Ohio University Voinovich School Webinar
Controlling Rising Ohio Capacity Costs

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Electricity Shopping 101

Deregulated
Market Driven
70%

Regulated
Tariff Driven
30%
Supplier Cost Components
(Fe customer - typical 1 shift operation)

June 2013 – May 2014:
- Energy: 90%
- Capacity: 5%
- Losses: 3%
- Other: 2%

June 2015 – May 2016:
- Energy: 57%
- Capacity: 40%
- Losses: 1%
- Other: 2%

Capacity is 20% for Duke, AEP and DPL customers.
Supplier Cost Components- $/kwh –

FE customer

![Bar chart showing cost components over years]
Energy Market Forwards

**Customer Takeaway:** Forward power curves are up significantly for 2014-2015 but still near historical lows for 2016-2017, indicating value in long-term contracts.
What is Capacity?

• Payment to generating resources by load to cover demand peak
  • Electricity must be produced on demand
  • Must have enough generation to cover peak to ensure reliability

• PJM Capacity Market is designed to ensure adequate availability of resources through monetary pricing signals

• Pricing is derived by auction three years in advance of delivery year
  • Base Residual Auction (BRA)
  • Three Incremental Auctions
  • All four are combined volumetrically for Final Zonal Capacity Price (FZCP)
Capacity BRA Results $/MW-d

- 2008/2009
- 2009/2010
- 2010/2011
- 2011/2012
- 2012/2013
- 2013/2014
- 2014/2015
- 2015/2016
- 2016/2017

**DPL, Duke, AEP**

**FE**

- $0.00
- $50.00
- $100.00
- $150.00
- $200.00
- $250.00
- $300.00

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Customer Cost Impact

Annual Costs per 1 MW of Capacity Obligation

Annual cost = 1 MW * Auction Rate * 365 days/year

Graph showing annual costs from 2012/2013 to 2016/2017 for DPL, Duke, AEP and FE.
Capacity Cost in Supply Agreements

Capacity Cost = \( \text{Volume} \times \text{Price} \)

Peak Load Contribution (PLC)*
Your usage during the five highest hours on the entire PJM grid

Most suppliers charge FZCP

* Academically speaking this is grossed up by approximately 10% due to two PJM reserve requirement factors. Bottom line is how is the supplier charging you in your contract.
### Historic PLC Hours

<table>
<thead>
<tr>
<th>Hour</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013 EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hour 1</td>
<td>6/9 4-5 pm Monday</td>
<td>8/10 4-5 pm Monday</td>
<td>7/7 4-5 pm Wed</td>
<td>7/21 4-5 pm Thursday</td>
<td>7/17 4-5 pm Tuesday</td>
<td>7/18 4-5 pm Thursday</td>
</tr>
<tr>
<td>Hour 2</td>
<td>7/17 4-5 pm Thursday</td>
<td>8/18 3-4 pm Tuesday</td>
<td>7/6 4-5 pm Tuesday</td>
<td>7/22 2-3 pm Friday</td>
<td>7/18 2-3 pm Wednesday</td>
<td>7/19 2-3 pm Friday</td>
</tr>
<tr>
<td>Hour 3</td>
<td>7/18 4-5 pm Friday</td>
<td>8/17 4-5 pm Monday</td>
<td>7/23 4-5 pm Friday</td>
<td>7/20 4-5 pm Wednesday</td>
<td>7/6 4-5 pm Friday</td>
<td>7/17 4-5 pm Wednesday</td>
</tr>
<tr>
<td>Hour 4</td>
<td>7/21 4-5 pm Monday</td>
<td>8/11 4-5 pm Tuesday</td>
<td>8/10 4-5 pm Tuesday</td>
<td>7/19 4-5 pm Wednesday</td>
<td>7/5 3-4 pm Thursday</td>
<td>7/16 4-5 pm Tuesday</td>
</tr>
<tr>
<td>Hour 5</td>
<td>6/1 4-5 pm Tuesday</td>
<td>8/20 4-5 pm Thursday</td>
<td>8/11 4-5 pm Wednesday</td>
<td>6/8 4-5 pm Wednesday</td>
<td>7/16 4-5 pm Monday</td>
<td>7/15 5-6 Monday</td>
</tr>
</tbody>
</table>

30 out of 36 hours have occurred between 4-5 pm
# Programs to Mitigate Capacity Costs

## Summary of Load Management Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Value Method</th>
<th>Required Action</th>
<th>Action Frequency</th>
<th>Value</th>
<th>Action Timing</th>
<th>Benefit Timing</th>
<th>Program Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLC Management</td>
<td>Lower Invoice from Supplier by reducing PLC</td>
<td>Respond to PLC Notifications</td>
<td>Goal: No more that 10 events for 20 hours</td>
<td>Up to 100% of Capacity Costs</td>
<td>Summer 2014</td>
<td>Summer 2015</td>
<td>None</td>
</tr>
<tr>
<td>Demand Response</td>
<td>Revenue from Curtailment Service Provider</td>
<td>Respond to DR Events if none then 1 hour test</td>
<td>5 events in FE and 1 event in AEP</td>
<td>Approx. 65% of Capacity Costs</td>
<td>Summer 2014</td>
<td>Fall 2014</td>
<td>Discounted value by PJM and % Split with Curtailment Service Provider</td>
</tr>
</tbody>
</table>
# Example: FE, 1 MW Cap Obligation

## DR Only

<table>
<thead>
<tr>
<th>Planning Year</th>
<th>BRA ($/MW-day)</th>
<th>Total DR Value (BRA<em>1MW</em>365 days)</th>
<th>Customer DR Revenue (75%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>$125.99</td>
<td>$45,986.35</td>
<td>$34,489.76</td>
</tr>
<tr>
<td>2015-2016</td>
<td>$294.03</td>
<td>$107,320.95</td>
<td>$80,490.71</td>
</tr>
<tr>
<td>2016-2017</td>
<td>$90.54</td>
<td>$33,047.10</td>
<td>$24,785.33</td>
</tr>
</tbody>
</table>

Total DR Value: $139,765.80

## DR & PLC Management

<table>
<thead>
<tr>
<th>Planning Year</th>
<th>FZCP ($/MW-d)</th>
<th>Capacity Savings (FZCP<em>1MW</em>365 days)</th>
<th>DR Revenue</th>
<th>Total Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2015</td>
<td>$-</td>
<td>$-</td>
<td>$34,489.76</td>
<td>$34,489.76</td>
</tr>
<tr>
<td>2015-2016</td>
<td>$342.30</td>
<td>$124,939.50</td>
<td>$-</td>
<td>$124,939.50</td>
</tr>
<tr>
<td>2016-2017</td>
<td>$104.48</td>
<td>$38,135.20</td>
<td>$-</td>
<td>$38,135.20</td>
</tr>
</tbody>
</table>

Total DR and PLC MGT: $197,564.40