

Distributed Energy Resources Integration

Southern California Edison

ORNL DECC Program Meeting

October 11, 2007



This Presentation will Discuss...

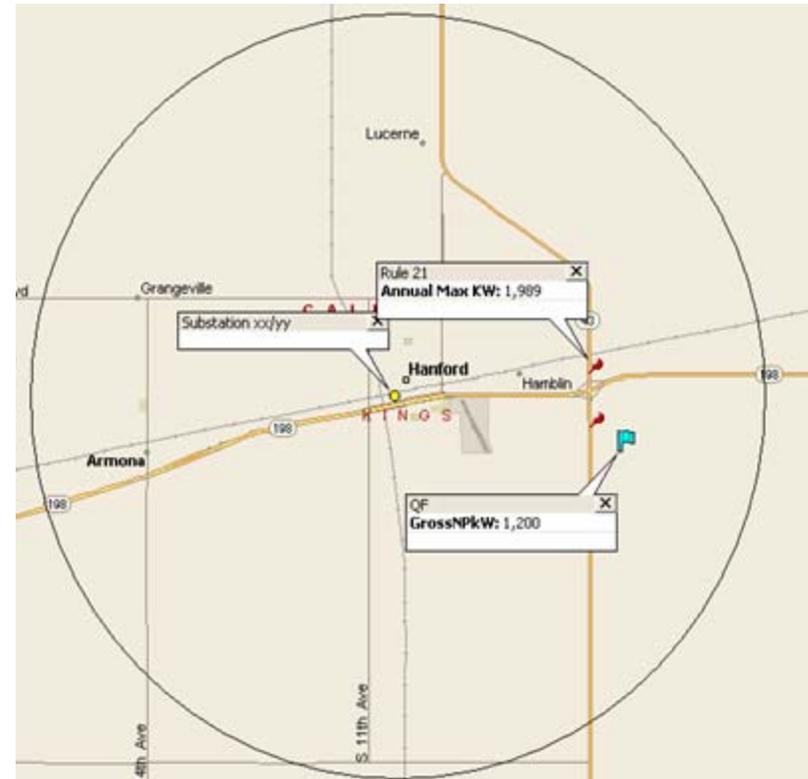
- SCE DER Advocacy and Activity
- SCE DER Research

DER Advocacy

- SCE helped forge revisions to Rule 21 to facilitate the interconnection of DER facilities
- SCE has approved and interconnected many DG facilities
 - Approximately 4,000 projects totaling 270 MW
- SCE DER supports development of interconnection criteria and tariffs that enable access to beneficial grid-friendly capabilities
 - IEEE 1547, California's Rule 21
- SCE DER offers industry perspective and interest to active and proposed research
 - Advanced Device Development & Demo
 - Renewable Resource Integration
 - Microgrids

DER Activity, DG for Distribution Planning

- CPUC mandated that California utilities consider DG installations in lieu of distribution line upgrades
- Annual review of opportunities for upgrade offset opportunities
- SCE is developing methods, processes and agreements to allow for customer owned DG



