

ASK THE EXPERT

Microgrids: The New Norm for Grid Resiliency and Reliable Customer Service



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The grid is becoming more complex and diverse with distributed renewable resources, and microgrids are becoming the new standard for many enterprises. Implementing a microgrid has become a more mainstream choice as renewable energy resource costs have decreased and production efficiencies have increased. This is especially evident as packaged systems that include solar photovoltaic (PV) panels and battery energy storage systems (BESS) are combined to bring dependable energy assets.

A microgrid is no longer an isolated pocket of self-sufficiency for a few industries; it is among the many decisions that facility operators are making to meet the needs of the facility occupants. Energy independence — ensuring that energy is reliable and resilient and that operations can continue in the face of grid anomalies — has moved microgrids from a concept to a necessity for many industries.

As the need for these systems continues to grow and availability of a variety of solutions become more prolific, the options and choices that end users and utilities alike face are not simple. When considering a microgrid project moving forward requires not only understanding the possible technologies and the how these are architected but the ongoing maintenance and support that will be required for long-term effectiveness.

We spoke with [Jason Petermeier](#), chief operating officer at ELM Microgrid and ELM Solar, about these issues and how ELM is prepared to help their clients navigate their pathway to success.

What are the leading drivers influencing owners and operators to pursue a microgrid as a solution?

Many factors leading the decision process to have a microgrid as part of an enterprise solution include energy reliability and supply resilience, given the significant dependence business and commerce have on sustained uptime. Traditionally, high availability requirements have been a requirement for the “MUSH” market, which includes buildings that support municipal and state governments, universities, schools, and hospitals. However, the industrial sector, which includes manufacturing, transportation, logistics, and warehousing, and commercial sectors, including e-commerce, financial services, and retail, have their own unique needs and requirements.

The strong dependence on the internet, telecommunication, and data services is the core of transactions and service integration. Downtime of these services directly impacts bottom-line revenue, can result in lost productivity, and may have long-term impacts on brand equity and trust. Taking direct control of energy resources is a leading reason for considering the implementation of a microgrid.

What are the key technologies behind a microgrid, and are they complex?

Many essential elements make up a microgrid. First is the primary energy supply resource, often leveraging renewable sources such as solar PV and wind. To convert the DC power, these resources are converted to AC using an inverter. Given the variation of output from these assets due to the nature of climate conditions, battery energy storage systems are included and sized to mitigate this intermittency. Most microgrids operate in parallel with the servicing grid provided by the local serving utility and have an interfacing element such as a relay/switch, known as the point of common coupling (PCC). A metering device is also included to measure utility consumption and local production.

The most important part of any microgrid is the microgrid controller (MGC). This can be one of the most complex components of any solution set. Setting the operating parameters for all envisioned use cases is non-trivial. Production and load conditions must be balanced and include sufficient capacity to charge any connected battery energy storage system.





This is not only significant during the grid-connected mode, but it becomes essential when the microgrid must island due to anomalies or interruptions of the connected grid service. The transition from grid-connected to islanded operation must follow the new interconnection standards set by IEEE-1547-2022, which dictates how the microgrid must operate and “ride through” any temporary grid conditions. These standards actually enable the microgrid to be a short-term reinforcement of the grid that may be helpful in preventing a longer-term outage. Making sure that the coordination is well-established between the microgrid and the utility is a critical factor.

What are some of the microgrid life cycle management factors that must be considered?

Microgrids are living and continuously evolving ecosystems. The load being served by this resource can change dynamically over both a short and long time period. Certainly, weather conditions directly impact load, but they also impact the resources powering the microgrid. Balancing between available resources to support the load and sustain operations in the event of a need to island requires continuous monitoring of the asset and facility. Having an organization that understands these parameters and can develop appropriate use cases and scenarios is essential for operational effectiveness and solution success.

What role does a solution provider take to help clients with this complex process?

Often, we see multiple choices for element options. There are strong firms that can provide just the PV and battery packages; others offer the necessary switchgear and protection. However, to help many organizations seeking this energy alternative and the many options they need to consider, we see the critical need for an organization that can do the full range of services, including requirements capturing, conceptual design, solutions engineering, and architecture. The firm must be able to size and design the solution, contract with the element providers as needed, and be responsible for the construction, implementation, and testing of the solution. For ongoing support, a solution partner must be able to fully manage this critical resource in partnership with their client. Given the critical nature and reliance that customers have on this asset, support must be available around the clock.

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