Market Performance and Planning Forum

June 8, 2010
Objective: Enable dialogue on implementation planning and market performance issues

- Review key market performance topics
- Share updates to 2010-2011 release plans, resulting from stakeholders inputs
- Provide information on specific initiatives
  - to support Market Participants in budget and resource planning
- Focus on implementation planning; not on policy
- Clarify implementation timelines
- Discuss external impacts of implementation plans
- Launch joint implementation planning process
## Agenda

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<thead>
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<th>TIME</th>
<th>TOPIC</th>
<th>PRESENTER</th>
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<tr>
<td>9:00 - 9:15</td>
<td>Overview, Objectives</td>
<td>Mercy Parker-Helget</td>
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<td>9:15 - 11:15</td>
<td>Market Performance and Quality Update</td>
<td>Mark Rothleder, Nan Liu, Brian Jacobsen</td>
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<td>11:15 - 11:30</td>
<td>Market Design and Policy Update</td>
<td>Margaret Miller</td>
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<td>11:30 - 12:00</td>
<td>Monthly Release Process, Change Management</td>
<td>Jami Long</td>
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<td>12:00 - 12:30</td>
<td>Lunch – Provided by ISO</td>
<td>Janet Morris, Li Zhou, Lynn Rasmussen</td>
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<td>12:30 – 3:00</td>
<td>Release Plan Updates &amp; Milestones</td>
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<td>Multi-Stage Generator Modeling Update</td>
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<td>SCP I/II Impact Assessment, Business Requirements</td>
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<td>Dynamic Transfers Impact Assessment</td>
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<td>Convergence Bidding Update</td>
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Market Performance and Quality Update

Mark Rothleder
Director, Market Analysis & Development
Day-Ahead Market Publish Beats Timelines by an Average of 30 minutes

2010 DA Publish Time

Day-Ahead Market Timeline 1pm
Day-Ahead Market Completion Trend
HASP approach 100% in May, however Real-Time Dispatch experience small increase in failures.
Regional Marginal Loss Surplus Allocation Study Status

- Data collection and validation to calculate regional losses taking longer than anticipated

**Tentative Timeline**
- Data Preparation: June 2010
- Analysis: July 2010
- Report: August 2010

- SP15 Trading Hub tends have more negative marginal loss quantities than NP15
  - There are some locations with higher losses in SP15
  - As Path 26 flows increase south to north relative loss differences
Comparison of Trading Hub Marginal Losses

Average Daily Marginal Loss Difference NP15 and SP15 Trading Hub

- Peak (NP15-SP15) Avg $0.90
- Off-Peak (NP15-SP15) Avg. $1.33
- Peak (NP15-SP15) Exclusive of lowest 5% Avg. $0.14
- Off-Peak (NP15-SP15) Exclusive of lowest 5% Avg. $0.46
Comparison of Trading Hub Marginal Losses

Trading Hub LMP Loss Components

Marginal Loss ($/Mwh)

Date

lmp_loss_TH_NP15_onpeak lmp_loss_TH_SP15_onpeak

Trading Hub LMP Loss Components

Marginal Loss ($/Mwh)

Date

Imp_loss_TH_NP15_onpeak Imp_loss_TH_SP15_onpeak
Comparison of Trading Hub Marginal Losses

Trading Hub LMP Loss Components
(Exclusive of lowest 5% nodes)
Comparison of Trading Hub Marginal Losses

Comparison of NP15 and SP15 Losses and Path 26 Flow
(April 1, 2009 - December 31, 2009)

- Path 26 Flow (MW) (North to South)
- Path 26 Flow (MW) (South to North)
- SP15 MCL > NP15 MCL ($Difference)
- NP15 MCL > SP15 MCL ($Difference)
Forbidden Operating Region in RTM - Update

- On April 15, 2010 implemented Forbidden Operating Region (FOR)
- In May, variance fixes applied for some observed issues
- Observations since last application of fixes:
  - Resources are generally being transitioned through and not being dispatched within the FOR as expected
  - Infeasibilities have decreased or been eliminated
  - Observe resources that fall behind in following instruction or ignore instructions observe may receive dispatches that reverse before transiting through FOR
Objective Cost and MIP Gap Tolerance Performance

- MIP Gap is the solution tolerance of how close the solution gets to a theoretical optimal result
- MIP Gap Tolerance:
  - 4/1/2009 – 11/15/2009 => 0.5% or $1,200/hour
  - 11/18/2009 – Present => 0.1% or $100/hour (Est. Eff. Gain: $11million/yr)
  - 4/2/2010 - Increase bid cap and associated parameters
- Observations
  - Between 4/1/2009 – 11/15/2009, some instances of uneconomic commitment or ramp-rate segment selection observed in DAM
  - Between 11/18/2009 and 4/1/2010 decrease in uneconomic observations
  - After 4/2/2009 small increase in uneconomic observations
- Next Step
  - Evaluation of further reduction of MIP Gap tolerance
MIP Gap Performance

MIP Gap ($ difference)

MIP Gap Tolerance 0.1%

Bid Cap Increase

0.5% MIP Gap
Market Performance and Quality Update

Nan Liu
Manager of Market Analysis and Development
Operational Improvements - Updates

