

JCM Initiatives Review



**Joint Stakeholder Meeting
Carmel, IN
June 2, 2006**



Joint and Common Market Initiatives



Complete	Cost 3 Year Gross Benefit	Evaluation	Cost 3 Year Gross Benefit
Implementation	Cost 3 Year Gross Benefit	Not Recommended	Cost 3 Year Gross Benefit

		2006		2007		2008		
Commercial	1	FTR Market Convergence	Alignment of FTR Timelines and Products (Note: All MISO cost)	\$600,000		Cross Border FTRs in the allocations	\$4,000,000 <i>Analyzing</i>	
			\$3,008,657		Cross border FTRs in auctions	\$8,000,000 \$4,374,524		
	2	Price Rationalization and Convergence at the Border			PJM implementation of marginal losses	\$600,000 N/A		
					Alternative Border Pricing Point Calculation	\$200,000 <i>Analyzing</i>		
	3	Reduce Hurdle Rate	Alignment of PJM Operating Reserves and MISO Revenue Sufficiency Guarantee (Note: All MISO cost)	\$600,000 \$3,764,432	Depancaking of PTP ancillary services (Control Area Services, T.O. Control Center Services, Reactive, Black Start)	\$400,000 (\$2,505,757)		
	4	Broader Price Transparency and Common Reporting	Existing MISO & PJM Websites Linking of sites	\$500,000 \$1,952,165	Standard Data Exchange (Web Services) LMPs, Contingencies, Loads, Dispatch Signals, Outages, Emergency Event/Notifications	\$3,000,000 \$2,547,477	Implementation of single MISO & PJM Website (Individual Websites go away)	\$750,000 N/A
			Common Search Capabilities Data Available at Both Sites (LMPs, Tie Flows, Loads)	\$200,000 \$1,125,000			Standard Data Visualization and Reporting Portal	\$8,500,000
			Enhanced Joint Website to Host Joint meeting and Events Calendar, Joint Documents and	\$600,000 \$1,125,000			Create a single MISO & PJM Data and Report Portal	\$4,158,174
	5	Increased Market Opportunities	Moving JOUs between markets	\$100,000 \$156,851			Shared Regulation Market	\$8,000,000 <i>Analyzing</i>
	6	Operational Consistency	Common Long Term Transmission Queue	\$200,000 \$1,091,108	Common Time Zones (Note: All PJM cost)	\$5,000,000 N/A	Single Resource Adequacy Solution	\$8,000,000 N/A
MISO Ramp Viewer			\$150,000 \$913,703	Central location to view both ramp viewers	\$100,000 \$1,527,405	Common Ramp Portal	\$750,000 \$2,091,108	
Alignment of OASIS Business Practices			\$500,000 \$1,365,867	Coordinated OASIS	\$1,200,000 <i>Analyzing</i>			
Single OASIS			\$8,000,000 \$6,168,760	Reserve Sharing	\$8,000,000 N/A			
Common Treatment of Dynamic Schedules/Pseudo-Ties			\$200,000 \$382,934					
7	Single Market	Year 1 - Rule Alignment & Market Portal Design	\$15,000,000 \$5,000,000	Year 2 - Initial Market Portal Implementation	\$40,000,000 \$27,000,000	Year 3-5 - Implementation of Single Market	\$50,000,000 \$34,700,000	
Reliability	1	Emergency Energy Agreement	Alignment of Agreements and Practices	\$100,000 <i>Reliability</i>				
	2	Black Start and Restoration			Alignment of Agreements and Practices	\$500,000 \$936,000		
Plan	1	Joint Expansion Planning and Common Deliverability Studies	Joint Expansion Planning (Coordinated System Plan)	\$20,000 <i>Reliability</i>				
	2		Common Deliverability Studies	\$100,000 <i>Reliability</i>				
	3		Cross Border Cost Sharing of Expansions	<i>Reliability</i>				
Total			2006	2007	2008			
		Costs	\$3,870,000	\$1,200,000	\$750,000			
		3-Year Gross Benefit	\$14,885,717	\$2,463,405	\$2,091,108			

JCM Overarching Objectives

A group of initiatives that are intended to result in achievement of the following objectives have been identified in a series of stakeholder sessions:

- *Provide the highest level of inter-regional reliability.*
- *Deliver the lowest cost energy and ancillary services to load across the combined MISO and PJM regions.*
- *Plan, build and operate the combined MISO and PJM transmission facilities for maximum joint benefit across the region.*

Initiatives have been, or will be, assessed in a cost / benefit analysis and the results presented back to stakeholders for implementation decisions.

Committed Initiatives: PJM and Midwest ISO have committed to initiating the stakeholder processes and other tasks necessary for implementing these initiatives.



JCM 2006 Initiatives

1) Alignment of FTR Timelines and Products

- Align Midwest ISO FTR products with PJM FTR products.
- Align Midwest ISO FTR allocation and auction timeframes with PJM FTR allocation and auction timeframes.

2) PJM Implementation of Marginal Losses

- To achieve a greater level of price convergence and rationalization at the RTO border.
Note this is a 2007 initiative. FERC ordered implementation date of October 2, 2006.

3) Alignment of Operating Reserves/Revenue Sufficiency Guarantee Products

- Allocate Operating Reserves (OR) and Revenue Sufficiency Guarantee (RSG) charges similarly to reduce the hourly volatility of these charges in the Midwest ISO market.

4) Website Common Search Capabilities

- Implement one search engine that searches both the PJM and Midwest ISO public websites.

5) Existing MISO Price Transparency Portal and PJM eData Websites (Linking of Sites)

- Link the existing PJM eData and Midwest ISO Price Transparency Portal sites together.
- Exchange a subset of data (LMP, Instantaneous Load, Tie Flows) and make available for display and download.

6) Enhanced Joint Website

- Create one new joint website that hosts PJM and Midwest ISO common information (e.g. joint meeting and event calendars, joint documents and reports).



Committed Initiatives: PJM and Midwest ISO have committed to initiating the stakeholder processes and other tasks necessary for implementing these initiatives.



JCM 2006 Initiatives (cont.)

7) Moving Joint Owned Units Between Markets

- Allow selection of PJM or Midwest ISO Markets to sell output of certain Joint Owned Units.

8) Common Long Term Transmission Queue

- Create a common long-term transmission queue that facilitates easier scheduling of annual, cross-border firm transmission service requests.

9) MISO Ramp Viewer

- Provide the MISO Market Participants with the ability to view ramp.

10) Alignment of OASIS Business Practices

- Align timing requirements between PJM and the Midwest ISO associated with transmission service requests.

11) Common Treatment of Dynamic Schedules/Pseudo Ties

- In general, participants desire the flexibility to allow their generating units to participate directly in the RTO of their primary interest, even if those units are not physically located in that RTO. Providing this flexibility means implementing dynamic schedules the same way in each RTO.

