Residual Metered Load Pricing Overview

Market Settlements Subcommittee
September 22, 2014
Residual Metered Load Pricing Overview

• Residual Zone (Residual Metered Load Aggregates)
  – An aggregate containing all load buses in the fully metered EDC territory, minus all load that has been designated to be priced at a specific non-zonal (or nodal) location

• Residual Metered Load Pricing approved for implementation on 6/1/2015
  – Use of the residual metered load aggregate LMP rather than the physical zone LMP for pricing real-time load

  • All non-nodal load in the zone will be priced at the same pricing point
  • Nodal load will continue to be priced at the applicable nodal pricing point
  • No opt out provisions
Nodal Load Impacts on Physical Zone Price

Physical Zone Definition

- Pnode A: 20% (20 MWh, $35 LMP)
- Pnode B: 15% (15 MWh, $40 LMP)
- Pnode C: 35% (35 MWh, $25 LMP)
- Pnode D: 30% (35 MWh, $35 LMP)

Total Zone Load Charges: $3525
Physical Zone LMP: $35.25

Residual Zone Definition

- Pnode A: 24% (30 MWh, $45 LMP)
- Pnode B: 15% (15 MWh, $40 LMP)
- Pnode C: 41% (35 MWh, $25 LMP)
- Pnode D: 35% (35 MWh, $35 LMP)

Total Zone Load Charges: $3525
Residual Metered Load LMP: $34.41
Residual Metered Load Aggregate Definitions

- **Day-ahead distribution factors** will default to the final real-time distribution factors for the residual metered load aggregate at 8:00 a.m. one week prior to the Operating Day
  - i.e., if next Operating Day is Monday, the default distribution is from 8:00 a.m. on Monday of the previous week.
  - Consistent with physical zones, the definition will apply to all hours in the day

- **Preliminary 5 min. real-time LMPs** will be calculated using same residual metered load distribution factors used for the Day-ahead market for the Operating Day

- **Final hourly real-time distribution factors** will be calculated using InSchedule-submitted nodal load MWh
Residual Metered Load Definitions for FTR Credit
Target Allocation

• Residual Metered Load aggregate definitions used for ARR/FTR purposes are fixed for the planning period

• Initial aggregate distribution for FTRs will be determined based on the contribution of each bus to the total residual load at the time of previous year’s PJM annual peak
  – Consistent with the practice used to determine the physical zone distribution used for ARRs/FTRs

• Initial distribution will be adjusted by any new nodal load requests
  – LSEs moving to nodal load settlement are required to submit:
    • Peak load at time of PJM annual peak from the previous year
    • Aggregate definition distribution percentages
• InSchedule contracts for real-time load currently priced at non-nodal pricing points must use the Residual Metered Load Aggregate starting 6/1/2015
  – PJM will automatically terminate any affected contracts on 6/1/2015
  – EDCs/LSEs will be required to create new real-time load InSchedule contracts using the residual metered load aggregates effective 6/1/2015 and beyond
• Demand Response settled and dispatched at applicable load pricing point
  – Participants must specify residual zone or nodal pricing point when registering demand response resources effective 6/1/2015
• ARRs default to sinking at the pricing point at which the load is settled, with an option to sink at the physical zone
  – Defaults to residual metered load aggregate with an option to pick the physical zone on an annual basis
  – Participants wishing to sink ARRs at the physical zone for the 2015/2016 Planning Period must notify the FTR Group (FTRGroup@pjm.com) no later than 11/1/2014.
Impact to Reconciliation Settlements

- Differences between Nodal Customers’ InSchedule Load (next day) and Reconciled Load (2 months later) may result in RT load distributions being slightly different than the original distributions.

- An adjusted distribution reconciliation rate will be used to reconcile all load priced at the residual metered load aggregate, including load with no reconciliation MWh
  - Only impacts load reconciliation for transmission congestion and transmission losses

- The adjusted distribution reconciliation rate will be posted publicly and reported in MSRS
• Residual Metered Load Prices are currently being calculated for informational purposes and are posted in a separate "residual" file
• Physical zone prices will continue to be calculated and published after 6/1/2015
• New Residual Metered Load Aggregate Pricing page on PJM.com
  – FAQ document
  – Overview presentation
  – Link to Issue Tracking
• Training sessions will be held in early 2015
- **Manual 28** – Operating Agreement Accounting
  - Residual Metered Load calculation and Residual Metered Load Aggregate Definitions (Section 3)
  - Transmission Congestion Charge and Transmission Loss Charge Reconciliation (Section 8.3 and Section 9.3)
  - Default day-ahead definition for residual metered load aggregate (Section 2)
- **Manual 6** – ARR/FTR election language (Sections 3 and 4)
Future Settlements Topics

- MSRS and pjm.com settlements reports
- Others?
Appendix - Definitions and Examples
• **NODAL LOAD prices** are defined by weighting each load bus LMP by the *Nodal Load Distribution Factors* provided to PJM that represent each bus’ load contribution to the total nodal load.

