

Building A Smarter, More Reliable Grid



The emerging age of digital technology places greater demands on the electric power grid for safety, reliability, power quality and cost control. Fortunately, this same digital technology is being used to meet these demands in what is being called the “Smart Grid.” Southern California Edison (SCE) leads the nation in applying the remarkable new discoveries of this digital age to the way electricity is delivered to homes and businesses.

What Makes a Grid Smarter?

- Manual systems, still commonplace, now can be computerized to ensure more rapid, accurate, automated responses to grid conditions that can change at a pace only a microprocessor can match.
- Electro-mechanical devices, which are prone to mechanical failures, can be replaced with digital systems that have no moving parts.
- Grid operators can obtain more information, faster, about the causes and impacts of power outages, dispatching repair crews more quickly and precisely to trouble spots.
- Advanced sensors and computing systems now can be used to monitor indications of stress created by constantly fluctuating supply-and-demand conditions at any point on the grid.

SCE's Smart Grid Principles

SCE's vision of a smart grid is based on technology solutions that are now within reach, many of them deployed on SCE's grid. Key elements of our vision include interoperability, better information and control, and advanced security.

INTEROPERABILITY – Building a smarter grid means challenging grid component suppliers to produce plug-and-play devices that are compatible with other smart grid devices, reducing utility and customer costs. SCE's industry-leading advanced metering program –

Edison SmartConnect – is an example of this vision. SCE was the first utility to require broad interoperability and forward compatibility in the design of a new meter system. The metering industry responded with a better product at a better price.



BETTER INFORMATION, BETTER CONTROL– One of the challenges grid operators face is knowing exactly what is happening throughout the transmission grid, in real time, and having adequate controls to respond fast enough to prevent problems before they affect customers.



We have only recently reached the point where we can quickly and affordably analyze data from a large power grid. An example of this break through is **Synchronous Phasor Measurement** technology, an integration of hardware

and software that SCE engineers have pioneered during the past 12 years. The system captures millions of grid stress-point measurements, analyzes them, and synthesizes the data into a simple visual representation that allows operators to almost instantly see where action is needed to avoid widespread electric system collapses.



A related challenge faced by operators is isolating problems on the distribution grid. SCE's new **Avanti Circuit**, that went into service in August 2007, will be the most advanced distribution circuit in the country.

Its fault-current limiters, smart circuit breakers, and advanced voltage-support devices will be capable of isolating it from problems on adjoining circuits, and vice versa; limiting the number of customers affected. The impact of service disruptions will be reduced, thus improving reliability and safety for the public and our employees.

ADVANCED SECURITY – The smart grid must be a secure grid. Advanced data security systems are needed as utilities capture exponentially more information about grid conditions, transmit it to control centers wirelessly or with high-speed fiber optics, and send control signals back across the same communications systems. SCE is leading the industry effort to advance smart grid security to meet this challenge.

Smart Grid Features and Benefits

- New service options such as remote service activation
- Increased control of energy costs
- Connectivity to new “communicating” appliances
- Enhanced service reliability
- More stable, higher-quality electricity
- Shorter outages
- A “self-healing” grid, capable of self-assessment and self-correction
- The ability to minimize energy loss.

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