Smart Grid Development and Implementation: Legal Strategies
Tackling Standard Setting, Pricing, Cost Recovery and Regulatory Incentives

A Live 90-Minute Teleconference/Webinar with Interactive Q&A

Today's panel features:
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Tuesday, November 10, 2009
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1 pm Eastern
12 pm Central
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Smart Grid Development and Implementation

Recovery and Regulatory Incentives

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Four Components of My Presentation

- B. The Regulatory Framework
- C. The Department of Energy’s Role
- D. FERC’s Policy Statement
A. The Energy Independence and Security Act of 2007 (EISA), Title XIII
Overview and Background

The Act has nine focus areas:

1. Energy Security:
   - Increases auto mileage standards (CAFÉ)
   - Electric and plug-in hybrid transportation
   - Federal vehicle fleet efficiencies
   - Biofuels production funding

2. Energy Savings
   - Bans incandescent light bulbs by 2012-2014
   - Commercial and industrial buildings conservation
   - Energy Star lighting in all Federal buildings
   - Reduction, and eventual elimination of carbon fuels in Fed. buildings, 2030
EISA, Continued

3. Taxpayer funding of R and D for various renewable energy sources
4. Expanded research on Carbon sequestration
5. “Green jobs” creation
6. Office of Climate Change and Environment w/in the D.O.T. (highways and railroads)
7. Small business loans for energy efficiency improvements
8. Smart Grid
9. Pool safety (pool drain covers and pool barriers)
B. The Regulatory Framework

1. What is the definition of Smart Grid?

Components of our electric system (from appliances back upstream to the generator) “talking” to each other

“A transformed transmission and distribution network, or grid, that uses robust two-way communications, advanced sensors, and distributed computers to improve the efficiency, reliability and safety of power delivery and use.” Wikipedia, 2008.
2. What and who are the Smart Grid drivers?

- Power markets: Wholesale deregulation has changed power flows across transmission systems, has created new methods of buying power ("products"), the advent of ISOs, RTOs and new transmission security standards from NERC

- Transmission-increased construction costs, siting difficulties (ROW), permitting and resulting rate impacts

- Integration of analog and digital technologies

- Renewable energy sources mixing with conventional sources

- Cyber security – Transmission reliability standards being consistent with the ACT and the FERC requirements

- Consumer demands for more efficient use of existing power facilities
3. Who are the Smart Grid Responders?

- Congress - passed the EISA, June 2007

- NIST-sets new standards for security

- Utilities- actively involved by making Smart Grid system investments

- Manufacturers- Whirlpool, General Electric and others create the Smart Green Grid Initiative (SGGI) that will be a recognized organization at the Copenhagen environmental conference in December 2009

- Regulators – review Smart Grid options considered by a utility prior to approving non Smart Grid facilities investments and encouraged to offer investment recovery to a Smart Grid investment by a utility

- Consumers and consumer groups – better use of existing facilities
4. Singing in Harmony (What actually happens)

- Just as singers in a choral group blend their parts, components of the electricity grid “harmonize” (more efficiently) through the Smart Grid.

- We have dealt, in segments, with all the Smart Grid elements for years, appliances, meters, transformers and substations, generators, etc. But, they have been “off key” with each other compared to the Smart Grid.

- The electricity grid, simply stated, is a large synchronous motor. Thus, the better the generation output and the load are synchronized, the more efficient is the electric system.

- Think of the Smart Grid as the choral conductor trying to keep all the components on key, your appliances, the meter on your house, the transformer that serves your house, the distribution line that feeds your transformer, the substation that feeds the distribution line, the transmission line that feeds the substation, and last, but certainly not least, the generating plant that produces the electricity.

- “The Smart Grid, An Introduction,” DOE’s Office of Electricity and Energy Reliability
5. What are the gains from Smart Grid’s Success?

