Intraday Offers Education

September 15, 2017
PJM has made all efforts possible to accurately document all information in this presentation. The information seen here does not supersede the PJM Operating Agreement or the PJM Tariff or any pending FERC Filings or Orders.

<table>
<thead>
<tr>
<th>Introduction</th>
<th>12:00 p.m. – 12:15 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Impacts, Opt Out</td>
<td></td>
</tr>
<tr>
<td>Impacts to Day-Ahead Market, Rebid Period, Intraday Period</td>
<td>12:15 p.m. – 12:50 p.m.</td>
</tr>
<tr>
<td>Demand Response, Ancillary Services Switch to Cost, TPS, and Dual Fuel Availability</td>
<td>12:50 p.m. – 2:00 p.m.</td>
</tr>
<tr>
<td>Break</td>
<td>2:00 p.m. – 2:15 p.m.</td>
</tr>
<tr>
<td>Settlements</td>
<td>2:15 p.m. – 3:30 p.m.</td>
</tr>
<tr>
<td>Close/Final questions</td>
<td>3:30 p.m. – 3:45 p.m.</td>
</tr>
</tbody>
</table>
Introduction
Intraday Offer Overview

• Introduction of Intraday Offers (IDO) will enable hourly differentiation and modifications for certain parameters of supply offers for
  – Generation Resources
  – Demand Resources

• Benefits:
  – Allows Energy Market offers to be more flexible
  – Allows participants to more accurately reflect costs throughout the operating day
  – Improved coordination with the gas market timing
### Key Features of Intraday Offers

<table>
<thead>
<tr>
<th>Feature</th>
<th>Today</th>
<th>IDO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offer Curve Granularity</td>
<td>Daily Curve</td>
<td>Hourly Differentiated Curves</td>
</tr>
<tr>
<td>Update Timeline</td>
<td>No updates after Rebid Period</td>
<td>Updates permitted 65 minutes prior to operating hour*</td>
</tr>
<tr>
<td>Regulation and Sync Reserve</td>
<td>Daily Offer</td>
<td>Hourly Offer</td>
</tr>
<tr>
<td>Offer Flexibility</td>
<td>Election made day before; updates made 3 hours in advance of operating hour</td>
<td>65 minutes in advance of operating hour</td>
</tr>
<tr>
<td>Dual Fuel Flexibility</td>
<td>Offline units evaluated</td>
<td>Online and Offline units evaluated, Self-Scheduled units included</td>
</tr>
<tr>
<td>Market Mitigation</td>
<td>Offline units evaluated</td>
<td></td>
</tr>
</tbody>
</table>

*Subject to business rules specified in later slides
Intraday Offers (Hourly Offers) Filing History

1. **Jun 2015**
   - PJM files proposal to implement Intraday Offers

2. **Nov 2015**
   - FERC initiates 206 proceeding directing PJM to move to Intraday Offers

3. **Jun 2016**
   - PJM submits compliance filing

4. **Aug 2016**
   - FERC rejects the PJM proposal and orders a compliance filing

5. **Feb 2017**
   - PJM 2nd submits compliance filing

6. **Mar 2017**
   - FERC issues order accepting PJM’s Intraday Offers proposal

7. **Nov 2017**
   - Go Live
Intraday Offers Roadmap

<table>
<thead>
<tr>
<th>Q4 2016</th>
<th>Q1 2017</th>
<th>Q2 2017</th>
<th>Q3 2017</th>
<th>Q4 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate Markets Gateway</td>
<td></td>
<td>Member Markets Gateway Testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Train Environment Dec. 22</td>
<td></td>
<td></td>
<td>Prod: Nov 1, 2017</td>
<td></td>
</tr>
<tr>
<td>Intraday Education: Jan 9, 2017</td>
<td></td>
<td>Additional Member Education Aug. 7 Sep. 15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Market trials scheduled for September 19 & 20 and October 4 & 5
Market Trials

• Market trial days will be available on Sep. 19 & 20 and Oct. 4 & 5. Markets personnel will be dedicated to answering questions and helping to resolve any issues.

• Users will have the ability to:
  – Enter DA daily and differentiated offer information
  – See DA results daily on the Markets Results screen
  – Exercise price updates for committed/uncommitted schedules
  – Enter hourly updates while observing lock-out periods

• Notes:
  – All of the above are available on a daily basis, everyday
  – Intraday Offers Train environment does not have RT engines or RT dispatching
  – Although there are no RT commitments, DA commitments can be used to experience price updates for committed/uncommitted schedules and lockout periods
  – There is no Settlements capability
Submitting and Updating Offer Timelines

Operating Day -1 (OD-1)

- Day-Ahead Offers for OD Due
- Day-Ahead Results for OD Posted

Operating Day (OD)

- Market Clearing Window
- Rebid Window for OD
- Reliability Run

IDO

*Hourly Updates can be submitted up to 65 mins prior to Operating Hour

Lockout Period
Updates Permitted
General Impacts
The implementation of Intraday Offers will limit the schedule IDs that can be created and offered

- This impacts **all** Generation resources, not just those that plan to update schedules hourly

Schedules using IDs not in the new list cannot be made available in Markets Gateway starting on the November 1 market day

Members should begin using the reduced number of Intraday Offers schedule IDs at their earliest convenience to minimize the implementation impact
Converting Schedule IDs

- PJM posted a step by step guide with instructions to:
  - Create new schedules with the accepted IDs
  - Download existing schedule details to copy to the new accepted IDs
  - Guide to Convert Schedule IDs in Markets Gateway has been added to the Markets Gateway Tools page, under Intraday Offers

- Will require Market Seller action by October 31 in order to offer into the Day-Ahead Market on November 1

*Number of cost based schedules increased to 12
Today Generation schedules can be assigned a Market Type
  • Day-Ahead
  • Balancing
  • Both
With the Intraday Offers Implementation, this Market Type field will be removed from the Schedule Detail and Schedule Selection screens
Non-Capacity Resources wishing to offer only in Real Time may change the unit’s Commit Status from Unavailable prior to DA to Available after the DA Market
Units wishing to offer differently between DA and RT can update schedule availability during the Rebid Period
  - Exceptions exist for Dual Fuel units

- May update the offer intraday
• Opt-out is the default for all units at go-live, and for any new units added at a later date, but the option to opt-in is available.