12) Emergency Energy Agreement (Alignment of Agreements and Practices)

- Former Control Area Operators of PJM and Midwest ISO had emergency energy agreements in place to facilitate the sale of energy during emergency conditions. While these agreements existed prior to RTO development, Midwest ISO and PJM may not be a legal party to the agreement. Midwest ISO and PJM would need to replace these existing agreements with emergency energy agreements between the RTOs.

Committed Initiatives: PJM and Midwest ISO have committed to initiating the stakeholder processes and other tasks necessary for implementing these initiatives.



JCM 2006 Initiatives (cont.)

13) Joint Expansion Planning (Coordinated System Plan)

- Regional expansion plans will include coordinated planning to include evaluation of impacts on other RTO facilities and required facility upgrades.

14) Common Deliverability Studies

- Generation deliverability studies will include common criteria and study to obtain results, which demonstrate if units are deliverable in both RTOs and if they are not deliverable in both RTOs what system constraints limit the deliverability.

15) Cross Border Cost Sharing of Expansions

- Cross-border allocation of cost sharing for reliability and for economic expansions.

Note: Cross border cost sharing for economic expansion filing due June 1, 2006.



Further Action Needed Initiatives: Certain initiatives have been identified as potential additional elements to the joint and common market; however, further evaluation of these initiatives is required to determine if they will be recommended for implementation.

JCM 2006 Initiatives (cont.)

1) Alternative Border Pricing Cost-Benefit Analysis

- Perform a cost-benefit analysis to determine the benefits MISO participants would receive from allowing participants to submit transactions based on physical flow effects on localized transactions.

2) Common Time Zones – PJM Move to EST

- Perform a cost-benefit analysis to determine the benefits MISO and PJM participants would receive from implementing the use of a common time zone across the entire footprint. MISO's systems are currently on EST. PJM currently operates on EPT. The recommendation would be to move PJM's system to EST to align with the MISO system.

3) Coordinated OASIS Cost-Benefit Analysis

- Perform a a cost-benefit analysis to determine the benefits MISO participants would receive from linking the two OASIS nodes, so there is a single logon (to two individual nodes)

4) Single Market Production Cost Study

- Perform a production cost study to determine the benefits to the participants of MISO and PJM becoming a single market.





Committed Initiatives



FTR Alignment

Milestone Summary

C	Analyze Product
Y	Stakeholder Review
G	Develop System Requirements
G	Modify Applications
G	Conduct Testing
G	Implement Changes

G Overall Status

KEY ACCOMPLISHMENTS

- Completed product analysis.
- MISO stakeholders evaluating proposed changes to allocation process to more closely align with PJM process.

UPCOMING ACTIVITIES

- Monthly Transmission Rights Task Force Meetings.

JCM Leads

- MISO: A. Adams
- PJM: S. Bresler

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- MISO stakeholders decisions in some respects do not result in closer alignment, but instead maintain current misalignment.
- Alignment of timelines important for cross border products.
- Differences in instrument terms may make alignment difficult (e.g., seasonal peak and off-peak for allocation).
- Process may be slightly delayed due to the addition of the long term FTR NOPR.

OR & RSG Alignment

Milestone Summary

C	Analyze Product
R	Stakeholder Review
R	Develop System Requirements
G	Modify Applications
G	Conduct Testing
G	Implement Changes

R Overall Status

KEY ACCOMPLISHMENTS

- Completed product analysis.
- MISO RSG TF evaluating proposed changes to RSG allocation.
- PJM Reserve Markets Working Group also considering OR allocation changes that may have beneficial impacts for PJM/MISO transactions.
- MISO submitted to FERC request for clarification and rehearing on April 25, 2006 Order.
- May 17, 2006 FERC granted extension to comply with requirements until after it issues an order on rehearing.

UPCOMING ACTIVITIES

- Continued monthly RSG Task Force meetings.
- Continued PJM Stakeholder meetings.
- Planned joint meeting of RSG TF and Reserves Market WG.

JCM Leads

- MISO: A. Adams
- PJM: S. Bresler

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- Recent FERC Order re MISO RSG filing may impact timeline for RSG TF and subsequent filing of changes to EMT.
- Clearly different camps in terms of causation versus predictability (unclear that we will get to common rules).
- PJM is also considering changes (moving targets for both organizations) making close coordination imperative.

PJM Marginal Losses

Milestone Summary

- G** Stakeholder Review
- G** Complete FERC Filings
- G** Develop System Requirements
- G** Modify Applications
- G** Conduct Testing
- G** Implement Changes

G Overall Status

JCM Leads

- MISO: A. Adams
- PJM: S. Bresler

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

KEY ACCOMPLISHMENTS

- PJM met with stakeholders to review.
- PJM stakeholders voted to remove requirement to implement marginal losses from the PJM Tariff and Operating Agreement.
- Reviewed PJM Stakeholder vote with JCM Executive Team.
- Response on PHI complaint received from FERC, ordering PJM to implement marginal losses by October 2, 2006
- On May 16th, the PJM MRC endorsed a motion to request FERC to approve delay in the implementation date until June 1, 2007
- Reset milestone dates due to FERC order to implement marginal losses.

UPCOMING ACTIVITIES

- An endorsement vote on the same motion to request a delay in implementation until June 1, 2007 will be taken at the June 1st PJM Members Committee meeting.

ISSUES & CONCERNS

- October 2, 2006 implementation date for marginal losses presents many issues, and may not be the prudent or practical course of action.
- Current implementation date on the milestone chart is 6/30/07, and we are in no danger of not meeting that schedule.

Price Transparency – Common Search

Milestone Summary

C	Evaluate Search Engine
G	Modify System
G	Conduct Testing
G	Implement Common Search Engine

G Overall Status

KEY ACCOMPLISHMENTS

- Joint web site will use Google search engine to query both PJM's and MISO's sites, as well as the Joint Web Site for documents.

UPCOMING ACTIVITIES

- Project Plan based on Google search engine will be developed by PJM.
- Seek approval from MISO on approach to send links to JCM website for common search capability.

JCM Leads

- MISO: D. Taylor
- PJM: C. Hendrzak

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- Google has just announced an upgrade to their search engine, which must be evaluated.
- Tool search issues when searching MISO PTP site.
- MISO's supporting the processes that need to be put in place to get documents / links to one place for searching. This process is needed until search engine can successfully search a portal (Google upgrade potentially required).

Price Transparency – Link PTP & eData

Milestone Summary

C	Identify Data for Display / Download
C	Evaluate Technical Alternatives
G	Modify System
G	Conduct Testing
G	Implement Changes to Link eData & PTP

G Overall Status

KEY ACCOMPLISHMENTS

- Technical implementation alternatives have been evaluated and Preliminary Design is complete.

