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# Citizens' Utility Board CLE on Smart Grid

Susan Ackerman  
Commissioner



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# Outline

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- Smart Grid Definition
- Potential Benefits of Smart Grid Investments
- Commission Actions
- Commission Investigations



# Smart Grid Definition

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- Information, communication, and control devices and software used to improve the control and operation of the entire power system and provide users with real-time information
- Key elements:
  - Two-way communication capability
  - “Smart” devices (e.g. sensors and meters to monitor and measure digital information)
  - Advanced controls (to use information to manage, optimize, simulate, etc)



# Smart Grid Definition

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- Sample technologies:
  - Advanced meters
  - Synchrophasors
  - Digital switches
  - Appliance control circuits



# Potential Benefits of Smart Grid Investments

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- Increased quality and reliability of service
  - Real-time information on the state of the power grid
  - Reduced time and cost to detect system problems that could lead to outages and to locate actual outages
  - Fewer, shorter outages and interruptions
  - Faster restoration of service after outages
- Lower cost of utility operation
  - Reduced cost of meter reading and billing
  - More efficient use of existing transmission and distribution system
  - Optimal capital investments
  - Reduced cost of integrating renewable resources into the grid



# Potential Benefits of Smart Grid Investments

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- Enhanced capability to save energy and reduce peak demand
  - Provide customers more timely information on usage
  - Allow optimal control of energy-using equipment
  - Give price signals to customers closer to time of usage

# Commission Actions: Order 08-245

- In 2008, Commission approved PGE's application to replace 825,000 conventional meters with advanced meters
  - Advanced meters measure and record usage data over short time intervals and transmit it as needed
  - Two-way communication between utility and customer
- PGE justified the investment on operational savings (primarily reduced meter reading costs) only

# Commission Actions: Order 08-245

- Commission attached conditions to its approval, including:
  - Report on installation status and customer response
  - Implement a voluntary critical peak pricing pilot
  - Implement an automated demand response pilot
  - Offer a peak demand reduction program for large users
  - Develop plans to use detailed usage data to:
    - Reduce transformer failures
    - Size transformers properly
    - Delay the need to increase capacity of distribution system conductors

# Commission Actions: Order 08-245

- Develop plans to use information on power system and meter status to:
  - Reduce trouble calls
  - Identify system faults faster
  - Speed up restoration after outages caused by storms



# Other Commission Actions

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- Idaho Power replaced conventional meters with advanced meters for its Oregon customers.
- Required Pacific and PGE to evaluate and install measures to improve the efficiency of its distribution systems.
- The Commission sponsored two workshops to hear from national experts
  - Discuss alternative visions of the future of the Smart Grid
  - Identify technical and regulatory issues the Commission should address
- Established a policy to require utilities to consider and evaluate a Smart Grid investment where a Smart Grid technology is a viable alternative.

# Current Investigations: Smart Grid Policies

- In 2010, Commission sponsored workshops and solicited comments to establish its Smart Grid policies and planning requirements.
- In May, Commission issued an interim order (Order No. 11-172) setting forth four directives:
  - Utilities to report on the status of current and planned smart grid investments, projects, and activities.
  - Commission staff to report on Smart Grid technologies, applications, and practices, and Smart Grid investments being made across the U.S.
  - Parties to meet in issue-oriented workshops to address information and privacy requirements and standards; cyber security; interoperability of equipment; role of utility in home energy management; and any other topic deemed necessary by the parties.

# Current Investigations: Smart Grid Policies

- Commission to address time-varying pricing in a separate docket, UM 1415.
- All tasks completed by utilities, staff, and parties
- On October 17, the Commission held a workshop to air the results from the issue workshops and hear from companies and staff on information reports.
- Future Commission order will set policy and planning guidelines and requirements



# Current Investigations:

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- UM 1415: Evaluate use of pricing that varies by time (e.g. hour, day, season).
  - Smart meters enable these pricing mechanisms because they:
    - Collect usage information over short time intervals (compared to monthly with conventional meters for residential customers)
    - Allow price signals to be communicated to customers.
- UM 1461: Establish electric vehicle policies.
  - Smart Grid can:
    - Allow pricing that encourages recharging during off-peak periods
    - Enable electric vehicles to back up the electric grid (V2G)



# Summary Observations

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- Smart Grid investments hold significant promise but can be tough to evaluate.
- Commission Test: Will benefits of Smart Grid investments exceed the cost?
- Utilities should be evaluating Smart Grid technologies and applications; developing plans for investments in a collaborative process; and seeking out investments that enhance service and yield benefits to consumers.



## Order No. 11-172, p.2.

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“The Commission’s core regulatory responsibility, and the utilities’ primary responsibility as electric service providers, is to ensure ‘adequate service at fair and reasonable rates.’ Smart grid investments must therefore assist the Commission and the utilities in meeting this responsibility. [S]mart grid investments have the potential to improve the quality and reliability of utility service, give customers options to manage their energy use, and lower the utility’s overall cost of service. The Commission expects utilities to consistently evaluate developing smart grid strategies and technologies, and to seek out those smart grid investments that will enhance service and produce a benefit to customers.”