PECO’s
Smart Grid & Meter Plan

Glenn Pritchard
What is a Smart Meter?

- The formula to find the area of a circle is $\pi r^2$.
- The capital of South Dakota is Pierre.
- A typical candy bar has 35.1 grams of carbohydrates.
Smart Meters / Smart Grid

Smart Meters are the foundational element of a Smart Grid

**Smart Home/Business**
- Real-time usage and pricing statistics
- Home Area Network composed of smart devices and appliances that know the price of energy

**Smart Meters (AMI)**
- A method to enable two-way information flow
- System status, customer outage status, usage and pricing signals delivered to and from location

**Smart Distribution System**
- Real-time reporting of status and outages
- Automated controls of relays and reclosers. Efficient field force management
- Effective interconnection of renewable energy sources

**Smart Utility**
- More efficient data collection, processing and back office functions

Leveraging *common* communication systems and information processing is critical
Pa. Act 129

- In 2008, the PA Legislature passed Act 129, which applies to EDCs (Electric Distribution Companies) serving more than 100,000 customers.

- Energy Efficiency and Demand Response
  - Overall load reduction goals
    - 1% in 2011, 3% in 2013
    - 4.5% on peak 100 hours in 2013
  - Nearly 20 different programs have been approved by the PUC, they include:
    - Compact Fluorescent Lighting Program
    - AC Cycling Program
    - Customer Education and Awareness Programs

- Smart Metering
Act 129 and Implementation Order

❑ Smart Meters
  ➢ Obligates PECO to furnish “Smart Meter Technology”: (1) upon customer request; (2) in new building construction; and (3) in accordance with a depreciation schedule not to exceed 15 years
  ➢ Defines “Smart Meter Technology” as metering and network capable of **bi-directional communications**, which records customer usage on at least an hourly basis, enables **time-of-use rates and real time price programs**, and **supports automatic control** of the customer’s electricity consumption
  ➢ Provides for full-and-current cost recovery of all prudent and reasonable costs, including related electric distribution system upgrades, less operating and capital costs savings realized, through base rates or rider
  ➢ The implementation order further defined the requirements by identifying 14 specific capabilities of a Smart Meter
## Smart Meter Capabilities

<table>
<thead>
<tr>
<th>Capability</th>
<th>Act 129</th>
<th>Implementation Order</th>
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<tbody>
<tr>
<td>Bidirectional data communications</td>
<td>X</td>
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<td>Remote disconnection and reconnection</td>
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<td>X</td>
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<tr>
<td>15-minute or shorter interval data to customers, EGSs, 3rd parties and RTOs on daily basis</td>
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<tr>
<td>Record minimum hourly reads and deliver at least once per day</td>
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<td>On-board meter storage of meter compliant with national, non-proprietary standards</td>
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<tr>
<td>Open standards and protocols compliant with national, non-proprietary standards</td>
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<td>Ability to upgrade minimum capabilities as technology advances and becomes economically feasible</td>
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<tr>
<td>Ability to monitor voltage at each meter and report data</td>
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<tr>
<td>Remote programming</td>
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<td>X</td>
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<tr>
<td>Communicate outages and restorations</td>
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<td>X</td>
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<td>Ability to support net metering of customer-generators</td>
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<tr>
<td>Support automatic load control by EDC, customer and 3rd parties with customer consent</td>
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<tr>
<td>Support time-of-use and real-time pricing programs</td>
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<td>X</td>
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<tr>
<td>Provide customer direct access to consumption and pricing information (hourly consumption information)</td>
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Key Milestones

Milestones
✓ Smart Meter Plan Filing – August 14, 2009
✓ Anticipated Smart Meter PUC approval – Mid-April 2010
✓ Initial Smart Meter deployment – October 2011

Key Smart Meter Project Tasks include:
✓ AMI Technology Selection
✓ Internal IT System Deployment
✓ Communication Network Installation
✓ New Rate Development
“Smart Future Greater Philadelphia”

✓ On February 18, 2009, the American Reinvestment and Recovery Act (ARRA) was signed into law, including a $3.4B for the SGIG program which provides matching contributions of up to 50 percent for qualifying Smart Grid investments.

✓ On August 6, 2009, PECO filed a $200M grant request, the “Smart Future Greater Philadelphia” SGIG application:
  • Up to 600,000 Smart Meters and associated infrastructure, supporting PECO’s Act 129 Smart Meter Initiative
  • Multiple Smart Grid Investments
  • Partnership Agreements with Penn, Drexel/Viridity, Liberty Property Trust and others

✓ On October 27, 2009, the U.S. DOE notified PECO that it had approved a SGIG award of $200 million, subject to negotiations and finalization of a project agreement.
Proposed Smart Grid Investments

Goals

• Enhance reliability of the electric power system by identifying, isolating and rapidly remediating outages and other disruptions

• Enable system visualization and harden and diversify communications and control to withstand cyber attacks and natural disasters

• “Smarten” substations and collect and store data for post-event analysis

COMMUNICATIONS AND OPERATIONS SUPPORT SYSTEMS

✓ Fiber Ring Upgrade – 340 miles of fiber optic construction through 61 substations to facilitate communications that will create a “self-healing network”

✓ Accelerated replacement of DMACS with DMS

✓ “Tier 2” backhaul communications to support telemetry backhaul, AMI and distribution automation (DA)

DISTRIBUTION AUTOMATION

✓ Install over 100 reclosers

✓ Install over 30 Underground Circuit Breakers in Center City Philadelphia

✓ Provide converged (with AMI) communications over 300 already installed reclosers

✓ Perform Conservation Voltage Reduction (CVR) on over 45 circuits, including ~80 capacitor controls

✓ Install Automatic Voltage Controls on 7 substation transformers

INTELLIGENT SUBSTATIONS

✓ Install DA with microprocessor relays at 7 substations

✓ Install microprocessor relay replacements for 16 transmission lines or transformers

✓ Install modern Disturbance Monitoring Equipment (DME) at 31 locations
Opportunities for the Customer

✔ Improved Reliability
✔ More information on personal energy usage
✔ New rate options including
  • Time-of-Use Rates
  • Real-Time Pricing
  • Critical Peak Pricing
✔ New tools and programs to help manage usage
  • In-Home Displays
  • Smart Thermostats
  • Load Control Devices
In-Premise Opportunities - Residential

- Advanced Rates
- Home Area Network
- Demand Response
- Smart Metering
- Appliance Control
- In-Home Displays & Web-Access
- Load Control Devices
- Automated Gas Reads
In-Premise Opportunities - Commercial

In-Premise Network

Smart Metering

Advanced Rates

HVAC Control

Lighting Control

Load Control Devices

Displays & Web-Access

PECO®
Thank You

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