ComEd Ex. 5.2

MISO / PJM Inter-Regional Planning

Stakeholder Advisory Committee (IPSAC)

December 7th, 2006

Agenda

- **Review of MISO-PJM Coordinated System Plan generator deliverability and baseline reliability analysis**
  - **Discussion of Results**
- **Review of MISO-PJM Markets Performance analysis**
  - **Discussion of Results**
- **Remainder of Analysis and Report**

MISO-PJM
Coordinated System Plan Scope of Work

Model Development

- **2011 Peak Summer Base System Model**
  - **Includes all interconnection projects with an executed ISA and associated network upgrades**
  - **Includes all currently identified enhancements included in the MISO / PJM regional transmission expansion plans**
  - **Includes approved long term firm interchange**

- **The model is available at the following web site**

http://www.pjm.com/committees/stakeholders/inter-regional-planning-adv/irpsac.html

Analysis

- **Perform an N-2 contingency analysis on PJM and MISO facilities 345kV and greater**
  - Purpose: To identify any new N-2 reliability violations using the CSP model (combined MTEP/RTEP model) that may not have already been identified in each RTO's individual planning processes (i.e. MTEP and RTEP)
- **Perform RTO standard generator deliverability test monitoring the other RTO's system**
  - Standard MISO to MISO Generator Deliverability analysis monitoring the PJM system
  - Standard PJM to PJM Generator Deliverability analysis monitoring the MISO system
    - Purpose: To identify any new deliverability constraints using the CSP model (combined MTEP / RTEP model) that may not have already been identified in each RTO's individual transmission expansion plan.
- **Common deliverability test monitoring PJM and MISO facilities while performing a combined generator deliverability study**
  - Purpose: Evaluate potential for combined deliverability of Network Resources within both RTOs to a combined RTO footprint

Baseline Reliability Analysis – N-2 Analysis

- **Study N-2 Contingencies for 345 kV and Greater Facilities**
  - **Analysis performed on the 2011 coordinated system model**
  - **All MISO and PJM 345 kV contingencies were simulated**
  - **Facilities 230 kV and greater were monitored in MISO and PJM**
  - **This involved approximately 1.9 million contingency pairs**

Baseline Reliability Analysis – N-2 Analysis

- **No reliability violations identified**
- **The following MISO facilities were overloaded due to N-2 contingencies but re-dispatch solutions were available to relieve the identified N-2 issues**

Baseline Reliability Analysis – N-2 Analysis

Mon Element	Re-dispatch MW amount	RTO	Contingency 1	Contingency 2
Pana - Kinkaid 345 kV	370	MISO and PJM	345-L8001-S1	345-L2102-S-OP
Gibson - Snake Run 345 kV	348	MISO	Jefferson - Rockport 765 kV	25393 08AMO 345 25753 08EDWDSP 345 1
Petersburg - Thompson 345 kV	325	MISO	Jefferson - Rockport 765 kV	16FRANCS-16HANNA-16PETE-08FRNCK-345-138
Cayuga - Frankfort 345 kV	319	MISO	Nucor - Cayuga 345 kV	Jefferson - Rockport 765 kV
Rising - Goose Crk 345 kV	199	MISO	345-L2106-S-OP	Clinton - Brokaw 345 kV
Walton 345/230 kV transformer	195	MISO	Dumont - Greentown 765 kV	Outage of Schahfer (NIPS)
Hortonville - Whitestown	145	MISO	08WHITST-16GUION-16WSTLAN-345-138	Jefferson - Rockport 765 kV line
Lafayette - Attica 230 kV	142	MISO	Nucor - Cayuga 345 kV	Dequine - Eugene 345 kV
Todhunter - Woodsdale 345 kV Ckt 1	128	MISO	Miami Fort - W. Milton 345 kV	Todhunter - Woodsdale 345 kV Ckt 2
Carmel Jct - Noblesville 230 kV	103	MISO	Greentown - Jefferson 765 kV	25379 08NOBLSV 345 22664 05FALL C 345 1
Nucor - Whitestown 345 kV	74	MISO	Jefferson - Rockport 765 kV line	25393 08AMO 345 25753 08EDWDSP 345 1
Coffeen - Pana 345 kV	71	MISO	Kinkaid 1 Unit outage (ComEd)	Clinton Unit outage (Ameren/IP)
Todhunter - Woodsdale 345 kV Ckt 2	44	MISO	Miamai - W. milton 345 kV + W. milton 345/138 kV tf	26276 08TDHNTR 345 26360 08WODSDL 345 1
Clinton - Brokaw 345 kV	41	MISO	Lanesville - Brokaw 345 kV	345-L2102-S-OP
Sammis - S. Canton 345 kV	39	MISO and PJM	Kammer - S. Canton 765 + S. Canton 765/500 kV tf +S. Canton 345/138 kV tf	Canton Central - Tidd 345 kV
Whitestown - Guion 345 kV	32	MISO	Fall Crk - Noblesville - Hortonville 345 kV + Hortonville 345/230 kV tf + Fall Crk 345/138 kV	Petersburg - Thompson 345 kV

