Energy Markets at a Crossroads?

A conversation on the future of electricity markets and the role of state regulators.
MODERATORS

DeAnn Walker
Chairman Texas PUC

PANELISTS

Mike Jacobs
Union of Concerned Scientist

Allison Silverstein
Independent Contractor

Mason Emnett
Exelon Corporation
DeAnn Walker

- Texas PUC Chairman

DeAnn is an ex-officio member of the Board of Directors of the Electric Reliability Council of Texas and the Texas Reliability Entity and a member of the Regional State Committee for the Southwest Power Pool. She is a member of the National Association of Regulatory Utility Commissioners, serving on the Electricity Committee, and the Advisory Council of the New Mexico State University Center for Public Utilities.
Alison Silverstein is a consultant, strategist, researcher and writer on electric transmission and reliability, energy efficiency and technology adoption issues. She has worked for decades to enable and exploit the use of energy efficiency, demand response, distributed generation, renewables and various advanced grid technologies.

Silverstein organized, researched and wrote DOE’s “Staff Report on Electric Markets and Reliability” (8/17) and co-authored, “A Customer-focused Framework for Electric System Resilience” (5/18) and “Customer-Focused and Clean – Power Markets for the Future” (10/18). She served as project manager for the North American Synchrophasor Initiative,
MIKE JACOBS

Mike Jacobs is the lead on Electricity Markets and Regulatory efforts in the Climate and Energy Program at the Union of Concerned Scientists (UCS). Prior to coming to UCS, Mr. Jacobs worked as the markets and policy director at a number of renewable energy and energy storage companies, and the American Wind Energy Association (AWEA). In these positions, he developed strategies for wind integration using battery storage, and new and existing transmission. While with AWEA, he led settlement efforts at the Federal Energy Regulatory Commission to streamline generator interconnection rules. He has served on the boards of Vineyard Power Co-op, Solar Grid Storage, Wind on the Wires, the Wind Coalition, Interwest Energy Alliance and the Northern Maine Independent System Administrator.
MASON EMNETT

Mason oversees the development and implementation federal regulatory strategy for Exelon Corporation, the nation’s largest producer and distributor of clean energy. He is responsible for achieving Exelon’s policy objectives in matters before the Federal Energy Regulatory Commission and Environmental Protection Agency. Prior to joining Exelon, Emnett was Senior FERC Counsel for NextEra Energy, Inc., where he provided legal support and strategic advice on federal regulatory matters. Before joining NextEra in 2014, Emnett served as Deputy Director of the Office of Energy Policy and Innovation at the Federal Energy Regulatory Commission, where he led the development of regulations and rules governing wholesale electric markets and the provision of interstate transmission service.
THOUGHTS ON WHOLESALE ELECTRIC MARKETS

Alison Silverstein
Alison Silverstein Consulting
NARUC Electricity Committee
November 18, 2019
Wholesale electric markets

Balancing or juggling?

The early view – just balance supply & demand using competition and prices

But balancing is hard

And electric markets are way harder than that.
Current competitive electric markets are challenged

- Older baseload generation retiring, falling grid inertia
- Increased grid operational speed and volatility
- State mandates for resource adequacy and subsidies
- State and customer mandates for clean energy
- Insufficient demand participation in market
- Falling spot electric prices, greater volatility
- Growing utility-scale & distributed renewables
- Little electric demand growth, increased variability
Market design factors

What competes in the market?
Which supply resources?
Which demand resources?
Type, size, owners, aggregators, ...

What are market rules?
Energy and ancillary service products
Price calculation method, elements
Dispatch rules and speed
Resource bid parameters

Missing money mechanism?
Type -- capacity payments or ORDC?
What qualifies to receive payment and why?

Who and how much to buy?
Amount in spot market v. self-supply or bilateral
Amount self-scheduling (so out of market)
### Outside factors that affect markets

<table>
<thead>
<tr>
<th>Technology &amp; economics</th>
<th>Macro policies</th>
<th>State &amp; RTO policies</th>
<th>Societal and customer choices</th>
</tr>
</thead>
</table>
| • Technology development advances and associated economic costs (renewables, inverters, demand response, storage, EVs)  
  • Fuel costs  
  • Trade and economic development policies  
  • Speed of storage capabilities and cost | • Carbon price  
  • Clean energy mandates  
  • Energy efficiency standards  
  • Federal subsidies (tax and royalty payments and policies)  
  • Support for energy production (gas, wind, etc.)  
  • Fuel and electricity delivery infrastructure support | • Transmission construction & interconnection  
  • Energy efficiency codes, standards, funding  
  • TOU rates, advance meters  
  • DG interconnection policies, net metering  
  • Reliability adequacy requirements & IRPs  
  • Infrastructure support or abandonment | • Customer preferences (carbon, clean energy, personal resilience)  
  • Customer economic capacity to adopt DER resources  
  • Rate and capability of customer defection from utility  
  • Social equity and environmental justice |
Conclusions

