RTO Expansion
The Evolving Industrial View and Southeast Developments

American Forest & Paper Association
September 17, 2020

Jennie Chen – Senior Fellow, Electricity Policy
Devin Hartman – Director, Energy & Environmental Policy
Overview

I. Industrial View of RTOs (Devin)
   - Evolution of position
   - Contemporary conditions
   - Outlook

II. Southeast Developments (Jennie)
   - Competition options
   - Cost savings and transparency
   - Renewables access and integration
Evolution of Industrial Views on RTOs

- 80s/90s/00s led state pro-market reforms
  - Bilateral-only advocacy, opposed RTOs
- Late 2000s-2015: RTO resentment common
- Late 2010s: realize RTO benefits > costs
Implementation Quality Matters

• Wholesale performance varies by:
  – Market design
  – Transmission policy
  – Governance

• Healthy retail required
  – Proper restructuring (e.g., Texas)
    • Wholesale benefits flow to all consumers
  – Flawed restructuring (e.g., Ohio)
    • Inverse relationship b/t wholesale and retail
    • Some industrials benefited
RTO Benefits Vary by Regulated, Quasi- and Fully Restructured Status

**Fully Restructured**
- Competitive Parent
  - Competitive Retailer
  - Competitive GenCo
- Utility Holding Co.
  - Distribution Monopoly

**Quasi-Restructured**
- Utility Holding Co.
  - Competitive GenCo
  - Competitive Retailer
  - Distribution Monopoly & Default Retailer
## RTO Advantages

### Costs
- Clear energy and ancillary service advantage.
- Capacity markets better than IRP.

### Reliability
- Better power quality and outages frequency/duration. Opportunity for differentiated reliability; consumers pay for service level that they value.

### Customer Autonomy
- Enables superior demand response and self-supply optionality.
- Enhances value of market access, retail policy permitting.

### Transmission
- Better economic planning.
- Potential for better system oversight.

### Governance
- Ability for fair representation.
- Some consolidated compliance.

## RTO Disadvantages

### Costs
- Representation costs.
- RTO overhead costs.

### Reliability
- Potential to alter unique negotiations with utility.

### Customer Autonomy
- Potential to alter unique negotiations with utility.

### Transmission
- Reliability projects expensive.
- G&T synergies.
- Cost allocation concerns.

### Governance
- Complexity + concentrated vs. dispersed interests → consumers outgunned.
Net Benefits Categorical Variation

MISO 2019 Value Proposition

**QUANTITATIVE BENEFITS**

MISO provides approximately $3.6 billion in annual benefits to members

<table>
<thead>
<tr>
<th>Benefit Category</th>
<th>Value Range</th>
<th>Total Net Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Reliability</td>
<td>$278-$303</td>
<td>$2.195-$2,702</td>
</tr>
<tr>
<td>Compliance</td>
<td>$96-$133</td>
<td>$154-$261</td>
</tr>
<tr>
<td>Dispatch of Energy</td>
<td>$283-$313</td>
<td>$3.198-$3,972</td>
</tr>
<tr>
<td>Regulation</td>
<td>$49-$54</td>
<td></td>
</tr>
<tr>
<td>Spinning Reserves</td>
<td>$23-$25</td>
<td></td>
</tr>
<tr>
<td>Wind Integration</td>
<td>$415-$477</td>
<td></td>
</tr>
<tr>
<td>Footprint Diversity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demand Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Net Benefits</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

More Efficient Use of Existing Assets
Reduced Need for Additional Assets
Industrial Frustrations With RTOs

1. Capacity markets
   - ERCOT’s “energy-only” gold standard
   - Critical: markets better than IRP for capacity planning

2. Transmission policy

3. Stakeholder governance

Source: PJM IMM
Industrial Outlook: RTO Net Benefits

• Core value proposition increases
  – Emerging industrial preferences like ESG
  – Evolving resource mix: market advantage explodes

• Mission creep risk
  – E.g., MOPR, parochial stakeholder favoritism

• Regional Variances
  – West
    • Ghosts of Enron
    • Hydro advantage
  – SE
    • FERC skepticism
    • Model: ERCOT, MISO South, EIM, SEEM, other?

• Don’t forget retail policy quality!
Regional wholesale competition options and implications for the SE

• Options for enhancing competition
  • RTO
  • EIM
  • Southeast Energy Exchange Market (SEEM)
  • Compared to current status of electricity trading in SE

• How do they help fulfill your goals?
  • Cost savings, price transparency
  • Sustainability: Connecting RE with customers, RE integration, emissions reductions
Southeast Energy Exchange Market

Electric Service Territory Map

- Southern Company
- Dalton Utilities
- Associated Electric Cooperative, Inc.
- Dominion Energy
- Served by Dominion or South Carolina's electric cooperatives
- Georgia Transmission*
- MEAG Power
- PowerSouth
- Served by Duke or South Carolina's electric cooperatives
- Oglethorpe Power Corp.*
- TVA
- North Carolina EMCs
- Santee Cooper
- LG&E and KU Energy LLC

*Oglethorpe Power is a Georgia Transmission member and power supplier that serves the 38 member systems
Example: APS joining WEIM*

- **Size ~7 GW**
- **Startup cost ~$13-$19 M:** metering upgrades, communications software, business process changes and tariff changes
- **Ongoing cost ~$4 M annually**
- **$42 M/year actual benefits**
- **~$5.45 M/yr/GW net benefits after initial costs paid**

