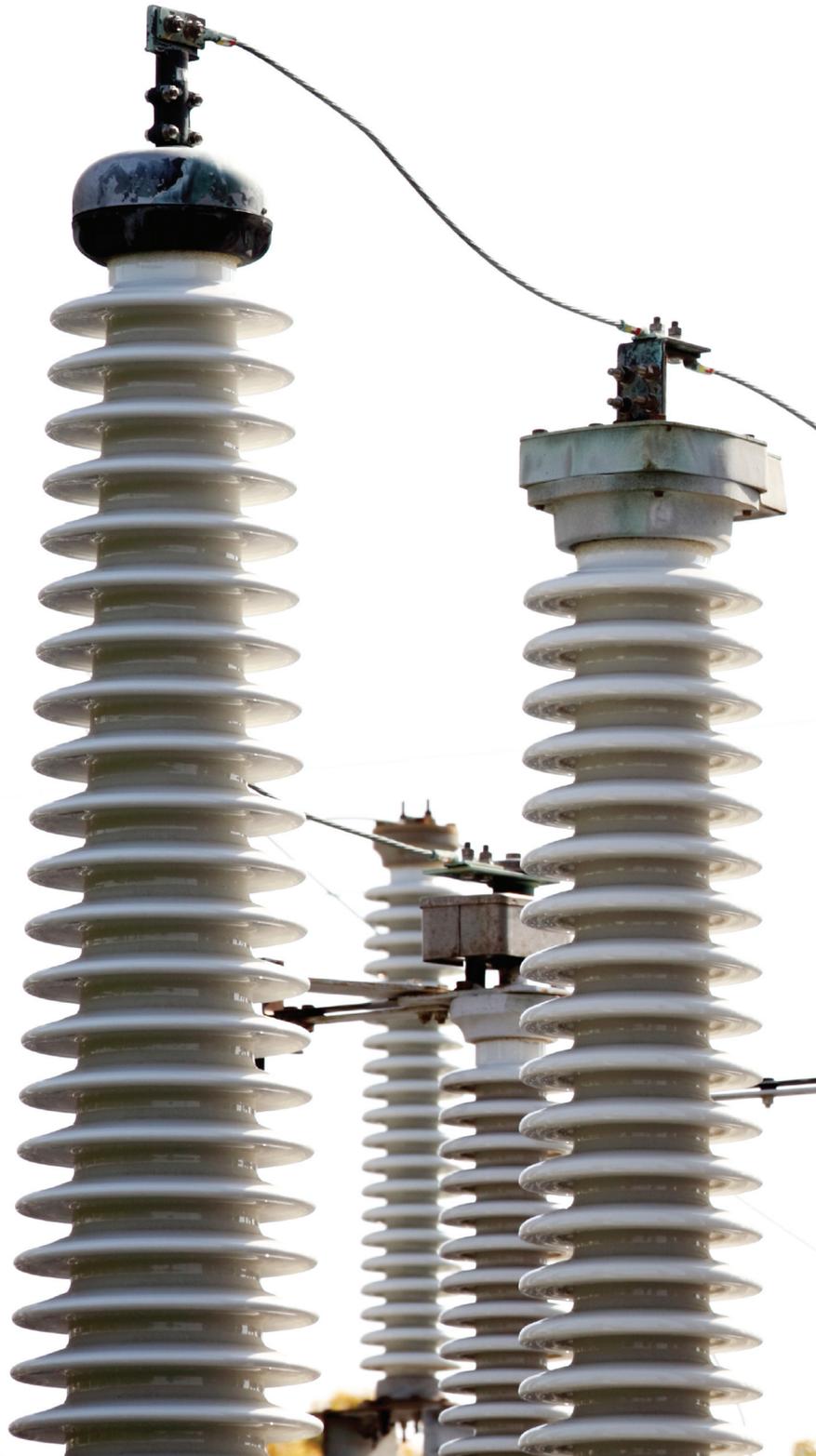


the smart grid for smaller utilities



The energy landscape is rapidly changing, and utilities are faced with rising electricity costs, increasing demand, environmental pressures, and growing customer expectations for greater transparency, control, and choice. The move toward a modern energy infrastructure and a “smarter grid” is already taking place.