- Minimum Online Commitment (MOC): G-206 and Outage
- Compensating Injection
- SCISL/SDGE Import Limit
- Transmission Constraints Data Release
- Load Distribution Factor – Day Ahead Market
- Other Market Improvements
MOC

- G-206 MOC implemented
- MOC for outages implemented
- MOC has significantly reduced and on many days eliminated Exceptional Dispatches in DAM
- Not all outages will have MOC requirement
- Generation commitment to meet SCIT constraint is not ready for MOC yet
Daily Exceptional Dispatch Frequency by Market Type and Resource

- Pre-DAM Unit Commitment
- Post-DAM Unit Commitment
- Real-Time Dispatch
- Intertie Dispatch

18-Apr: 2, 7, 2, 2
23-Apr: 6, 7, 10, 5
28-Apr: 11, 1, 10, 1
3-May: 1, 1, 11, 8
8-May: 2, 1, 17, 4
13-May: 5, 5, 3, 5
18-May: 6, 2, 6, 2
Compensating Injection

- Developed testing metrics and performance criteria
  - Total CI mismatches < tolerance
  - Total power flow errors with CI < Total power flow errors with CI
  - CI impacts on internal corridors
- Analyzed TEST results
- STAGE promotion:
  - Deploy changes to STAGE and analyze results with CI vs. without CI
- PROD promotion:
  - Market Notice prior to PROD promotion
  - Deploy changes to PROD
  - Turn on CI and analyze results
- Turn on CI in Production permanently
  - Market notice 10 days prior
SCISL/SDGE Import Limit

- SCISL is on hold until dispersion studies completed
- OEs are evaluating options to move forward on SCISL
- Work is underway to implement SDGE_PCT_IMP_BG in the market
- SDGE_PCT_IMP_BG will be tested in STAGE (RTM and DAM) before go live
- Targeting late June implementation
Transmission Constraints Data Release

- Mandated by FERC
- Only SC and entities who have legitimate business needs may have access to the data
- Access of the data will be bound by NDA
- Expect data transparency to improve market quality/efficiency/credibility and customer services in the long run
- Will include MOC constraints
Other Market Improvements

- Load Distribution Factor adjustment to account for temperature changes
  - Testing
  - Target deployment: end of June
- Load Forecast Improvement underway (ALFS3).
  - Functional tests are being performed
  - Integration test next
  - Target Day-Ahead go live June/July
  - Target Real-Time go live Sept/Oct
- Hourly Intertie Ramp
  - Better accounts for imbalance energy impact when running HASP
  - Testing phase in-progress
Process improvement under consideration to mitigate resource cycling

Brian Jacobsen
Manager of Market Operations

Mark Rothleder
Director, Market Analysis & Development
Proposed Process Improvement to Address Resource Cycling – Initial Conditions

- Discussion of paper posted on Initial Condition management
Proposed Improvement to Address Resource Cycling – 72 Hour Residual Unit Commitment (RUC)

- Concept of 72-hour Residual Unit Commitment Process:
  - Simultaneous 72 hour optimization
  - Hours 1-24 use IFM schedules + RUC availability bids (No change)
  - Hours 25-72 use bids submitted and replicated bids if none are submitted

- Benefits of 72-hour RUC process:
  - May extend commitment of resources in TD+1 HE23-HE24
  - Binding Extremely Long Start Resources for TD+2
  - Initial Conditions for from TD+2 will feed next days DAM
  - Low impact to market timeline RUC runs fast
  - Does not require bidding rule modification for resources committed TD+2 as IFM

- Limitations of 72-hour RUC process
  - May not bridge commitment if bridging results in over-generation conditions
  - Does not fully address efficiency of an full multi-day DAM commitment process in MPM and IFM

- Tariff modification is necessary to allow RUC to be a 72 hour optimization
  - Stakeholder conference scheduled June 15, 2010
### Proposed Improvement to Address Resource Cycling – Current Approach – Example

<table>
<thead>
<tr>
<th>Initial Condition</th>
<th>Min Down Time</th>
<th>Total</th>
<th>HE1</th>
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<tr>
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| Initial Condition | Min Down Time | HE1 | HE2 | HE3 | HE4 | HE5 | HE6 | HE7 | HE8 | HE9 | HE10 | HE11 | HE12 | HE13 | HE14 | HE15 | HE16 | HE17 | HE18 | HE19 | HE20 | HE21 | HE22 | HE23 | HE24 |
|-------------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| **Unit 1 (TD+2)** | Offline       |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Start-up Cost     | $ 30,000      | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  |
| Min Load MW       | 26            | 26   | 26  | 26  | 26  | 26  | 26  | 26  | 26  | 26  | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   |
| Min Load Costs    | $ 45,000      | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  |
| Energy Schedule   | 26            | 26   | 26  | 26  | 26  | 26  | 26  | 26  | 26  | 26  | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   | 26   |
| Energy Bid Costs  | $ 76,000      | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  |
| **Total (24 Hours)** | $ 151,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  |
| **Total (48 Hours)** | $ 206,000 | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  | $ -  |

