



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

| | Pacific Gas & Electric | San Diego Gas & Electric | Southern California Edison |
|-------------------------------|-----------------------------------|-------------------------------------|---------------------------------------|
| # of Electric Meters | 5.1M | 1.4M | 5.3M |
| # of Gas Meters | 4.2M | 0.9M | Gas Utility may connect to AMI |
| Costs Approved | \$1.7B in July 2006 | \$0.6B in April 2007 | \$1.7B |
| Costs Pending Approval | \$0.6B to upgrade | - | |
| Deployment Schedule | 2006 to 2012 | 2008 to 2011 | 2009 to 2012 |

➤ 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.





Advanced Meter: Minimum Functionality

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

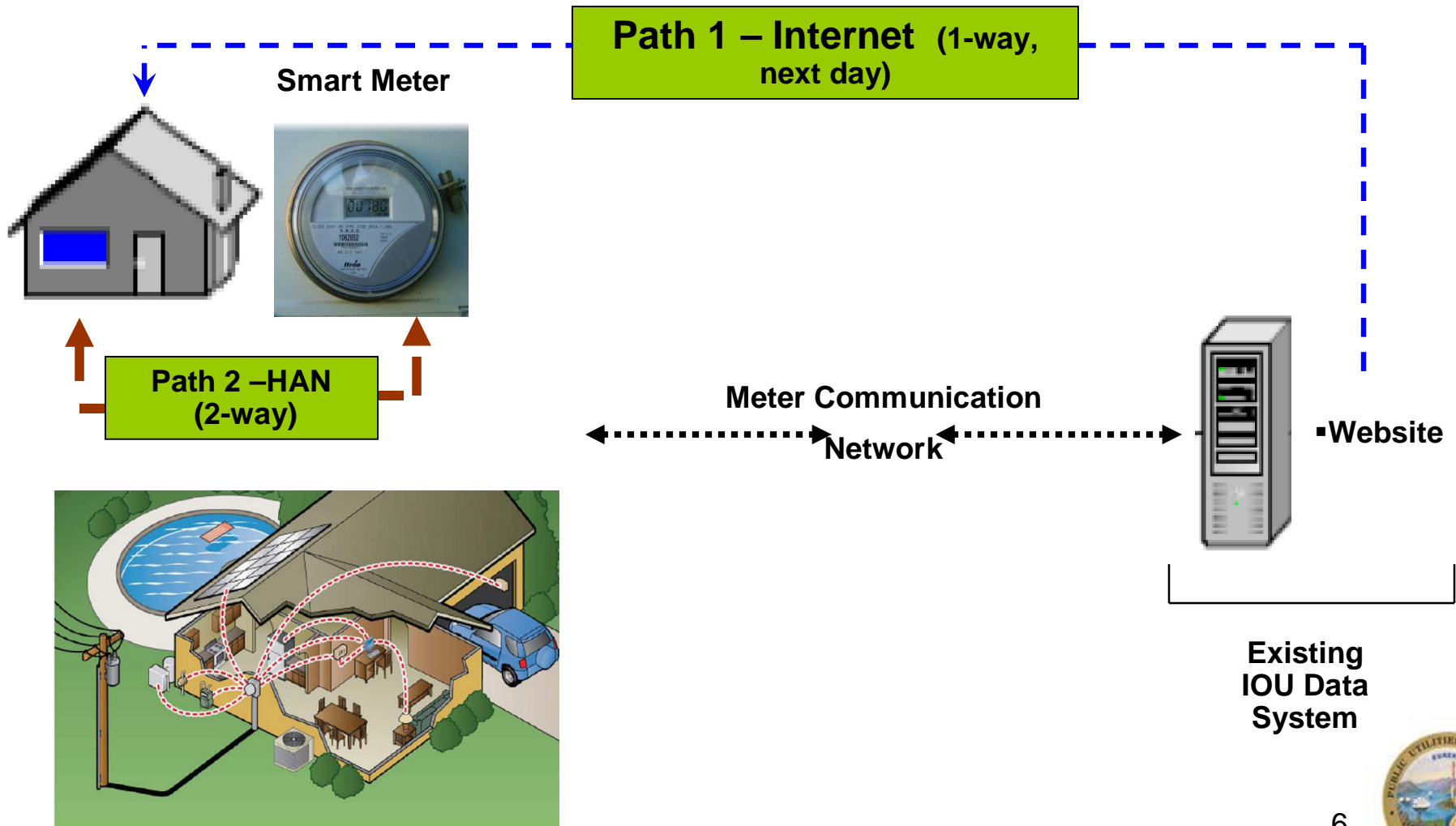
Increase system efficiency

- 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





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

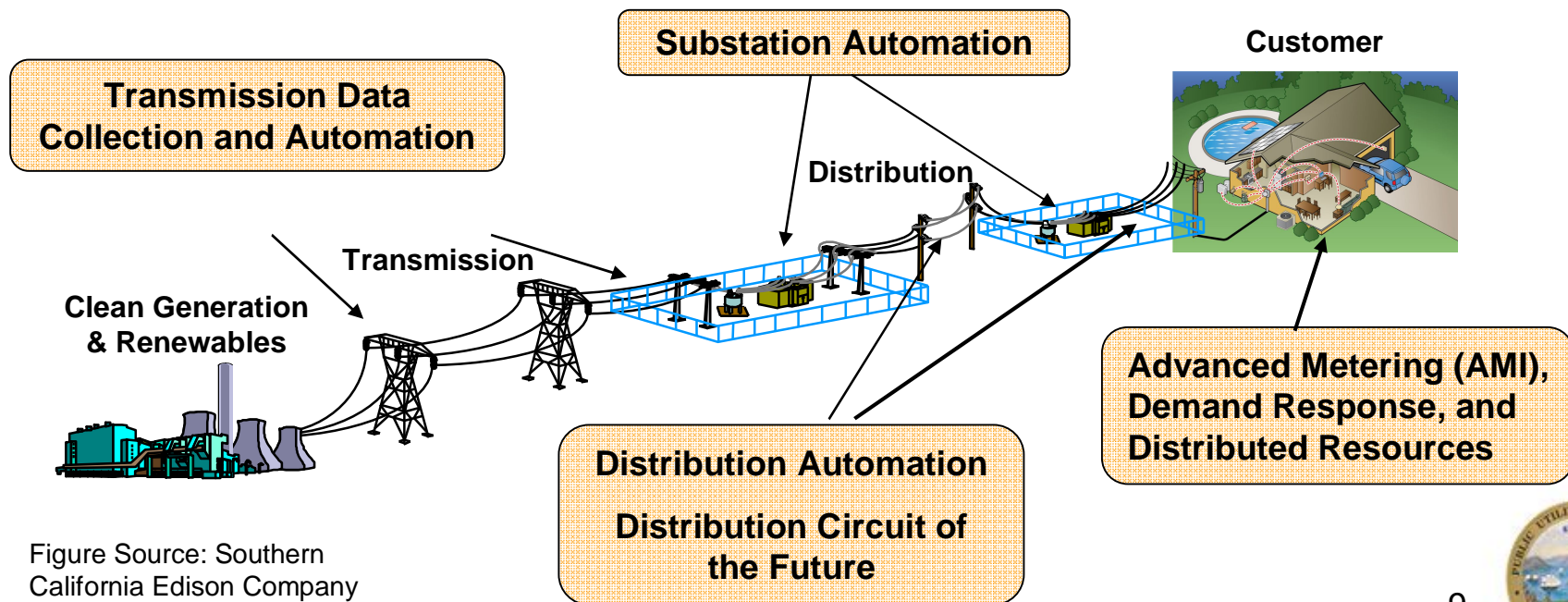


Figure Source: Southern California Edison Company





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**





Pending California Legislation: Senate Bill 17

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)