UPCOMING ACTIVITIES

- Detailed Design underway.
- Contract with vendor to develop the Contour Map for the combined PJM/MISO footprint, which will be generated by MISO and transferred to the Joint Web Site.
- Posting for review and commitment of the proposed LMP nodes

JCM Leads

- MISO: D. Taylor
- PJM: C. Hendrzak

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- Approach for accessing shared data exclusively on JCM website was not wholly supported by stakeholders. Links will be provided on the Joint Web Site for easy access to PJM and MISO Web Sites.
- Conceptual design was reviewed in more detail at the April 21st Stakeholder Meeting. Stakeholders were given the opportunity to specify key data (LMPs, Tie Flows, etc.) for the initial release.
- Requests for enhancements to the initial data set will be considered in the next release, in order to minimize cost/schedule impacts

Price Transparency – Enhanced Joint Website

Milestone Summary

- C** Define Joint Website Requirements
- G** Modify System
- G** Conduct Testing
- G** Implement Joint Website Enhancements

G Overall Status

KEY ACCOMPLISHMENTS

- Evaluation of the PJM Events Calendar is complete and it will be used for the JCM web site.
- Existing web site that is being hosted by PJM will continue as the JCM Web Site.
- Architectural review complete.

UPCOMING ACTIVITIES

- Licensing of Calendar for dual access by PJM and MISO will be reviewed.

JCM Leads

- MISO: D. Taylor
- PJM: C. Hendrzak

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

ISSUES & CONCERNS

- (Same issue from Common Search Engine) MISO's support of the processes that are being put in place to get documents / links to one place for searching. This process is needed until search engine can successfully search and retrieve documents from the portal.

Common Long Term Transmission Queue

Milestone Summary

C	Identify Differences Between MISO & PJM
G	Develop Common LT Trans. Queue Process
G	Develop System Requirements
G	Modify Applications
G	Conduct Testing
G	Implement Changes

G Overall Status

KEY ACCOMPLISHMENTS

- Completed milestone – identify differences between MISO and PJM.
- Identified opportunities for alignment.
- Developed high level plan for alignment.
- Presented interim results at 4/21 stakeholder meeting.

UPCOMING ACTIVITIES

- Develop detailed plan for queue coordination as discussed at 4/21 meeting.
- Document process flows for each RTO as the sink.
- Review hurdles to implementation (FERC filing, tariff alignment).
- Revise/develop business practices and manuals.

JCM Leads

- MISO: T. Mallinger
- PJM: M. Bryson

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- PJM is also updating internal processes.
- Coordinated process shouldn't affect timeliness of results in either RTO.

Alignment of OASIS Business Practices

Milestone Summary

C	Analyze MISO & PJM Business Practices
G	Stakeholder Review
G	Develop System Requirements
G	Modify Applications
G	Conduct Testing
G	Implement Changes

G Overall Status

KEY ACCOMPLISHMENTS

- Initiative is being coordinated with Coordinated OASIS initiative cost benefit analysis.
- Completed conceptual design.
- Presented timing results at 4/21 stakeholder meeting.

UPCOMING ACTIVITIES

- Finish the process diagrams for each RTO leading the study.
- Revise the Tariff and Business Practices.
- Conduct RTO stakeholder reviews.

JCM Leads

- MISO: T. Mallinger
- PJM: M. Bryson

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- No issues at this time.

MISO Ramp Viewer

Milestone Summary

- C** Build MISO Ramp Viewer
- C** Test MISO Ramp Viewer
- C** Implement MISO Ramp Viewer

C Overall Status

KEY ACCOMPLISHMENTS

- Implementation completed May 15, 2006.

UPCOMING ACTIVITIES

- None

JCM Leads

- MISO: T. Mallinger
- PJM: M. Bryson

ISSUES & CONCERNS

- None

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

Moving JOUs Between Markets

Milestone Summary

- C** Define Moving JOU Requirements
- C** Modify System
- C** Conduct Testing
- C** Implement Moving JOUs Between Markets

C Overall Status

KEY ACCOMPLISHMENTS

- MISO system changes applied with March Model update.
- Final test occurred on 3/31.
- Changes are in the production system.

UPCOMING ACTIVITIES

- Individual stakeholders to complete changes on their side to take advantage of the new flexibility.

JCM Leads

- MISO: A. Adams
- PJM: M. Bryson

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

ISSUES & CONCERNS

- None

Common Treatment Dynamic Sched./Pseudo-Ties

Milestone Summary

- C** Develop System Requirements
- G** Modify Applications
- G** Conduct Testing
- G** Implement Changes

G Overall Status

KEY ACCOMPLISHMENTS

- Software changes are under development.

UPCOMING ACTIVITIES

- Software available to begin testing mid- to late June.

JCM Leads

- MISO: A. Adams
- PJM: M. Bryson

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

ISSUES & CONCERNS

- None at this time

Emergency Energy – Align Agreements & Practices

Milestone Summary

C	Identify Agreements to be Replaced
C	Doc. Legal, Regulatory, Corp. Structure Issues
Y	Conduct Stakeholder Reviews
G	Make Appropriate Regulatory Filings
G	Draft New Emergency Energy Agreements
G	Implement New Emergency Energy Agreements

G Overall Status

JCM Leads

- MISO: A. Adams
- PJM: M. Bryson

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

KEY ACCOMPLISHMENTS

- MISO drafted (MISO/PJM) Emergency Energy Transaction language which is currently being reviewed internally. Language is patterned on what is proposed between MISO and IESO.

UPCOMING ACTIVITIES

- MISO tariff language to address cost allocation (when purchasing Emergency Energy) and revenue distribution (when selling Emergency Energy) to be reviewed with stakeholders.
- Determine proposed changes to tariffs based on proposed Emergency Energy Transactions document.
- FERC filing to obtain approval of tariff changes.

ISSUES & CONCERNS

- For MISO, the Emergency Energy tariff changes need to be coordinated with the ARC and Manual Redispatch changes which are currently on the critical path for filings.
- RTOs cannot take title to energy, so agreements must state RTOs will buy on behalf of market participants.
- Outcome must accommodate differences in resource adequacy constructs.

Joint Expansion Planning (Coordinated System Plan)

Milestone Summary

C	Develop Common Model
G	Initial Analysis
G	Stakeholder Appr. Interim Results (IPSAC)
G	Complete Analysis & Prelim. Report
G	Stakeholder Input on Draft Report (IPSAC)
G	Complete & Publish CSP Report

G Overall Status

KEY ACCOMPLISHMENTS

- Development of scope document.
- IPSAC stakeholder meeting for input to scope.
- Development of 2011 joint planning base system model.

UPCOMING ACTIVITIES

- Initial Joint Expansion Plan Analysis - joint generator deliverability, n-2 and common market analysis.
- Joint MISO/PJM IPSAC Meeting Scheduled for July 25th

JCM Leads

- MISO: T. Mallinger
- PJM: M. Bryson

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

ISSUES & CONCERNS

- No issues at this time.

