



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 21st 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



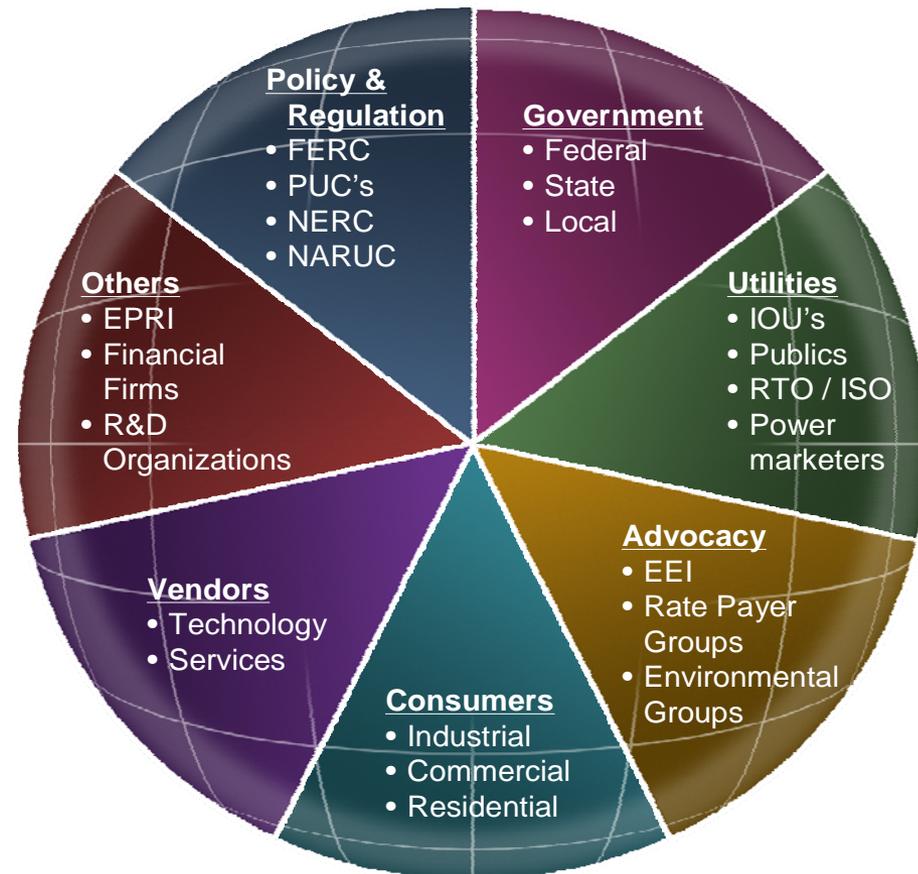
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Lot of players!

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





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Regulation - Incentives and Risk

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 - Incentives and Risk

What is the federal government's role:

- 21st 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



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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!