- Better use of existing facilities and postponing new, more expensive ones

- Coordination of analog (older) and digital (newer) technologies

- Lower emissions due to lowered demands on power generation

- Less rate pressure

- Research and development opportunities and new products to market

- Better load control and faster service restoration (valuable in sparsely populated areas {electric coop areas, avg. 5-8 customers per line mile})

- Improved balance of supply and demand (system reliability and stability)

- **CAVEAT**: Smart Grid investments should be consumer-benefit driven, not to create a regulatory asset for return on investment
C. The Department of Energy’s Role

1. - Periodically, makes status reports to the Congress on Smart Grid’s deployment (within one year of enactment and every two years thereafter), SEC. 1302

2. - Establish a Smart Grid Advisory Committee to advise DOE and other Federal agencies on Smart Grid development and deployment, SEC. 1303 (DOE, Commerce, EPA, Homeland Security, Agriculture and Defense)

3. - DOE, FERC and other Federal agencies to demonstrate the benefits of load demand response from R&D and grid technology investments, SEC. 1304

4. - NIST to coordinate the development of an interoperability framework and standards for info. mgt. among Grid systems and devices, SEC 1305 (software that creates the “harmony” among components)
5.- To establish a Smart Grid Matching Grant Program, SEC 1306
   (20% reimbursement to utilities making Smart Grid qualified
   system investments, e.g. computers, grid equipment, electric vehicle
   recharging equipment)

6.- EISA amends portions of PURPA by requiring State jurisdictional
   utilities to justify non-Smart Grid technology investments, SEC 1307
   - Rate recovery from Smart Grid investments
   - Smart Grid information accessibility by purchasers

7. - Study of States’ wire laws and regulations regarding privately-owned
     distribution wires sited across public lands, SEC 1308

8.- Report to Congress, within 18 months following enactment, both
    potential and existing Smart Grid impacts, SEC 1309
D. FERC’s Policy Statement

1. Draft Policy proposed March 19, 2009, FERC Docket No. PL09-4-000

2. Final Policy adopted July 16, 2009, FERC Docket No. PL09-4-000

3. The Policy’s objectives:
   - Sets standards for interoperability and functionality through NIST (allows old and new systems, and their components, to communicate)
   - Long term consumer savings through better grid efficiencies
   - Real-time information exchange between the supply side and load side
   - Establishes FERC policy for utility investment cost recovery
   - Cyber security for the Smart Grid
   - Provide two-way communications among market operators and utilities
   - Coordination of renewables, demand response, electric storage and electric transportation resources
   - No FERC interference with State-adopted Smart Grid programs
Smart Grid
Models of Jurisdiction, Governance and Standard Setting

Ray Gifford
Kamlet Reichert LLP
November 12, 2009
Relevant Institutions
Relevant Imperatives

Utilities: Serve and Earn a Return for Shareholders

SSOs: Avoid Standards Wars, Create Reliable Platforms

Vendors: Innovate, earn a return, benefit from network effects, lock-in customers

Federal Regulators: Promote adoption, Interoperability, Hand Out Money

State Regulators: Just and reasonable rates, prudent investment
Utility Incentives

**Pro**
- Incentives to innovate change business model and allow new business opportunities
- Regulatory wind blowing this way, so better join and cut deal for guaranteed cost recovery
- Price caps allow for increased returns to shareholders with good management

**Con**
- No incentives to take risks or innovate in cost-of-service environment
- Leap into unknown with dynamic rate design, value of service rate propositions
- Current variable rates recover fixed costs, and SG-caused demand response would pinch that
- Standards, cost recovery, cost/benefit picture not clear
- Business model uncertainty: EPCO or vertically-integrated service/delivery Co?
Vendor Incentives

Pro

• Sell, sell, sell
• Need to get your standard blessed by NIST or join in standards consortium that utilities’ trust
• Utilities finally serious about larger scale deployments

Con

• Regulatory scrutiny of costs
• Lose a standards beauty contest
• Open standards have weakened investment incentives
• Standards uncertainty slows utility deployment
State Regulatory Incentives