Common Deliverability Studies

Milestone Summary

- G** Complete Initial Analysis in CSP
- G** Review Study Results with Stakeholders
- G** Obtain Stakeholder Approval (IPSAC)
- G** Modify Policies, Procedures, Applications
- G** Implement Changes to/ New Policies Procedures, Applications

G Overall Status

KEY ACCOMPLISHMENTS

- Development of scope document for joint CSP analyses.
- IPSAC stakeholder meeting for input to scope.
- Development of 2011 joint planning base system model.

UPCOMING ACTIVITIES

- Complete joint generator deliverability analyses – part of Coordinated System Plan.
- Joint MISO/PJM IPSAC Meeting Scheduled for July 25th

JCM Leads

- MISO: T. Mallinger
- PJM: M. Bryson

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

ISSUES & CONCERNS

- No issues at this time.

Cross Border Cost Sharing of Expansion

Milestone Summary

C	File Policy Baseline Reliability Projects
C	Order on Reliability Filing
C	Compliance Filing on Reliability Filing
C	1. Develop Policy Concepts for Econ. Projects
C	1. Stakeholder input on Policy Econ Projects
C	2. Develop Policy Concepts for Econ. Projects
C	2. Stakeholder input on Policy Econ Projects
C	File Extensions with FERC
G	3. Develop Policy Concepts for Econ. Projects
G	3. Stakeholder input on Policy Econ Projects
G	File Policy Cross Border Alloc. Econ. Project Costs

G Overall Status

JCM Leads

- MISO: T. Mallinger
- PJM: M. Bryson

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues

KEY ACCOMPLISHMENTS

- Develop and File policy for Baseline Reliability Projects.
- Compliance Filing on Reliability.
- Develop Policy Concepts for Economic Projects.
- Stakeholder Discussion on Policy for Economic Projects.
- Extensions filed with FERC for economic cross border allocation cost sharing compliance filings.

UPCOMING ACTIVITIES

- Develop Policy Concepts for Operational Performance Projects.
- File Policy for Cross Border Allocation of Economic Project Costs.

ISSUES & CONCERNS

- MISO and PJM made separate filings for proposed changes to the JOA section “Cross-Border Allocation Share” in their April 20, 2006 compliance filing for Reliability Cost Sharing. Seeking FERC guidance on this issue.



Further Analysis Initiatives

Alt. Border Pricing Point Calculation

Milestone Summary

- G** Perform Analysis
- G** Identify Changes
- G** Stakeholder Review
- G** Decision Point on Cost Benefit Analysis

G Overall Status

KEY ACCOMPLISHMENTS

- Initial discussion between RTOs staff has occurred.
- Official kickoff of initiative held May 12th.

UPCOMING ACTIVITIES

- Detailed proposal to be drafted and submitted for stakeholder comments.

JCM Leads

- MISO: A. Adams
- PJM: S. Bresler

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

ISSUES & CONCERNS

- Need to formalize methodology to be used in analysis and identify resources to be used.

Common Time Zones – Move PJM to EST

Milestone Summary

- C** Perform Analysis
- C** Quantify Effort
- C** Stakeholder Review
- C** Decision Point on Cost Benefit Analysis

R Overall Status

KEY ACCOMPLISHMENTS

- Whitepaper completed – reviewed with PJM committees – SIS / SOS / OC / MIC /MRC
- All PJM committees endorsed staying on EPT after review of whitepaper.
- PJM stakeholders reached decision not to move to EST.

UPCOMING ACTIVITIES

JCM Leads

- MISO: D. Taylor
- PJM: M. Bryson

Legend

- C** Completed
- G** On Target – No Issues
- Y** Need to watch – Some Issues
- R** In Jeopardy – Significant Issues

ISSUES & CONCERNS

- The DST Team recommends to Management that PJM remain on EPT, and the initiative to switch PJM to EST year round should not be pursued. This is based on:
 - Potential high cost in the millions
 - Removal of PJM – MISO seam would create additional seams.

Coordinated OASIS

Milestone Summary

Y	Perform Analysis
G	Stakeholder Review
G	Decision Point on Cost Benefit Analysis

G Overall Status

KEY ACCOMPLISHMENTS

- PJM reviewed multiple alternatives for hosting of their OASIS node, including MISO hosting.
- PJM decision to host their own OASIS node.

UPCOMING ACTIVITIES

- PJM to implement their OASIS node.
- After PJM OASIS node is in production MISO and PJM will look at additional alternatives for a coordinated OASIS.
- Reset milestones to complete analysis in 2006.

JCM Leads


- MISO: T. Mallinger
- PJM: M. Bryson

ISSUES & CONCERNS

- No issues at this time.

Legend

C	Completed
G	On Target – No Issues
Y	Need to watch – Some Issues
R	In Jeopardy – Significant Issues



Single Economic Dispatch
Production Cost Study
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Approach and Results

