

PHI's Smart Grid Vision and Investment Grant Awards



DOE Energy Information Administration
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Presentation Overview

- PHI Company overview
- PHI's Smart Grid Vision
- SGIG Awards – Scope, Costs, Benefits and Schedules
- Distribution Automation
- Key Next Steps

Who is Pepco Holdings, Inc.

Transmission & Distribution



A PHI Company



A PHI Company

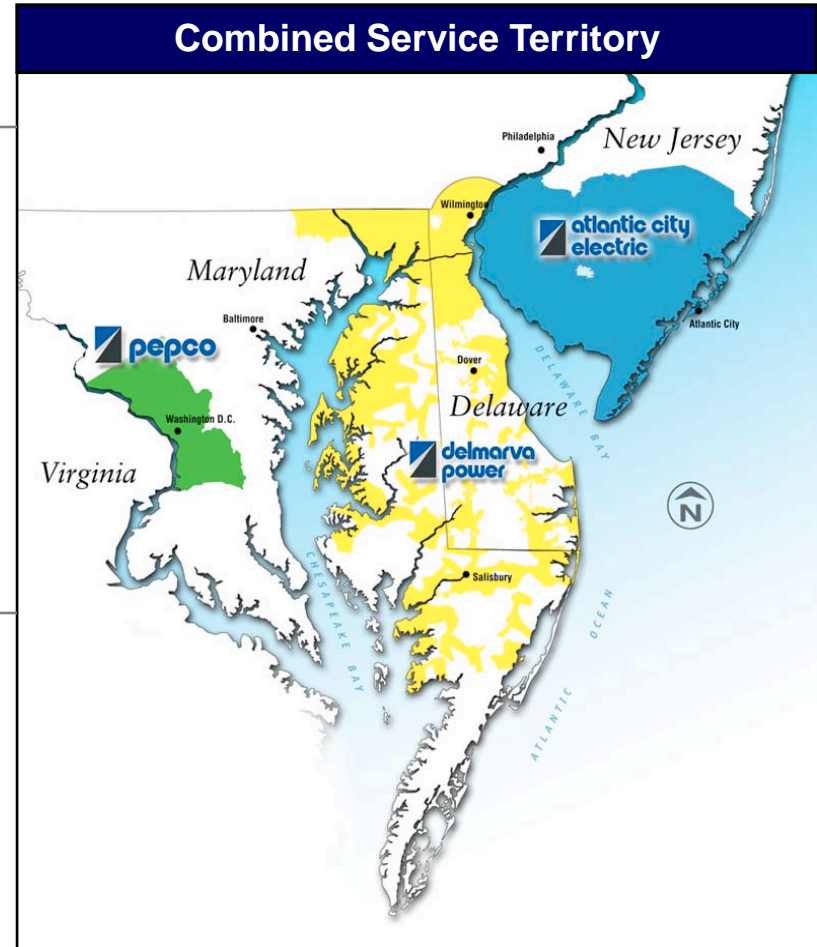


A PHI Company

Competitive Energy / Other



PHI Investments



*Regulated transmission and distribution is
PHI's core business.*

Business Overview

Power Delivery



Electric



Electric

Gas



Electric

Customers	▶ 778,000	▶ 498,000	▶ 123,000	▶ 547,000
GWh	▶ 26,549	▶ 12,494	▶ N/A	▶ 9,659
Mcf (000's)	▶ N/A	▶ N/A	▶ 19,044	▶ N/A
Service Area (square miles)	▶ 640	▶ 5,000	▶ 275	▶ 2,700
	▶ District of Columbia, major portions of Prince George's and Montgomery Counties	▶ Major portions of Delmarva Peninsula	▶ Northern Delaware	▶ Southern New Jersey
Population	▶ 2.1 million	▶ 1.3 million	▶ .5 million	▶ 1.1 million

Note: Based on 2009 annual data

PHI's Smart Grid Vision...

