



Utility Regulation, Innovation, & Collaborative Federalism

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Public Utilities Commission of Ohio

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American Academy of Arts & Sciences
Social Science and the Alternative Energy Future

The views expressed herein are my own and should not be regarded as an opinion regarding the merits of any pending case.



Overview

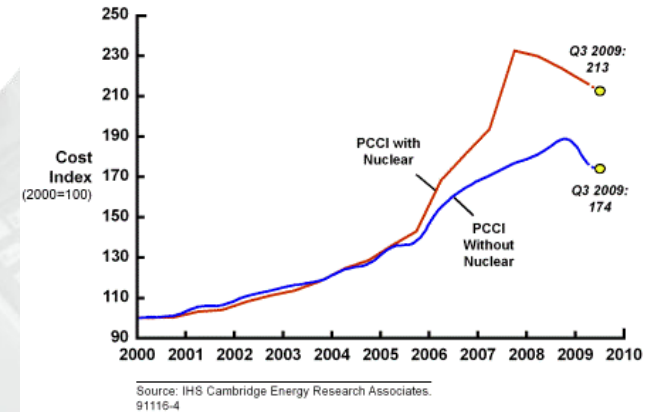
- Key Energy Challenges
- Ohio's Electricity Law
- Utility Regulation & Innovation
- Collaborative Dialogues:
 - Smart Grid Interoperability Panel
 - Smart Device Integration
 - Price Responsive Demand
 - Making Clean Affordable
- Collaborative Federalism



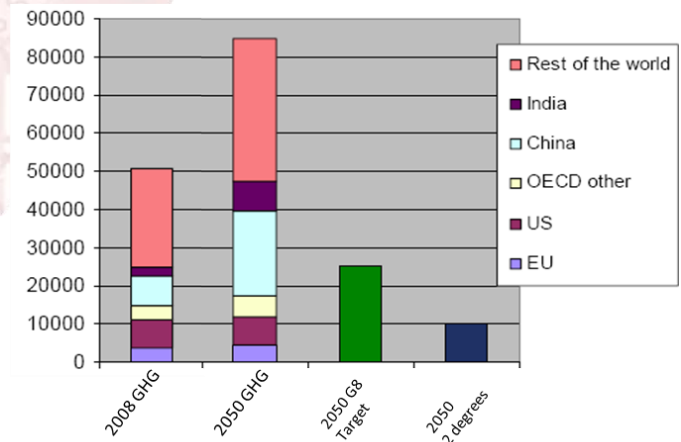
Key Challenges

- Economic Security: Global Competition & Increasing Costs
- Energy Security: "Oil into Salt"
- Cyber Security: System Resilience
- Environmental Security: Climate Change

IHS CERA North American Power Capital Costs Index (PCCI) with and Without Nuclear



Projected Global GHG Emissions & Targets





Ohio's Electricity Law

- Utility Rate Options
 - Electric Security Plan: Agreed upon Rate, Recovery Options for New Investment
 - Market Rate Option: Path to Market Rates if Meet Qualifying Conditions
- Advanced & Renewable Energy
 - Advanced & Renewable Energy Standard: 25% of Energy by 2025
 - At least Half from Renewables, Annual Renewable & Solar Requirements
- Energy Efficiency
 - Electric Efficiency Standard: 22%+ Reduction by 2025
- Price Responsive Demand
 - State Policy: Encourage Advanced Meters & Time Differentiated Pricing
 - Peak Demand Reduction Standard: 7.75% by 2018
- Smart Grid
 - Single Issue & Incentive Ratemaking for Grid Modernization
 - Duke – Will Complete Meter Deployment by 2014 + Distribution Automation
 - AEP – Comprehensive Demonstration with 110,000 Meters installed in 2010
 - First Energy – Pilot Program with 44,000 Advanced Meters by 2012
 - Distribution Service Quality Standards and Incentives
 - Consumer's right to 24 mo. detailed usage & price history



