



**UTILITIES NEED
TO EMBRACE**

**A NEW ERA OF
COOPERATION**

Harnessing distributed intelligence
can help power energy transition

The US Department of Energy wants to build a better grid to help address climate change and bolster the security of the electricity grid. With historic investments in technologies and communities, a strong and clean grid will provide more affordable power that can better handle disruptions. The DOE project focuses on resiliency and reliability at all levels – federal, state, and community – to improve the grid. To succeed, it needs a cooperative effort across the entire system.

With more than 3,000 utilities in North America, every state or province has its own regulations, in addition to federal ones. All utilities are focusing on three key areas: reliability, improving customer experience, and modernizing the grid. The opportunity for utilities is clear but, as a regulated industry, seizing it can be challenging. They face the traditional utility cycle of analysis and then justify investments to regulators.

It can be intimidating to be the first to try new ideas, especially when the pace of technology change is accelerating. But emerging innovations may be the pieces that address the four goals above. Utilities need to open themselves to collaboration. If six or seven utilities cooperate around a specific innovation and explore different use cases, it becomes easier to tell a collective story on how to take advantage of new technology, like distributed intelligence (DI).

The distributed-intelligence opportunity

A push for grid modernization requires new ways of working. Utilities need to think about how to be more agile, with smaller releases over time, rather than undergoing one major project launch every two or three years, so they can be more targeted when trying to solve specific reliability and resiliency challenges. DI applications have the potential to support transformation to a more flexible and agile grid with less risk.

DI is about pushing decision-making to the edge of a network, removing the need for massive data sets and complex calculations. The advantages of DI at the edge include making decisions faster and automatically. This is especially relevant for utilities companies which have grids with multiple nodes, like smart meters, and the potential to add more. The challenge is one of exploiting the vast information in these systems.

The power of edge devices

Edge devices need to play a larger role in how modern grids can drive benefits across the entire utility. For example, AMI 2.0 with distributed intelligence can process large volumes of data locally, enabling real-time monitoring, diagnostics, and analytics.

This would allow DI to solve a specific challenge in a specific area. For example, a utility could find problems that exist within certain communities and apply a software fix specific to that region. Or in the case of cold load pickup after an outage, DI-enabled meters could sequence load to avoid blowing out a transformer.

The integration of machine learning (ML) and artificial intelligence (AI) algorithms for predictive maintenance, outage detection, and asset management are also DI implementations that can reduce cost and improve system performance. Insights generated through advanced analytics can inform demand-side management programs, fostering energy conservation and customer satisfaction.

More grid resilience

DI on a meter can also help utilities identify factors such as rooftop solar and electric vehicles at a location. That information can help manage generation or demand at a more granular level as customers look to add renewable energy to their homes.

Edge devices with DI functionality also allow for more granular, real-time usage data, giving customers greater control over consumption. This facilitates the implementation of dynamic pricing models, enabling customers to adjust usage based on price and save on energy costs. It also supports the development of innovative applications and services such as home energy-management systems and automated demand-response programs, to enhance customer engagement and satisfaction.

More specific information can also fuel localized decision-making and improve grid efficiency, reliability, and resiliency. DI enables better management of distributed energy resources (DERs) such as solar PV, wind, energy storage, and demand-response programs. It also improves the ability to handle fluctuations in supply and demand, ensuring grid stability and avoiding potential disruptions.

Collaboration and agility

Collaboration is not uncommon among utilities but this needs to become more proactive and focused on enabling technology to justify new investments and sharing learnings. More variables and data are only making the grid more complex and DI applications are a prime example of how pooling resources can drive real change.

DI applications are the path to a more flexible and agile grid. To succeed, utilities must work together to:

- Use DI applications to find value in use cases
- Work with an ecosystem of partners to rapidly pilot DI use cases to create a baseline of value
- Work with regulators to help them understand the value of AMI 2.0 and how DI apps are a key enabler of reliability, resiliency, and customer satisfaction
- Work with property accounting to create a mechanism to capitalize on DI apps
- Find new ideas on how DI apps can enable a modern grid journey.

The fundamentals of supporting customers and passing regulatory scrutiny remain the same but, with technology innovation coming faster than ever, utilities need to shift their mindsets and find ways of supporting customers by adopting new methods faster.

Capgemini has the industry knowledge and experience to help utilities capitalize on DI applications while proving their value to regulators. With a diverse global team, Capgemini has the skills to build and support DI applications that can make real impact on the business. There are still many questions to be answered around DI applications but new approaches and tools are required to meet the need for the future. Harness the power of distributed intelligence across the grid to attain energy transition goals and build a more resilient grid.



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