The U.S. Perspective on Electric Grid Modernization

SPIEF 2011: Emerging Leadership for a New Era
Smart Grids – Projects of the Future

George W. Arnold, Eng.Sc.D.
National Coordinator for Smart Grid Interoperability
National Institute of Standards and Technology
16 June 2011
The North American Electric Grid

U.S. figures:
- 22% of world consumption
- 3,200 electric utility companies
- 17,000 power plants
- 800 gigawatt peak demand
- 165,000 miles of high-voltage lines
- 6 million miles of distribution lines
- 140 million meters
- $1 trillion in assets
- $350 billion annual revenues
Smart Grid – A U.S. National Policy

• The 2007 Energy Independence and Security Act (EISA) lays out a national policy for the Smart Grid in the U.S.
  – The Act assigned NIST the primary responsibility to coordinate development of standards for the Smart Grid.
  – NIST is also supporting future FERC and State PUC rulemaking to adopt Smart Grid standards.

• The White House National Science and Technology Council has established a Smart Grid Subcommittee
  – The Subcommittee will produce a report to lay out the Administration’s policy on Smart Grid.

• Key Federal policy recommendations include
  – Enabling cost-effective smart grid investments
  – Unlocking innovation
  – Empowering and informing consumers
  – Securing the grid
**Goals of U.S. Grid Modernization**

U.S. Smart Grid goals include:

- Increase system efficiency and cost effectiveness
- Improve reliability, resiliency and power quality
- Provide customers tools to manage energy use
- Enable use of innovative technologies including renewables, storage and electric vehicles
U.S. Smart Grid Investment Grants

<table>
<thead>
<tr>
<th>Category</th>
<th>$ Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated/Crosscutting</td>
<td>2,150</td>
</tr>
<tr>
<td>AMI</td>
<td>818</td>
</tr>
<tr>
<td>Distribution</td>
<td>254</td>
</tr>
<tr>
<td>Transmission</td>
<td>148</td>
</tr>
<tr>
<td>Customer Systems</td>
<td>32</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>3,429</td>
</tr>
</tbody>
</table>

18 million smart meters
1.2 million in-home display units
206,000 smart transformers
177,000 load control devices
170,000 smart thermostats
877 networked phasor measurement units
671 automated substations
100 PEV charging stations
U.S. Smart Grid Examples

- Premium Power Corporation Smart Grid Storage Demonstration Project
  - Demonstrating a battery-based energy storage system for load shifting, peak shaving, renewable system integration, and support for micro-grid operations.

- Phasor Measurement Units Deployments
  - Deploying PMUs across the electrical grid to collect data for real-time situational awareness.

- City of Tallahassee Smart Grid Project
  - Implementing a comprehensive demand response program that will target residential and commercial customers to reduce peak power.

More information is available at: [www.sgiclearinghouse.org](http://www.sgiclearinghouse.org)
Global Collaboration is Key to Success

- The laws of physics do not differ from country to country – the electric grid must obey them!
- There are many technical challenges to solve – sharing knowledge helps all
- Global standards avoid unnecessary adaptations for different markets, resulting in lower costs and greater innovation
- Forums for Collaboration:
  - Smart Grid Interoperability Panel (SGIP)
  - International Smart Grid Action Network (ISGAN)
  - Asia Pacific Economic Cooperation (APEC)
Thank You!

- Web portal: http://www.nist.gov/smartgrid
- Contact:
  - George Arnold, National Coordinator
  - Email: george.arnold@nist.gov
  - Telephone: +1.301.975.2232