- Note: Resource cycles off and incurs start-up of $30,000
## Proposed Improvement to Address Resource Cycling – Proposed Approach - Example

| Unit 1 (TD+1) | Initial Condition | Min Down Time | HE1 | HE2 | HE3 | HE4 | HE5 | HE6 | HE7 | HE8 | HE9 | HE10 | HE11 | HE12 | HE13 | HE14 | HE15 | HE16 | HE17 | HE18 | HE19 | HE20 | HE21 | HE22 | HE23 | HE24 |
|---------------|------------------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Start-up Cost | $ -              | $ -          | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Min Load MW   | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |
| Energy Schedule | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |
| Energy Bid Costs | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |
| Total         | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |

| Unit 1 (TD+2) | Initial Condition | Min Down Time | HE1 | HE2 | HE3 | HE4 | HE5 | HE6 | HE7 | HE8 | HE9 | HE10 | HE11 | HE12 | HE13 | HE14 | HE15 | HE16 | HE17 | HE18 | HE19 | HE20 | HE21 | HE22 | HE23 | HE24 |
|---------------|------------------|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Start-up Cost | $ -              | $ -          | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - | $ - |
| Min Load MW   | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |
| Energy Schedule | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |
| Energy Bid Costs | $ 60,000         | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |
| Total         | $ 136,000        | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |

| Total (48 Hours) | $ 196,000        | $ 2,500      | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 | $ 2,500 |

**Efficiency Gained**

- Considering additional 24 hours results in:
  - Resource not cycling
  - Efficiency of commitment $10,000 by avoiding start-up
On June 2-3, FERC held technical conference on Unit Commitment

Discussion included how to consider uncertainty in load and variable resources into unit commitment

Market Design and Policy Update

Margaret Miller
Manager, Market Design & Regulatory Policy
Policy initiatives on the Board agenda for July

- Dynamic Transfers
- Changes to Commitment Costs
- Non Resource Specific RA & Sub-Set of Hours RA
Policy initiatives starting this month:

- **Reliability Demand Response Product (RDRP)**
  - First working group meeting – June 10, 2010
  - Seek Board approval – November 2010

- **Renewable Integration Market & Product Review**
  - Issue paper posted – June 18, 2010
  - Conference call – June 21, 2010
  - Stakeholder Meeting – July 8, 2010
    - Requesting market participants to present information on defined topics
  - Seek Board approval for Phase 1 – December 2010
Policy initiatives starting this month:

- Updates to Interim Capacity Procurement Mechanism (ICPM) & Exceptional Dispatch Bid Mechanism
  - Issue paper June 9, 2010
  - Stakeholder Call – June 16, 2010
  - Seek Board approval – December 2010
Planning & Managing Change

Jami Long

Director, Business Solutions and Quality
Improving Organizational Sustainability

- IT Product Planning: Business Solution Roadmap Planning for External-Facing Systems
- Standard Maintenance Windows
- Monthly Production Software Release Cycles
- Quarterly Production Software Release Cycles
- Projects follow the Release Planning process and deployment dates which may or may not align with this non-project release schedule.
IT Product Roadmaps

- Public IT product roadmaps are posted including known variances and minor enhancements for external-facing systems that impact participants.
- Roadmaps will soon include variances and enhancements for external-facing systems that do not necessarily impact participants.
- Items related to CIDI tickets will have the associated identifier included.
IT Product Planning

- IT Product Planning will occur through the SIUG forum
- OASIS planning scheduled for June 15, 2010
- A proposal of subsequent planning sessions will be discussed in the SIUG
- As IT products plans are finalized, updates will be provided in the public IT product roadmap
- Feedback & Questions on IT product planning?
Monthly Release Cycle: Second Tuesdays

- All systems (Except IFM/RTN, which are bi-weekly)
- Minor enhancements and variance fixes
- Changes that do not require market participants to change their systems
- All external-facing system outages if possible
Quarterly Release Cycle

- For new market features
- For enhancements and variance fixes that require market participants to change their systems; SIBR, ADS, CMRI, OASIS, PIRP, SLIC, OMAR, CRR, SFTP, MF, IMS, Portal, RAAM, RMR and SDS
Managing Change to Externally Visible Environments

- Standard Maintenance Windows:
  - [Link](http://www.caiso.com/2746/274684aa50dc0.pdf)
  - **Production**: Second Tuesday Monthly, 3:00 to 5:00 PM
  - **Stage**:
    - Market simulation - any weekday, 5:00 to 8:00 PM
    - Non-market simulation periods - Wednesdays, 3:00 to 5:00 PM
  - **MAP Stage**:
    - Market simulation - any weekday, 5:00 to 8:00 PM
    - Non-market simulation periods - Friday, 3:00 to 5:00 PM
Market Simulation Environments

- **Stage:** Shorter simulation efforts (1-2 weeks)
  - Monthly releases
  - Transmission Constraint Data Release (June 22 – July 1)
  - Proxy Demand Resource (July 19 – 30)