• For units electing to opt-in:
  – The opt-in election must be specified in the Fuel Cost policy.
  – A methodology for developing costs intraday must be specified in the Fuel Cost Policy.
  – Units can change their election and opt-out on a monthly basis, as long as the option to do so is specified in their Fuel Cost Policy.
• Users must communicate their desire to opt in or opt out prior to midnight of the 15th day of the month prior to the month the election will begin
  – An exception to this rule will be made for new Fuel Cost Policies approved outside of the above timeline. In this case, PJM will manually set the opt-in/out
  – For Nov. 1, PJM will manually opt-in units that have specified it in their Fuel Cost Policy, and that policy is approved prior to Nov. 1

• Opt in/out is generator specific, and continues until the user cancels
• There is no XML capability for opt out
• There is no opt-out option for Demand Response
If a Generator chooses to opt out of Hourly updates in accordance with their Fuel Cost Policy, certain capability is still available:

If a Generator opts out, they may:

• Provide hourly differentiation for their DA offer
• Update the incremental energy offer, min run time, and no load and startup costs during the Rebid period for hours where the unit does not have a Day-Ahead commitment.
• Update schedule based notification time (except during lockout periods)
• Utilize “Switch to Cost” functionality
• Update Regulation and Spin MW values 65 minutes prior to the operating hour

If a Generator opts out, they may NOT:

• Update incremental energy offer, min run time, no load and start-up costs after the Rebid period
• Update Regulation and Spin cost and price after the rebid period or throughout the operating day
Preliminary Go-live information

- To participate in DA market for market day of 11/1/17
  - Participants must have compliant schedules (Cost 1-12, Price PLS 79, Price 99) in the system by 10/31/17
  - All schedules will be set to Unavailable for market day 11/1
  - Participants will need to set their applicable schedules for 11/1 to Available by 10:30 a.m. on 10/31
  - Participants may differentiate (vary by hour) their Day Ahead offer for the 11/1 market day, and may update in the Rebid period (1:30 to 2:15)*
  - If the participant has indicated they will opt-in to Intraday Offers in their Fuel Cost Policy (and been approved), they may then make real-time hourly updates to their offer beginning after 18:30 on 10/31 (for 11/1)

* For opted-out units, updates are locked at the end of rebid for uncommitted units and at the beginning of rebid for committed units
Markets Timeline for IDO Implementation Date

Tuesday, October 24

00:00

Day-Ahead Offers for 11/1 Due

03:30

Schedule availability will NOT carry over for 11/1 Market Date. Members will need to make an IDO compliant schedule available for 11/1 by 10:30 on 10/31

10:30

Day-Ahead Market Clearing Window

13:30

Rebid Window for 11/1

14:15

Reliability Run

18:30

23:59

Wednesday, November 1

IDO

Lockout Period

Updates Permitted to 11/1 Market Day

Updates Permitted for uncommitted or committed units, except for units that opted-out

*Hourly Updates can be submitted up to 65 mins prior to Operating Hour
Impacts to Day-Ahead Market Offers
Impacts to Day-Ahead Offers

Day-Ahead Offer Period

- Day-Ahead Offers for OD Due
- Day-Ahead Results for OD Posted

Operating Day -1 (OD-1)
- Market Clearing Window
- Rebid Window for OD
- Reliability Run

Operating Day (OD)

*Hourly Updates can be submitted up to 65 mins prior to Operating Hour

Lockout Period
- Updates Permitted
Impacts to Day-Ahead Offers

• Segmented Ramp Rate will be considered in Day-Ahead Market Clearing starting November 1
• Schedule availability will continue to be designated on a daily basis, however will be able to change offer curves and certain parameters that differ on an hourly basis.
• Parameters include:
  – No Load Cost
  – Startup Cost (Cold, Intermediate, Hot)
• New screens will be added to Markets Gateway to support the hourly differentiated values
  – Offer Updates
  – Detail Updates
Impacts to Day-Ahead Offers

- Daily offers and parameters must continue to be submitted
- Hourly differentiated values supersede the daily values on the Offer and/or Detail pages
  - Hourly differentiations are made via the Offer Updates or Detail Updates pages of Markets Gateway
- Hourly differentiated values made on the Offer Updates or Detail Updates pages are not carried over into the next operating day
Daily Offers submitted here

Hourly Differentiated Offers submitted here; overwrite Daily Offers

Default Startup and No Load Costs submitted here

Hourly Differentiated Startup and No Load Costs submitted here
Offers Screen in Markets Gateway

- Right click anywhere on the screen to “Add Item”
- Can submit up to 10 different MW and Price pairs
- Segments submitted on this screen will apply to all hours of the day
- Capacity Resource offers are carried over to the next market day
Offer Updates Screen in Markets Gateway

- Right click on the hour to “Add Segment”
- Can add hourly offer curves for one, some or all hours
- If an hour is not populated, will default to use the daily curve (on Offers screen)
- Updates made will not carry over to the next market day
Detail Screen in Markets Gateway