Some utilities have begun adopting technologies and processes to transform the traditional grid into a Smart Grid. In order for smaller utilities to effectively implement Smart Grid technology, they must consider all Smart Grid functions as a system and develop a long-range plan that includes the information technology needed to make the various functions of the Smart Grid attainable.



What Is the Smart Grid?

The Smart Grid is a coupling of electric utility equipment with data communications. It is an intelligent system that delivers electricity from suppliers to consumers using digital technology to save energy, reduce cost, and increase reliability and transparency. Smart Grid technology allows for real-time visibility into the system and control of the equipment, use, flow, and generation of power.

The functionality of the Smart Grid includes integrated two-way communications and advanced control methods for data collection and monitoring of grid components, sensing and measurement technologies such as smart meters, and improved interfaces and decision support. An advanced Smart Grid can even include the ability for systems to make “intelligent” decisions for automated generation optimization and automated restoration, known as the “self-healing” grid.

What Are Your Drivers?

To move forward with investments in Smart Grid, utilities need to identify their specific drivers—the needs and opportunities to improve their operation and meet external requirements. These drivers may include meeting Corporation Commission requirements, integrating renewables, improving demand response, or having visibility into the system to reduce outages and response times. Whatever the reasons, they need to be enumerated to begin to develop your plan for the Smart Grid.

Utilities can partner with a Smart Grid technology provider to develop a roadmap that helps them optimize their planning—beginning with a “self-assessment” of where they are today and a step-by-step framework to deliver an appropriate development path toward their desired level of Smart Grid maturity.

Integrated, Advanced Technologies

After listing the drivers, a utility needs to prioritize these drivers and determine which functionality of the Smart Grid can help it achieve the goal for each driver. The next step will be to determine if there are related functionalities that can be built simultaneously with either minimal costs or significant cost savings that could help pay for the first phase of the project.

For example, if the utility wants visibility into its system to get information about breaker status or equipment condition, investing in a SCADA system may be the first phase to invest in Smart Grid-enabling technology. A related Smart Grid function may be a voltage/VAR control program, and the costs and expected value or savings can help determine if this related functionality is optimal for your utility at that point in time.

Advanced control technologies can help collect data and monitor all critical power system components, providing information to utilities that enable quick diagnoses and response to events. They can also improve asset management and help drive efficient operations by providing visibility and insight into utility performance in real time.

Decisions around Smart Grid investments should be thought of as an integrated system, as selection of one manufacturer’s technology that is incompatible with future expansion can result in higher costs and complexity. Furthermore, making decisions without understanding how one change can impact another area can lead to counterproductive results.

Benefits for Utilities

Utilities play a critical role in modernizing today's grid infrastructure and moving toward the Smart Grid by integrating the latest advances in digital and information technology to reliably move electricity to consumers. Using real-time, two-way communications between utilities and consumers through an open network will enable information-based decision making for increased operational efficiency and a more consumer-interactive model.

By adopting integrated technologies that improve system reliability, security and efficiency, utilities are well positioned to gain many benefits, including:

- Reduced costs of power outages with control technologies that isolate faults and rapidly restore service to portions of the distribution system
- Better decision making with a clearer “big picture” view to understand and measure what's going on in the system
- Better control for grid optimization—improving load factors and reducing energy consumption
- Optimized management of generation assets under various conditions

Establishing a Holistic Smart Grid Roadmap

The transformation toward the Smart Grid is a very unique change to the operations of electric utilities—touching every part of the traditional utility organization and creating several new ones. If not managed with a roadmap that is built with a holistic approach, the Smart Grid may easily turn into a technical quagmire.