Overview

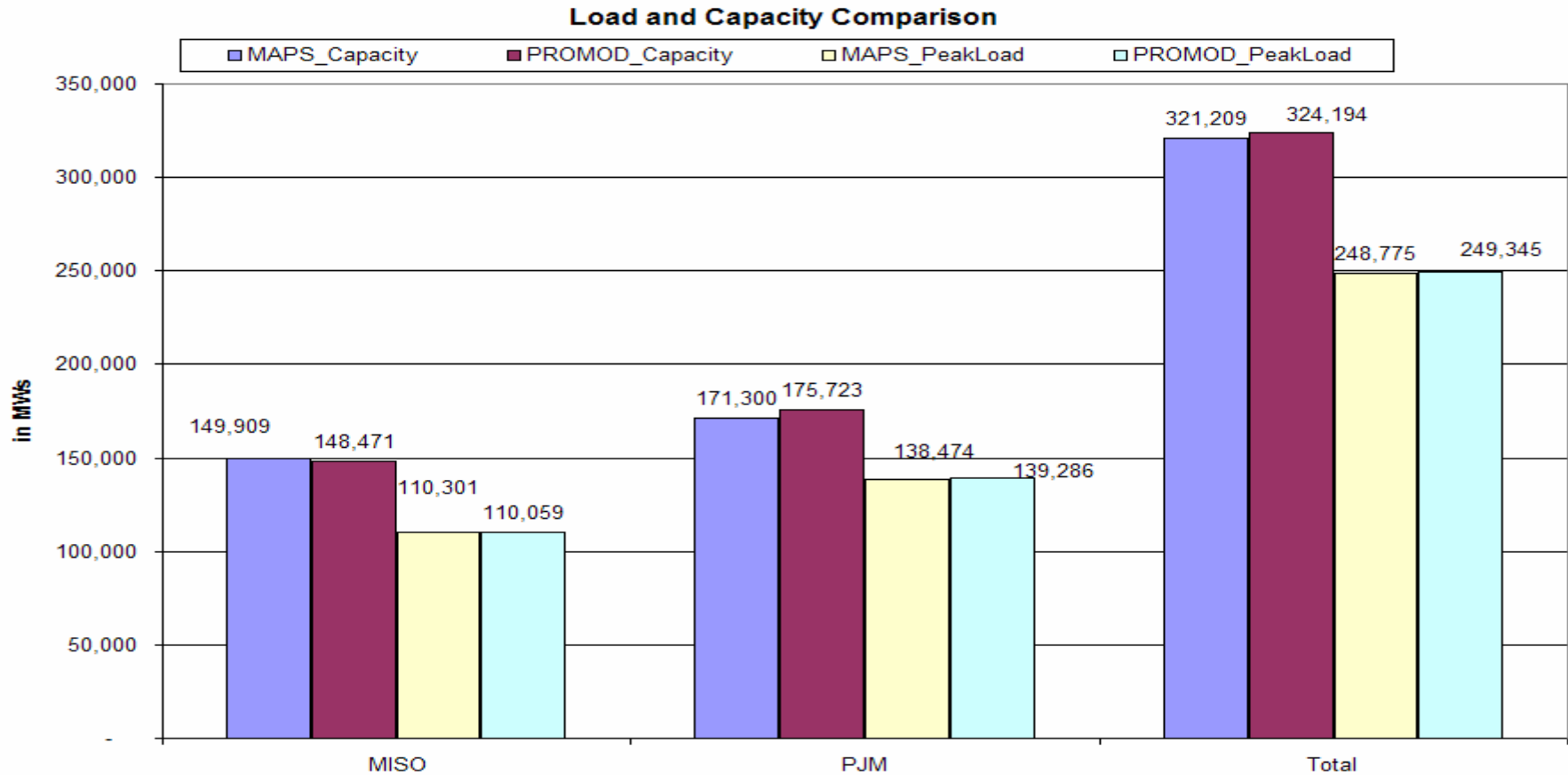
- Study Description
- GE-MAPS and PROMOD Benchmark
- Cases Performed
- Production Cost Benefits – Options and Results
- Sensitivity Run Results

Study Description

- Study conducted using commercially available production cost/power flow analysis tools. (PJM uses GE-Maps, MISO uses PROMOD®)
- Annual simulation using security-constrained unit commitment and economic dispatch algorithm with full transmission modeling
- Base Case: each market area separated by inter-market hurdle rates, re-dispatch for market-to-market constraints possible
- Change Case: Remove hurdle rates between MISO and PJM
- Single Market Benefit: Reduction in production cost between Base Case and Change Case
- Sensitivity runs for different fuel prices are done to verify the stability of the results.

GE-MAPS & PROMOD Input Data Benchmark

GE-MAPS and PROMOD Load and Capacity Comparison



Benchmarks

There are several key variables that can be used to perform a benchmark of forecast models to historical system performance, including:

- Interchange between Pools
- LMPs at Hubs
- Capacity Factor of generating units

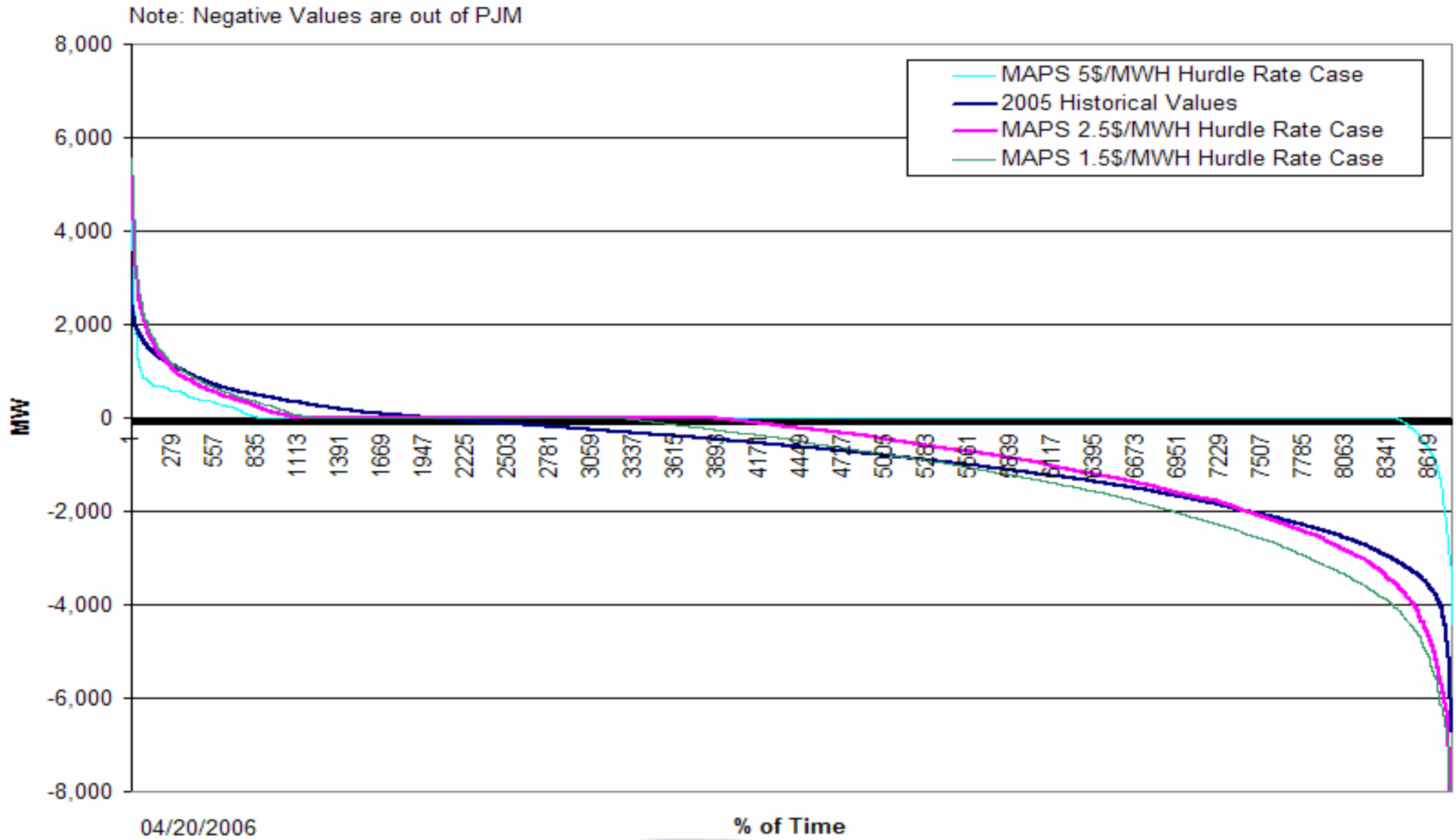
Primary Benchmark – Scheduled Interchange