Default Startup Costs

Default No Load Costs

Default Notification Time

*No change from today*
Updates to Offers during Rebid Period
Impacts to Rebid Period

- **Rebid Window**

- **Operating Day -1 (OD-1)**
  - Day-Ahead Offers for OD Due
  - Day-Ahead Results for OD Posted

- **Operating Day (OD)**

  - Market Clearing Window
  - Rebid Window for OD
  - Reliability Run

- **IDO**

- **Lockout Period**
  - Updates Permitted

  *Hourly Updates can be submitted up to 65 mins prior to Operating Hour*
### Updating Offers During Rebid Period

<table>
<thead>
<tr>
<th></th>
<th>Today</th>
<th>IDO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Committed Day-Ahead</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer MW</td>
<td>No updates permitted for entire day</td>
<td>No updates permitted for committed hours</td>
</tr>
<tr>
<td>Offer Price</td>
<td>No updates permitted for entire day</td>
<td>Updates permitted to offer price for all hours (price schedule offer price cannot be increased for an hour that is committed)</td>
</tr>
<tr>
<td><strong>Not Committed Day-Ahead</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offer MW</td>
<td>Updates may be submitted prior 1415</td>
<td>Updates may be submitted prior 1415</td>
</tr>
<tr>
<td>Offer Price</td>
<td>Updates may be submitted prior 1415</td>
<td>Updates may be submitted prior 1415, and again after 1830</td>
</tr>
</tbody>
</table>
Intraday Updates to Offers
Intraday Updates to Energy Offers

- Generation offers can be updated after the Reliability Run is complete, starting at 18:30 up to 65 minutes prior to operating hour

- Potential Updates to Offers include:
  - Price component of the Offer Segment
  - No load and Startup Costs
  - Notification Time
  - Min Run Time
  - Switch to Cost Schedule
### Incremental Energy Offer Price Updates

<table>
<thead>
<tr>
<th>Type of Unit</th>
<th>Type of Schedule</th>
<th>Committed Hours</th>
<th>Uncommitted Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-Based*</td>
<td>Cost</td>
<td>Increase/Decrease</td>
<td>Increase/Decrease</td>
</tr>
<tr>
<td>Price-Based</td>
<td>Price</td>
<td>Decrease</td>
<td>Increase/Decrease</td>
</tr>
<tr>
<td></td>
<td>Cost</td>
<td>Increase/Decrease</td>
<td>Increase/Decrease</td>
</tr>
</tbody>
</table>

*Cost-Based units cannot have a Price-Based schedule*
Allowable Real Time Schedule Updates – Price-Based Unit

Price Curve

- $50
- $40
- $30
- $20

Cost Curve

- $50
- $40
- $30
- $20

Price (or Price-PLS) Schedule submitted DA

Commitment (DA or RT)

Only

or

Cost Schedule Submitted DA

www.pjm.com

PJM©2017
## What Determines a Price Increase?

Price increases are determined at the segment level.

A decrease in price for one segment does not off-set an increase in another segment.

### Price Schedule at Commitment

<table>
<thead>
<tr>
<th>Segment</th>
<th>MW</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>$5</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>$7</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>$10</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>$15</td>
</tr>
</tbody>
</table>

### Update to Price Schedule

<table>
<thead>
<tr>
<th>Segment</th>
<th>MW</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>$5</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>$8</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>$10</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>$14</td>
</tr>
</tbody>
</table>
Example 1: Committed on Price – Increase to Offer in RT

Assume cost increases for the entire day after DA market clears.

Price Curve
- Price schedule submitted DA
- Price schedule update submitted the day prior (after reliability run)

Cost Curve
- Cost schedule submitted DA
- Cost schedule update submitted the day prior (after reliability run)
Example 2: Committed on Cost – Increase to Offer in RT

Assume cost increases for hour 10 and beyond
Example: A flexible unit is committed in DA and called on to run in RT

- It updates its price before being called in RT
- The most recent update prior to the commitment becomes the ceiling price
- If for DA the price is $50, but at RT the price is updated to $40, then the unit is subsequently committed, $40 will be the ceiling price
Example 3: Flexible Unit Decreases Offer before RT Call On

Price Curve

- Price schedule submitted DA
- DA Commitment
- Price schedule update submitted in RT @ 5:00
- RT Commitment (Called on for 7:00 and actual on time is 7:00)

Updates made after RT call on cannot go above this ceiling price:

Cost Curve

- Cost schedule submitted DA
- Cost schedule update submitted in RT @ 8:55
- Values submitted can go above this level:

www.pjm.com
Example 4: CT Increases Price Before vs. After RT Call On

Both units are price-based with min run time = 8 hours

Unit A

- Price schedule submitted DA
- DA Commitment 6:00 – 14:00
- Price schedule update submitted in RT @ 7:00
- RT Commitment (Called on for 12:00 and actual on time is 12:00)

Unit B

- Price schedule submitted DA
- DA Commitment 6:00 – 14:00
- Price schedule update submitted in RT @ 15:55
- RT Commitment (Called on for 12:00 and actual on time is 12:00)

HB 14-20: Commitment uses latest schedule update

Update before commitment

Update after commitment
Example 5: Committed on Price in RT (No DA Commitment)

Unit has a min run time of 6 hours. Assume cost increases for hours 10 and beyond subsequent to DA offer submission. Offer is updated in RT prior to RT commitment. Offer is then updated again in RT after commitment decision is made.
Price Increase Lockout Periods