- **MAP-Stage:** Longer simulation efforts (2 weeks or more)
  - Multi-Stage Generator Modeling (July 6 – September)
  - Convergence Bidding (October 4 – January)
  - Standard Capacity Product II (November 1-19)
Release Update

- Summer 2010 Release
  - Make Whole Payments deployed June 1, 2010
  - Scarcity Pricing deployment planned for July 7, 2010
  - Transmission Constraint Data Release deployment planned for July 13, 2010
  - Proxy Demand Resource deployment planned for August 10, 2010
- Fall 2010 Release
  - MSG on track for deployment on October 1, 2010
  - SCP I/II to be deployed in December 2010
  - 72 Hour RUC plans are pending stakeholder discussion
  - CRR enhancements and credit policy – impact assessment to be provided at next meeting
- Early 2011 Release
  - Convergence Bidding on track for deployment on February 1, 2011
## Summer 2010 Release - External Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Transmission Constraints Data Release</th>
<th>Proxy Demand Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish Final Draft Proposal</td>
<td>Jan 2010</td>
<td>✓</td>
</tr>
<tr>
<td>CAISO BOG Approval</td>
<td>Feb 2010</td>
<td>✓</td>
</tr>
<tr>
<td>Submit FERC Filing</td>
<td>May 2010</td>
<td>✓</td>
</tr>
<tr>
<td>Publish Business Requirements</td>
<td>April 26, 2010</td>
<td>✓</td>
</tr>
<tr>
<td>Publish Technical Specifications</td>
<td>Not required</td>
<td>✓</td>
</tr>
<tr>
<td>Publish BPM Drafts</td>
<td>May 4, 2010</td>
<td>✓</td>
</tr>
<tr>
<td>Go-Live</td>
<td>July 13, 2010</td>
<td>August 10, 2010</td>
</tr>
</tbody>
</table>
## Fall 2010 Release Milestones – Project Update

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Multi-Stage Generator</th>
<th>Standard Capacity Product I/II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish Final Draft Proposal</td>
<td>May 8, 2009</td>
<td>April 7, 2010</td>
</tr>
<tr>
<td>CAISO BOG Approval</td>
<td>May 18, 2009</td>
<td>May 17, 2010</td>
</tr>
<tr>
<td>Submit FERC Filing</td>
<td>May 2010</td>
<td>June 2010</td>
</tr>
<tr>
<td>Publish Business Requirements</td>
<td>Aug 12, 2009</td>
<td>June 2010</td>
</tr>
<tr>
<td>Publish Technical Specifications</td>
<td>Dec 15-31, 2009 (initial drafts)</td>
<td>September 2010</td>
</tr>
<tr>
<td>Implementation Plan</td>
<td>February 26, 2010</td>
<td>September 2010</td>
</tr>
<tr>
<td>Settlement Configuration Guides</td>
<td>April 20, 2010</td>
<td>September 2010</td>
</tr>
<tr>
<td>Publish BPM Drafts</td>
<td>Jun 2010</td>
<td>September 2010</td>
</tr>
<tr>
<td>Begin Market Simulations</td>
<td>July 6, 2010</td>
<td>November 1, 2010</td>
</tr>
<tr>
<td>Go-Live</td>
<td>Oct 1, 2010</td>
<td>December 2010</td>
</tr>
</tbody>
</table>

- On track
# Early 2011 Release Milestones - Project Update

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Convergence Bidding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Publish Final Draft Proposal</td>
<td>Oct 2, 2009</td>
</tr>
<tr>
<td>ISO BOG Approval</td>
<td>Oct 29-30, 2009</td>
</tr>
<tr>
<td>Submit FERC Filing</td>
<td>Q2 2010</td>
</tr>
<tr>
<td>Publish Business Requirements</td>
<td>Dec 2, 2009</td>
</tr>
<tr>
<td>Publish Technical Specifications</td>
<td>March 31, 2010</td>
</tr>
<tr>
<td>Implementation Guide Draft</td>
<td>April 20, 2010</td>
</tr>
<tr>
<td>Publish BPM Drafts</td>
<td>Q3 2010</td>
</tr>
<tr>
<td>Begin Market Simulations</td>
<td>Oct 4, 2010</td>
</tr>
<tr>
<td>Go-Live</td>
<td>Feb 1, 2010</td>
</tr>
</tbody>
</table>

- On track
Market Initiatives Release Plan – Straw Proposal

- Refer to separate document
MSG Updates – Bid-in Limit for Real-time Configurations

After considering various concerns regarding the limit of a maximum of 3 real-time bid-in configurations per trading hour, CAISO has relaxed the constraint as follows:

The maximum number of real-time bid-in configurations per trading hour shall be 3 in addition to the IFM or RUC committed configurations.
After considering various concerns regarding the need to post MSG configuration IDs for the expected energy and expected energy allocation, CAISO has planned to implement the following:

In CMRI expected energy and expected energy allocation reports, the MSG configuration IDs will be given associated with the expected energy type, resource ID. Settlement will not be able to provide configuration IDs in the settlement statement due to system and architecture constraints.
Objectives: To resolve the following issues that market participants have raised while allowing feasible implementation,

