Michigan-Ontario
PAR Operations
Joint and Common Market
May 10, 2013
Michigan-Ontario PARs Overview

• Started coordinated interface operations on April 5, 2012
  – Some initial start-up challenges at first
  – Not all PARs in service all of the time resulting in less than optimal loop flow control
• All PARs in service after July 18th, 2012
  – All PAR’s consistently in service resulting in full control
• Interface control capability of PARs (collectively)
  – Normally operated to control actual flow equal to scheduled flow (±200 MW)
  – Able to fully control interface ~96-98% of the time
  – Provides significant degree of control all of the time
    • Observed to be up to approximately 700-800 MW in either direction
  – Normally limited by operational limitations of the PARs or local transmission facilities
Loop Flow Managed (Aug 2012 – Mar 2013)

- Loop Flow reduced in direction and magnitude
  - Predominantly clock-wise direction eliminated
  - On average, significant loop flow practically eliminated
  - Maximum observed correction of 834 MW
  - Periods with significant loop flow (>200) decreased
    - 49% during Aug 2011 – Mar 2012 period
    - 17% during Aug 2012 – Mar 2013 period

<table>
<thead>
<tr>
<th></th>
<th>Direction (% Time)</th>
<th>Loop Flow(^1) (Avg. MW)</th>
<th>PAR Correction(^1) (Avg. MW)</th>
<th>Loop Flow (Max MW)</th>
<th>PAR Correction (Max MW)</th>
<th>Loop Flow &gt; 200 MW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CW</td>
<td>CCW</td>
<td>CW</td>
<td>CCW</td>
<td>CW</td>
<td>CCW</td>
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<tr>
<td>Aug-Mar 2012</td>
<td>61%</td>
<td>39%</td>
<td>353</td>
<td>404</td>
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<tr>
<td>Aug-Mar 2013</td>
<td>50%</td>
<td>50%</td>
<td>285</td>
<td>295</td>
<td>340</td>
<td>308</td>
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</tbody>
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**IDC Regulated Time inside dead band**

- 96.4%
- 82.8%

1- Periods when Loop Flow exceeded Control Band (±200MW)
Interface Trend (Aug 2012 – Mar 2013)
Loop Flow Managed (April 2013)

- **Loop Flow reduced in direction and magnitude**
  - Predominantly counter clock-wise direction eliminated
  - Loop flow reduced
  - Maximum observed correction of 600 MW
  - Periods with significant loop flow (>200) decreased
    - 53% without PAR control
    - 17% with PAR control

<table>
<thead>
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<tr>
<td>W/O PARs</td>
<td>31%</td>
<td>69%</td>
<td>200</td>
<td>257</td>
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<tr>
<td>With PARs</td>
<td>50%</td>
<td>50%</td>
<td>132</td>
<td>133</td>
<td>220</td>
<td>198</td>
</tr>
</tbody>
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**IDC Regulated**
- Time inside dead band: 96.0%

**Time inside dead band**: 86.1%