*“Through the ‘**Smart Grid**’, customers will be empowered to make choices regarding their use and cost of energy.*

*It will create opportunities for **innovation** for the customer and PHI.*

*It will provide the ability for PHI and its customers to take advantage of energy alternatives and **efficiencies**. It will allow the industry and customers to take advantage of **green alternatives**.*

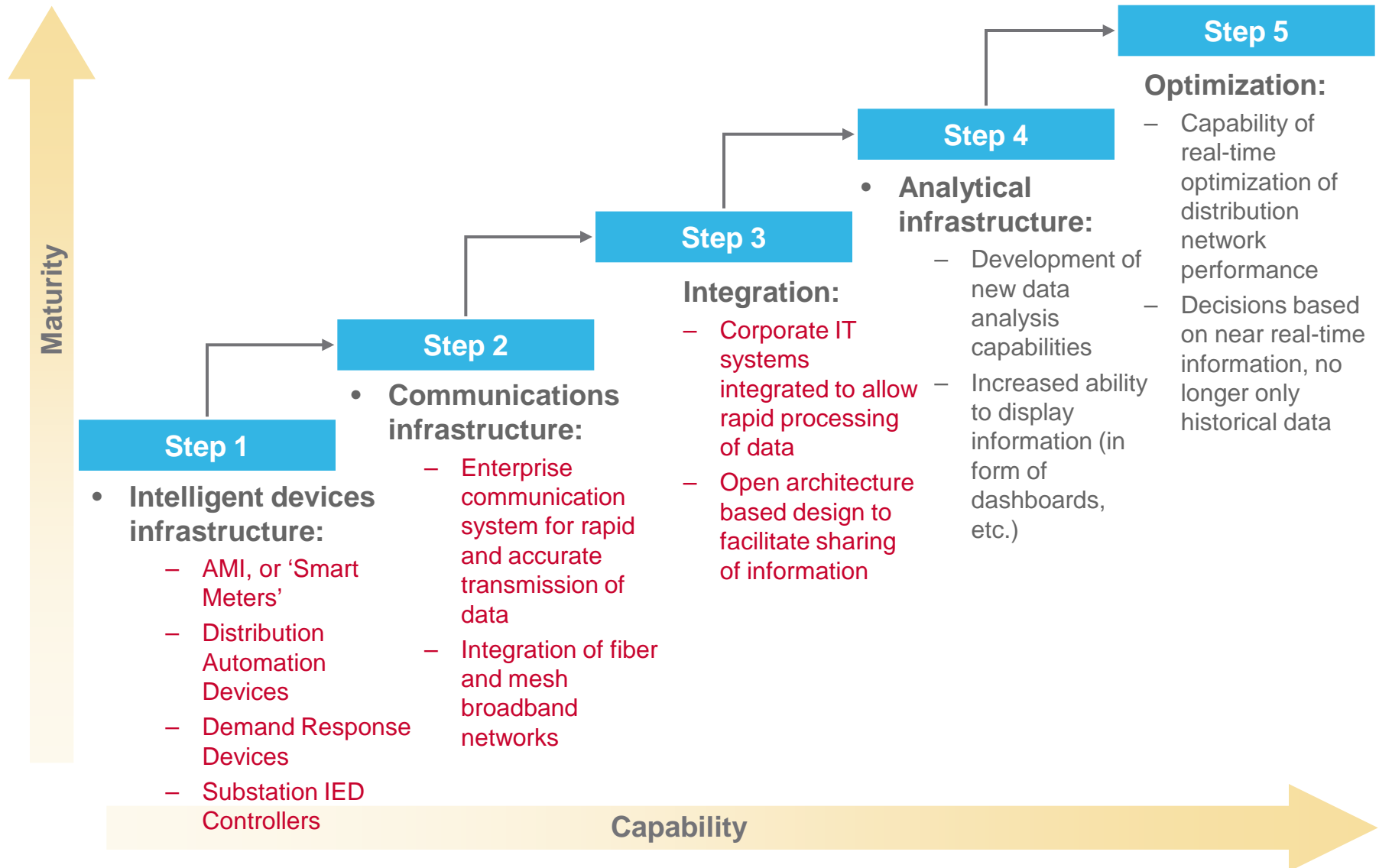
*PHI's Smart Grid strategy will improve **reliability**, while ensuring data security.*

*PHI will enhance our Asset Management and Infrastructure strategies enabling us to upgrade, operate and maintain the grid assets in a **more cost effective manner**.*