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<th>Con</th>
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<tr>
<td>Schumpeterian innovation in electric service delivery</td>
<td>Fail prudent investment test</td>
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<td>Net system savings, avoided costs, increased reliability</td>
<td>Stranded investment with standards mistakes</td>
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<tr>
<td>Pioneer factor – greatest innovation since Cudahy/Kahn marginal cost rate</td>
<td>Dynamic pricing, price discrimination opportunities upset regulatory model/capabilities</td>
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<td>Need to adopt price caps to create right incentives for utility</td>
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# Federal Regulatory Incentives

**Pro**

- Need for federal push to solve public goods problems with standards
- Source of dynamic innovation
- Could reduce carbon output
- Cost of failure borne at state level

**Con**

- Very little actual jurisdiction over ‘unsmart’ generation and distribution parts of grid
- Cost/benefit not uniform across all systems/loads
- Jurisdictional fight with states over prerogatives
<table>
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<th>Con</th>
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<tr>
<td>• Need for standards before utilities will deploy SG technologies as prudent</td>
<td>• Political economy pressures brought by standards competitors</td>
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<td>• Attention to security necessary from the outset</td>
<td>• Error costs of blessing the ‘wrong’ standard</td>
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<td>• Open standards encourage innovation and use of platform</td>
<td>• Open standards have weak incentives to invest in and improve the open standard</td>
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<td>• Closed standards lead to lock-in, increased costs</td>
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What’s Going On?

Institutions, Governance and Standards
Legal Institutions

**Federal Law:**
EPACT 2005: Smart grid – “yeah”
EISA 2007: Smart grid policy of US; established NIST interoperability standards process; encouraged states to adopt criteria
ARRA 2009: [$4.5B] “As a condition of receiving funding under this subsection that demonstration projects utilize open protocols and standards (including Internet-based protocols and standards) if available and appropriate.”

**State Utility Law**
CoS regulated monopolies
- Just and Reasonable rates
- Public Interest, Convenience and Necessity
- ‘Competitive’ states
  - More developed wholesale market to respond to demand shifts
  - Distribution cost recovery still a prudence analysis
NIST Interoperability Framework

Three-Phase Plan

- Engage stakeholders and by fall deliver
  - the Smart Grid architecture;
  - priorities for interoperability and cybersecurity standards, and an initial set of standards to support implementation; and
  - plans to meet remaining standards needs.

- Launch a formal partnership to facilitate development of additional standards to address remaining gaps and integrate new technologies.

- Develop a plan for testing and certification to ensure that Smart Grid equipment and systems conform to standards for security and interoperability.

- Standards draft Interoperability Framework unveiled during Gridweek and follow up November

16 Initial Draft Standards

- Advanced metering infrastructure (AMI)
- Substation and feeder device automation
- Inter-control center communications
- Substation automation and protection
- Application level energy management system interfaces
- Information security for power system control operations
- Cybersecurity
- Price responsive and direct load control
- Home Area Network device communication,
NIST Framework and Roadmap for Smart Grid Interoperability
Standards Release 1.0

(i) describes a high-level reference model for the Smart Grid,

(ii) identifies 77 existing standards (of which, NIST believes that 31 have obtained strong stakeholder consensus for adoption and identifies an additional 46 standards for further review and comment),

(iii) identifies 14 high priority gaps in existing standards, plus cyber security, for which new or revised standards are needed,

(iv) documents priority action plans (“PAPs”) to fill those gaps, and,

(v) describes the strategy being pursued to establish standards for ensuring cyber security of the Smart Grid.

NEXT STEPS:
NIST Framework and Roadmap for Smart Grid

Smart Grid Interoperability Panel (SGIP)

21 stakeholder groups identified to participate
Working committees on architecture and testing
Consensus-driven process
Identify existing programs, certifications, best practices

Solve the chicken-egg problem of no utility or regulator wanting to build before a standard is established.