Both PJM and MISO performed their own independent model benchmarks. The scheduled interchange benchmark served as the primary metric to determine the dispatch hurdle rate to be used for the base case:

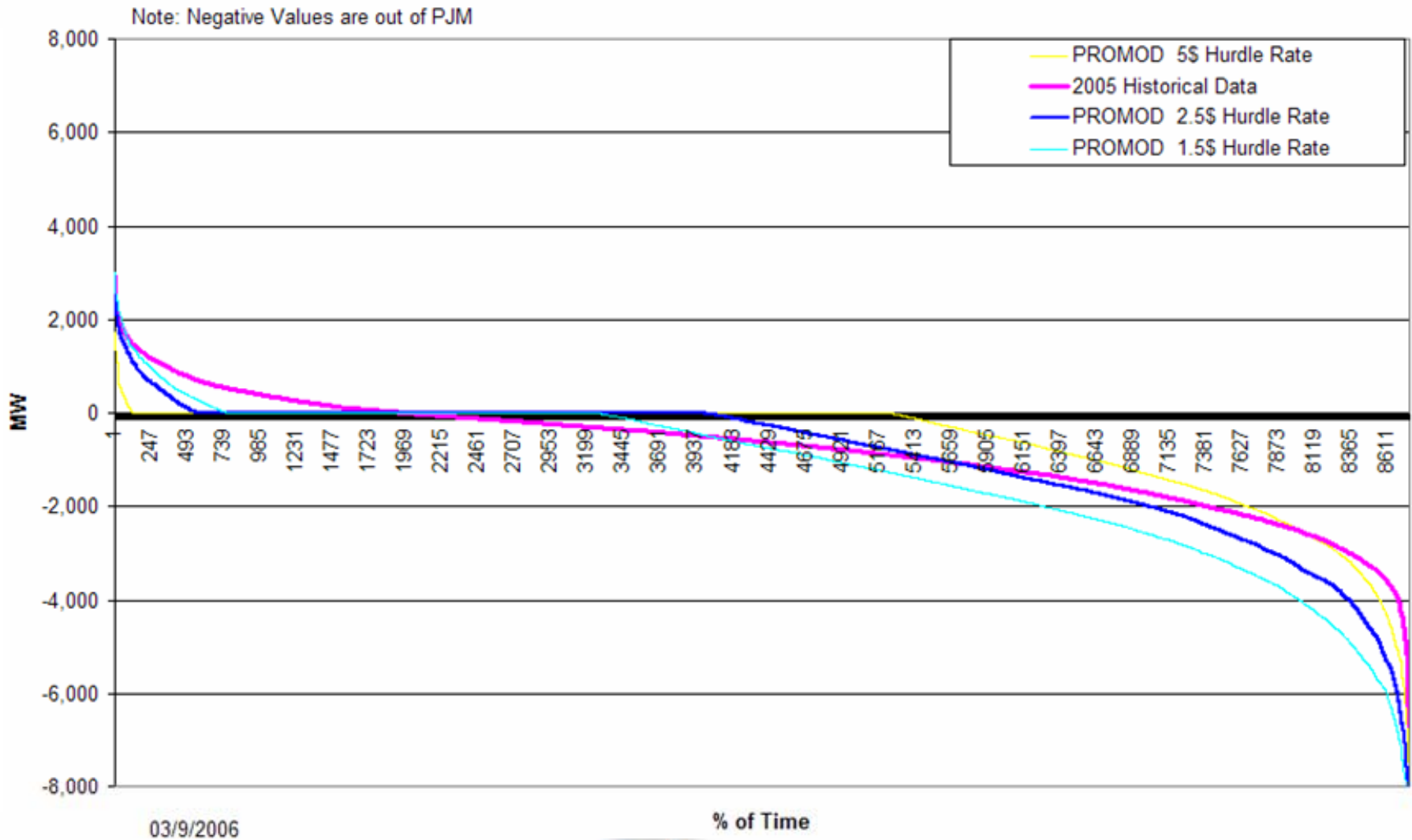
- 1.5 \$/MWH
 - 2.5 \$/MWH
 - 5 \$/MWH
- All cases used a \$10/MWH Commitment Hurdle Rate

The hourly MISO/PJM interchange from these cases are compared to the 2005 actual MISO/PJM scheduled interchange values.

GE-MAPS Benchmark - Scheduled Interchange



PROMOD Benchmark: Scheduled Interchange



PROMOD Benchmark: Hub LMP

MISO performed additional benchmarks using PROMOD to investigate LMP performance at various Hubs.

- Hub LMPs from PROMOD case with \$2.5/MWh PJM/MISO dispatch hurdle rate and \$10/MWh commitment hurdle rate is used to benchmark the DA market data (Jan 2006)
- Used Statistical Indices to check the benchmark

PROMOD Benchmark: Hub LMP

Statistical Indices used to check the benchmark:

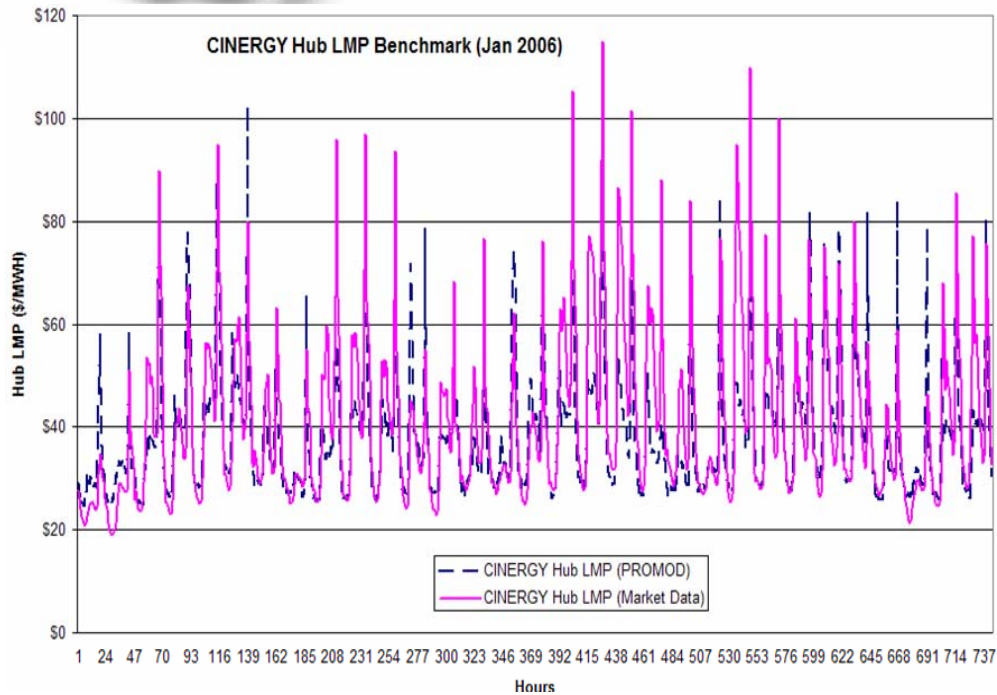
- Correlation – The single number that describes the degree of relationship between two variables.
 - For this study the two variables are PROMOD LMP and DA market LMP.
 - The closer the number is to 1, the closer the relationship and the better the correlation.
 - If we assume correlation of a chance occurrence is not greater than 1%, then the critical value of correlation is 0.188. Therefore if the correlation of the hub LMPs is larger than 0.188 we conclude the correlation is "statistically significant".