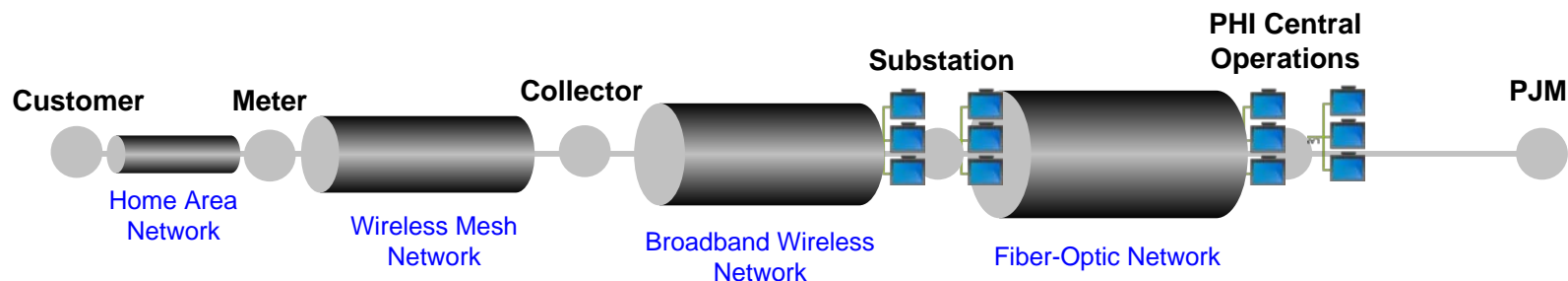
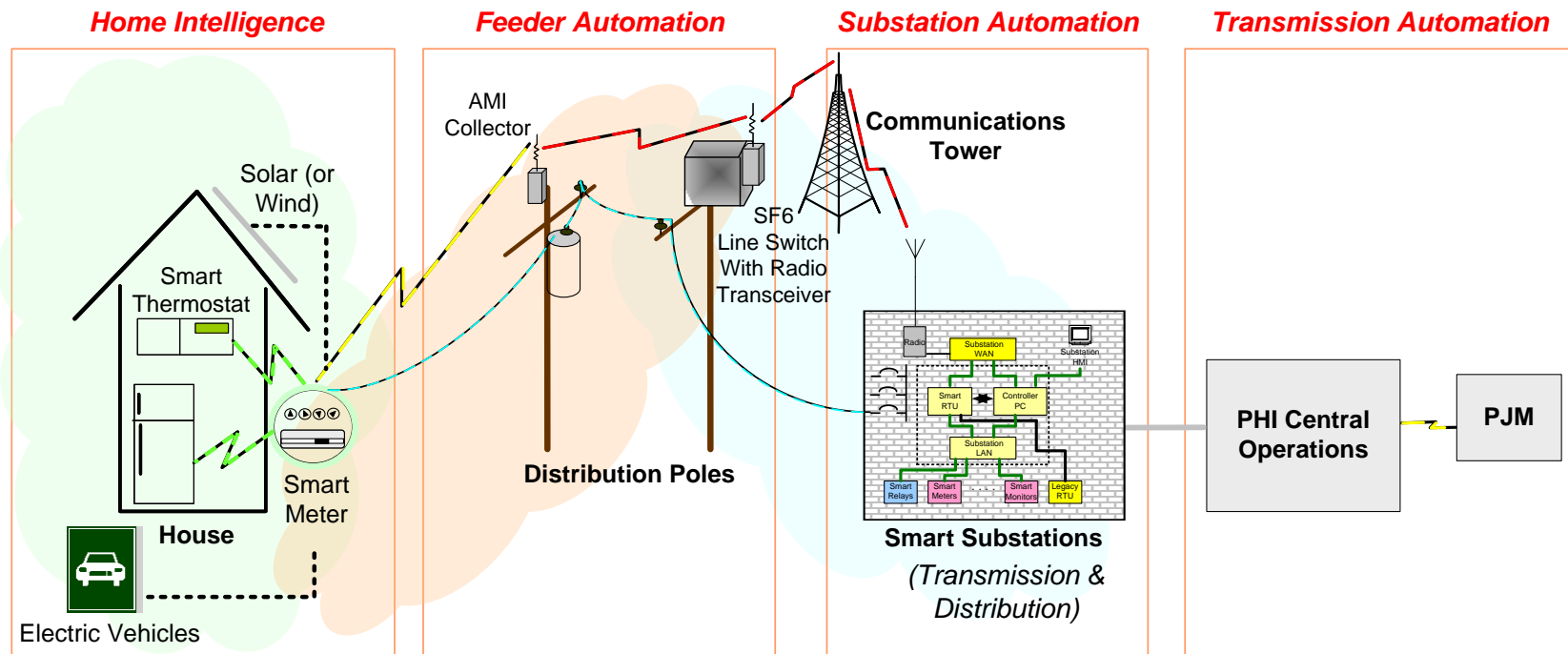
Greater Efficiency of Smart Grid

