

## Building A Smarter, Greener, More Reliable Grid



Electricity fuels the digital age. Consumers are using more electricity in more ways than ever before to power complex, sensitive computerized equipment in the workplace and at home. However, many of the electricity grids supporting America's high-tech culture are still low-tech, employing technologies developed decades ago. Southern California Edison (SCE) leads the nation in

applying the remarkable advances of the digital age to the way electricity is delivered to homes and businesses.

### What Makes a Grid Smart?

- Manual systems, still commonplace, can be computerized to provide 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 with no moving parts.
- System operators can obtain more information, faster, about the causes and impacts of power outages, dispatching repair crews more quickly and precisely to grid trouble spots.
- Advanced sensors and computing systems can be used to monitor the constantly fluctuating power supply-and-demand conditions, identifying grid stress points.

### Edison's Smart Grid Vision

SCE's vision of a smart grid is based on technology solutions that are within reach, many of them already 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 suppliers to produce plug-and-play devices that are compatible with other smart grid devices, reducing utility and customer costs.

**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 AND 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.

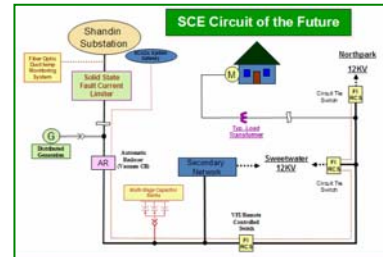


We have only recently reached the point where we can quickly and affordably analyze data from a large power grid.

**Synchronous Phasor Measurement** technology, is an integration of

hardware and software that SCE engineers pioneered during the past 12 years. The system captures millions of grid stress-point measurements, analyzes and synthesizes the data into a simple visual representation that allows operators to see almost instantly 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 **Circuit of the Future** is 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** – A smart grid is 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.

### A Summary of Smart Grid Features & 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