PROMOD Benchmark: Hub LMP

➤ **Average Error** - This is an index widely used to check the quality of forecasted values compared to the true values. For a certain hub, the PROMOD hub LMPs are: P_1, P_2, \dots, P_{744} , the DA market hub LMPs are: M_1, M_2, \dots, M_{744} , then the average error for these LMPs is:

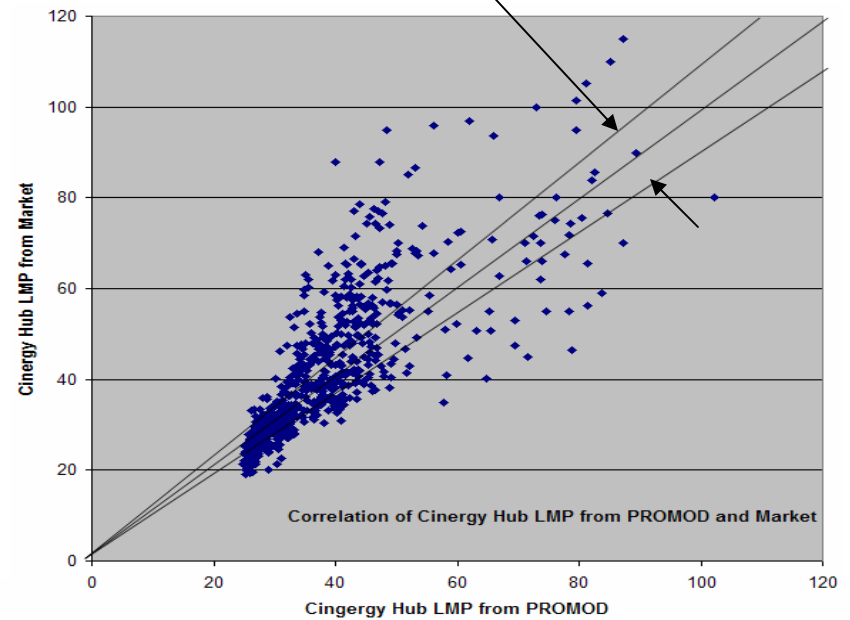
$$\text{AverageError} = \frac{\sum_{i=1}^{744} \text{abs}(P_i - M_i) / M_i}{744}$$

PROMOD Benchmark: CIN Hub LMP

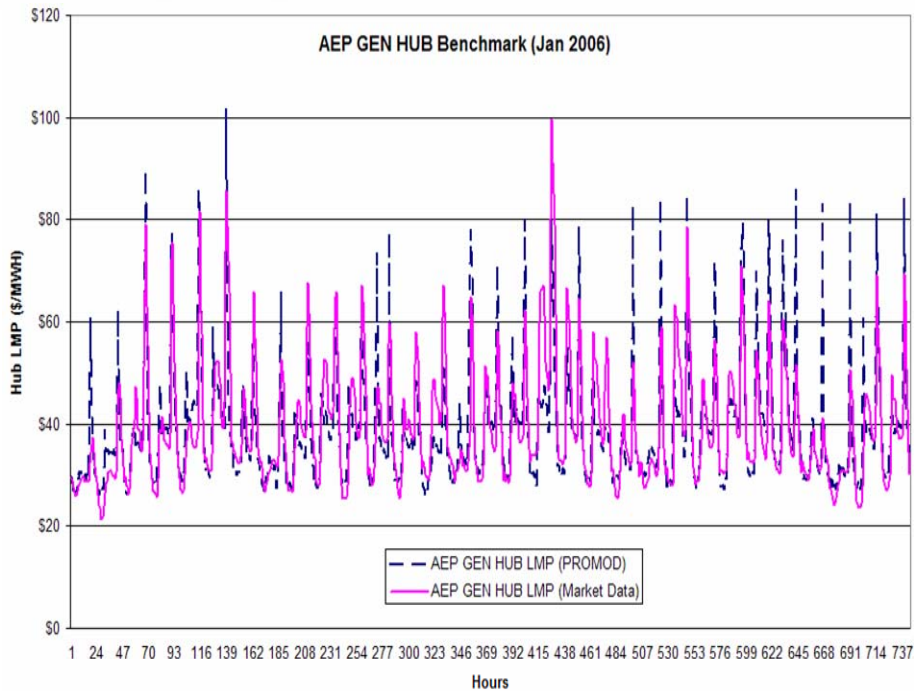


Correlation = 0.804 > 0.188
Average Error = 13.3%

The points fall in this area are hours with PROMOD LMP and DA Market LMP difference smaller than 10%

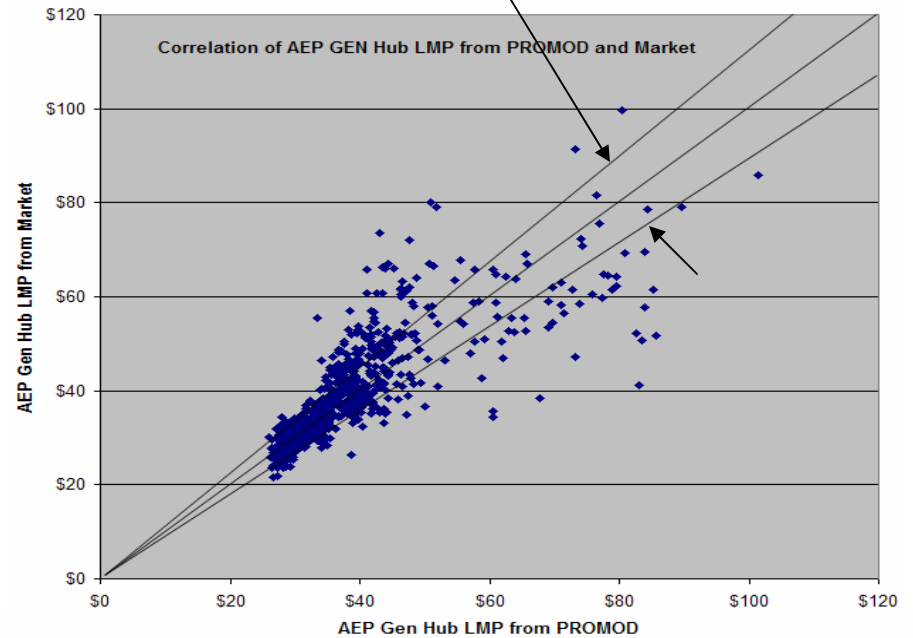


PROMOD Benchmark: AEP GEN Hub LMP



Correlation = 0.808 > 0.188
Average Error = 10.4%

The points fall in this area are hours with PROMOD LMP and DA Market LMP difference smaller than 10%



Benchmark: Conclusions

- The benchmark from both MAPS and PROMOD of the MISO/PJM scheduled interchange indicates the range from \$1.5/MWh - \$5.0/MWh produces solid benchmarks with the \$2.5/MWh rate level viewed as the preferred dispatch hurdle rate for use between MISO and PJM.
- The PROMOD hub LMPs benchmarked well to DA Market LMPs in multiple hubs.