Baseline Reliability Analysis – N-2 Analysis

- **No reliability violations identified**
- **The following MISO facilities were overloaded due to N-2 contingencies but re-dispatch solutions were available to relieve the identified N-2 issues**

Baseline Reliability Analysis – N-2 Analysis

Monitored Element	Re-dispatch MW amount	RTO	1st Contingency	2nd Contingency
Dequine - Reynolds 345 kV	4329	PJM	Dequine - Olive - 08WESTWD 345 kV and 08WESTWD 345/138 kV TR	Jefferson - Rockport 765 kV line
Stuart - Spurlock 345 kV	3305	PJM + MISO	Sgrove - Zimmer 345kV	UNON - Zimmer 345kV
South Canton - Star 345 kV	3240	PJM + MISO	Sammis - Star 345kV	Base Case – No Contingency
Breed - Dequine 345 kV	2253	PJM	Breed - Casey 345 kV line	Jefferson - Rockport 765 kV
Dequine - Olive 345 kV	2237	PJM	Dequine - Reynolds - Olive 345 kV and Reynolds 345/138 TR	Jefferson - Rockport 765 kV
Ohio Central - Muskingum River 345 kV	1989	PJM	Generator outage (934 MW) in 02DVBSG	Base Case – No Contingency
Eugene - Darwin 345 kV	1524	PJM	Jefferson - Rockport 765 kV line	Breed - Casey 345 kV
Dequine - Eugene 345 kV	455	PJM	08NUCOR - 08CAYUGA 345 kV line	Base Case – No Contingency
Beatty - Adkins 345 kV line	356	PJM	Marysville - 02TANGY 345 kV and Marysville 765/345 kV TR	Base Case – No Contingency
Latham - Kincaid 345 kV	256	PJM	Generator outage (1026 MW) in Clinton	Kincaid OP for fault on ckt 2102
Tanners Creek - M. FTHS 345 kV	79	PJM +MISO	06DEARB - 06PIERC1 345 kV	08EBEND - 08TERMNL 345 kV

MISO Generator Deliverability Analysis Method

- **Complete generator deliverability analysis on 2011 base system model**
  - **MISO generator deliverability impacts to PJM facilities**
    - Analysis involves simulating N-0 and N-1 contingencies under a defined dispatch pattern to determine if the delivery of MISO resources within the MISO footprint has an impact on PJM facilities
    - Identify any PJM facilities that are impacted
    - Identify extent of impact to deliverability
    - Identify preliminary solutions

MISO Generator Deliverability Analysis Results

- **Results indicate the following PJM circuits may be impacted by MISO generator deliverability**

Deliverability Type	Monitored Facility	Contingency	Undeliverable MW
MISO to MISO Generation	None		

PJM Generator Deliverability Analysis Method

- **Complete generator deliverability analysis on 2011 base system model**
  - **PJM generator deliverability impacts to MISO facilities**
    - Analysis involves simulating N-0 and N-1 contingencies under a defined dispatch pattern to determine if the delivery of PJM resources within the PJM footprint has an impacts on MISO facilities
    - Identify any MISO facilities that are impacted
    - Identify extent of impact to deliverability
    - Identify preliminary solutions

PJM Generator Deliverability Analysis Results

- **Results indicate the following MISO circuits may be impacted by PJM generator deliverability**

Deliverability Type	Monitored Facility	Contingency	Undeliverable MW
PJM to PJM Generation	Lanesville 345/138 kV TR	L2102 – Kincaid – Latham – Pontiac 345kV and Kincaid – Pawnee 345kV via SPS operation	125

Common Generator Deliverability Analysis Method

- **Complete common generator deliverability analysis on 2011 base system model**
  - **Evaluate Potential for Deliverability of Combined Network Resources to a common (both MISO and PJM) market**
    - Determine reasonable regions of deliverability
    - Identify Network Resources that would be deliverable in a common market
    - Identify constraints and potential preliminary solutions

Common Generator Deliverability Analysis Results

- **Results indicate the following MISO & PJM circuits may be impacted by universal MISO & PJM generator deliverability**

Deliverability Test Type	Generation Constrained	Facility	Contingency	Undeliverable MW
Universal	PJM	Wolfs 345/138kV Transformer	Electric Junction - Wolfs 345kV	605
Universal	PJM	Muskingum - Ohio Central 345kV	Base Case - No Contingency	377
Universal	PJM	Davis 345/138kV Transformer	Braidwood - Davis 345kV	372
Universal	PJM	East Frankfort 345/138kV Transformer	East Frankfort - Goodings Grove 345kV	294
Universal	PJM	Electric Junction 345/138kV Transformer	Electric Junction 345/138kV Transformer	266
Universal	MISO & PJM	Kincaid - Lanesville	Kincaid - Latham - Pontiac 345kV with SPS trip of Kincaid - Pawnee 345kV	862
Universal	MISO & PJM	Havana - Ipava 138kV	Havana - Cuba 138kV	760
Universal	MISO	Arpin 345/138kV Transformer	Arpin - Rocky Run 345kV	228
Universal	MISO	Black Dog 27 -- Wilson 115kV	Inver Hills Transformer 345/115kV	127
Universal	MISO	Empire - Presque Isle 138kV	Empire - Empire ckt1 138kV	122
Universal	MISO	Edegewood - Saint Martin 138kV	White Water - Walworth 138kV	108
Universal	MISO	Effingham NW- Effingham 138kV	Newton - Casey 345kV	101