- Be able to provide Ancillary Service for the trading interval within which the MSG resource is starting or finishing transition
- Be able to accurately account for ramp during transition to ensure feasible schedule
- Be able to differentiate constraints for moving up and down between MSG configurations
MSG Updates – Transition Time Rounding Rule

- Transition Ramp Time Rounding Rule:
  It will be rounded by the mid interval in the DAM and RTM applications for energy and ancillary service co-optimization and associated pre and post processing. The rounding will be performed as per the mid interval rounding rule. This is best illustrated by two examples:

Example 1:
Transition Ramp Time: 97 minutes
IFM: Rounded to 120 min (2 intervals)
RTPD: Rounded to 90 min (6 intervals)
RTD: Rounded to 95 min (19 intervals)
Example 2:
Transition Ramp Time: 23 minutes
IFM: Rounded to 0 minutes (0 interval)
RTPD: Rounded to 30 minutes (2 intervals)
RTD: Rounded to 25 minutes (5 intervals)
It was originally stated that the daily maximum number of transitions per directional transition will not be modeled but instead the minimum up/down time configuration will be used to model similar constraints.

After evaluation of implementation options and performance impacts with vendor, and in consideration of recent inputs from market participants, the following is what CAISO come up with,

1. Minimum Up/Down Time on configuration level will continue to be modeled. However, the minimum up time does not include the transition time during transition;
2. Daily Maximum Number of Transitions per directional transition will be modeled to control the number of transitions up or down.

Example, daily maximum number of transitions per config 1 to config 2 is 3, maximum daily transition per config 2 to config 3 is 4, daily maximum number of transitions per config 2 to config 1 is 10.

Regarding item 2: Current MF RDT already allows registration for the Daily Maximum Number of Transitions. Please use the RDT to submit those numbers if your resource does have that constraint.
MSG Commitment Cost Registration Options

- At MSG go live:
  - MSG Resource will specify either proxy or registered for both SU and ML costs
  - Whichever option is chosen applies to all the MSG resource’s configurations for both SU and ML

- Upon implementation of Commitment Costs changes:
  - MSG Resource will specify either proxy or registered for either SU and ML costs at the MSG resource level
  - Whichever option is chosen for the resource’s SU is applied to each configuration’s SU; likewise for ML
  - Further clarification: All transition costs are registered under the current proposal. A $ value is provided to the ISO, but that $ value then floats with the daily GPI
MSG Updates – Market Simulation and Conference Call

- MSG Market Simulation Plan to be posted on June 8, 2010 (Today)
  - More detailed version of the MSG Market Simulation Scenarios than previously presented.

- MSG Market Simulation Conference Call to be held on June 10, 2010 at 1:00pm.
Resource Adequacy Release Plan

Fall 2010
- SCP Phase 1 Enhancements
- SCP Phase 2

Spring 2011
- Update to ICPM

Fall 2011
- SCP Phase 3 (Demand Response)
- Bids for RA Imports and Subset of Hours RA
- Replacement Requirement for RA Resources for Planned Outages

To be determined
- Long Term Resource Adequacy changes
Standard Capacity Product Phase 1 Enhancements

- Automated approach that will detect a “Forced” and “Planned” outage overlap. Only the MW de-rate in the Forced Outage beyond the overlapping planned outage will be considered as a true “Forced Outage”;

  Capability for Scheduling Coordinators to convert from a “forced” outage to an “ambient not due to temperature” outage or “ambient” outage to an “ambient not due to temperature” outage. Short term process will be used until automated approach is developed.

  Further detail will be provided in external BRS for SCP II.
Grandfathering provisions will exclude RA contracts executed prior to August 1, 2010 and expiring after December 31, 2010 from Availability Incentive Payments and Non-Availability Charges for the initial term of the RA contract.

SCP Charges and Payments will apply to Resource Adequacy Resources whose Qualifying Capacity value is determined by historical output.

Availability for a Resource Adequacy Resource shall be determined by:

- Hourly Available Resource Adequacy Capacity = Min (RA Capacity, Max (Actual Energy, Proportional Derated Capacity))
  - RA Capacity = Resource Adequacy Capacity designated in the Supply Plan
  - Actual Energy = Total actual Energy delivered by the resource in the Availability hour
  - Proportional Derated Capacity = Resource’s Net Qualifying Capacity as reduced for that hour by the same percentage by which any Forced Outages or temperature-related ambient de-rates reduced the resource’s capacity from its PMax capacity

