Smart Grid: Enabling Operational Efficiency and Distributed Generation

The smart grid is a reinvention of how energy is transmitted, distributed, and measured. It is becoming the new standard for utilities and consumers.

Capgemini understands that large centralized power plants are no longer the only source of electricity and that selling more power is no longer the key objective of energy providers. The new goal is managing supply and demand with less carbon impact.

Building upon the capabilities of the smart grid, Capgemini is able to offer strategic opportunity analysis, technical solution development and due diligence, as well as business case modeling of the smart grid itself.

Smart Grid Is Now

The smart grid represents the merging of multiple technologies into a system that provides reliable and cost-effective energy. Unlike the local and manual operation of equipment on a traditional grid, the smart grid enables operators to manage and monitor millions of devices and sensors. The smart grid has extensive communications

Smart grids support the monitoring and management of renewable energy systems through two-way energy flow and distributed generation. The era of traditional power grids is coming to an end.
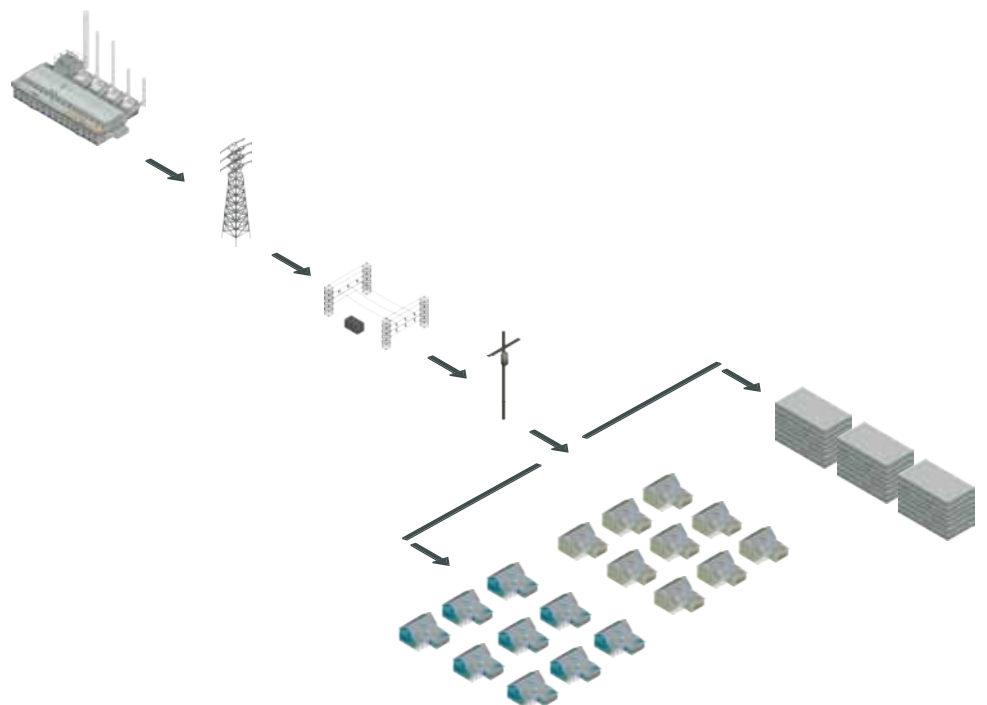
capabilities that enable smart metering, as well as transformer monitors and other data gathering devices.

- **Remote monitoring and data collection** is useful for both customer relationship management and data analysis, making it possible for utilities to assess service levels constantly using information from sensors located throughout the distribution grid.

- **Transformer monitors** use sensors to collect information about grid activity that can be analyzed and then applied to avoid failures, extend the transformer life, and lower costs.

- **Smart meters** are the foundation for smart grid. They make usage data accessible for utilities so that billing can be more accurate and precisely linked to disconnect/connect dates with

alerts for instances of meter tampering. With smart meters, a Meter Data Management System monitors and analyzes data that flows to and from customer locations. As part of this system, smart meters:

- Are read automatically, as frequently as every 15 minutes, and they support on-demand meter reads for customer service support as well as remote alerts.

- Enable remote monitoring of the whole service area to determine when a customer is out of power and when power has been restored.