- Puts decision making in the hands of customers
 - Improved information, programs and pricing options will allow customers to make informed energy choices
 - Gives customers better information about their service and use
- Automatically accommodates changing conditions
 - Fault isolation, quick automatic restoration
 - Reroute power flows, change load patterns, improve voltage profiles
 - Minimal workforce intervention, auto notification for corrective actions and maintenance activities
- Lets us operate the system with greater efficiency
 - Better asset management – optimize grid design and investments
 - Optimized grid operations
 - Greater reliability and security
- Promotes integration of green energy initiatives and enables distributed, renewable energy resources to participate and controls the charging of electric hybrid vehicles

PHI believes there are 5 evolutionary steps to achieving the Smart Grid...



PHI's Smart Grid Domains and Integrated Communications Infrastructure



Growing volume of data...

Blueprint initiatives are accelerated through DOE funding...

	Pepco-DC	Pepco-MD	ACE-NJ
	-280,000 smart meters -20,000 DLC devices -17 ASR schemes -Dynamic pricing -Enabling comms	-570,000 smart meters -168,000 DLC devices -62 ASR schemes -Dynamic pricing -Enabling comms	-25,000 DLC devices -20 ASR schemes -158 Capacitor banks -Enabling comms
Total Cost	\$89.2M	\$209.6M	\$37.4M
DOE Funded	\$44.6M	\$104.8M	\$18.7M

Impacts on PHI

- Acceleration of installation of meters, thermostats and demand response programs
- Acceleration of benefit for customer to reduce their energy use
- Modernization of the electric system
- Transforms the distribution system by automating outage detection and restoration activities

PHI's Smart Grid Plans and Benefits of DOE SGIG Awards – 2010-2014

Description	PHI , in millions				SGIG Note 1	Target Completion Note 2
	AMI	DA	DLC/DR	TOTAL		
Smart Grid - DPL DE	\$80.8	\$17.5	\$7.3	\$105.6	X	2011
Smart Grid - DPL MD	\$56.9	\$15.5	\$17.5	\$89.9	X	2014
Smart Grid - Pepco DC	\$68.2	\$13.9	\$7.1	\$89.2	\$44.6	1st Q 2013
Smart Grid - Pepco MD	\$137.7	\$20.5	\$51.4	\$209.6	\$104.8	2nd Q 2013
DLC and DA - ACE	\$99.4 See Note 3	\$24.0	\$13.4	\$37.4	\$18.7	2014
TOTAL	\$443	\$91.4	\$96.7	\$631.1	\$168.1	

