



# 2008 National Electricity Delivery Forum



*The Role of Electricity Delivery Infrastructure in Addressing Climate Change, Demand Growth, and Energy Security*

## **Barriers to Grid Modernization**

### **Breakout Session B: Should Grid Operations be Changed?**

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## Characteristics of a Smart Grid

### ***A Smart Grid will:***

- Motivate and include the consumer
- Accommodate all generation and storage options
- Enable markets
- Provide power quality for 21<sup>st</sup> century needs
- Optimize assets and operate efficiently
- Anticipate & respond to system disturbances (self-heal)
- Resist attack



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## What's taking so long to get there?

### *So many variables to align:*

- Lot of players
- Regulation
- Legislation
- Communication and Culture
- Technical



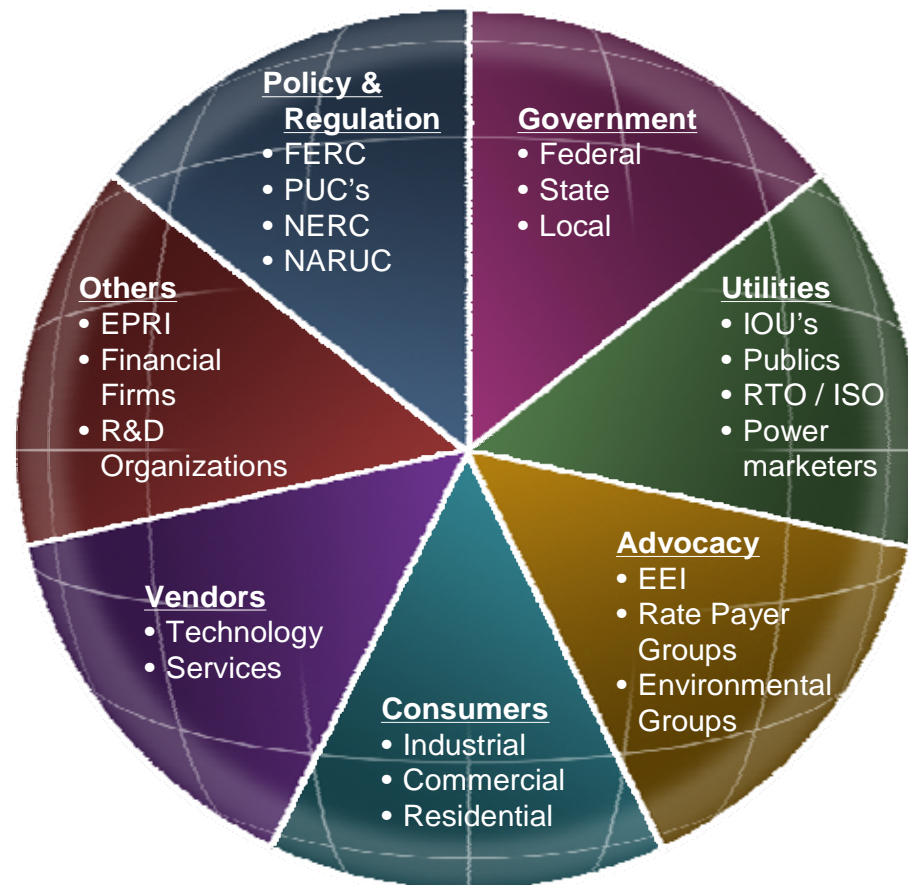
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## Lot of players!

- All Play a Part
- Need a clear vision
- Alignment critical
- Keep the “End in mind”
- Must be “win-win”





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## Regulation

### ***Regulatory policy should incentivize investment in the Smart Grid:***

- Time based rates and net metering
- More favorable depreciation rules
- Policy changes to give utilities an incentive to invest in grid modernization – new regulatory model
- Clear policies on cost recovery
- Consider societal benefits

***NETL's Modern Grid Team providing support to state regulators***



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## Legislation

### *What is the federal government's role:*

- 21<sup>st</sup> century's equivalent to "put a man on the moon"
  - Leadership
  - Incentives
  - Research, development, and demonstration
- Energy Independence and Security Act – 2007
  - RD&D Program for SmartGrid technologies
  - Regional Demonstration Initiative
  - Matching funds program



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## Communication and Culture

***A significant change management effort is needed:***

- Strengthen consumer education and research
- Active leadership by regulators to stimulate progress
- Alignment around a common vision
- Metrics to monitor progress
- “De-siloed” utility culture

***DOE SmartGrid Implementation Workshop – June 2008 – Vision and Metrics***



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## Technical

### *Some technical issues:*

- Simplified interconnection standards
- Integration vs. “widgets”
- Distributed system behavior not well understood
- Decades behind in “computing and communications”
- Loss of skilled human resources
- Minimal funding of R&D



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## Keep this in mind!

### ***Cost to Modernize***

- \$165B over 20 years
  - \$127B for Distribution
  - \$38B for Transmission
- ~\$8.3B per year  
(incremental to business-as-usual)
- Current annual investment - \$18B

### ***Benefit of Modernization***

- \$638B - \$802B over 20 years
- Overall benefit to cost ratio is 4:1 to 5:1

*(Source: EPRI, 2004)*

***We are making progress and the prize is grand!***