Smart Grid in California

California Public Utilities Commission
December 17, 2008
California Committed to Implement Smart Grid

• Statewide advanced metering deployment launched in 2006

• California regulatory agencies are launching key Smart Grid initiatives
  – California Public Utilities Commission (CPUC)
  – California Energy Commission (CEC)

• Three large Investor-Owned Utilities have significant Smart Grid initiatives in progress

• Smart Grid legislation currently pending in California legislature
Advanced Metering Deployment Progressing in California

- In 2003, CPUC adopted a policy that all electric customers should have advanced meters.
- Advanced meters in place now for customers with greater than 200 kilowatt (kW) maximum demand.
- System-wide advanced metering deployments approved for Pacific Gas & Electric and San Diego Gas & Electric and Southern California Edison.
- Concurrent tariff changes to offer time-of-use and dynamic pricing.
## California Advanced Metering Initiative Summary

<table>
<thead>
<tr>
<th></th>
<th>Pacific Gas &amp; Electric</th>
<th>San Diego Gas &amp; Electric</th>
<th>Southern California Edison</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Electric Meters</td>
<td>5.1M</td>
<td>1.4M</td>
<td>5.3M</td>
</tr>
<tr>
<td># of Gas Meters</td>
<td>4.2M</td>
<td>0.9M</td>
<td>Gas Utility may connect to AMI</td>
</tr>
<tr>
<td>Costs Approved</td>
<td>$1.7B in July 2006</td>
<td>$0.6B in April 2007</td>
<td>$1.7B</td>
</tr>
<tr>
<td>Costs Pending Approval</td>
<td>$0.6B to upgrade</td>
<td>-</td>
<td></td>
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<tr>
<td>Deployment Schedule</td>
<td>2006 to 2012</td>
<td>2008 to 2011</td>
<td>2009 to 2012</td>
</tr>
</tbody>
</table>

- Note: The table pertains to meters for utility customers with maximum load less than 200 kW. Customers with maximum load greater than 200 kW already have advanced meters.
Enable dynamic pricing & feedback to Utility and Customer
- Track hourly or more frequent usage data: measure, store, transmit
- Implement price responsive tariffs:
  - Time of use, critical peak pricing, real-time pricing
- Provide two-way communication with utility
- Provide customers access to usage data and dynamic prices
  - Understand usage patterns & their relationship to energy costs

Increase system efficiency
- Enhance system operating efficiency
  - Auto meter reading, outage management, improved forecasting, theft reduction
- Interface with Direct Load Control communication technology
- Support billing, customer support, outage management applications
Two Methods of Providing Customer Feedback

Path 1 – Internet (1-way, next day)

Path 2 – HAN (2-way)

Smart Meter

Website

Existing IOU Data System
California Regulatory Agencies Pursuing Smart Grid

- **California Energy Commission (CEC)**
  - Held two public workshops on Smart Grid
  - Public Interest Energy Research group to fund development of 2020 Smart Grid goals

- **California Public Utilities Commission (CPUC)**
  - Held Smart Grid roundtable
  - Plan to open Smart Grid Rulemaking in December 2008
CPUC Smart Grid Rulemaking Expected in Late 2008

- Comply with federal Energy Independent Security Act of 2007 and potential new state law
- Develop state-wide Smart Grid vision and consistent framework
- Process expected to last two years
  - Initiate public workshops
  - Explore role of standards
  - Consider other policy issues
Smart Grid in California

- Digital
- Advanced Communications
- Predictive & Self-Healing
- Sensors & Automation

- Integrated (Distrib. Gen, Storage, PHEV)
- Smart Meters
- Interactive, Real-time info
- Standardized & Evolving

Figure Source: Southern California Edison Company
California IOU Smart Grid Investments in Progress

• Three largest investor-owned utilities have significant smart grid initiatives already in progress. Some examples:
  – Advanced metering infrastructure
  – Substation and Distribution automation
  – Grid failure prevention, detection, repair
  – Enable integration of Distributed Energy Resources
  – Operational efficiencies

• No specific Smart Grid related regulatory framework is guiding these deployments to-date
Key provisions:

• Lays out goals for a state-level Smart Grid initiative
• References same “characteristics” of Smart Grid identified in federal Energy Security Independence Act of 2007
• By July 2010, the bill would require the CPUC to...
  – “Adopt” standards & protocols developed by industry and government standards groups, and
  – “Determine requirements” for Smart Grid deployment plans
  – Consult with CEC and California Independent System Operator in performing above tasks
• One year later, utilities would be required to submit their Smart Grid deployment plans for approval
Links to Related Documents

• Pacific Gas & Electric Advanced Metering Decision (July 2006)
  http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/58362.htm

• San Diego Gas & Electric Advanced Metering Decision (April 2007)
  http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/66766.htm

• California Energy Commission Smart Grid Workshop
  http://www.energy.ca.gov/load_management/documents/
  (see section dated April 29, 2008)