Settlements Issues Forum

Q1 2014 Meeting

Rachel Likover
MANAGER, MARKET SETTLEMENTS
MARKET ANALYSIS & SETTLEMENTS

Gary Faber
SUPERVISOR, HOURLY MARKETS
MARKET ANALYSIS & SETTLEMENTS

Revision: March 24, 2014
Settlements Topics and Issues

- Upcoming Settlement/Market Changes
  - Regulation Market
  - Energy Market Offer Flexibility (EMOF) & Net Commitment Period Compensation (NCPC) Redesign

- Implemented Market Changes – Update
  - Winter 2013/14 Reliability Program

- Divisional Accounting Update

- Informational Items – Forum dates for 2014

- Discussion, Q&A
UPCOMING MARKET CHANGES

Regulation Market

- Energy Market Offer Flexibility
- & Net Commitment Period Compensation (NCPC) Redesign
Regulation Market Changes (Order No. 755)
May 21, 2014*

• Joint ISO-NE/NEPOOL FERC Filing

• Objectives
  – Use separate, uniform prices for regulation capacity and service
  – Provide two-part compensation based on those uniform prices

* Pending FERC approval
Regulation Market Changes

Changes for Regulation Service Providers

• Market Participants will have the ability to submit two-part offers for generation or alternative technology regulation resources
  – Regulation Capacity (Includes opportunity cost)
  – Regulation Service

• Determination of separate uniform clearing prices
  – Regulation Capacity
  – Regulation Service ("mileage")

• Regulation providers will be paid on the two clearing prices
  – Both payments subject to certain adjustments for performance
    • Performance evaluated within expected bandwidth tolerances
    • See ISO Operations presentation at Regulation Monitor Training
  – Make whole payment if applicable
  – Capacity to Service Ratio ("Q" factor) eliminated

• Regulation self schedule concept eliminated
Regulation Market Changes

Charges and Settlement Reporting

• Regulation charges allocated pro-rata on hourly Real-Time Load Obligation
  – Same as current market design

• Regulation payments and charges will be reported on new Market Information Server (MIS) Settlement reports
  – Current MIS reports will be retired
    • SD_REGDTLASM and SR_REGASWM
  – MIS Report Descriptions for new reports will be issued at least 30 days in advance of market implementation
    • SD_REGDTL and SR_REGSUM
    • Divisional Accounting included
UPCOMING MARKET CHANGES

- Regulation Market
- Energy Market Offer Flexibility
- & Net Commitment Period Compensation (NCPC) Redesign
Energy Market Offer Flexibility & NCPC Redesign

Reliability and Resource Performance Market Changes

• Address concerns related to:
  – Reliability and market efficiency issues resulting from the increased reliance on natural gas
  – Resource performance during stressed conditions

• Previous market changes include:
  – Day Ahead Market Acceleration
  – Forward Reserve Market revisions
  – Generation Auditing requirements
  – Winter 2013/2014 Reliability Program
  – Forward Capacity Market Shortage Event Trigger
Energy Market Offer Flexibility & NCPC Redesign

December, 2014

• Joint ISO-NE/NEPOOL FERC Filings

• Allow Market Participants to submit hourly supply offers, and revise supply offers in Real-Time during the Operating Day

• Revise NCPC calculations to account for Energy Market Offer Flexibility

Joint ISO-NE/NEPOOL FERC Filing

Energy Market Offer Flexibility

Offer Flexibility – ER13-1877-000
NCPC Redesign – ER14-1147-000

Markets Committee Presentations

NCPC Redesign

10/8/2013 Agenda Item 2 presentations
Energy Market Offer Flexibility & NCPC Redesign

Day-Ahead Market (DAM) Supply Offers

Today:

• Supply Offer submittal is constant for 24 hours of the DAM
  – Identical values of Start-Up, No-Load, Incremental Energy
    (MW/Price pairs or Bid Slope) are offered for all 24 hours

Offer Flexibility:

• Supply Offer submittal can specify different values during the DAM
  – Up to 24 hourly values for Start-Up, No Load, Incremental Energy allowed
  – Dual fuel units can specify different fuel type by hour
  – Incremental Energy method can vary
Energy Market Offer Flexibility & NCPC Redesign

Real-Time Market (RTM) Supply Offers

Today:

• Supply Offer submittal is constant for 24 hours of the Operating Day
  – Identical values of Start-Up, No-Load, Incremental Energy (MW/Price pairs or Bid Slope) are offered for all 24 hours
  – Participant can update its RTM offer during the re-offer period after the DAM has cleared
    • Re-offer period usually concludes at 2:00 p.m. on the day before the operating day
Energy Market Offer Flexibility & NCPC Redesign

Real-Time Market Supply Offers

Offer Flexibility

- Supply Offer submittal can specify different values
  - Up to 24 hourly values for Start-up, No-Load, and Incremental Energy
  - Dual fuel units can specify different fuel type by hour
  - Incremental Energy method can vary

- In Real-Time, New Supply Offer for an hour can be submitted up to 30 minutes in advance of the hour
  - New RT offer can specify varying values for subsequent hours
Energy Market Offer Flexibility & NCPC Redesign

Supply Offers: Advantage of Flexible Offers

• Generator owners can reflect the true cost of fuel in the offers
• Today, supply offers are submitted one day before the operating day
• With offer flexibility, supply offers can reflect changes in the costs of procuring fuel in real time
• Locational Marginal Prices will reflect real cost of fuel, providing better market signals
Energy Market Offer Flexibility & NCPC Redesign

High Level Concepts – Settlement Considerations

• The Energy Market settlement rules and mechanics are not impacted by the Energy Market Offer Flexibility changes
  – All generation is still compensated at LMP
  – Supply offers are not considered in the settlement

• Today, the NCPC evaluation determines if a generator has recovered its costs through the energy settlement at LMP
  – NCPC provides “make whole” payment to a generator following ISO dispatch instructions, if revenue at LMP does not fully compensate the cost of generation based on the generator’s supply offer
Energy Market Offer Flexibility (EMOF) & NCPC Redesign

NCPC Overview - Principles

• Existing NCPC rules are incompatible with Offer Flexibility
  – Existing rules based on one offer (Start Up, No-Load, Incremental energy) for all 24 hours of the operating day

• New Market Design for NCPC determination
  – Hourly Offers
  – Intraday hourly offers
  – Negative offers
Energy Market Offer Flexibility & NCPC Redesign

New Principle for NCPC Payments

• Replace “make whole” concept with “no worse off principle”

• Ensure Market Participants are compensated for an inappropriate financial loss, relative to the “best alternative”, when following ISO instructions
Energy Market Offer Flexibility & NCPC Redesign

New NCPC Concepts & Terms: NCPC Settlement Period

• Replaces operating day as the period for NCPC calculations

• Corresponds to commitment duration for non-fast start units
  – Commitments that are not contiguous will have separate settlement periods

• Credit calculation performed separately for each period; profitable periods do not subsidize losses
  – Market Participant is “not worse off” for following dispatch in unprofitable period
    • Profits don’t net out losses in the different periods

• Fast Start Units are evaluated hourly; profits in any hour do not net out losses in another hour
Energy Market Offer Flexibility & NCPC Redesign

New NCPC Concepts & Terms: Cumulative Profit Determination

- Performed after Minimum Run Time has elapsed
- Determine hour in which cumulative profit is maximized. Calculate NCPC to recover forgone profit when generator is not shut down by the ISO at the end of this hour
  - The Market Participant will recover the foregone profit, thus “no worse off” for staying online

**Example:**

<table>
<thead>
<tr>
<th>Hour</th>
<th>Revenue – Cost Calculation</th>
<th>Cumulative Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>$1000</td>
<td>$1000</td>
</tr>
<tr>
<td>11</td>
<td>$500</td>
<td>$1500</td>
</tr>
<tr>
<td>12</td>
<td>-$100</td>
<td>$1400</td>
</tr>
<tr>
<td>13</td>
<td>-$200</td>
<td>$1200</td>
</tr>
<tr>
<td></td>
<td><strong>Maximum Profit</strong></td>
<td><strong>$1500</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Cumulative Profit:</strong></td>
<td><strong>$1200</strong></td>
</tr>
<tr>
<td></td>
<td><strong>NCPC Payment:</strong></td>
<td><strong>$300</strong></td>
</tr>
</tbody>
</table>
Energy Market Offer Flexibility & NCPC Redesign

NCPC Overview - Principles

• More Precision in Cost Allocation
  – Replace hourly allocations based on total pool load with allocation to the generator’s unprofitable hours only
Energy Market Offer Flexibility & NCPC Redesign