- Units are locked out of increasing Price schedules in Markets Gateway for the duration of their DA commitment.
- If commitment is extended in RT, the lockout period will also be extended.
- More specific rules for lockout periods exist for flexible units – this will be communicated in a supplemental FAQ document.
Real Time Updates to No Load and Startup Costs

- No load cost and startup costs (cold, intermediate, hot) can be updated hourly via the Detail Updates Screen based on the following rules:

<table>
<thead>
<tr>
<th>Type of Schedule</th>
<th>Startup/No load Election</th>
<th>Current Updates Permitted</th>
<th>Future Updates Permitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Cost</td>
<td>Updated Daily on Schedule Detail Screen</td>
<td>Increase/Decrease hourly except for lockout period</td>
</tr>
<tr>
<td>Price</td>
<td>Cost</td>
<td>Updated Daily on Schedule Detail Screen</td>
<td>Increase/Decrease hourly except for lockout period</td>
</tr>
<tr>
<td>Price</td>
<td>Specified biannually on Unit Detail screen</td>
<td>No change to current functionality</td>
<td></td>
</tr>
</tbody>
</table>
Real Time updates to Notification Time and Min Run Time

- **Notification Time and Min Run Time:**
  - May be updated hourly up to 65 minutes before the start of the target hour (excluding lockout periods)
  - Updates are used in Reliability Run and Real Time only
  - Min Run Time cannot be updated for committed hours
  - Updates made via the Detail Updates Screen
Detail Updates Screen in Markets Gateway

- Left click on the hour to submit hourly updates for:
  - No Load Cost
  - Startup Costs
  - Min Run Time
  - Notification Time
- If an hour is not populated, will use default values (on Detail screen)
Impacts to Demand Response Resources
Incremental energy offer price and the shut down cost of a DSR can be updated up to 65 minutes prior to the start of the target hour under the following conditions:

- Price will be added to the Demand Response > Offer Updates screen
- Shut Down Cost will be added to the Demand Response > Hourly Updates screen
• Hourly Notification Time and Min Down Time Values:
  – Can be submitted up to 65 minutes before the start of the target hour (excluding lockout periods)
  – Updates only used in Reliability Run and Real Time
  – Updated via Demand Response > Hourly Updates screen
  – Min Down Time cannot be updated for committed hours
Impacts to Ancillary Service Offers
## Impact to Generation Regulation Offers

<table>
<thead>
<tr>
<th>Offer Price Granularity</th>
<th>Today</th>
<th>IDO Implementation</th>
<th>Opt Out of IDO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily</td>
<td>Hourly</td>
<td>Hourly</td>
</tr>
<tr>
<td>Offer Price Update Deadline</td>
<td>1415 Day Before</td>
<td>65 minutes prior to Operating Hour</td>
<td>1415 Day Before</td>
</tr>
<tr>
<td>Offer MW/Status Granularity</td>
<td>Hourly</td>
<td>Hourly</td>
<td>Hourly</td>
</tr>
<tr>
<td>Offer MW/Status Update Deadline</td>
<td>60 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
</tbody>
</table>
## Impact to Demand Response Regulation Offers

<table>
<thead>
<tr>
<th>Offer Price Granularity</th>
<th>Today</th>
<th>IDO Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offer Price Update Deadline</td>
<td>Daily</td>
<td>Hourly</td>
</tr>
<tr>
<td>Offer MW/Status Granularity</td>
<td>1415 Day Before</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
<tr>
<td>Offer MW/Status Update Deadline</td>
<td>Hourly</td>
<td>Hourly</td>
</tr>
<tr>
<td></td>
<td>60 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
</tbody>
</table>
# Impact to Generation Synchronized Reserve Offers

<table>
<thead>
<tr>
<th></th>
<th>Today</th>
<th>IDO Implementation</th>
<th>Opt Out of IDO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offer Price Granularity</td>
<td>Daily</td>
<td>Hourly</td>
<td>Hourly</td>
</tr>
<tr>
<td>Offer Price Update Deadline</td>
<td>1415 Day Before</td>
<td>65 minutes prior to Operating Hour</td>
<td>1415 Day Before</td>
</tr>
<tr>
<td>Offer MW Granularity</td>
<td>Hourly</td>
<td>Hourly</td>
<td>Hourly</td>
</tr>
<tr>
<td>Offer MW Update Deadline</td>
<td>2 hours prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
<tr>
<td>Hourly Availability Update Deadline</td>
<td>60 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
</tbody>
</table>
Impact to Demand Response Synchronized Reserve Offers

<table>
<thead>
<tr>
<th></th>
<th>Today</th>
<th>IDO Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offer Price Granularity</td>
<td>Daily</td>
<td>Hourly</td>
</tr>
<tr>
<td>Offer Price Update Deadline</td>
<td>1415 Day Before</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
<tr>
<td>Offer MW Granularity</td>
<td>Hourly</td>
<td>No Change</td>
</tr>
<tr>
<td>Offer MW Update Deadline</td>
<td>60 minutes hours prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
<tr>
<td>Hourly Availability Update</td>
<td>60 minutes prior to Operating Hour</td>
<td>65 minutes prior to Operating Hour</td>
</tr>
</tbody>
</table>
Switch to Cost Functionality
If a unit is committed on a price schedule and its cost schedule incremental energy offer subsequently exceeds its price schedule value, it may elect to be switched to its cost schedule:

- Unit will be switched to use the cheapest available cost schedule.
- The unit must then stay on its cost schedule for the rest of the Operating Day.
- The price schedule will become unavailable and will not be permitted to made available again for the rest of the Operating Day.
Switch to Cost Schedule

**Today (GUCC)**
- Elected on “Availability Update” screen
- Elect between 1830 and 2100 the day before
- Election does not propagate to subsequent market days

**Intraday Offer Implementation**
- Elected on “Detail Updates” Screen
- Elect prior to DA, during Rebid Period, or between 1830 the day before and 65 minutes prior to operating hour
- Election does not propagate to subsequent market days
Switch to Cost in Markets Gateway

To switch to Cost Schedule in Markets Gateway, follow these steps:

1. Check the "Switch to Cost Schedule" box.
2. Select the Start Hour.
3. By selecting Switch to Cost in Day Ahead or Real Time, Price-based and Price-PLS schedules will be set to Unavailable.

