MISO Outage Coordination Update

July 2013 JCM
John Harmon
jharmon@misoenergy.org
Overview

• Market to Market Review
  – Guiding Principles

• MISO FTR Funding Success
  – Internal coordination practices

• Next Steps
  – Ensure problem statement is well defined
  – Additional data necessary to determine next steps
Market to Market Is a Tool for Operations

- M2M has existed since 2005 and brought many benefits to the seam
  - Lower production costs when managing congestion
  - Price convergence at the Seam
  - Minimizes out of market actions to preserve reliability

- Increase in M2M flowgates does not increase congestion across the seam
  - 90% of total binding hours on MISO flowgates are for standing constraints
Complex Seam with Heavy Transfers

- Loss of Wilton Center-Dumont 765 kV impacts underlying 345kV and 138kV system

- Meadow Lake & Fowler Ridge

- Clinton and Kincaid

- M2M facilitates efficient and reliable operation under a variety of operating scenarios
Tipping point for No. of M2M Flowgates

• Parties agreed in 2011 to no longer use approximate or “Proxy” Flowgates to control flow on heavily loaded constraints
  – Maximizes flow across all facilities; requires more flowgates b/c there are no substitutes in real time
  – Can make it challenging to model expected congestion on forward processes

• Half of increased M2M Flowgates only exist for switching equipment in and out of service
  – MISO is willing to explore alternative approaches to temporary conditions at the start of planned outages
MISO’s FTR Funding Improvement

- MISO solved FTR underfunding issues through internal coordination without changing outage coordination rules.
Coordination Prior to Annual/Monthly Auctions

• Forward Operations groups focus models on expected outcomes
  – System is dynamic, changes month to month

• Review expected outages for upcoming month and suggest constraints to be modeled in monthly auction
Multiple Areas Driving FTR Underfunding

- MISO provides monthly reports at its FTRWG that identify specific drivers of underfunding for each month.

![Diagram showing FTR Shortfall, Topology, and Non-Topology categories with subcategories such as Outages, Network Topology, Phase Shifters, Constraint Management, and Unpurchased Capacity.]
Additional Detailed Analysis Is Required

• **PJM reports** show 2012/2013 PJM underfunding driven primarily by outages in PJM classic -> $240M
  – Underfunding on MISO facilities -> $47M (20%)
  – 8 out of the 9 MISO facilities are standing constraints

• **Specific drivers of underfunding need to be identified**
  – Outage Driven -> If so, submitted in time for FTR auction?
  – Other standing system constraint
  – Requested specific outage details from PJM that will assist us in our analysis

* Monthly MIC Markets Reports
Next Steps

• MISO receive and review data from PJM and quantify key drivers for PJM FTR underfunding issues

• MISO work with PJM SMEs to explore process improvements

• MISO continue discussions with TOs about outage submittal times
Timeline

- Propose SMEs meet bi-weekly
- Detailed review of outage processes – August 2013
- Identify possible solutions – September 2013
- Feedback from JCM – November 2013
- Develop detailed design – Nov – Jan 2014
- MISO and PJM Stakeholder Processes – Feb – Mar 2014
- Implementation – Apr- June 2014
## Binding Hours on MISO Flowgates

<table>
<thead>
<tr>
<th>Year</th>
<th>Outage Specific Flowgate Binding Hours</th>
<th>Total MISO Flowgate Binding Hours</th>
<th>Percentage Outage Specific Binding Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>2,490</td>
<td>18,405</td>
<td>14%</td>
</tr>
<tr>
<td>2012</td>
<td>2,451</td>
<td>22,456</td>
<td>11%</td>
</tr>
<tr>
<td>2013*</td>
<td>783</td>
<td>8,114</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>5,724</td>
<td>48,975</td>
<td>12%</td>
</tr>
</tbody>
</table>

* Data as of April 2013
## MISO Flowgates Identified in PJM MIC Operations Reports

<table>
<thead>
<tr>
<th>Flowgate</th>
<th>Underfunding</th>
<th>Constraint Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monticello - East Winamac 138kV</td>
<td>$15.6M</td>
<td>Standing</td>
</tr>
<tr>
<td>Laporte – Michigan City 138 kv</td>
<td>$9.5M</td>
<td>Standing</td>
</tr>
<tr>
<td>Beaver Channel – Albany 161 kV</td>
<td>$8.8 M</td>
<td>Standing</td>
</tr>
<tr>
<td>Oakgrove – Galesburg 161 kV</td>
<td>$3.5M</td>
<td>Standing</td>
</tr>
<tr>
<td>Stillwell Xfmr</td>
<td>$3.3M</td>
<td>Forced Outage</td>
</tr>
<tr>
<td>Rising 345/138 kV Xfmr</td>
<td>$2.7M</td>
<td>Standing</td>
</tr>
<tr>
<td>Rantoul – Rantoul Jct 138 kV</td>
<td>$1.9M</td>
<td>Standing</td>
</tr>
<tr>
<td>Brokaw 345/138 kV Xfmr</td>
<td>$1.2M</td>
<td>Standing</td>
</tr>
<tr>
<td>6101 - Hennepin 138kV (Comed/MISO)</td>
<td>$1.2M</td>
<td>Standing</td>
</tr>
</tbody>
</table>