Sempra Utilities

Combined Service Areas

- Largest energy utility customer base in US with over 7.6 million meters serving 29 million customers
- 13 counties
- 233 municipalities
- Population - 22 million
- 6.7 million residential households
- 325,000 small commercial & industrial customer accounts
- 1,600 large commercial & industrial accounts
Filing (Section 11) –
COMMUNICATION SYSTEM, ELECTRIC METERS and PCTs (July 2006)

“AMI is an important and foundational building block for SDG&E’s long term operating vision. This vision necessitates the deployment of technologies that will transform our electric system into a smart grid.”

Source: SDG&E A.05-03-015 -- Advanced Metering Infrastructure Deployment Scenario and Associated Cost Recovery and Rate Design
Vision

• The Electric grid evolves to incorporate advances in information technology, communication systems and new operational technologies

• Ubiquitous communications backbone
  • Sensors

• Information technologies
  • New Applications

• New operational technologies
  • Advanced distribution
Value Proposition

- To utility
  - Operations, asset management, distributed generation
- To consumer
  - Real-time access: information, choices
- To society
  - Renewables, jobs, market opportunities
- To regulators
  - Aging assets, competition, modern economy, environment, reduced dependence on petrochemical fuels
Smart Meter - Smart Grid

- Infrastructure from back office - into meter – then into the home
- Measure power quality and disturbances
- Support automation
- Incorporate solar, electric vehicles
Smart Grid Basics

**It’s a concept, not a system**
- Interactive with Consumers and Markets
- Adaptive
- Optimized to make best use of resources
- Predictive rather than reactive
- Accommodates generation options
- Integrated system

**Technology**
- Digital
- Advanced communication
- Self healing
- Lots of sensors
- Automated control
AMI: Foundational

Future Vision: optimize use of technology to improve service to customers and operational efficiency

The Smart Home

Intelligent Appliances
Self-heal; Self-sense
Real-time Analytics
Central Automated Operations
Intelligent Dispatch

AMI

TODAY

FUTURE
Smart Grid
Information Transition

Today

Smart Grid

Data Volume

High

Low

Real Time

Time

Days

Operations

Customer

Assets

Data Volume

High

Low

Real Time

Time

Days

Customer

Operations

Assets
What Does AMI Enable?

**Near Term**

- Meter reading
- True Outage Management – from detection to restoration.
- Real and accurate load research
- Distribution Transformer Load Management (DTLM)
- DR programs – from direct load control to customer programs
- Grid efficiency – Tamper and loss detection
- Customer Empowerment - Information
What Does AMI Enable?

*Long Term*

- Distribution planning optimized in real-time
- Broad Scale Distribution Automation
- DR programs – EMS system-wide and into the home working together in real-time.
- Grid efficiency – Real-time phase balancing, loss detection and correction, network switching.

- Customer/Utility partnerships to truly manage the load curve for the entire connected network.
Smart Home, Smart Grid, Smart Systems

- Empowers Customer
  - Integrated information from utility
  - Outage detection
- Load Management
  - Intelligent net metering
  - Distributed Energy Resources
- Operational Efficiencies
  - Future field communications
  - Accurate asset health data
  - Situational data in real-time
  - Power quality collection
- Built with the future in mind
  - Upgradeable communications
  - Future customer service offerings
• Meter and meter communication system
  • Gateway between the utility and the consumer.
• It all started with PCT functions
  • Utility controls load by communicating with PCT
  • Grid reliability demand-response (DR) program
Communications

- Designed for two-way information flow
  - New services could be added
  - Require WAN high-speed communications
- Home area network (HAN)
  - Open industry standards, non-proprietary, interoperability
  - Working with the other CA IOU’s
  - Secure means of sending information between utility and end points (tolerant of attacks)
- Communications infrastructure supports long-term vision to collect:
  - Power quality information
  - New sensor data for smart grid, building automation designs
  - Grid state (monitoring, automation)
Software

- Ability to leverage outage management systems to detect outages
- Ultimately enable transmission and distribution (T&D) operations to sense and review information from many data sources
  - Either aggregation or as finely detailed as necessary
- Communicate with consumer whereby system designed to add new functionality as customers require
  - Provide DR and energy efficiency information to consumer via PCT, in-home display, other enabling technology
  - May offer consumer centralized energy management system or allow use of information to manage own system
Smart Metering West Coast 2008, Seattle, WA

HAN Capabilities

- Supports a secure two way communication with the meter
- Supports load control integration
- Provides direct access to usage data
- Provides a platform for future customer owned products which leverage meter data and utility/grid information
- Supports three types of communications: public price signalling, consumer specific signalling and control signalling
- Supports solar/distributed generation and plug-in hybrid metering
- Supports gas and/or water meter communications
Summary

Technology Considerations

Any broad scale deployment should include:

- Careful consideration of network topology
- Smart meters and communication infrastructure
- Capabilities that enable remote and proactive system analysis feeder by feeder

- Examination of where you want to be in 15 years, not just 5 years.
Contacts

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