Regulation & Innovation: Objectives

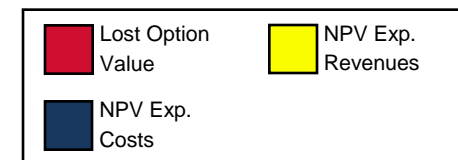
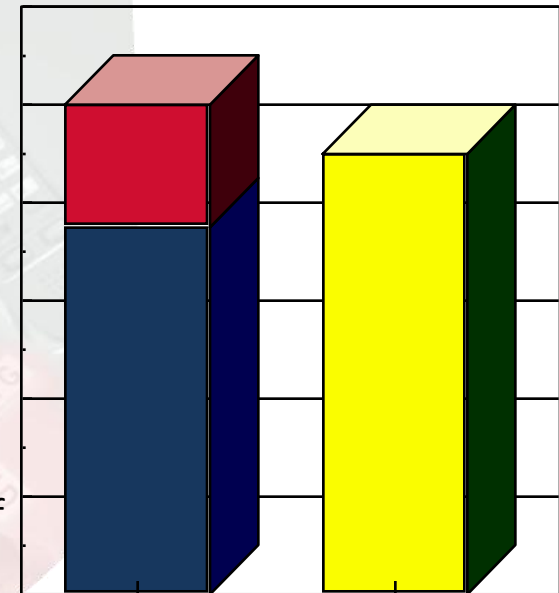
- Traditional Regulation based on Static Concepts of Efficiency
 - Limiting Monopoly or Market Power
 - Ensuring Adequate Service
- Dynamic Efficiency is Key to Alternative Futures
 - Dynamic Efficiency: Balances Short Run Concerns with Ability to Improve Efficiency Over Time & to Adapt to Changed Conditions
- Expanded Objectives Enables and includes Incentives for Dynamic Efficiency
 - Fosters an Innovation Ecosystem
 - Research, Development, & Deployment of Promising New Technology
 - Addresses Market Failures, e.g. Energy Efficiency
 - Engages Consumers with Dynamic Pricing Options
 - Pursues Smart Grid as a Platform for Innovation



Investment Under Uncertainty

- Under Uncertainty, “Least Cost Planning” is Inappropriate, where:
 - Decision to Invest is Irreversible
 - Opportunity to Postpone Significant Investment Decision
- Investing Today = Surrendering Option to Make the Same Investment in the Future
 - Real Option, Like Financial Option, has Economic Value
- Uncertainty Increases the Value of:
 - Learning & Development of Options
 - An Adaptive Grid that Performs Well Enough in a Range of Potential Futures
 - Incremental Investments in Smaller Generating Units
 - Less Capital Intensive Options
 - Waiting to Make Large Irreversible Investment Decisions
- Social Science Question: How to Value Options & Risks in Planning & Regulation: Not Assume Static Technology

Incorporating the Value of Real Options





Regulation & Innovation: Function

- In Traditional Regulation the Primary Function of the Regulator is to Adjudicate Cases
 - Utility applies to undertake action and/or recover costs
 - Utility has the burden to prove its actions/costs are needed, prudent, just & reasonable
- To achieve Alternative Future, Regulator may need to Clarify Objectives and must Identify and Align the Incentives of Necessary Actors
 - Pursuit of the Public Policy is an Affirmative Responsibility
 - “... [T]he Commission has claimed to be the representative of the public interest. This role does not permit it to act as an umpire blandly calling balls and strikes for adversaries appearing before it; the right of the public must receive active and affirmative protection at the hands of the Commission.”
Scenic Hudson Preservation Conference v. FPC, 354 F.2d 608, 620 (2d Cir. 1965) (referring to the Federal Power Commission), *cert. denied sub nom., Consolidated Edison Co. v. Scenic Hudson Preservation Conference*, 384 U.S. 941 (1966).
 - Policy Workshops: Create Common Terminology & Facilitate Dialogue, Bring New Information to Stakeholders, Attract the Innovative Energy & Best Ideas of Others