- Make possible remote disconnect and reconnect services for faster, more certain customer service, which provides both the utility and the consumer with enhanced access to information.
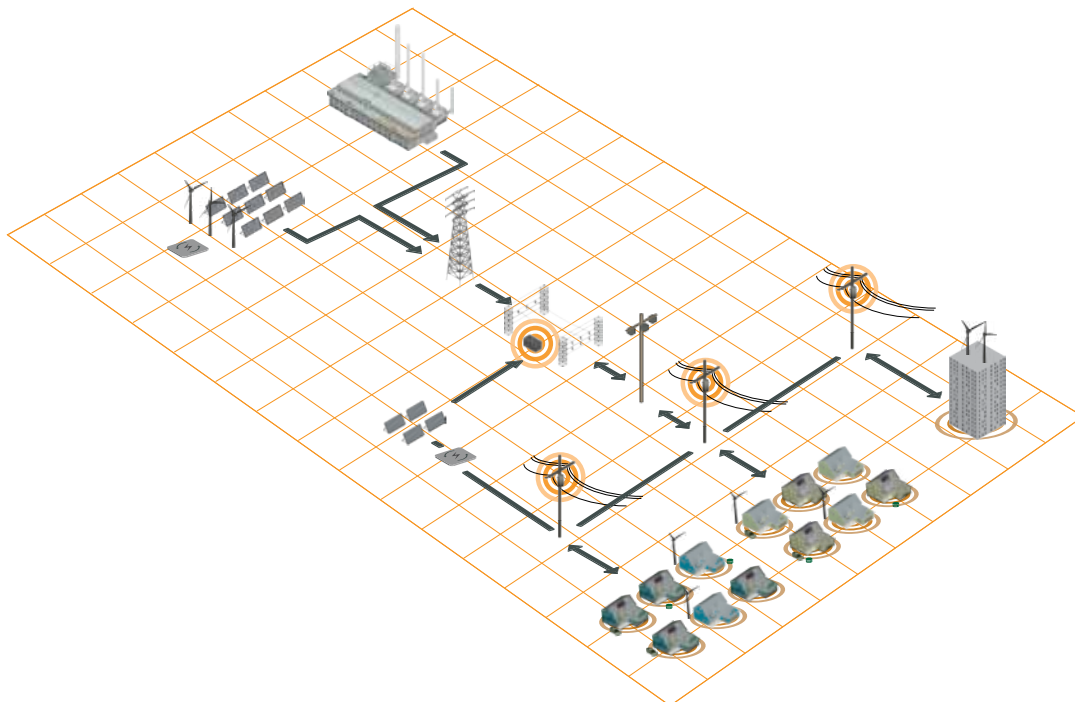
The smart grid is the way utilities and customers will manage energy in the future.

One-Way Distribution: Past ➡ Present

- **Distribution Management Systems** enable extensive communication and deeper insight into grid-related problems, permitting targeted proactive maintenance. This is based on dynamic analytics that continuously assess the "health" of the grid and immediately send out alerts concerning faults and outages, as well as notification when power is restored.

- **Real-Time Outage Management and Restoration** ensure that as soon as power is interrupted, the two-way communication network will be able to provide a near real-time view of the distribution grid. While a mobile crew is dispatched to make the repair, energy is redistributed, and the restoration process is monitored.

- **Conservation Voltage Reduction** minimizes energy losses on the system.

- **Integrated Volt/Var Control** helps calculate optimal settings for voltage regulators and capacitor banks.

- **Phase Load Balancing** ensures the total load is distributed as evenly as possible across the three phases of the distribution grid.

- **Automated Switching for Feeder Restoration or Loading** helps reconfigure the distribution system after a fault and quickly restores service.

Operationally, the smart grid provides increased reliability, more effective asset and energy management, and reduction of CO_2 while integrating systems and devices on the distribution grid. This enables utilities to operate systems close to real time and at a more granular level, increasing efficiency and reliability. The smart grid is the foundation of the way utilities and customers will manage energy in the future.

Two-Way Distribution: Present ➡ Future

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Why is Capgemini's Smart Energy Services Unique?

Capgemini's Smart Energy Services are real, in the market now, and already making a difference for utilities around the world. We support utilities and their customers by delivering sustainable energy efficiency and environmental solutions—transforming utility operations and customer fulfillment. Our commitment is strong with more than 7,000 professionals dedicated to the utility sector.

Capgemini's Smart Energy Services:

- Has extensive utilities industry experience with an unequaled track record for successful innovation and delivery. We offer our clients lessons learned and a growing knowledge base

- Leads the industry in the delivery of smart energy solutions in mass deployment and production

- Offers a unique, turn-key solution called Managed Business Services, which has a usage-based pricing model

- Offers strategic relationships and delivery experience from an ecosystem of long-standing global technology partners

For more information about Smart Energy Services, please visit www.capgemini.com/smartenergy.

About Capgemini and the Collaborative Business Experience

Capgemini, one of the world's foremost providers of consulting, technology and outsourcing services, enables its clients to transform and perform through technologies. Capgemini provides its clients with insights and capabilities that boost their freedom to achieve superior results through a unique way of working, the Collaborative Business Experience™. The Group relies on its global delivery model called Rightshore®, which aims to get the right balance of the best talent from multiple locations, working as one team to create and deliver the optimum solution for clients. Present in more than 30 countries, Capgemini reported 2009 global revenues of EUR 8.4 billion (approximately USD $11.6 billion) and employs 90,000 people worldwide.

More information is available at **www.capgemini.com/smartenergy**

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