“High Level” Example

• Conceptual overview
  – Current NCPC methodology
  – NCPC redesign methodology

• Many new concepts and rules in NCPC redesign

• Overview today to illustrate broad differences using a single example
  – Commitment and Dispatch in Real-Time only
  – Provide context for upcoming changes in Settlement mechanics and Settlement MIS reporting
Generator XYZ Commitment and Dispatch
NCPC Calculations Today

<table>
<thead>
<tr>
<th>Commitment Reason: 1&lt;sup&gt;st&lt;/sup&gt; Contingency Protection</th>
<th>Commitment Reason: Voltage Support (VAR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 - 7:00, 8:00, 9:00</td>
<td>10:00 - 11:00, 12:00, 13:00</td>
</tr>
</tbody>
</table>

RAA 2:00 am on Operating Day
RAA 5:00 pm on Day Prior to Operating Day

Calculate NCPC Credit
• Revenues at LMP
• Costs at Supply Offer
All Hours of Day are Netted Together

If Cost > Revenue:
NCPC = Cost - Revenue

Allocate Costs Based on Hourly Total Pool Load
Generator XYZ Commitment and Dispatch
NCPC Calculations – Offer Flexibility

<table>
<thead>
<tr>
<th>Time</th>
<th>Commitment Reason #2</th>
<th>Time</th>
<th>Commitment Reason #1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00</td>
<td>Commitment Reason: 1st Contingency Protection</td>
<td>10:00</td>
<td>Commitment Reason: Voltage Support (VAR)</td>
</tr>
<tr>
<td>7:00</td>
<td>RAA 2:00 am on Operating Day</td>
<td>11:00</td>
<td>RAA 5:00 pm on Day Prior to Operating Day</td>
</tr>
<tr>
<td>8:00</td>
<td>Commitment Decision 2 (CD #2)</td>
<td>12:00</td>
<td>Commitment Decision 1 (CD #1)</td>
</tr>
<tr>
<td>9:00</td>
<td>Effective Offer for Commitment (EOC)</td>
<td>13:00</td>
<td>Effective Offer for Commitment (EOC)</td>
</tr>
<tr>
<td></td>
<td>Startup / No Load / Incremental Energy at Economic Minimum</td>
<td></td>
<td>Startup / No Load / Incremental Energy at Economic Minimum</td>
</tr>
</tbody>
</table>
## Generator XYZ Commitment and Dispatch

### NCPC Calculations – Offer Flexibility

<table>
<thead>
<tr>
<th>Effective Offer for Dispatch</th>
<th>EOD at 6:00</th>
<th>EOD at 7:00</th>
<th>EOD at 8:00</th>
<th>EOD at 9:00</th>
<th>EOD at 10:00</th>
<th>EOD at 11:00</th>
<th>EOD at 12:00</th>
<th>EOD at 13:00</th>
</tr>
</thead>
</table>

### Commitment #2
- **Commitment Reason: 1st Contingency Protection**
- EcoMin 100 MW

### Commitment #1
- **Commitment Reason: Voltage Support (VAR)**

### Calculate Hourly Dispatch NCPC Credit
- Revenue at LMP
- Cost using EOD

### Calculate Hourly Dispatch NCPC Credit
- Revenue at LMP
- Cost using EOD

### Note:
If any of the values in an EOD supply offer are less than the values in the EOC supply offer in that hour, the lesser value is used.

### Calculate Commitment NCPC Credit
- Revenue at LMP
- Costs, using:
  - EOC (CD #2):
    - Start-Up, No-Load, Incremental Energy up to EcoMin
  - EOD:
    - Incremental Energy Above EcoMin

### Calculate Maximum Accumulated Profit NCPC Credit
- Revenue at LMP
- Costs, using:
  - EOC (CD #1):
    - No-Load, Incremental Energy up to EcoMin
  - EOD:
    - Incremental Energy Above EcoMin

### Allocate Costs Based on Hourly Negative Net Revenue

---

**EOC**: Effective Offer for Commitment
**EOD**: Effective Offer for Dispatch
Energy Market Offer Flexibility & NCPC Redesign

“High Level” Example – Calculation Information

• To augment the high level concepts, a table of calculations is provided for review purposes