Cases Performed

PJM and MISO performed independent assessments using the same assumptions”

- Dispatch Hurdle Rate in pre single market case is set at \$1.5/MWh, \$2.5/MWh and \$5.0/MWh
- Commitment Hurdle Rate is set at \$10/MWh
- Dispatch and Commitment Hurdle Rates are set to \$0/MWh in the single market dispatch case

Adjusted Production Cost is used as the measurement metric

- Differing approaches to the calculation of purchases and sale (which are used in the adjusted production cost metric) provides for three separate options for comparison

Production Cost Benefit

The adjusted production cost captures the actual production cost used to serve the load. The production cost used to serve the purchase/sale to the outside world needs to be removed from the total production cost such that only the production cost to serve the load remains. Three options to calculate the adjusted production cost are evaluated:

- Option 1: *CA level calculation (PROMOD only)* - CA's transactions within pool and outside pool are priced separately based on CA load or generation weighted LMP.
- Option 2: *Pool level calculation* - Pool transaction is priced based on the pool-wide load or generation weighted LMP.
- Option 3: *Pool level calculation (PROMOD only)* - Captures the transaction from each CA to outside pools, and prices this transaction with CA's load or generation weighted LMP. Internal transactions between CAs are not priced.

Single Economic Dispatch – Option 2

Range of Adjusted 2006 Production Cost Savings – Allocation

Hurdle Rate (\$/MWh)	MAPS Results (\$ Million)			PROMOD Results (\$ Million)		
	PJM	MISO	Total	PJM	MISO	Total
1.5	55.1	(5.8)	49.2	25.7	8.7	34.4
2.5	71.2	(4.8)	66.4	34.4	18.4	52.8
5.0	99.4	(4.0)	95.4	45.7	24.4	70.1

Single Economic Dispatch – Results By Options

Production Cost Adjustment Options Results

Hurdle Rate (\$/MWh)	MAPS Results (\$ Million)			PROMOD Results (\$ Million)		
	Option 1	Option 2	Option3	Option 1	Option 2	Option3
1.5	na	49.2	na	43.7	34.4	14.8
	<i>MISO</i>	(5.8)		(3.1)	8.7	(7.6)
	<i>PJM</i>	55.1		46.8	25.7	22.4
2.5	na	66.4	na	65.4	52.8	33.6
	<i>MISO</i>	(4.8)		9.8	18.4	2.6
	<i>PJM</i>	71.2		55.6	34.4	31.0
5.0	na	95.4	na	98.7	70.1	51.9
	<i>MISO</i>	(4.0)		18.6	24.4	9.3
	<i>PJM</i>	99.4		80.1	45.7	42.6

Production Cost Analysis – Observations

Range of dispatch hurdle rates (\$1.5 - \$5/MWh) analyzed for base case. Single market dispatch savings ranged from \$15 to \$99 million over all hurdle rates and all options. These savings represent less than 0.2% of the total production costs.

- The calculation methodology for treating purchases and sales is important.
 - Three options are investigated
 - Option 1 based on Control Areas – MISO approach
 - Option 2 based on Pools – PJM Approach
 - Option 3 based on Pools – New approach

- Hurdle rate of \$2.5/MWh provides the best fit to historical interchange data. Range of savings at the \$2.5/MWh dispatch hurdle rate is \$34 - \$66 million.

Production Cost Analysis – Observations

- MAPS results show higher total savings than the PROMOD results for a comparable case.
- MAPS results indicated MISO receives no benefit from the single market dispatch.
- PROMOD results indicate PJM companies receive two-thirds of the benefits and the MISO companies receive a one-third benefit. The MISO results at the \$1.5/MWh dispatch hurdle rate also showed negative MISO benefits.
- Results are sensitive to the method used to price the purchase and sale transactions.
- Savings are limited compared to the total production costs of the combined footprint.

Additional Sensitivities Studied

The following fuel price sensitivity runs were performed by PJM and MISO on the \$2.5/MWh dispatch/\$10/MWh commitment hurdle rate case and single market dispatch case.

- Lower Gas Price (10% lower than original case in all eastern interconnection)
- Higher Gas Price (10% higher than original case in all eastern interconnection)

Additional sensitivities are contained in the Assumption Documents.

Sensitivity Run Results

Option 2 LMP Treatment at the \$2.5/MWh Hurdle Rate

Sensitivity	MAPS Results (\$ Million)			PROMOD Results (\$ Million)		
	PJM	MISO	Total	PJM	MISO	Total
Gas - 10%	46.0	(4.9)	41.1	27.3	14.3	41.6
Base	71.2	(4.8)	66.4	34.4	18.4	52.8
Gas + 10 %	74.0	(9.5)	64.5	30.8	14.7	45.5

Sensitivity Run - Observations

- The savings vary with different fuel prices
- PJM and MISO model results are consistent
- Variations are small compared to the total production cost.

Capturing Benefits

- The JCM initiatives already under development or consideration are expected to achieve a significant portion of the production cost savings estimated in the simulations, at substantially less cost than a single unit commitment and dispatch.
- Existing JCM Initiatives – certain of the initiatives already being implemented or investigated will directly enhance the efficiency of the two markets and achieve a portion of the production cost savings
 - PJM implementation of marginal losses will result in better price convergence at the border
 - Alignment of O.R. and RSG products will reduce transaction costs between the two markets and enhance convergence
 - Moving JOUs between markets will enhance price convergence at individual nodes
 - Alternative border pricing point mechanisms will facilitate increased trading and market convergence

Capturing Benefits

- Further enhancement of Midwest ISO and PJM Market to Market Coordination
 - Continued analysis of and enhancements to dispatch tools and processes that will achieve better shadow price convergence on binding RCFs
 - Joint PJM and Midwest ISO investigation into circulation (loop flow) through the combined footprint

- Additional JCM Initiatives Under Consideration
 - Dynamically Dispatchable Transactions between Midwest ISO and PJM
 - Real-time Dynamic Schedule between Midwest ISO and PJM



- Questions

- Comments