things (IIoT), which is comprised of sensors that digitally connect physical assets to one another and to the utility operations center, an operator can get instantaneous status updates on multiple assets, regardless of their size or distance between them. This continuous monitoring allows operators to spot problems sooner and apply solutions more quickly.

But monitoring is just the beginning. IIoT technologies can also be used to run tests and generate data, enabling predictive maintenance that will be used to correct problems before they turn into a power outage.

These emerging capabilities can help utilities leverage Distributed Energy Resources (DERs) as assets to their grid, rather than viewing them as challenges to overcome. For example, a key concern for utilities is the increased volatility of electricity flow from DERs. Historically, utilities had less control and visibility of this energy flow, and these fluctuations constituted a risk to existing assets. Now, utilities can use IIoT to track each of these DERs and integrate the data they collect into bigger-picture operations and decision-making.

Once integrated, the IIoT system can continuously analyze this data, harness the DER energy to overcome problems in the grid, identify environmental changes that require handling and then automate a response.



For example, the system can spot a drop in energy production from customers' PV installations in a certain region, and then increase the output from the main grid in response, or prompt the grid energy storage system to discharge power in this region when needed. The system can quickly respond to predicted upswings or declines in energy loads, shifts in predicted electricity prices or weather changes and adjust energy flow accordingly.

The result is a smarter, more resilient grid that uses data to efficiently manage and leverage existing assets. As the U.S. and other countries around the world feel the mounting impacts of climate change, the importance of grid resilience has never been greater. By taking advantage of IIoT, utilities can begin to shift their focus from expansion to adaptation. The good news is that with today's digital technologies, the tools needed to cost-effectively adapt to a dynamic energy landscape are literally at utilities' fingertips.

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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