Private/Semi-Private SSOs

Gridwise Architecture Council
- Articulate the goal of interoperability across the electric system
- Identify the concepts and architectures needed to make interoperability possible
- Develop actionable steps to facilitate the interoperation of the systems, devices, and institutions that encompass the nation’s electric system.

Zigbee Alliance
- Defining the network, security and application software layers
- Providing interoperability and conformance testing specifications
- Promoting the ZigBee brand globally to build market awareness
- Managing the evolution of the technology

EPRI Intelligrid
- Guidance on deployment of infrastructure technology to support advanced applications.
- Assistance in deploying monitoring, communications, computing, and IT
- Assistance in how best to deploy SG technology.
Why not a standards war?

- It’s the American way?
  - GSM vs. CDMA; BluRay vs. HD DVD; Beta vs. VHS; iPod vs. Zune et al

- Consumers freeze without clear standards winner
  - Utilities will postpone SG investment until standards clear
  - Regulators will hesitate on prudence review

- SG Standards Suffer More Acutely from being in the nature of a public good because of the regulatory structure of electric industry
## Open vs. Closed Standards with Close Regulation

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<th>Open</th>
<th>Closed</th>
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<tr>
<td>• Tendency of most standards toward some sort of openness</td>
<td>• Traditional utility standards play</td>
</tr>
<tr>
<td>• Promotes innovation ‘on top of’ standard</td>
<td>• Perceived to be more secure</td>
</tr>
<tr>
<td>• Weak incentives to innovate within standard</td>
<td>• More incentive to innovate within standard</td>
</tr>
<tr>
<td>• Perceived security vulnerabilities</td>
<td>• Danger of lock-in, stranded standards</td>
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Who holds the bag for stranded investment?
State Regulation Still the Key

Prudence of investment
- Microanalysis of load profile, customer and system characteristics dictate ‘bang for buck’
- “Smart Enough Grid” using existing broadband/utility infrastructure may get you most the way there

Change Utility Business Model
- What dynamic pricing will regulators allow?
- Price cap regulation will give stronger innovation incentives, but error costs are high
- How far can utility integrate forward? Electric platform Co? Or allow some vertical integration?

Standards, technology, rate structure
- States still have predominant role in signing off
- Traditional regulatory analytic tools cannot account for innovation
- No necessary institutional competence for technology and architectural decisions
QUESTIONS

1. Are NIST-blessed, national standards necessary before states and utilities are convinced of the prudence of a given smart grid investment?

2. Are traditional public utility law norms of cost-of-service based regulation outmoded for the dynamic incentives and risk-taking required to deploy smart grid? Or, will utilities only deploy smart grid with explicit pre-approval of cost recovery?

3. Are ‘open standards’ mandates at odds with consumer usability or security? [Who will build the iPod smart grid interface without some degree of closed architecture?]

4. Is the cost/benefit of smart grid undertaken at a detailed enough level of analysis such that load profile, system characteristics, consumer behavior is accounted for? Is “smart enough grid” enough?
QUESTIONS continued

5. Will standardization require federalization of regulation, as occurred in telecommunications?

6. Will dynamic pricing and load management benefit all consumers, or leave some behind? Will the net benefits to the system ‘raise all boats’ for even demand inelastic, predictable, low load customers? (Can I have an “amen” from Mark Cooper?)

5. Do the political economy pressures or just plain error costs from a centralized standard setting process warrant some hedging, or at least consideration, through the NIST process?
   • Any lessons from the telecommunications standard setting processes of the 70s and 80s?
   • Any lessons from wireless standards in the US vs. Europe?
   • Any lessons from the tech industry standard setting processes?
Smart Grid Incentives and Cost Recovery

November 10, 2009

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SCOPe AND DURATIoN

- On July 16, 2009, FERC adopted an Interim Rate Policy allowing the recovery of jurisdictional smart grid costs if certain showings are made through either a petition for declaratory order or a limited FPA section 205 filing.