Further detail will be provided in external BRS for SCP II
## Standard Capacity Product Phase 2 Impact Assessment

| Application Software Changes | The following applications will require software modifications for information related to Standard Capacity Product 2:  
|                            | • ISO Reliability Requirements  
|                            | • Resource Adequacy Availability Management  
|                            | • Settlement |

| BPM Changes | Settlements and Billing:  
|             | • Section 8.2.2 - Exhibit 8-2: MRTU Subscript Conventions. Will need to add a subscript for "Intermittent Resources".  
|             | • Configuration Guide: Changes to 7 configuration guides.  
|             | Resource Adequacy:  
|             | • Section 8.4 Availability Calculations will need to be amended to handle the new resource types and their outage reporting requirements.  
|             | • Section 8.5 Non-Availability Charges to include the new resource types being added.  
|             | • Section 8.8 Exempt Capacity to capture grandfathered resources and target date for GF determination. |

| Business Process Changes | N/A |
| Client Training Materials | TBD |
| Operating Procedures | N/A |
| Market Simulation | November 1, 2010 through November 19, 2010 |
| Proposed Implementation Timeframe | To be implemented January 1, 2011 |
### Transmission Constraints

| Application Software Changes | The following applications will require software modifications for information related to transmission constraints:  
|                             | • OASIS (Binding Constraints and Contingency causing the Constraint Binding)  
|                             | • CMRI will provide Transmission Constraints list (Flowgates, Transmission Corridors, Nomograms, and Transmission Contingencies) to any party signing NDA |
| BPM Changes                 | Market Operation, Market Instruments |
| Business Process Changes    | N/A |
| Client Training Materials   | Not Planned |
| Operating Procedures        | N/A |
| Market Simulation           | June 22, 2010 through July 1, 2010  
|                             | Market Participants to submit NDA and AARF form by June 14, 2010 |
| Proposed Implementation Timeframe | To be implemented July 13, 2010 |
Revised Transmission Planning Process (revised TPP) Impact Assessment

<table>
<thead>
<tr>
<th>Application Software Changes</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPM Changes</td>
<td>BPM change, Transmission Planning Process</td>
</tr>
<tr>
<td>Business Process Changes</td>
<td>revised TPP combines the process for planning transmission to access renewable resources to meet RPS (earlier known as RETPP, evolve to current name as revised TPP) with the activities and objectives of the ISO’s existing transmission planning (TPP) and generator interconnection (LGIP) processes. Large Generator Interconnection Process (LGIP) – For 2010/2011 cycle all LGIP Phase 2 Cluster Studies results can proceed to LGIAs. Starting with 2011/2012 cycle, large LGIP upgrades are reassessed in revised TPP.</td>
</tr>
<tr>
<td>Client Training Materials</td>
<td>Not Planned</td>
</tr>
<tr>
<td>Operating Procedures</td>
<td>N/A</td>
</tr>
<tr>
<td>Market Simulation</td>
<td>To be determined</td>
</tr>
<tr>
<td>Proposed Implementation</td>
<td>To be implemented in the ISO 2010-11 Transmission Planning Process; The process will be repeated annually thereafter. Timeline of 2010/2011 and ongoing annual transmission planning process has been presented on May 7, 2010 (Complete Final Proposal).</td>
</tr>
</tbody>
</table>
Dynamic Transfer (DT) Impact Assessment (Interim Functionality)

| Application Software Changes | As a extension to Dynamic Transfer pilots, software modifications to the following applications are being implemented to support existing Dynamic Transfers functionality:  
| • Master File (support Pseudo Tie Generator (PTG) map to Tie, support PTG map to Primary and Alternative Tie, modify Transfer Script to the SIBR/IFM/RTN)  
| • IFM/RTM (associate PTG with primary or Alternative Tie, create payloads include PTG to ITC mapping)  
| • Settlement (layoffs, A/S congestion charge associate with primary and/or alternative Tie)  
| • OASIS (display ATC recognize PTG mapping to primary or alternative tie)  
| The following applications will require software modifications related to Dynamic Transfer:  
| • ADS (potential change to communicate operating order message)  
| • EMS (potential connect to Dynamic Scheduling System (DSS)) |

| BPM Changes | Market Operations, Compliance Monitoring |
| Business Process Changes | Dynamic Transfer Resource Enrollment |
| Client Training Materials | To be determined |
| Operating Procedures | DS and PST curtailment rules |
| Market Simulation | Not planned |
| Proposed Implementation Timeframe | Dynamic scheduling of conventional resources is supported by current tariff and processes. Some enhancements require FERC approval of CAISO Dynamic Transfer Filling |
## Dynamic Transfer (DT) Impact Assessment (Full Functionality)

<table>
<thead>
<tr>
<th>Application Software Changes</th>
<th>The following applications will require software modifications for information related to Dynamic Transfer:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• SIBR (support Transmission Reservation (TR) Bids)</td>
</tr>
<tr>
<td></td>
<td>• IFM/RTM (include TR Bids in Objective function and ITC constraints in DAM and HASP, preserve the TR in RTPD and in RTD.)</td>
</tr>
<tr>
<td></td>
<td>• Settlement (TR settlements with A/S credit or charge, Dynamic Export settlement)</td>
</tr>
<tr>
<td></td>
<td>• ADS (accommodate Dynamic Transfer rolling 2-hour 5-minute forecasts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BPM Changes</th>
<th>Market Operations, Compliance Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Process Changes</td>
<td>Dynamic Transfer Resource Enrollment</td>
</tr>
<tr>
<td>Client Training Materials</td>
<td>To be determined</td>
</tr>
<tr>
<td>Operating Procedures</td>
<td>Dynamic Transfer Congestion Management</td>
</tr>
<tr>
<td>Market Simulation</td>
<td>Not planned</td>
</tr>
<tr>
<td>Proposed Implementation</td>
<td>Tentatively Planned in Fall, 2011</td>
</tr>
<tr>
<td>Timeframe</td>
<td></td>
</tr>
</tbody>
</table>
Convergence Bidding Update