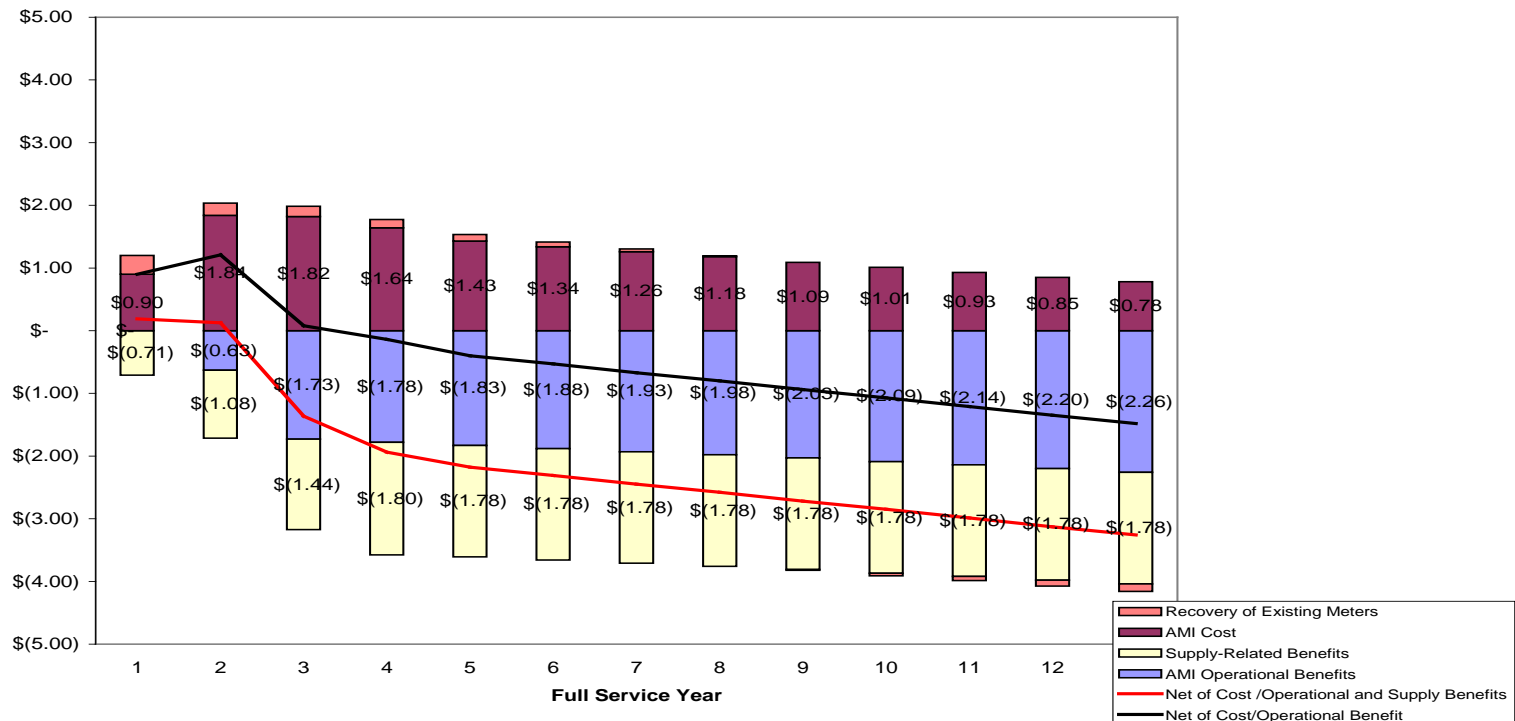
1. SGIG awards allows PHI to accelerate its plans for Smart Grid
2. PHI will continue investment in smart grid beyond SGIG awards
3. AMI was not included in SGIG application for ACE. Currently, we are working with NJ BPU to approve AMI.
4. Costs for certain operating system upgrade or change outs such as OMS, EMS, Customer information systems, etc not part of these costs

The AMI Opportunity Created by SGIG

- ❑ The impact of AMI, subsidized through a DOE grant, is of even greater benefit to the Pepco customer.



Potomac Electric Power Company - Maryland
AMI Implementation - 50% Stimulus Funding
Estimated Trend of Monthly Incremental Customer Bill Impacts



Transition to Smart Substations

Analog Substations

- Separate relays for each event
- Limited situational awareness
- Visual confirmation of failure event
- Limited station communication to Control Center