The table below shows the schedule details, including the hour, Net Load Cost, Cost Startup Cost, Incremental Startup Cost, Net Startup Cost, Minimum Runtime, Notice Time, and Status.

<table>
<thead>
<tr>
<th>Hour</th>
<th>Net Load Cost</th>
<th>Cost Startup Cost</th>
<th>Incremental Startup Cost</th>
<th>Net Startup Cost</th>
<th>Minimum Runtime</th>
<th>Notice Time</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hot Committed</td>
</tr>
</tbody>
</table>
Managing Dual-Fuel Units Intraday
Schedule Availability Update for Dual Fuel Units

- Situations may arise for Dual Fuel units when a fuel switch is required
- If a unit is designated as Dual Fuel on the Generator>Unit>Detail tab in Markets Gateway, schedule availability may be changed hourly throughout the operating day
  - May be changed in Real Time only, between 1830 the day before and 65 minutes before the operating hour
  - For cost schedules only
  - Price schedule remains Available (note: changing Availability does not imply switch to cost)
  - Schedule may be changed from Available to Unavailable, and vice versa, as needed
  - One cost schedule per fuel type may be Available at any one time
  - Can be changed for hours in which a schedule is not committed

www.pjm.com
Dual Fuel Example #1

Price schedule (gas)
submitted DA  ($30)

DA Commitment

Cost schedule (gas)  ($35)

8:11 - 2 hrs. of gas remain

Cost schedule (gas)  ($30)

8:30 - Gas cost schedule made Unavailable starting at 10:00

Cost schedule (oil)  ($60)

8:55 – minimum of T-65 min. switch to cost for 10:00

Balance of Commitment

8:55 – Switch to cost
Dual Fuel Example #2

Price schedule (gas) submitted DA ($40)

Cost schedule (gas) ($35)

Cost schedule (oil) ($60)

8:11 – Determine 2 hrs. of gas remains

Gas cost schedule availability cannot be updated for committed hours. Call to Dispatch required.
Three Pivotal Supplier Test
• The TPS test is a test for structural market power. The test examines the concentration of ownership of the supply compared to the level of demand

• PJM utilizes the Three Pivotal Supplier (TPS) Test to mitigate market power for:
  – Transmission Constraints
  – Regulation Market
  – RPM
Three Pivotal Supplier Test

- A test failure means that the ownership of the required supply is concentrated among few suppliers:
  - Those suppliers have the potential to exercise market power (structural market power)
  - It does not mean those suppliers are attempting to exercise market power
  - A test failure triggers mitigation as a preventative step in the event of a concentration of ownership

- Resources that fail TPS are placed on the cost or price schedule that results in the lowest overall system production cost (DA Market) or the lowest dispatch cost (RT Market). This is referred to as offer capping.
Three Pivotal Supplier Test (DA)

- DA TPS will be updated to consider hourly differentiated offers in the TPS test evaluation
- “Must run” resources will be included in the evaluation and subjected to mitigation
- TPS testing performed for binding transmission constraints
Three Pivotal Supplier Test (RT)

- Real-time energy TPS testing is performed in the ITSCED application for binding transmission constraints.
- Currently, TPS testing is performed for offline units only, as part of the RT unit commitment process.
- Under Intraday Offers:
  - There will be no change to the TPS process for offline resources.
  - There will be an online unit TPS test performed following the completion of either the DA commitment period, or the min run time if the unit was committed in real-time.
- For the online resources that have met their commitment period, TPS testing will occur every hour until they are released.
- For self-scheduled units committed in the Real-time Market (and not in the Day-Ahead Market), the TPS test will be performed after min run time is met and occur every hour until the resource comes offline.

Only offline units are subject to offer capping.

Online Units (including self-scheduled units).

Today

Intraday Offers

Offline units
Online Unit TPS Test and Offer Capping

• Units running in real-time beyond completion of either the DA commitment period, or the min run time if the unit was committed in real-time will be subject to evaluation for market power on an hourly basis and will be offer capped as follows:
  – Units operating on a price-based schedule whose owner passes the TPS test will not be offer capped and will remain on the price-based offer.
  – Units operating on a price-based schedule whose owner fails the TPS test will be offer capped.
  – Units operating on a cost-based schedule will remain on that schedule regardless of the results of the TPS test.
Offer Capping Duration

• Offer capped resources will remain offer capped until the earlier of:
  – End of the day
  – Unit is released
  – Start of its next pre-existing commitment

• Applies to units cycled in the day-ahead commitment or brought online in real-time prior to day-ahead commitment
Visibility into Online TPS Offer Capping