• Competition works but
• Current market design is not working well
• We need market changes for the next 20+ years with high decarbonization, variability and uncertainty
• Don’t ignore extra-market factors
• Don’t expect markets to solve everything
Decarbonizing the Generation Stack
Aligning Wholesale Electricity Markets with Environmental Policy

W. Mason Emnett
Vice President, Competitive Market Policy

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The carbon challenge

Global Carbon Emissions

- Higher Scenario (RCP8.5)
- Lower Scenario (RCP4.5)
- Even Lower Scenario (RCP2.6)
- Observed

Global Average Temperature Change

- Higher Scenario (RCP8.5)
- Lower Scenario (RCP4.5)
- Even Lower Scenario (RCP2.6)
- Observed


Annual Economic Damages in 2090

<table>
<thead>
<tr>
<th>Sector</th>
<th>Annual damages under RCP8.5</th>
<th>Damages avoided under RCP4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor</td>
<td>$155B</td>
<td>48%</td>
</tr>
<tr>
<td>Extreme Temperature Mortality◊</td>
<td>$141B</td>
<td>58%</td>
</tr>
<tr>
<td>Coastal Property◊</td>
<td>$118B</td>
<td>22%</td>
</tr>
<tr>
<td>Air Quality</td>
<td>$26B</td>
<td>31%</td>
</tr>
<tr>
<td>Roads◊</td>
<td>$20B</td>
<td>59%</td>
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<tr>
<td>Electricity Supply and Demand</td>
<td>$9B</td>
<td>63%</td>
</tr>
<tr>
<td>Inland Flooding</td>
<td>$8B</td>
<td>47%</td>
</tr>
<tr>
<td>Urban Drainage</td>
<td>$6B</td>
<td>26%</td>
</tr>
<tr>
<td>Rail◊</td>
<td>$6B</td>
<td>36%</td>
</tr>
<tr>
<td>Water Quality</td>
<td>$5B</td>
<td>35%</td>
</tr>
<tr>
<td>Coral Reefs</td>
<td>$4B</td>
<td>12%</td>
</tr>
<tr>
<td>West Nile Virus</td>
<td>$3B</td>
<td>47%</td>
</tr>
<tr>
<td>Freshwater Fish</td>
<td>$3B</td>
<td>44%</td>
</tr>
<tr>
<td>Winter Recreation</td>
<td>$2B</td>
<td>107%</td>
</tr>
<tr>
<td>Bridges</td>
<td>$1B</td>
<td>48%</td>
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<tr>
<td>Munic. and Industrial Water Supply</td>
<td>$316M</td>
<td>33%</td>
</tr>
<tr>
<td>Harmful Algal Blooms</td>
<td>$199M</td>
<td>45%</td>
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<tr>
<td>Alaska Infrastructure◊</td>
<td>$174M</td>
<td>53%</td>
</tr>
<tr>
<td>Shellfish*</td>
<td>$23M</td>
<td>57%</td>
</tr>
<tr>
<td>Agriculture*</td>
<td>$12M</td>
<td>11%</td>
</tr>
<tr>
<td>Aeroallergens*</td>
<td>$1M</td>
<td>57%</td>
</tr>
<tr>
<td>Wildfire</td>
<td>−$106M</td>
<td>−134%</td>
</tr>
</tbody>
</table>
States are taking action

13 states and the District of Columbia have a Governor Executive Order or legislation enacted targeting 100% clean electricity (11) or 100% RPS (2+D.C.).

22 states have 100% clean electricity targets, deep GHG reduction targets, or both, encompassing 44% of US electricity sales and 53% of US residential electricity customers.
The New England example

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The California example


Figure 2.6  Hourly frequency of day-ahead prices near or below $0/MWh (January – June)

Figure E.11  Estimated net revenue of hypothetical combined cycle unit

Source: Long-Run Resource Adequacy under Deep Decarbonization Pathways for California, E3 (June 2019).

Figure 9. New Build Selected Resources Results

Source: Long-Run Resource Adequacy under Deep Decarbonization Pathways for California, E3 (June 2019).
(Re)Aligning responsibilities

State(s)

- Generation Mix
- Revenue Sufficiency

RTO/ISO/EIM

- Regional commitment and/or dispatch
- Operational requirements (e.g., ramping needs)

Backstop procurements (e.g., local reliability, resource adequacy)
QUESTIONS?

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