Digital Substations

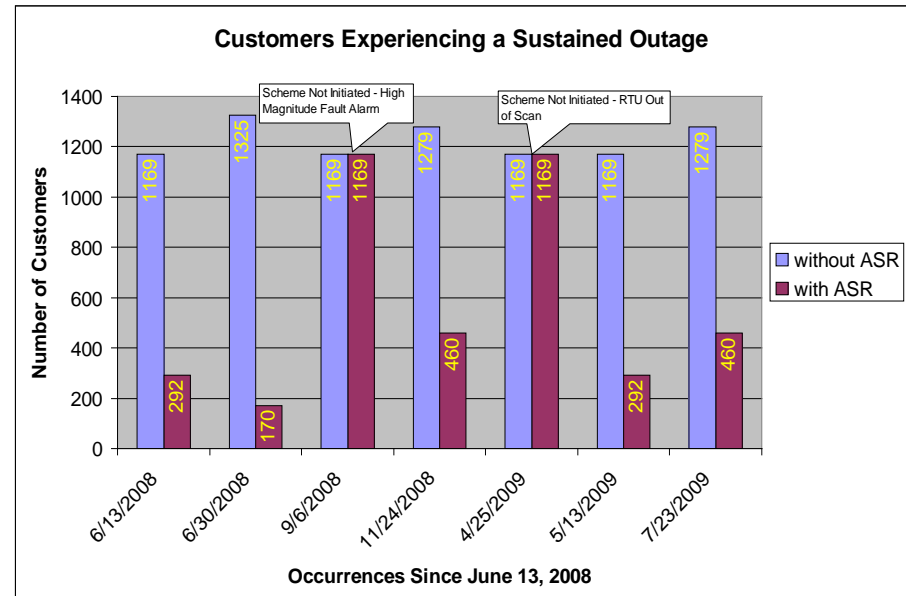
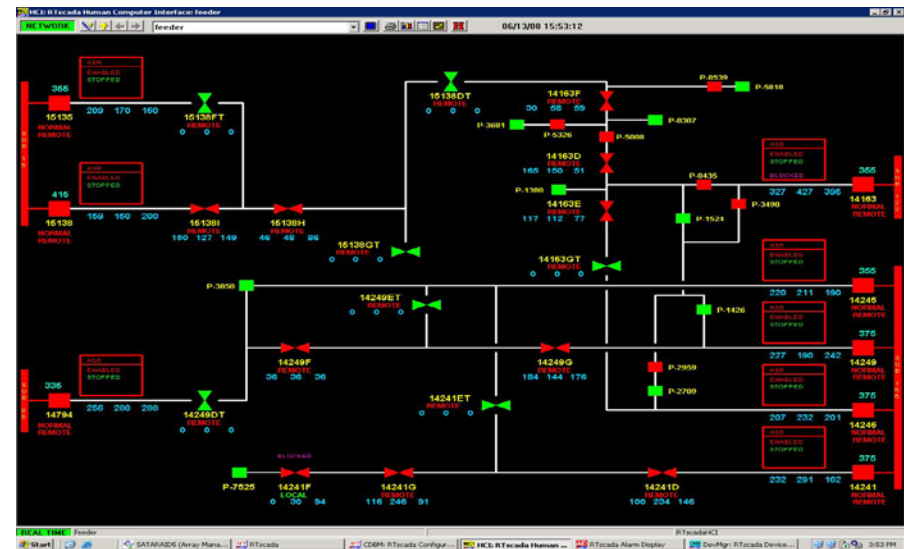
- Multiple events managed by Smart Relays
- Increased situational awareness and analysis of events
- Increased status communication to Control Center