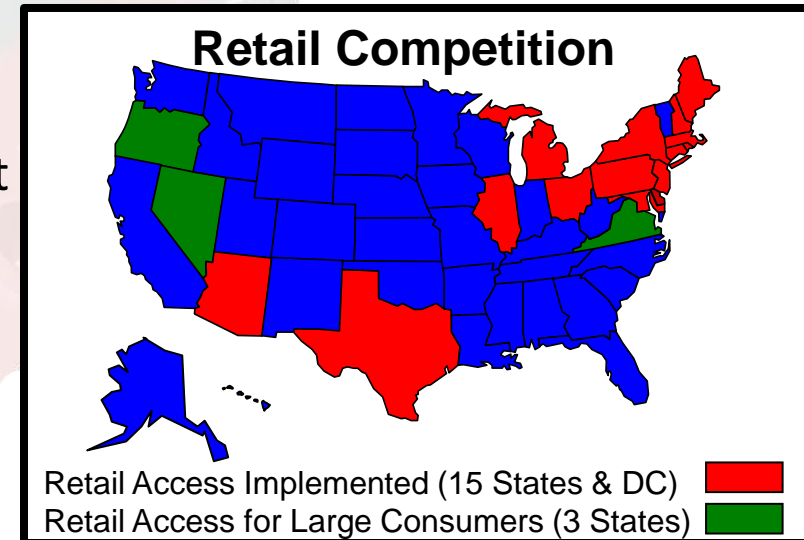
Regulation & Innovation: Scope

- Traditional model focused on Regulation of Jurisdictional Utilities
 - Jurisdictional Tensions between Federal and State Regulation
- Influencing Energy & Product Markets is Key to Alternative Energy Futures
 - Even where Organized Power Markets and Retail Competition, Extensive reliance on Administrative Mechanisms & Cross-Subsidies
 - Efficient Future will require Coordination between Wholesale and Retail Power Markets
- Collaboration is also Key to Achieving Alternative Futures
 - Collaboration among States, with Federal Regulators, & involving Private Sector Can Create Broader Impacts



Federalism in Utility Regulation

- Federal Energy Regulatory Commission (FERC) regulates interstate transmission, wholesale sales, & reliability standards
 - Independent System Operator & Regional Transmission Organization wholesale markets include 2/3s of US consumers
 - Wholesale sales at Market Prices
- State & Local Commissions regulate local distribution, retail markets &, in most states, retail rates & generation investment
 - 18 States & the District of Columbia allow retail competition
- Municipal utilities & cooperatives not subject to most state utility regulation





Smart Grid Interoperability Panel



- Public-private partnership created in Nov. 2009
- Broad range of stakeholders in SGiP developing consensus through transparent process about how to build a smarter grid
 - 672 member organizations, including over 70 international organizations
 - More than 1700 participants from 22 stakeholder categories
- Coordinating & accelerating development of interoperability standards
- Key Success Factors:
 - High Level Federal Leadership
 - Common Economic Interests of Private Sector Participants
 - Focused on Carefully Defining & Resolving Technical Issues
- Social Science Questions:
 - What is the right Government role & long-term Organizational Structure



