



Interoperability

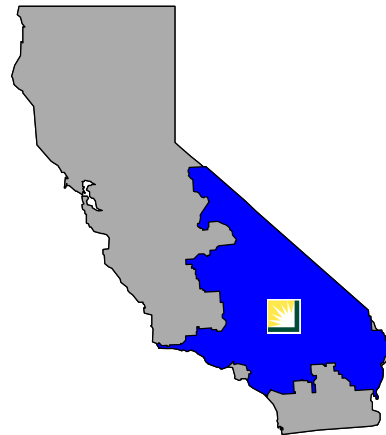
A Key Element for Integrating Distributed Energy Resources into Smart Grids

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- » ***Southern California Edison*** is one of the largest electrical utilities with 4.67 million customers in its 50,000 square mile territory serving 430 cities and communities.
- » Nearly 14,000 Employees
- » SCE adds 70,000 New Customers each year.
- » 5396 Transmission(1,196) and Distribution circuits(4,200).
- » 857 Total Substations
- » Southern California Edison, started in 1897, has over a century of experience serving its communities.





SCE's Commitment to Technological Advancement

- *Rising customer expectations and the needs of a technology driven economy demand superior safety and reliability from electrical systems....at no increase in cost.*
- *SCE's research initiatives are focused on technological advancements for its electric Transmission and Distribution Systems.*



» *GridWise™ is a vision for transforming the nation's electric power grids using advanced communications, automated controls and other forms of information technology.*

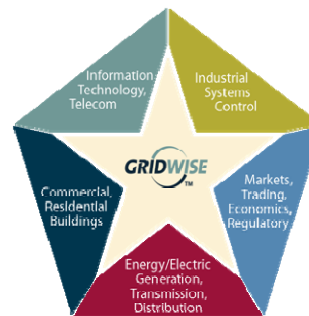


The GridWise Architecture Council's (GWAC) work in Interoperability will help facilitate integrating large numbers of DER with utility systems




» **GridWise Architecture Council (GWAC) Mission**
To establish broad industry consensus in support of technical principles that enable the interoperability necessary to transform electric power operations into a system that integrates markets and technology to enhance our socio-economic well-being and security

- » Council consists of 13 members
- » Members have various expertise
- » Provides forum to bring new ideas across various industries
- » Focus on developing broad-based buy-in and input regarding interoperability



GWAC Supports DER

- » *The interoperation of electric systems along with their controls and components has many commonalities with the integration of resources in other large systems*
- » *Integration of DER into electric utility systems will lead to internet based solutions*
 - Access to information (e.g., energy service network)
 - E-commerce contracting and settlement
 - Remote monitoring and control
- » *Integration of intelligent DER requires secure communication paths, privacy rights, and audit trails with decentralized schemes for command and control*



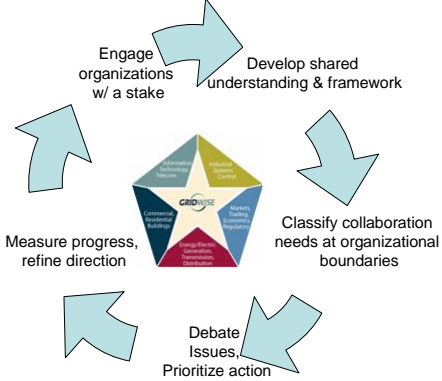

» *GWAC continues to reach out to those with similar DER visions*

» *Developing a roadmap for interoperability*

» *Establishing forums for various groups involved in similar visions*

» *Future deliverables:*

- Interoperability issues and requirements
- Strategic roadmap for interoperability

SCE Supports DER

» *SCE helped forge revisions to California's Rule 21 and IEEE's 1547 interconnection standards to facilitate the interconnection of smaller DER facilities*

» *SCE has approved and interconnected its electric systems with many DER facilities*

- Approximately 4000 projects totaling 270 MW

» *SCE continues to develop and tailor methods, processes and agreements to accept and integrate customer owned DER*

» *SCE is open to collaboration with the DER community and has produced useful revisions to its interconnection contracts, tariffs, and processes*

Improved Utility – DER Communications

- » **Developing secure Internet monitoring and control of DER in an individual and aggregated manner.**
- » *Technical proof-of-concept for aggregated DER monitoring and controlling by multiple parties with differing authority*
- » *Connected Energy - project lead, DOE funded*
- » *CEC joined and funded for DR*
- » *Total Project funding: \$2.8M*

Integrating DER In Distribution Design

- » *Purpose is to evaluate the use of temporary DER for grid support*
- » *Will provide improved grid reliability under stressed conditions*
- » **Project is a part of SCE's Circuit of the Future initiative which includes many other new technologies:**
 - Potential opportunities VAR control and load management
 - Improved operations
 - Intelligent distribution circuits
 - Peer to peer coordination for auto circuit reconfiguration
 - Added Intelligence



*Interoperability is the Key to
Integrating DER with Tomorrow's
Electric Systems*

SCE, through its support and participation with GWAC and other research efforts is facilitating the useful and economic integration of DER