- The Interim Rate Policy will be effective until relevant interoperability standards have been adopted through Commission rulemakings.
DEMONSTRATION REQUIRED

An applicant seeking the recovery of smart grid costs must make four demonstrations (in addition to normal rate filing requirements)

- The smart grid facilities will advance the goals of Energy Independence and Security Act of 2007 (EISA), section 1301.
  - Applicant must describe the proposed investment (including the technologies, systems, and applications it entails) and how it is consistent with the policy and one or more of the goals Congress set forth in section 1301 of EISA.
  - Those goals include increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid, dynamic optimization of grid operations and resources, with full cybersecurity, and deployment and integration of distributed resources and generation, including renewable resources, demand side resources and energy efficiency resources.
The reliability and cybersecurity of the bulk-power system will not be adversely affected by the deployment of the smart grid facilities at issue.

- Applicant must describe how its proposed deployment of smart grid equipment will maintain compliance with Commission-approved Reliability Standards, such as the NERC Critical Infrastructure Protection (CIP) Reliability Standards, during and after the installation and activation of smart grid technologies so the reliability and cyber security of the bulk-power system will not be jeopardized.

- Applicant must also address: (1) the integrity of data communicated (whether the data is correct), (2) the authentication of the communications (whether the communication is between the intended smart grid device and an authorized device or person), (3) the prevention of unauthorized modifications to smart grid devices and the logging of all modifications made, (4) the physical protection of smart grid devices, and (5) the potential impact of unauthorized use of these smart grid devices on the bulk-power system.
Applicant has minimized the possibility of stranded investment in smart grid equipment, in light of the fact that such filings will predate adoption of interoperability standards.

- Applicants must show how they have relied to the greatest extent practical on existing, widely adopted and open interoperability standards; and where feasible, relied on systems and firmware that can be securely upgraded readily and quickly.
Applicant must agree to provide feedback useful to the interoperability standards development process, by sharing information with the Department of Energy Smart Grid Clearinghouse (the same information required by the Department of Energy for its grant program).
PRICING AND RATE DESIGN

Rate Incentives for Smart Grid Investment

- Single issue rate treatment (Petition for Declaratory Order or limited Sec. 205 Filing).
- Recovery of stranded costs for jurisdictional legacy systems being replaced by jurisdictional smart grid equipment, provided that proposals to recover these costs are supported by an equipment migration plan that minimizes the stranding of unamortized costs of legacy systems.
- Recovery of investments that become obsolete as standards change.
- Accelerated depreciation and abandonment authority.
- Formula rates.
Cost Recovery Not Assured

- Relative magnitude of smart grid investment at the transmission vs. distribution level.
- Transmission cost recovery issues are broadly addressed in the FERC Policy Statement.
- However pass-through of transmission costs to retail customers could be problematic.
- Cost allocation across RTO’s and ISO’s.
State Ratemaking Issues for Distribution Smart Grid

STATE ISSUES NOT RESOLVED

- No mechanism for pre-approval/rate certainty.
- Smart Grid involves small investments over a number of years and does not "fit" with rate case model (regulatory lag).
- Obsolescence/Stranded costs.
- Benefits of the investment may be difficult to measure and compare to costs.
- Potential for after-the-fact disallowance due to actual costs incurred or benefits realized differing from estimates.
- If successful, the reduced demand can harm utility recovery of its R/O/R.
POSSIBLE RATE MECHANISMS

- State Cost Recovery Issues
- Formula rates that track costs and revenues
- Separate tracker mechanism for smart grid cost
- Surcharge for smart grid costs
- Deferred accounting and/or balancing accounts
- Fees for customers that participate
- State funding
- Decoupling utility return from usage levels
- Recovery from retained cost savings/efficiencies
SMART GRID/SMART RATES

- Retail customer charges may need to move to dynamic rates that reflect changing costs
  - Peak pricing for limited hours.
  - Rebates for reduced use on certain peak hours.
  - Rates that change hourly to reflect cost of power at wholesale.

- Interplay between rate recovery approach and rate design for retail customers