• **PHYSICAL ZONE prices** are defined by weighting each load bus LMP by that bus’ *State Estimated Load Contribution* to the total zonal load.

• **RESIDUAL METERED LOAD prices** are defined by weighting each load bus LMP by that bus’ *Residual Load Distribution Factor* calculated by PJM. Residual metered load is defined as all load buses in the fully metered EDC territory less all nodally priced load.
### Real-Time Load Settlement Examples

#### Settlements Today
- **15 MWh load priced nodally at Pnode B**
  - \(15 \text{ MW} \times \$40 = \$600\)
- Remaining 85 MWh load priced at physical zone
  - \(85 \text{ MWh} \times \$35.25 = \$2996.25\)
- Residual EDC and/or POLR load pays difference
  - \(100 \text{ MWh} - 15 \text{ MWh} - 85 \text{ MWh} = 0 \text{ MWh}\)
  - \(\$3525 - \$600 - \$2996.25 = -(\$71.25)\)

#### Residual Metered Load Aggregate Pricing Implementation
- **15 MWh load priced nodally at Pnode B**
  - \(15 \text{ MW} \times \$40 = \$600\)
- Remaining 85 MWh load priced at residual metered load aggregate
  - \(85 \text{ MW} \times \$34.41 = \$2925\)
- Residual EDC and/or POLR load pays difference
  - \(100 \text{ MWh} - 15 \text{ MWh} - 85 \text{ MWh} = 0 \text{ MWh}\)
  - \(\$3525 - \$600 - \$2925 = 0\)

<table>
<thead>
<tr>
<th>Pnode</th>
<th>MWh</th>
<th>LMP</th>
<th>Total Zone Load Charges</th>
<th>Zonal Distribution</th>
<th>Weighted Physical Zone LMP</th>
<th>Residual Distribution</th>
<th>Weighted Residual LMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
<td>35</td>
<td>$700</td>
<td>20% $7.00</td>
<td>23.5% $8.22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td>40</td>
<td>$600</td>
<td>15% $6.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>35</td>
<td>25</td>
<td>$875</td>
<td>35% $8.75</td>
<td>41.2% $10.30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>45</td>
<td>$1,350</td>
<td>30% $13.50</td>
<td>35.3% $15.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td>$3,525</td>
<td>100% $35.25</td>
<td>100% $34.41</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Residual Metered Load Aggregate Pricing Settlements

<table>
<thead>
<tr>
<th>Pnode</th>
<th>Original MWh</th>
<th>LMP</th>
<th>Total Zone Load Charges</th>
<th>Residual Metered Load Agg Distribution</th>
<th>Weighted Residual Metered Load Agg LMP</th>
<th>Net MWh after reconciliation</th>
<th>Revised Residual Metered Load Agg Distribution</th>
<th>Revised Weighted Residual Metered Load Agg LMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>20</td>
<td>35</td>
<td>$700</td>
<td>23.5%</td>
<td>$8.22</td>
<td>20</td>
<td>14 (nodal)</td>
<td>1.16%</td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td>40</td>
<td>$600</td>
<td>$</td>
<td>-</td>
<td>1 MWh less load priced at Pnode B</td>
<td>-1 MWh * $40 = ($40)</td>
<td>14 MWh * $40 = $560</td>
</tr>
<tr>
<td>C</td>
<td>35</td>
<td>25</td>
<td>$875</td>
<td>41.2%</td>
<td>$10.30</td>
<td>35</td>
<td>1 MWh more load priced at residual metered load aggregate</td>
<td>86 MWh * $34.48 = $2965</td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>45</td>
<td>$1,350</td>
<td>35.3%</td>
<td>$15.89</td>
<td>30</td>
<td>85 MWh original load priced at difference between new/original residual metered load aggregate price</td>
<td>$2925 + $40 = $2965</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td>$3,525</td>
<td>100%</td>
<td>$34.41</td>
<td>100</td>
<td>Residual EDC and/or POLR load pays difference</td>
<td>Residual EDC and/or POLR load pays difference</td>
</tr>
</tbody>
</table>

### Original Settlement
- **Nodal Load**: 15 MWh load priced at Pnode B
  - 15 MW * $40 = $600
- **Remaining Load**: Remaining 85 MWh load priced at residual metered load aggregate
  - 85 MW * $34.41 = $2925

### Reconciliation Settlement
- **Nodal Load**: 1 MWh less load priced at Pnode B
  - -1 MWh * $40 = ($40)
- **Remaining Load**: 1 MWh more load priced at residual metered load aggregate
  - 1 MWh * $34.48 = $34.48
  - 85 MWh original load priced at difference between new/original residual metered load aggregate price
  - 85 MWh * ($34.48 - $34.41) = $5.52
  - $34.48 + $5.52 = $40

### Net Settlement
- **Nodal Load**: 14 MWh * $40 = $560
  - $600 + ($40) = $560
- **Remaining Load**: 86 MWh * $34.48 = $2965
  - $2925 + $40 = $2965

* Note: Unrounded distribution weightings and prices must be used to recalculate these settlements