**SPP projected EIM trade net benefits 2005 ~$37M/yr / 40 GW**

=> ~ $0.93M/yr/GW

**Costs/Benefits**

**SEEM**

- ~160 GW size
- ~$37-58 M/yr saving (base case)
- ~$121-151 M/yr savings for region in 2037 (carbon constrained)
- ~$3 M/year for region, non centralized costs
- ~ $0.28M/yr/GW net benefits (base case)
- ~ $0.83 M/yr/GW net benefits (carbon constrained)

*Caveat: This is not a rigorous analysis, just a back-of-envelope estimate of potential net benefits compared to SEEM.*
SoCo Energy Auction

<table>
<thead>
<tr>
<th>2020 January</th>
<th>February</th>
<th>March</th>
<th>April</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-01-09 Hourly</td>
<td>2020-02-01 Hourly</td>
<td>2020-03-11 Hourly</td>
<td>2020-04-08 Hourly</td>
</tr>
<tr>
<td>2020-02-06 Hourly</td>
<td>2020-02-11 Hourly</td>
<td>2020-03-14 Hourly</td>
<td>2020-04-09 Hourly</td>
</tr>
<tr>
<td>2020-02-13 Hourly</td>
<td>2020-02-21 Hourly</td>
<td>2020-03-15 Hourly</td>
<td>2020-04-15 Hourly</td>
</tr>
<tr>
<td>2020-02-22 Hourly</td>
<td>2020-02-22 Hourly</td>
<td>2020-03-16 Hourly</td>
<td>2020-04-17 Hourly</td>
</tr>
<tr>
<td>2020-02-27 Hourly</td>
<td>2020-03-22 Hourly</td>
<td>2020-03-23 Hourly</td>
<td>2020-04-19 Hourly</td>
</tr>
<tr>
<td>2020-03-27 Hourly</td>
<td>2020-03-27 Hourly</td>
<td>2020-03-28 Hourly</td>
<td>2020-04-20 Hourly</td>
</tr>
<tr>
<td>2020-03-28 Hourly</td>
<td>2020-03-29 Hourly</td>
<td>2020-03-30 Hourly</td>
<td>2020-04-21 Hourly</td>
</tr>
<tr>
<td>2020-03-30 Hourly</td>
<td>2020-03-31 Hourly</td>
<td>2020-03-31 Hourly</td>
<td>2020-04-25 Hourly</td>
</tr>
<tr>
<td>2020-03-31 Hourly</td>
<td>2020-03-31 Hourly</td>
<td>2020-03-31 Hourly</td>
<td>2020-04-27 Hourly</td>
</tr>
</tbody>
</table>

2020-07-30_HOURLY_CLEARING_PRICES

<table>
<thead>
<tr>
<th>UTC_FLOW_HOUR</th>
<th>CPT_FLOW_HOUR</th>
<th>CPT_HOUR_END</th>
<th>PRICE</th>
<th>TLU</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020-07-30 10:00:00</td>
<td>2020-07-30 05:00:00</td>
<td>6</td>
<td>20.63</td>
<td>2020-07-30 08:52:08</td>
</tr>
</tbody>
</table>
Heat map of every U.S. wind turbine (4/2020)
Top 10 States

<table>
<thead>
<tr>
<th>State</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>25,016 MW</td>
</tr>
<tr>
<td>North Carolina</td>
<td>5,467 MW</td>
</tr>
<tr>
<td>Arizona</td>
<td>3,788 MW</td>
</tr>
<tr>
<td>Nevada</td>
<td>3,452 MW</td>
</tr>
<tr>
<td>Florida</td>
<td>3,156 MW</td>
</tr>
<tr>
<td>Texas</td>
<td>2,957 MW</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2,829 MW</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2,535 MW</td>
</tr>
<tr>
<td>New York</td>
<td>1,718 MW</td>
</tr>
<tr>
<td>Utah</td>
<td>1,661 MW</td>
</tr>
<tr>
<td>Georgia</td>
<td>1,572 MW</td>
</tr>
<tr>
<td>Region</td>
<td>2019 Renewable Capacity as Percent of Total (GW)</td>
</tr>
<tr>
<td>---------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>WECC-CA</td>
<td>30.5% (22.6 GW)</td>
</tr>
<tr>
<td>ERCOT</td>
<td>28.6% (29.6 GW)</td>
</tr>
<tr>
<td>SPP</td>
<td>25.8% (22.3 GW)</td>
</tr>
<tr>
<td>WECC (excl. CA)</td>
<td>16.7% (23.4 GW)</td>
</tr>
<tr>
<td>MISO</td>
<td>14.8% (25.2 GW)</td>
</tr>
<tr>
<td>ISO-NE</td>
<td>10.8% (3.7 GW)</td>
</tr>
<tr>
<td>PJM</td>
<td>7.0% (13.7 GW)</td>
</tr>
<tr>
<td>NYISO</td>
<td>6.9% (2.9 GW)</td>
</tr>
<tr>
<td>FRCC</td>
<td>4.8% (2.7 GW)</td>
</tr>
<tr>
<td>SERC</td>
<td>4.3% (7.1 GW)</td>
</tr>
</tbody>
</table>
Figure 3. The size of the balancing authority area and increasing frequency of dispatch can reduce regulating reserve (Milligan et al. 2011).
Resources

Thank you!

Jennifer Chen
ReGrid Energy Policy Consulting
M: (213) 422-3305
@jenniechenergy
chen@regrid.net