Smart Grid Implementation at the Sacramento Municipal Utility District

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March 2, 2010

Presentation

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About SMUD

- SMUD is the nation's sixth largest community-owned electric utility
- SMUD provides power to 600,000 customers in a 900-square-mile service area
- SMUD is committed to maintaining a high level of customer satisfaction
- SMUD's vision is *to empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region*

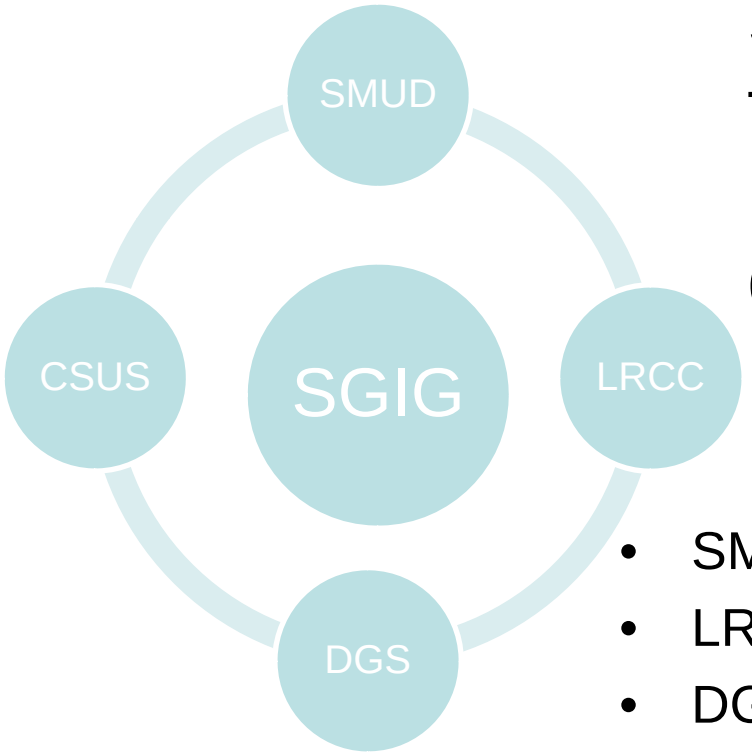
SMUD's Smart Grid Vision

- A comprehensive regional smart grid solution built upon the installation and operation of an end-to-end smart grid that extends from generation to the smart meters of all SMUD's customers. It will:
  - Link smart meters and home area networks with upstream, automated distribution operations
  - Optimize distribution system operations to improve system reliability and efficiency
  - Enable our customers to fully participate in the electricity marketplace through dynamic pricing and demand response programs

SMUD's Smart Grid Grant

- SMUD received a $127.5M Smart Grid Investment Grant from DOE to implement:
  - Advanced Metering Infrastructure/Smart Meters
  - Consumer Behavior Study (Dynamic Pricing)
  - Demand Response
  - Distribution Automation
  - PHEV/EV Infrastructure
  - Customer Applications (Partner Projects)
  - Cyber Security

SMUD's Smart Grid Partners



SMUD has partnered with three public agencies to implement the Smart Grid grant.

Partners

- SMUD – Sacramento Municipal Utility District
- LRCCD – Los Rios Community College District
- DGS – CA, Department of General Services
- CSUS – California State University, Sacramento

Smart Meters

- Smart meter installation is the foundation and first step in SMUD's smart grid
- Smart Meters project will install a communication network and deploy smart meters for all customers
- Project benefits:
  - Reduce operating costs
  - Improve customer service
  - Support new energy efficiency, demand response and time based pricing programs

Consumer Behavior Study

- SMUD will conduct a large-scale dynamic pricing study to test:
  - Customer response to Critical Peak Pricing
  - Customer preferences for information and messaging
  - Ability of customers to reduce peak demand and energy using enabling technologies (such as programmable communicating thermostats)
  - Customer acceptance and response to new technologies and pricing options

Demand Response

- SMUD will provide 50,000 residential and small commercial customers with enabling technologies (such as home energy management systems) that allow them to participate in direct load control and pricing programs
- SMUD will work with medium and large commercial customers to provide technical assistance and enabling technology that allows them to automatically respond to peak prices by reducing load
- Benefits
  - Provides customers with tools to manage their bills
  - Reduces system peak
  - Enables dynamic pricing options

Distribution Automation

- SMUD will implement a comprehensive package of distribution system automation controls and systems to:
  - Expand SMUD's supervisory control and data acquisition (SCADA) system
  - Install intelligent switching and monitoring equipment
  - Implement an advanced Distribution Management System (DMS)
  - Demonstrate the interoperability between the energy management system (EMS), outage management system (OMS), the DMS and AMI
- Benefits
  - Improved system efficiency
  - Reduced operations and maintenance costs
  - Improved reliability

PHEV Infrastructure

- Installation and operational testing of 103 smart grid plug-in hybrid electric vehicle (PHEV) charging stations
- Direct load control enabled equipment will support a pilot program that shifts PHEV and EV recharging from peak to off-peak periods
- Future applications of PHEV/EV charging infrastructure can include:
  - Vehicle to home charging
  - Distributed resources for utility grid management
  - Customer battery storage

Partner Projects

- At each partner campus energy management systems will be installed or updated to save energy and reduce peak loads
- The CSUS distribution system will be upgraded to increase grid reliability
- PHEV/EV charging stations will be installed at all three partner campuses
- Smart meters will be installed on all 57 buildings on the CSUS campus

Cyber Security

- SMUD's smart grid will enact security programs and procedures that meet or exceed government mandated standards
- This is a continuation of SMUD's current best practices with increased resources to support smart grid initiatives

Where We Are Today

- Moving forward with the Smart Meters project:
  - Communication network 96% complete
  - 40,000 meters installed
  - 95% customers satisfied with installation
- Working with DOE to negotiate a final grant contract
- Meeting with equipment and software vendors to determine technology landscape
- Purchasing and testing equipment to determine what will be deployed

Questions?

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