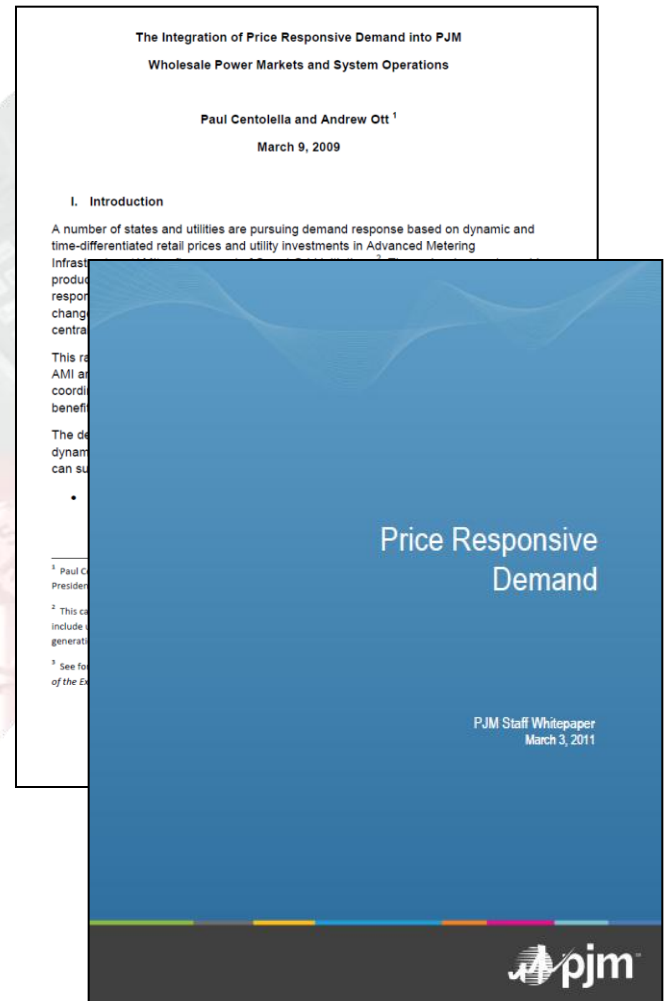
Smart Device Integration

- SGIP Business & Policy Domain Expert Working Group
- Issue: Can smart appliances, heating & cooling use thermal inertia to optimize power relative to a broadcast of wholesale prices even in the absence of dynamic retail rates?
- Key participants include RTOs, appliance manufacturers, control vendors, & national labs
- Potential success factors:
 - Bypasses barriers to mass market demand response: e.g. aggregation, dynamic retail pricing, & home energy management systems
 - Includes Key Actors that are not Distribution Utilities or Conventional Parties
- Social Science Questions:
 - Which devices require a consumer interface & what should that interface be



Price Responsive Demand

- Co-authored 2009 paper on PJM market barriers to ability of consumers to benefit from dynamic retail pricing
- After 2 year Stakeholder Process, PJM Staff recommended Board file Tariff revisions
- Success Factors:
 - Early Identification as Barrier to Smart Grid
 - Focus on Wholesale & Retail Market Coordination
 - Extensive Dialogue with PJM Management
- Social Science Questions:
 - Design of Experiments to Identify Combinations of: Dynamic Pricing, Consumer Messaging, Information Feedback, & Enabling Technology





Making Clean Affordable

- Objective: Connect results of DOE Advanced R&D, State Venture Capital & Economic Development Funds, Utility Test Beds, PUCO Policy, Advanced Energy Purchases, Local Hubs, & Private Investment to Accelerate Technology Commercialization & Economic Development
- Potential Success Factors:
 - Identification of Potential Breakthrough Technologies
 - Consistent Focus on Innovation
 - Policy Coordination
- Social Science Questions:
 - How to best support innovation, including the appropriate development & commercialization of new technologies
 - What is appropriate support for RD&D in the investment portfolio of a regulated utility



Collaborative Federalism

- Collaboration between States, the Federal Government, & Private Firms Can Be an Important Source of Innovation
- Federal Government Can Play Key Roles in:
 - Convening Collaborative Dialogues
 - Supporting Development & Coordination of Efficient Markets
 - Spreading the Risks and Costs of RD&D for Regulated Industry
 - Coordinating Research Results & Providing Technical Assistance
 - Regulating where Sufficient Consensus Exists
- Absent Consensus, Reliance on Federal Regulation Creates a Potential Single Point of Failure