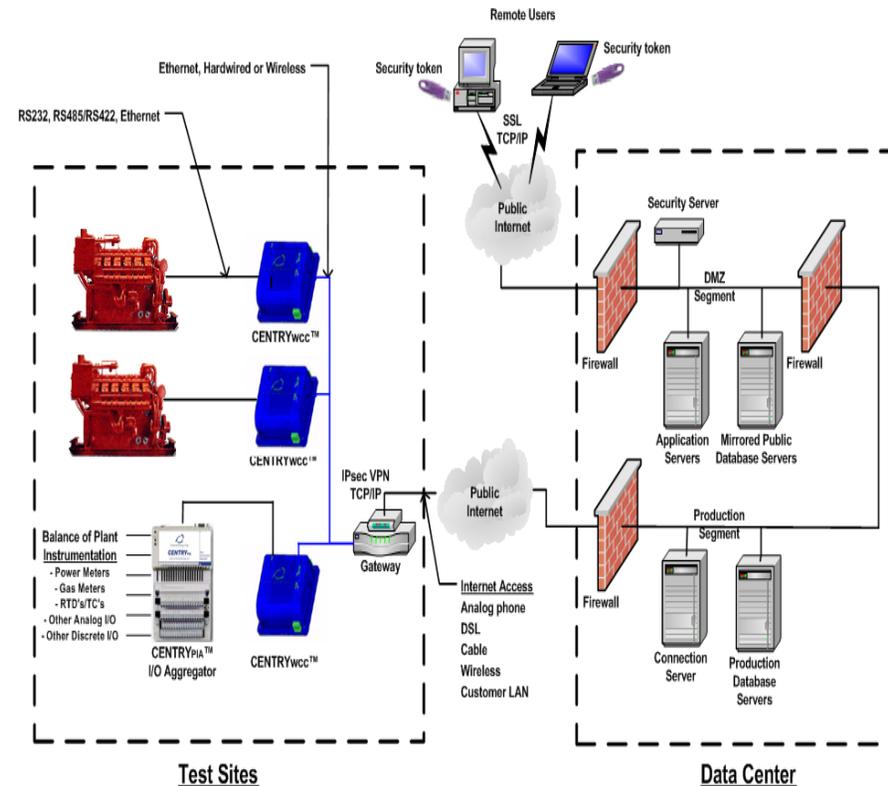
DER Research, Microturbine Testing

- Test Facility at UC Irvine
- SCE has tested microturbines since they first emerged in 1997, 14 MTG's, 80,000 hours
- SCE tests for performance against manufacturer's spec
- Evaluate installation and operation experience



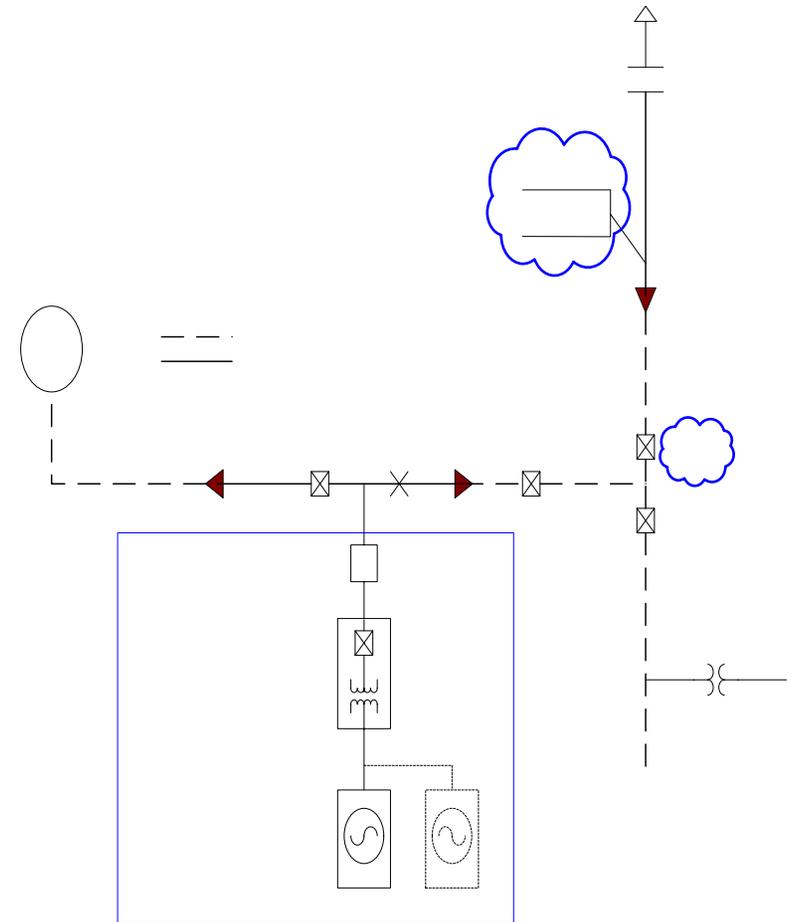
Advanced Communications and Control of DER

- Demonstrate secure Internet monitoring and control of DER in an individual and aggregated manner
 - Phase 1 -- SCE's Catalina units monitored
 - Phase 2 -- LA County Sanitation District four DG units with over 50 MW of DER to be monitored
 - Future phase: Further integrate aggregated DG with Demand Response (DR) from a common C&C capability
- Vision; DG market monitored and controlled by multiple parties with differing authority



Portable DER and Universal Interconnection Trailer

- Demonstrate the use of portable DER for grid support. A universal interconnection trailer has been designed, and built. Will be tested, and demonstrated to provide for grid-parallel operation of the portable DER
- This DER project is a part of SCE's Circuit of the Future which includes many other new technologies in addition to DER, such as
- Potential opportunities VAR control and load management
- Improved operations
- Intelligent distribution circuits
- Peer to peer coordination for auto circuit reconfiguration
- Data sources
 - Various SCADA Systems
 - Distribution device sensors
 - Increased localized intelligence



Other DER Related Research

- Integrated Control of Next Generation Power Systems
 - West Virginia University (project lead), NETL and SCE DER
- High Efficiency Inverter for Solid Oxide Fuel Cells
 - Virginia Tech (project lead) and SCE DER
- Inverter with Reactive Power Management Functionality
 - Mesta Electronics (project lead) and SCE DER
- Grid-Control Algorithms & Hardware to Enable High Distributed Energy Resource Penetration and Increased Electric-Grid Operating Margin (aka Catalina Renewable DG, *Proposed*)
 - OCC (project lead), ORNL, CE and SCE DER