



Senate Committee on Environment
and Natural Resources

Smart Grid

John Savage
Commissioner



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Outline

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



Smart Grid Definition

- 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

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



Potential Benefits of Smart Grid Investments

- 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

- 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

- 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 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.
- By the end of the year, the Commission will hold 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:

- 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

- 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.