Lynn Rasmussen
Convergence Bidding Project Lead
Convergence Bidding – Project Update

- Updated CMRI Interface Specifications and OASIS Technical Specifications were posted to the CAISO website: http://www.caiso.com/2769/2769c6df12cb0.html
- Sample Bid Set File has been posted to the CAISO website
- Testing has begin on the initial deliverable for the Credit Tracking System
- Test plans for the core market applications are drafted and are currently under review
- The ISO continues with Load and Performance testing to evaluate the potential impact of very large payloads which could be generated by Convergence Bidding
- The ISO is targeting to begin the settlements portion of Market Simulation one week earlier than previously announced to accommodate the request of stakeholders. The updated start date for producing settlements statements during Market Simulation is 11/29.
## Convergence Bidding – Key Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target date for Tariff filing</td>
<td>June 23 – 25, 2010</td>
</tr>
<tr>
<td>Participants provide two Convergence Bidding sample bid sets for use in testing</td>
<td>July 1, 2010</td>
</tr>
<tr>
<td>BPM draft language anticipated to be available</td>
<td>Q3</td>
</tr>
<tr>
<td>Complete submittal of CBE registration materials for Market Simulation</td>
<td>September 1, 2010</td>
</tr>
<tr>
<td>Settlement Configuration Guides Posted</td>
<td>September 22, 2010</td>
</tr>
<tr>
<td>Market Simulation begins</td>
<td>October 4, 2010</td>
</tr>
<tr>
<td>Market Simulation Test Break - Implement Patches (Holiday)</td>
<td>November 22 - 26, 2010</td>
</tr>
<tr>
<td></td>
<td>December 20 – 31, 2010</td>
</tr>
<tr>
<td>Code Freeze – Market Simulation Ends</td>
<td>January 24, 2011</td>
</tr>
<tr>
<td>Go Live</td>
<td>February 1, 2011</td>
</tr>
</tbody>
</table>
Convergence Bidding – Implementation Plan

- Purpose of the document is to provide participants additional information during the implementation phase.
- The contents are in draft form and will be finalized as part of the BPMs, Technical Specifications or other design documents.
- The information ultimately contained in BPMs, Technical Specifications or other formal documents supersedes any information contained in this implementation plan document.
- The ISO plans to issues updates to this document as implementation activities progress.
- The document can be found on the ISO website at: http://www.caiso.com/1807/1807996f7020.html
Convergence Bidding – Implementation Plan Updates

- Registration Clarification and Relationships
- BPM Updates
- Updated training matrix
- Convergence Bid Characteristics
- SIBR screenshots
Convergence Bidding – Registration Clarification (Market Simulation / Production)

- To register as a Convergence Bidding Entity for Market Simulation, an SC must submit
  - Complete the Convergence Bidding Entity application
  - Identify the SCID(s) that will be utilized, including the CRR SCID(s) for the CRR Settlement Rule
- Must use the registered legal name
  - Found on the Secretary of State document
  - For example: Energy Co LLC ≠ Energy Co, LLC
- To register as a Convergence Bidding Entity for Production, an SC also must
  - Submit an affiliate disclosure form
  - Sign and return to the ISO the Convergence Bidding Agreement once it is approved by FERC
# Convergence Bidding – Registration Relationships

<table>
<thead>
<tr>
<th>Relationship Matrix</th>
<th>SCID to Parent SC</th>
<th>Convergence Bidding Entity (CBE) to SCID</th>
<th>Convergence Bidding Entity (CBE) with multiple SCID’s</th>
<th>SCID to Parent SC</th>
<th>Signatory company of the Convergence Bidding Entity (CBE) agreement to signatory company of the Congestion Revenue Right (CRR) agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affects Credit - Same as today</td>
<td>Affects Position Limits</td>
<td>The sum of all SCID’s associated with a CBE “share” the position limit at any single location. Once the limit has been exceeded, ALL SCID virtual bids at the location will be rejected</td>
<td>Position limits</td>
<td>Credit limits</td>
<td>Every bid or BATCH of convergence bids (CB) submitted will be evaluated for sufficient credit. If a bid or BATCH of CB’s exceed the limit, the bid or batch of bids will be rejected based on last in, first out.</td>
</tr>
<tr>
<td>All child SCID’s roll up to a Parent SCID which holds all the credit collateral</td>
<td>Multiple SCID’s can be used by a single CBE. Position Limits will be evaluated at the CBE level</td>
<td></td>
<td></td>
<td></td>
<td>All SCID’s of a CBE will be evaluated in the CRR settlement rule with all the SCID’s of a CRR’s holder of the same company who signed the agreement</td>
</tr>
</tbody>
</table>

| CRR Settlement Rule |
Convergence Bidding – BPM Updates

- Created Table outlining BPM’s to be updated with Convergence bidding
- Begin to identify the Sections in each BPM that will be affected.