- Participants will be notified of offer capped units via a new screen in Markets Gateway (Generator>Schedule>TPS Schedule Switch)
- Will display units offer capped as a result of the Real Time Online TPS test
- Information will be updated starting 20 minutes prior to the upcoming operating hour
- Data can be downloaded via XML
• Resource has 2 available schedules: Price and Cost
  – Price Schedule dispatch cost = $50
  – Cost Schedule dispatch cost = $40
• Resource committed in DA Market, resource owner passes the DA TPS test. Not offer capped.
• Resource will remain on the cost schedule until the earlier of the end of the day or when it is released
• Resource has 3 available schedules: Price, Cost 1 and Cost 2
  – Price Schedule dispatch cost = $50
  – Cost 1 Schedule dispatch cost = $40  $55
  – Cost 2 Schedule dispatch cost = $45
• Resource committed in DA Market, resource owner failed the DA TPS test. Resource offer capped on the Cost 1 schedule.
• Resource committed in Real Time
• Resource has a 2 hour min run time
• Resource has 3 available schedules: Price, Cost 1 and Cost 2
  – Price Schedule dispatch cost = $50
  – Cost 1 Schedule dispatch cost = $45
  – Cost 2 Schedule dispatch cost = $40
• Resource committed in real-time starting in HE17 on Cost Schedule 2 since owner fails TPS test at the time of commitment decision
TPS Example 3

- Participant makes updates to the Cost 2 schedule in real time after being committed
  - Price Schedule dispatch cost = $50
  - Cost 1 Schedule dispatch cost = $45
  - Cost 2 Schedule dispatch cost = $40 - $50
• Resource committed in Real Time
• Resource has a 2 hour min run time
• Resource has 3 available schedules at the time of commitment: Price, Cost 1 and Cost 2
  – Price Schedule dispatch cost = $35
  – Cost 1 Schedule dispatch cost = $45
  – Cost 2 Schedule dispatch cost = $40
• Resource committed in real-time HE17 on the Price schedule since the owner fails the TPS test at the time of commitment and Price is the cheapest available schedule.
TPS Example 4

- Participant makes updates to the Cost 1 schedule in real-time after being committed
  - Price Schedule dispatch cost = $35
  - Cost 1 Schedule dispatch cost = $45
  - Cost 2 Schedule dispatch cost = $40

Eligible for real-time offer capping
Remains on cost schedule

Fails Hourly TPS, switched to C1
Based on discussions between PJM and the IMM the following changes to TPS rules are being proposed and brought through the stakeholder process for endorsement:

- Resources self scheduled in real time will be online TPS tested and subject to mitigation after the first hour of operation.
- Resources which fail TPS test in DA or RT and are mitigated on their Price Schedule will be subject to re-evaluation of the offer cap level if any part of their three part offer is updated for a committed hour subsequent to commitment.
BREAK
Impacts to Market Settlements
Impacts to Market Settlements

• Intraday Offers has impacts on the following Market Settlement areas:
  – Operating Reserve Credits
    • Day-Ahead Operating Reserve Credits will use hourly differentiated offer
    • Balancing Operating Reserve Credits have changes to the version of schedule to which a resource will be made whole and changes in the balancing value portion of the calculation
  – Lost Opportunity Cost Credits
    • Changes to the version of the schedule on which a resource will be compensated
Terminology

- **Committed Offer**
  - The offer on which a resource was scheduled for a particular clock hour

- **Real Time Offer**
  - Any update to an existing offer made after the close of the Day-Ahead offer period

- **Final Offer**
  - The offer on which a resource was dispatched by the Office of the Interconnection for a particular clock hour for the Operating Day
Review of Balancing Operating Reserves

• Purpose is to cover costs represented in Resource offers
  – Results in prices and compensation that preserves the incentive for generation and Demand Resources to follow real-time dispatch signals/instructions

• The total resource offer amount for generation, including startup and no-load costs as applicable, is compared to its total energy market value for specified operating period segments during the day
  – If the total value is less than the offer amount, the difference is credited to the PJM Member.
Balancing Operating Reserve Credit Calculation

1. Balancing Operating Reserve Credit =
   Real Time Offer\(^1\) – Balancing Value\(^2\) – DA Value – DA Operating Reserve Credit – Any Sync/Non Sync/Reactive/DASR revenue

\(^1\)Real Time Offer = Energy Offer + including startup and no-load costs as applicable

\(^2\)Balancing Value = (RT MW\(^3\) – DA MW) * RT LMP

\(^3\)Greater of:
   – RT MW
   – Lesser of: Desired MW and DA MW
The Balancing Value accounts for the difference in Real Time output compared to the Day-Ahead commitment valued at the RT LMP.

Increases to offer prices after commitment would result in units being dispatched down:
- As a result the unit has to buy back energy in Real Time
- Absent a change, this behavior could result in a BOR Credit due to the balancing value going negative.
Existing Balancing Value Illustration

Balancing Value = 
\[(\text{RT Generation MW} - \text{DA Scheduled MW}) \times \text{RT LMP}\]

= \[(50 MW - 100 MW) \times 10\]

= -$500

A negative balancing value results in an increased Balancing Operating Reserve Credit
Balancing Value =

\[(\text{RT Generation} - \text{DA Scheduled}) \times \text{RT LMP}\]

\[(100 \text{ MW} - 100 \text{ MW}) \times $10\]

\[= 0\]

Adjusted Balancing Value Illustration

<table>
<thead>
<tr>
<th>Segment</th>
<th>Day-Ahead MW</th>
<th>Final RT Offer MW</th>
<th>RT LMP</th>
<th>DA LMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>5</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>10</td>
<td>100</td>
<td>15</td>
</tr>
</tbody>
</table>

DA LMP = $10, DA Scheduled MWh = 100 MW
RT LMP = $10, RT Dispatch Desired MWh = 50 MW

RT Generation MW = Greater Of:
- DA Scheduled MWh
- Committed Offer Desired MWh

Lesser of:
- RT Dispatch Desired MWh = 50 MW
- DA Scheduled MWh = 100 MW

= 100 MWh
Balancing Operating Reserve credits are calculated by operating segment within an Operating Day.