• Calculations are presented in an informal format, tailored specifically for this example
<table>
<thead>
<tr>
<th>MIN RUN TIME (MRT)</th>
<th>6:00</th>
<th>7:00</th>
<th>8:00</th>
<th>9:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMP ($/MWh)</td>
<td>51</td>
<td>51</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>EOD to 110 MW ($/MWh)</td>
<td>52</td>
<td>52</td>
<td>52</td>
<td>62</td>
</tr>
<tr>
<td>EOD to 105 MW ($/MWh)</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>61</td>
</tr>
<tr>
<td>Start-Up Cost(1)</td>
<td>$250</td>
<td>$250</td>
<td>$250</td>
<td>$250</td>
</tr>
<tr>
<td>No-Load Cost</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
<td>$500</td>
</tr>
<tr>
<td>Incremental Energy to Economic Minimum</td>
<td>$4,800</td>
<td>$4,800</td>
<td>$4,800</td>
<td>$4,800</td>
</tr>
<tr>
<td>Incremental Energy to Economic Dispatch Point</td>
<td>$250</td>
<td>$250</td>
<td>$250</td>
<td>$0</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$5,800</td>
<td>$5,800</td>
<td>$5,800</td>
<td>$5,550</td>
</tr>
<tr>
<td>Revenue at Economic Dispatch Point</td>
<td>$5,355</td>
<td>$5,355</td>
<td>$5,250</td>
<td>$6,000</td>
</tr>
<tr>
<td>Profit/Loss</td>
<td>-$445</td>
<td>-$445</td>
<td>-$550</td>
<td>$450</td>
</tr>
<tr>
<td>Net Profit/Loss</td>
<td>-$990</td>
<td>-$990</td>
<td>-$990</td>
<td>-$990</td>
</tr>
<tr>
<td>Commitment NCPC</td>
<td>$990</td>
<td>$990</td>
<td>$990</td>
<td>$990</td>
</tr>
<tr>
<td>Incremental Energy to Dispatch Point</td>
<td>$260</td>
<td>$260</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Revenue for Out of Merit Dispatch</td>
<td>$255</td>
<td>$255</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Profit/Loss</td>
<td>-$5</td>
<td>-$5</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Dispatch NCPC</td>
<td>$10</td>
<td>$10</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>Start-Up Cost(1)</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>No-Load Cost</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Incremental Energy to Economic Minimum</td>
<td>$5,400</td>
<td>$5,400</td>
<td>$5,400</td>
<td>$5,400</td>
</tr>
<tr>
<td>Incremental Energy to 105 MW</td>
<td>$275</td>
<td>$275</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Incremental Energy to 110 MW</td>
<td>$290</td>
<td>$290</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Total Cost</td>
<td>$6,965</td>
<td>$6,965</td>
<td>$6,400</td>
<td>$6,400</td>
</tr>
<tr>
<td>Revenue at Dispatch Point</td>
<td>$9,350</td>
<td>$8,250</td>
<td>$4,400</td>
<td>$4,900</td>
</tr>
<tr>
<td>Profit</td>
<td>$2,385</td>
<td>$1,285</td>
<td>-$2,000</td>
<td>-$1,500</td>
</tr>
<tr>
<td>Cumulative Profit</td>
<td>$2,385</td>
<td>$3,670</td>
<td>$1,670</td>
<td>$170</td>
</tr>
<tr>
<td>Maximum Profit</td>
<td>$3,670</td>
<td>$3,670</td>
<td>$3,670</td>
<td>$3,670</td>
</tr>
<tr>
<td>Post MRT NCPC</td>
<td>$57.14%</td>
<td>42.86%</td>
<td>$3,500</td>
<td>$3,500</td>
</tr>
<tr>
<td>Post MRT Cost Allocator</td>
<td>$2,000</td>
<td>$1,500</td>
<td>$2,000</td>
<td>$1,500</td>
</tr>
</tbody>
</table>

(1) Start-Up amortized through the end of the Commitment Decision period in which the MRT ended.
Energy Market Offer Flexibility & NCPC Redesign

“High Level” Example

• ISO will be providing training on Offer Flexibility and NCPC Settlement (Summer 2014)

• Note that every DA and RT NCPC Market Information Server (MIS) settlement report will be retired
  – All new MIS reports for NCPC redesign
  – Divisional Accounting included in new reports
Questions
RECENT MARKET CHANGES – UPDATE

• Winter 2013/14 Reliability Program
Winter 2013/14 Reliability Program
Settlement Schedule, including Resettlements

<table>
<thead>
<tr>
<th>Program Operating Month</th>
<th>Program Charges Billing Month</th>
<th>Program Credits Billing Month</th>
<th>Penalty Settlements, As Applicable Billing Month</th>
<th>Data Reconciliation Process (DRP) Resettlement Billing Month</th>
</tr>
</thead>
</table>