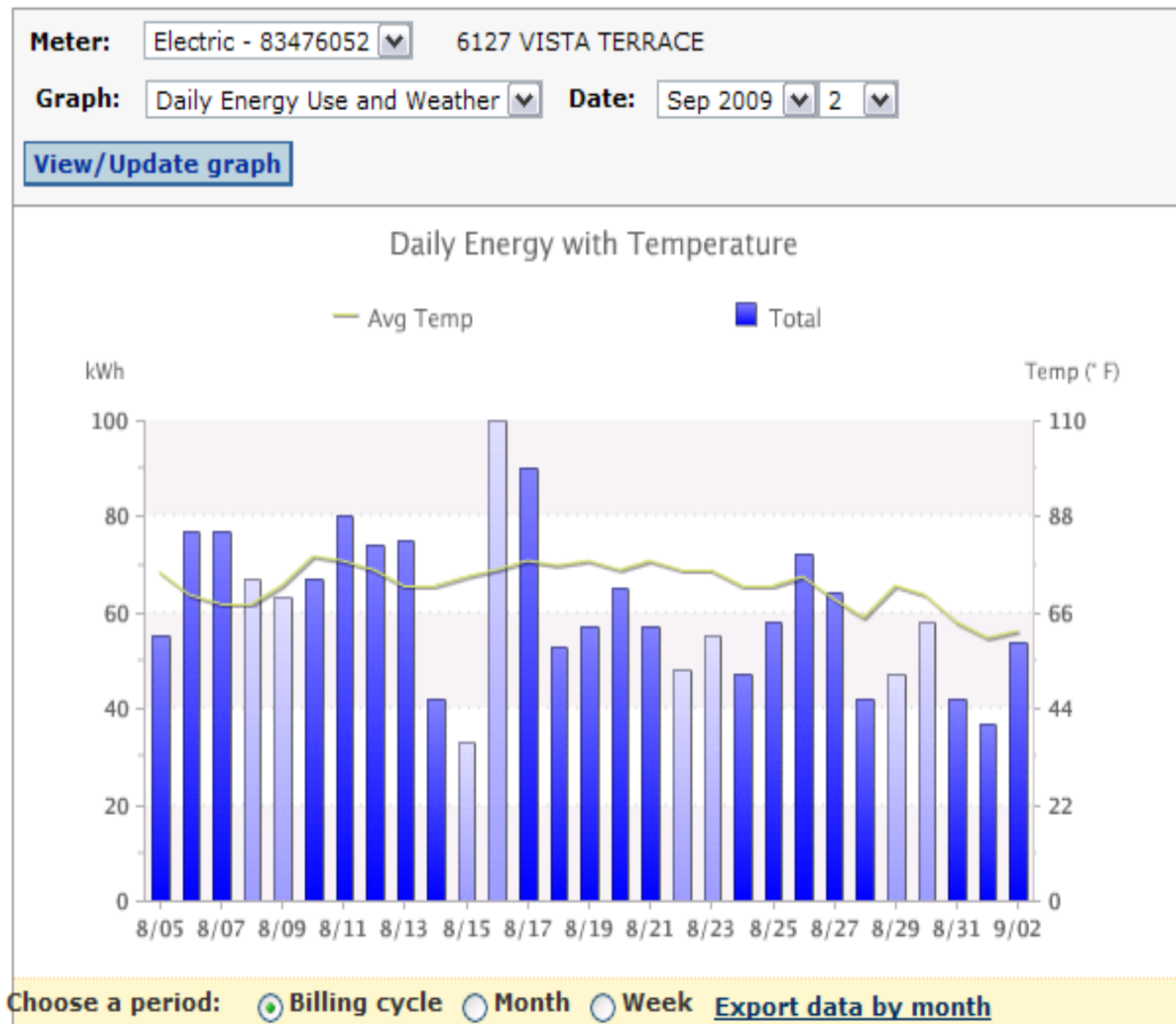
Transition started in late 1990s at Pepco.
SGIG accelerates this program.

Feeder Automation – Automatic Sectionalizing and Restoration Scheme

- Protects customers from sustained outages caused by feeder lock-outs
- Segments feeders into 2, 3, or 4 sections using remote controlled switches or Automatic Circuit Reclosers (ACR's) in the field
- For a fault in any one section:
 - ASR opens closed switches to isolate the section
 - ASR restores the other sections by reclosing the feeder breaker and/or closing open tie switches to other feeders
- Generally ASR operates in less than a minute
- 1 year Field Test yielded 7 operations and over 50% improvement in feeder performance



Customers can identify energy trends by monitoring daily energy usage with respect to average temperature



For Illustrative
Purposes Only

Customers can select the “Daily Energy Use and Weather” graph option to view total daily energy usage with respect to average daily temperature.

Customers can better understand the details of their usage over a billing cycle by identifying days in which temperature may have played a role in energy use. Customers can also get a better idea of how much their usage patterns fluctuate due to variations in temperature.

Looking forward to the future

- Successfully complete SGIG projects
- Customer engagement and education for maximizing benefits of smart grid implementation, proactive partnership with Regulators
- Lead and support development of secure grid, working with industry consortiums and standards development agencies
- Encourage innovation in the marketplace thru new capabilities of smart grid, including renewable integration and Vehicle-to-Grid
- Optimization of operations of T&D network upon full implementation of smart grid as laid out in evolutionary steps

Key Takeaways

***“The smart grid will only work to the extent that customers win,”
Joseph Rigby, CEO of Pepco Holdings***

- Customer Adoption and Participation is a key enabler
- Smart Grid will move at the *Speed of Value*
 - Utilities will still need Regulatory approval for large projects related to Smart Grid
 - Standards and Interoperability are key to preventing stranded assets
- Interoperability and Standardization are not spectator activities.
 - Utilities need to get involved and make their voices heard and be engaged as individual companies and as an industry
- Through the Smart Grid, Utilities will become “Technology” Companies
 - No longer the “best solutions” but rather iterations of “Better Solutions”
 - Similar to Electric System Operations, Communication Network Operations and enhanced Cyber Security will become part of our future DNA