A resource will be made whole for two periods for each synchronized start:
  - The two periods are as follows:
    1. greater of the DA Commitment and Min Run time at the time of commitment
    2. hours in excess of #1 (above)

Segment does not “carry over” to the next day.

Start-up costs (and applicable no-load costs) will be in the segment “greater of the DA Schedule or Min Run Time”
Impacts to Balancing Operating Reserve Credits

- The offer used in the Balancing Operating Reserve make-whole can vary hourly.
- Pool-Scheduled Resources will be made whole in Real Time to the lesser of:
  - Committed Offer
  - Final Offer
Example 1: Committed on Price – Increase to Offer in RT

Assume cost increases for the entire day after DA market clears

**Price Curve**

- **DA Commitment**: Price schedule submitted DA
- **Committed Offer**: Price schedule update submitted at 22:55
- **Final Offer**: Price schedule update submitted in RT the day prior (after the DA market clears)

**Cost Curve**

- **Cost schedule submitted DA**
- **Cost schedule update submitted in RT the day prior (after the DA market clears)**
Example 1: Committed on Price – Increase to Offer in RT

Assume cost increases for the entire day after DA market clears

The offer used for the Operating Reserves Credit calculations:

Offer Used for Day-Ahead:
- For HB 6 – 10 the offer used is $30
- For HB 10 – 14 the offer used is $50

Offer Used for Balancing (If the unit is called online):
- For HB 6 - 10 the offer used is $30 (segment 1)
- For HB 10 – 14 the offer used is $50 (segment 1)
- If the resource was extended before HB 6 or past HB 14, then the offer used is $60 (segment 2 excluding ramp)
Example 2: Committed on Cost – Increase to Offer in RT

Assume cost increases for hour 10 and beyond

**Price Curve**
- DA Commitment
- **DA Offer**: Price schedule submitted DA
- **Intraday Offer**: Price schedule update submitted in RT @ 7:00

**Cost Curve**
- **Committed Offer**: Cost schedule submitted DA
- **Final Offer**: Cost schedule update submitted in RT @ 7:00
- Additional portion of curve used for RT dispatch and pricing
Example 2: Committed on Cost – Increase to Offer in RT

Assume cost increases for hour 10 and beyond

The offer used for the Operating Reserves Credit calculations:

Offer Used for Day-Ahead:
- For HB 0 – 10 the offer used is $20
- For HB 10 – 14 the offer used is $40

Offer Used for Balancing:
- For HB 0 – 10 the offer used is $20 (segment 1)
- For HB 10 – 14 the offer used is $40 (segment 1)
- If the resource was extended past HB 14, then the offer used is $50 (segment 2)
Example 3: Committed on Cost in RT (for min run) – Increase to offer during committed and uncommitted hours

Unit has a min run time of 8 hours. Assume cost increases for hours 10 and beyond subsequent to DA offer submission and offer was not updated prior to RT commitment.

**Price Curve**

- Price schedule submitted DA
- Price schedule update submitted in RT @ 8:11

**Cost Curve**

- Committed Offer: Cost schedule at time of RT Commitment
- RT Commitment (commitment decision made @ 5:00) – used for make whole
- Final Offer: Cost schedule update submitted in RT @ 8:11
- Additional portion of curve used for RT dispatch and pricing (not included in make whole)
Example 3: Committed on Cost in RT (for min run) – Increase to offer during committed and uncommitted hours

Unit has a min run time of 8 hours. Assume cost increases for hours 10 and beyond subsequent to DA offer submission and offer was not updated prior to RT commitment.

The offer used for the Operating Reserves Credit calculations:

Offer Used for Day-Ahead:
- Not Committed

Offer Used for Balancing:
- For HB 6 - 10 the offer used is $20 (segment 1)
- For HB 10 – 14 the offer used is $40 (segment 1)
- If the resource was extended past HB 14, then the offer used is $50 (segment 2)
  - In this case the Committed Offer would be the $50 offer
Example 4: Committed on Price – Increase to Offer in RT and Elect Switch to Cost

Assume cost increases starting HE 11, elect Switch to Cost at 8:30 a.m. to be effective HE 11.

Price Curve

- DA Commitment
- Committed Offer: Price schedule submitted DA
- Increase Cost Offer and elect Switch to Cost effective 10:00

Cost Curve

- Cost schedule submitted DA
- Final Offer starting 10:00: Cost schedule update submitted in RT @ 8:30
- Additional portion of curve used for RT dispatch and pricing (not included in make whole)
Example 4: Committed on Price – Increase to Offer in RT and Elect Switch to Cost

Assume cost increases for the entire day after DA market clears, elect Switch to Cost at 8:30 a.m. to be effective 10:00

The offer used for the Operating Reserves Credit calculations:

Offer Used for Day-Ahead:
- For HB 6 – 10 the offer used is $30
- For HB 10 – 14 the offer used is $50

Offer Used for Balancing:
- For HB 6 - 10 the offer used is $30 (segment 1)
- For HB 10 – 14 the offer used is $50 (segment 1)
- If the resource was extended past HB 14, then the offer used is $60 (segment 2 excluding ramp)
Lost Opportunity Cost Credits

• Generators whose output is reduced or suspended for reliability may be eligible for Lost Opportunity Credits

• Pool scheduled resources will be compensated using the higher of:
  • the Committed offer
  • the Final offer

• Self Scheduled resource compensation rules will be detailed on further slides
LOC for Pool Scheduled Units