- Program Charges are billed to Participants with Real Time Load Obligation (RTLO)
  - $25 Million/Month for each of the three Winter Reliability Program months (Dec – Feb)
- Program Credits are paid to Participants providing Winter Reliability Service
- Program Penalties are settled as follows:
  - If a Winter Reliability Service provider incurred penalties, provider is charged for those penalties
  - Penalties are paid to Participants who were charged for the program operating month
- DRP Resettlements will reflect any changes in RTLO values
DIVISIONAL ACCOUNTING

- Project Recap
- Schedule
- Implementation Detail: Reserve Market Failure to Reserve Cost Allocation
Divisional Accounting Recap

- ISO’s current settlement system provides **one** account for each Market Participant
- Market Participants requested a Divisional Accounting option
- ISO New England is working on software enhancements to fulfill this request
  - Settlement MIS reports will be augmented with a new section detailing the report activity in Participant defined subaccounts
  - Subaccount activities will “roll up” and total to the same values published in the current settlement reports

Download materials from the September 2012 (Q3) Settlement Issues Forum for a complete overview of this topic.
Implementation Plan

Account management in CAMS

Phase 1 (Q1 2014)

CAMS Subaccount Management available
Implemented: March 6, 2014

WebEx training for CAMS Subaccount Management

February 26, 2014 Session Materials

CAMS User Guide for Company and Affiliate Maintenance
Divisional Accounting

Notes on Implementation

• CAMS is now available for Subaccount management

• Phase 2 release for Divisional Accounting will include the subaccounts in some settlement reporting; asset assignment to subaccounts will be reflected in these reports
  – Energy/Regulation/Reserves
  – Transitional Demand Response
  – Black Start

• Note that Phase 2 settlement reporting does not include activity assignment to subaccounts

• Activities that will not be reflected in subaccounts include
  – Day Ahead Cleared Demand Bids
  – Day Ahead Cleared Virtual Transactions (Incremental Offers (“Inc’s”) and Decremental Bids (“Dec’s”))
  – Internal and External Transactions
  – Financial Transmission Rights (FTRs)

• Note that Participants can set up Subaccounts in CAMS without enabling reporting
Implementation Plan

Projected Schedule

Phase 1 (Q1 2014) - CAMS Subaccount Management available

Phase 2 (Q2 2014) - Asset assignment to subaccounts in CAMS reflected in most Hourly Markets / Transitional Demand Response/Black Start Settlement reporting

Phase 3 (Q4 2014) - Asset assignment to subaccounts in CAMS reflected in NCPC settlement reporting

Phase 4 (2015) - Activity entry point assignments to subaccounts reflected in settlement reporting; subaccounts included in FTR settlements

Phase 5 (TBD) - Subaccounts reflected in FCM settlement reporting

Phase 6 (TBD) - Subaccounts reflected in OATT and ISO Self-Funding Tariff settlement reporting

This schedule may be modified to accommodate competing priorities.
Divisional Accounting

Implementation Detail

• ISO will implement rules to ensure that cost allocation is not affected by Divisional Accounting

• Costs with tiered rates or netting across dimensions will be allocated among subaccounts using a pro-rata approach
  – NCPC Load Obligation Deviations
  – Forward Reserve Market Failure to Reserve
  – ISO Tariff tiered costs and non-zero ANI transaction units

• The rule for allocation of Forward Reserve Market (FRM) Failure to Reserve penalties will be reviewed today
Divisional Accounting

Implementation Detail: Forward Reserve Market (FRM) Failure to Reserve

• A Participant with an FRM obligation incurs Failure to Reserve penalties in any hour where FRM delivery is less than FRM obligation

• There are scenarios where the ISO would not be able to attribute the penalties to a subaccount
  – Participant did not assign enough MW to meet its obligation
    • Which Subaccount “at fault”? Unknown
  – Participant overassigns MW to meet its obligation; but delivery falls short
    • Which Subaccount “at fault”? Unknown

• Since the ISO cannot determine which subaccount is responsible for the Failure-to-Reserve penalties, all Failure-to-Reserve penalties will be reported in the Default Account
  – Participant can determine correct allocation in-house for these penalties
Questions
ADDITIONAL INFORMATION

Settlement Issues Forum Dates for 2014
Settlements Issues Forum Dates

- Q2 meeting: Friday, June 13 at 10:00 AM
- Q3 meeting: Friday, September 12 at 10:00 AM
- Q4 meeting: Thursday, December 11 at 10:00 AM
Questions & Discussion