It is imperative that each utility establish its own roadmap with a strategy for how it will transform itself to meet government regulations, power supply issues, budget constraints, and member needs. Existing constraints on the utility can dictate how the roadmap will differ for each utility, including regulations, buy in from the top, funding, and data communications availability in the service area.

While these constraints are very real and will drive short-term decisions, a longer-term vision is necessary when considering where your utility will be in the future. The Smart Grid will help optimize asset utilization and enhance reliability, strengthening the transmission and distribution of power and increasing operational flexibility and availability.

Large quantities of data will be available for the utility to review and process. This data needs to be stored effectively in strategic locations where it is available to multiple functions instead of duplicating the data storage for each function. Therefore, utilities need a holistic approach to assessing investments in Smart Grid processes and technologies, as opposed to a single-solution approach with only near-term cost effectiveness in mind.

Restructuring of the Utility

The traditional structure and workforce of an electric utility was centered around linemen and engineers; the linemen built and maintained the lines and performed emergency repairs, and the engineers designed the system and worked on technical issues such as generation interconnections, VAR control, and system capacity. With the Smart Grid, how each of these groups work will change.

For example, data available from the Smart Grid will lead to more productive use of the lineman's time by eliminating some of the emergency line patrols and will also assist the engineers by providing actual data about loads and the system in a fraction of the time needed to perform the same work today.

Additionally, a new layer of functionality will be required to perform communications and IT to support the Smart Grid, and this infusion of communications and IT workers will change the utility organizational structure and increase the importance of these functions.

Openness and Interoperability

There is no one-size-fits-all approach that can solve all the Smart Grid complexities. Utilities need to take an approach that fits their current and future operations best and build a smarter grid incrementally over time as resources and technologies allow. The underlying information technology (IT) platform should be selected early in the development of the Smart Grid roadmap to enable interoperability with existing and new functionalities.

Because data is shared between the functions of the Smart Grid, a common IT platform is required to connect the various pieces, and this platform must be open, interoperable and scalable. Standards that enable interoperability are rapidly evolving and will help ensure seamless connectivity between the different components, including systems, communications data, and information technology. Without these components, true Smart Grid functionality may be impossible to achieve or too cost prohibitive.

Buy In From the Top

The decision to enable transformation toward a Smart Grid involves changing the way people work and how business processes are performed within your utility. Due to cost constraints, technical requirements, and organizational culture, different departments can be driven to justify their own use of new technology without regard to the Smart Grid as a system. Therefore, each utility's Smart Grid strategy and roadmap must originate at the top.

In the absence of top-down leadership and buy in, the Smart Grid solution at your utility may end up being a cobbled-together set of disparate solutions that do not function as an integrated system and have no common IT platform to enable interoperability. Management and boards must consider the utility's organizational structure during the implementation of Smart Grid to make decisions about how the systems will be designed.

Leading the Smart Grid Vision

Uniquely positioned to facilitate the Smart Grid, utilities can reap the vast benefits of this new infrastructure and meet consumers' expectations for increased control and transparency in their energy consumption choices. Utility leaders need to articulate the vision, chart the course with a holistic approach and the right technologies, and enable internal and external stakeholders to mesh that vision with the utility's overall business strategy and set maturity targets.

By taking advantage of the latest technologies and building a culture to support it, utilities can facilitate the creation of the Smart Grid, improving operational efficiency and enhancing customer service to drive sustainable profitability.

How Can GE Help?

GE has been solving technical problems for utilities and consumers since 1878, with over 300,000 employees in more than 100 countries. Our products and solutions provide a wide coverage of technically innovative solutions for the Smart Grid, including an IT platform that can operate with a wide variety of third-party solutions. We design solutions from both the utility and the consumer side, and we understand your business, thus allowing us to help you make decisions with a holistic approach.

Let GE help you envision the future of your utility and help you plan your Smart Grid for a sustainable competitive advantage.

For more information, visit www.ge.com/digital

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