- Lost Opportunity Cost Credit
  \[ \text{LOC Deviation} \times \text{RT LMP} - \text{Total Lost Opportunity Cost Offer} \]
  Where LOC Deviation =
  \[ \text{LMP Desired Output using schedule being dispatched on} \]
  Minus
  \[ \text{Actual Output} \]

- Total Lost Opportunity Cost Offer =
  Hourly Integrated value under the greater of Committed or Final Offer Curve
Lost Opportunity Cost for Self-Scheduled Resources

- Self-scheduled resources committed on a:
  - Cost Schedule will be compensated using greater of Committed or Final Offer
  - Price Schedule will be compensated using greater of Committed or Final Offer unless there is an available Cost Offer that is greater than the Price Schedule
Lost Opportunity Cost for Flexible Resources

• Flexible Resources are defined as having:
  – Combined startup and notification time less than or equal to 2 hours
  – Min Run time less than or equal to 2 hours

• Flexible Resources are not eligible for LOC if the Real Time Offer is greater than the DA Committed Offer

• LOC for Resources committed DA but not operated in Real Time will be calculated using the higher of:
  – the Committed Offer
  – the last Real Time Offer submitted for the Committed Offer
Example 1: Pool Scheduled Generating Unit with Updated Offer

- **EcoMax** = 300 MW
- **EcoMin** = 100 MW
- **RT LMP** = $60
- **Offer at Actual Output** = $30

The unit is mitigated in RT and backed down to 200 MW.

The applicable offer is the greater of Committed or Final Offer, which in this case is the Committed Offer.

Lost Opportunity Cost Credit = (LOC Deviation * RT LMP) – Total Lost Opportunity Offer

= (100 MW * $60) - $5000
= $1000

<table>
<thead>
<tr>
<th>Desired Output</th>
<th>Actual Output</th>
<th>RT LMP</th>
<th>Offer</th>
<th>LOC Deviation</th>
<th>Total Lost Opportunity Offer</th>
<th>Lost Opportunity Cost Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 MW</td>
<td>200 MW</td>
<td>$60/MWh</td>
<td>$30/MWh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 MW</td>
<td>100 MW</td>
<td>$50/MWh</td>
<td>$20/MWh</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 MW</td>
<td></td>
<td>$40/MWh</td>
<td>$10/MWh</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Committed Offer**: Price schedule submitted DA
**Final Offer**: Price schedule update submitted in RT @ 7:00
Example 1a: Pool Scheduled Generating Unit with Updated Offer

EcoMax = 300 MW
EcoMin = 100 MW
RT LMP = $60
Offer at Actual Output = $35
Unit is mitigated in RT and backed down to 200 MW.

Applicable offer is the greater of Committed or Final Offer which in this case is the Final Offer.

Lost Opportunity Cost Credit
= (LOC Deviation * RT LMP) – Total Lost Opportunity Offer
= (100 MW * $60) - $4750
= $1250

Committed Offer: Cost schedule submitted DA
Final Offer: Cost schedule update submitted in RT @ 7:00
Example 2: Pool Scheduled in DA Not Called in RT

EcoMax = 300 MW
EcoMin = 100 MW
RT LMP = $60
No-load cost = $100
Start-up cost = $500

Unit is committed Day-ahead for 5 hours, but does not operate in Real Time.

Applicable offer is the greater of Committed or last Real Time Offer which in this case is the Committed Offer.

Lost Opportunity Cost Credit
= (Day-ahead MW * RT LMP) – (Total Lost Opportunity Offer + no-load + start-up/5)
= (300 MW * $60) – ($10000 + $100 + $100)
= $7800
Example 3: Self-Scheduled Generating Unit

**Day-Ahead Offer**: Price schedule submitted DA

**Real Time Offer**: Price schedule update submitted in RT @ 7:00

EcoMax = 300 MW
EcoMin = 100 MW
RT LMP = $60
Offer at Actual Output = $30
Unit is mitigated in RT and backed down to 200 MW.
Applicable offer is the greater of Day-Ahead or Real Time which in this case is the Day-Ahead Offer.

Lost Opportunity Cost Credit = (LOC Deviation * RT LMP) – Total Lost Opportunity Offer
= (100 MW * $60) - $5000
= $1000

Desired Output

<table>
<thead>
<tr>
<th>Desired Output</th>
<th>Actual Output</th>
<th>RT LMP</th>
<th>Offer</th>
<th>Total Lost Opportunity Offer</th>
<th>LOC Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EcoMax = 300 MW</td>
<td>EcoMin = 100 MW</td>
<td>$60/MWh</td>
<td>$30/MWh</td>
<td>$50/MWh</td>
<td>$40/MWh</td>
</tr>
<tr>
<td>100 MW</td>
<td>200 MW</td>
<td>300 MW</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

www.pjm.com
Conclusion
Ongoing Communication Plan

• Any updates to the functionality discussed in this session will be communicated at the Tech Change Forum
• Following the completion of today’s session, and the one planned for Sep. 15, the team will evaluate if additional education would be beneficial. Communication regarding anything additional will be via:
  – MIC
  – Markets Gateway User Distribution List
  – Technotify
  – Demand Response Subcommittee
Supporting Materials

• Additional Materials are available under the “Intraday Offers” section of the Markets Gateway Tools Page
  – Markets Gateway Impacts Education Slides and January 9th Recording
  – Updated External Specification Guide
  – XML Schema, including XSD information
  – Markets Gateway User Guide (intraday offer-related updates available in July)
  – Guide to Convert Schedule IDs in Markets Gateway
  – Intraday Offers Frequently Asked Questions Document
    • Accessing the Intraday Offers Markets Gateway Training Environment
    • Market Rule Changes
    • XML/Browserless Information & Examples

www.pjm.com