Schedule:
- Drafts available in Q3
- PRR submitted by Nov 1, 2010
- Monthly conference Nov 23, 2010
- Final approval of BPM language Jan 4, 2011
Convergence Bidding – Training

- 3 Training Classes offered
  - SC Certification Training
  - Convergence Bidding Overview
  - Convergence Bidding New Market Initiative Training

- 11 Sessions in total

- Training locations for some of the classes
  - Folsom – All 3 classes
  - Houston – Convergence Bidding Overview
  - Portland – Convergence Bidding Overview
  - Southern California – Convergence Bidding Overview
Convergence Bidding – Training Schedule

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>June 14-16, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>June 30, 2010 Canceled</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>July 13, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>July 16, 2010; Houston, TX</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>Aug 12, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>Aug 24, 2010; Portland, OR</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>Sept 13-15, 2010</td>
</tr>
<tr>
<td>Convergence Bidding New Market Initiative Training</td>
<td>Sept, 22, 2010</td>
</tr>
<tr>
<td>Convergence Bidding Overview – strongly encouraged for all participants</td>
<td>October 7, 2010; Southern CA</td>
</tr>
<tr>
<td>Convergence Bidding New Market Initiative Training</td>
<td>Oct 20, 2010</td>
</tr>
<tr>
<td>Convergence Bidding New Market Initiative Training</td>
<td>Nov 17, 2010</td>
</tr>
<tr>
<td>SC Certification Training – required for new SCs</td>
<td>Dec 6-8, 2010</td>
</tr>
</tbody>
</table>

- Training courses will take place at the ISO unless otherwise specified.
Key elements of Convergence Bids
- Convergence Bids are for energy only
- Bids are subject to the bid cap and may not be a self-schedule
- Minimum bid quantity is 1 MW

Convergence Bidding occurs at locations – not at resources
- Convergence Bids at internal ISO Pnode or APnode locations are liquidated at the Real-Time price
- Convergence Bids at Intertie Pnode or APnode locations are liquidated at the HASP price

Generators which are not located in the ISO Control Area deliver at Intertie locations
A Convergence Bid must contain

- SCID who is submitting the bid
- Start and Stop Date and Time (GMT)
- Node ID (for an eligible location)
- Bid Type - Supply or Demand
- An economic energy bid curve of no more than ten segments

The XSDs and WSDLs for CBRawBid are posted

A sample CBRawBid XML file is posted

- Includes both Supply and Demand Convergence Bids
- Includes both Pnode and APnode Convergence Bids

Convergence Bidding Technical documentation is located at [http://www.caiso.com/2769/2769c6df12cb0.html](http://www.caiso.com/2769/2769c6df12cb0.html)
Convergence Bidding – Updated Web Services

- Updated OASIS technical artifacts and documentation were posted on May 15
  - Incorporate new reports for additional data release items approved at the February Board meeting
  - Latest version is 3.01
- Updated CMRI Interface Specifications were posted on May 11
  - No change to CMRI CB XSDs and WSDLs
  - Documentation updated to rollback the RMR APIs to the older version since RMR is not affected with MSG
- Convergence Bidding Technical documentation is located at http://www.caiso.com/2769/2769c6df12cb0.html
Convergence Bidding – Testing

- The ISO is requesting two bid sets to facilitate pre-Simulation testing
  - **Base CB Participation** – this bid set is requested to be generally representative of the participants planned activities in terms of the count of bids and MW volumes submitted.
  - **High CB Participation** – this bid set is requested to be generally representative of a maximum count of bids and MW volumes that a participant might submit.
- The provided bid sets
  - Will be subject to the same confidentiality rules associated with real bids
  - Will be used only in the ISOs testing efforts and will not be published
  - Will not be used to establish any expectation on how or where a participant will submit bids during market simulation or in production
- Please submit the bid sets to cb@caiso.com by July 1, 2010
  - Please use a zip format to compress the file size
  - Please rename the file extension to .zipped
Convergence Bidding – Technical Specifications

- 6 SIBR screenshots provided
  - Choosing Bid Type
  - Choosing CB Location
  - Validating/Look Up Node Limit
  - Submitting Convergence Bid
  - Created Bid
  - Bid Status with Credit System Validation
Convergence Bidding – Choosing Bid Type
Convergence Bidding – Choosing CB Location
Convergence Bidding – Validating/Look Up Node Limit
Convergence Bidding – Submitting Convergence Bid

Bid information represents test data and is shown for illustrative purposes only.
Convergence Bidding – Created Bid

![Image of a Convergence Bid Summary interface from California ISO]
Convergence Bidding – Bid Status with Credit System Validation

- Bid Status:
  - Valid
  - Invalid

- Bid Credit Status:
  - None
  - Pending
  - Approved
  - Disapproved
  - Error
Inquiries related to Convergence Bidding should be sent to the Convergence Bidding mailbox: cb@caiso.com

Other helpful documents

- Tariff
- Implementation Plan
- Business Practice Manuals
- Technical Documentation
- Registration Documents to become a Convergence Bidding Entity
Next Steps

- Next meeting on July 29, 2010.