Universal Deliverability Test Summary

Universal Deliverability Test - Summary

- 48 branch constraints impacted by MISO units
  - These branches limited universal deliverability of existing Network Resources within Midwest ISO system
  - 148 MISO units have limited deliverability (PMax: 19656 MW, Dlv: 18060 MW)
  - Of these 148 affected Midwest ISO NR units, 43 accounted for 80% of the total restricted MW amount (1600 MW). The remaining units had less than 10MW restrictions on combined deliverability.
  - Total MW amount restricted is about 1600 (about 1.2% of the total NR MWs limited and about 98.8% deliverable)
- 50 branch constraints impacted by PJM units
  - These branches limited universal deliverability of existing Network Resources within PJM system
  - 47 PJM units have limited deliverability (Pmax: 17921 MW, Dlv: 9777 MW)
  - 165000 MW PJM NR in the case.
  - Total MW amount restricted is about 8100 (about 5% of the total NR MWs limited and about 95% deliverable)

- Total MWs restricted within the combined footprint is about 10000 MW. This is about 3.3% of the total existing NRs in the combined footprint.

Universal Deliverability Test Summary

- Constraints limiting MISO NRs
  - 1 - 345kV Facilities
  - 3 - 230kV Facilities
  - 8 - 161kV Facilities
  - 11 - 138kV Facilities
  - 2 - 120kV Facilities
  - 23 - 120kV Facilities

- Constraints limiting PJM NRs
  - 16 - 345kV Facilities
  - 2 - 230kV Facilities
  - 2 - 161kV Facilities
  - 30 - 138kV Facilities

- Constraints limiting MISO and PJM NRs
  - 2 - 345kV Facilities
  - 1 - 138kV Facilities

Conclusions

- The N-2 reliability analysis demonstrated a number of potential reliability violations.
  - All of the potential reliability violations can be resolved through system adjustments.

- The individual generator deliverability analysis did not demonstrate any deliverability constraints in the MISO system.

- One deliverability constraint in the PJM system was identified.
  - There is an operating guide in place that specifies system adjustment as a acceptable solution in the event of an overload of this facility.

- The common generator deliverability analysis demonstrated numerous constraints on the MISO and PJM systems.
  - If not resolved through system upgrades, these constraints would result in small amounts of restricted generation on both the MISO and PJM systems.

- The network model contains many assumptions that may not reflect actual 2011 conditions in a combined MISO-PJM combined market system situation. The results and conclusions contained in this report are dependant on the 2011 CSP network model and analysis methodology contained in this report. The results of future CSP studies could be significantly different depending on the case, assumptions, and analysis methodology used.

2011 MISO-PJM COORDINATED SYSTEM PLAN (CSP)

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Market Performance Analysis

Overview

- Scope
- Market Simulation –Methodology, Tool and Model
- LMP Spread
- Top 15 Binding Constraints
- Solution for Top 15 Binding Constraints
- Sensitivity Run Results

Scope

- Complete a market simulation of the combined MISO/PJM systems
- Identify areas of highest LMP spreads
- Identify the facilities producing the highest projected congestion
- Identify potential preliminary solutions.

Market Simulation – Methodology, Tool and Model

Methodology:

- Build the 2011 CSP PROMOD model. Validate and for 2011.
- Calculate the LMP's for each company/region, and identify the area with the highest LMP spreads.
- Sort the binding constraints identified from PROMOD based on the total shadow price, and pick the Top 15 constraints in MISO and PJM areas.
- Identify with potential solutions (mainly transmission upgrades at this stage) to these Top 15 constraints.
- Re-run PROMOD with proposed solutions in the model, and see effects.
- Run sensitivity cases to evaluate the influence of uncertainty on the results.

Market Simulation – Methodology, Tool and Model

- Tools:

PROMOD is used to perform the hourly market simulation (security constrained unit commitment and economic dispatch). GE-MAPS used by PJM to validate and supplement the PROMOD Analysis

- Model:

Started from the MISO MTEP06 2011 PROMOD model, with the following adjustment:

  - Power flow used is the 2011 CSP power flow model which is developed specially for this CSP study;
  - More monitored lines/contingency pairs in PJM areas are added based on PJM's suggestion.

Detailed model assumptions can be found in the Appendix of the final report.

Market Simulation – Methodology, Tool and Model

Model Benchmark

The similar 2006 PROMOD model (which use the same economic database) has been benchmarked to MISO/PJM market:

- Interchange between MISO and PJM
- LMPs at MISO and PJM Hubs

Model Benchmark – MISO/PJM Interchange

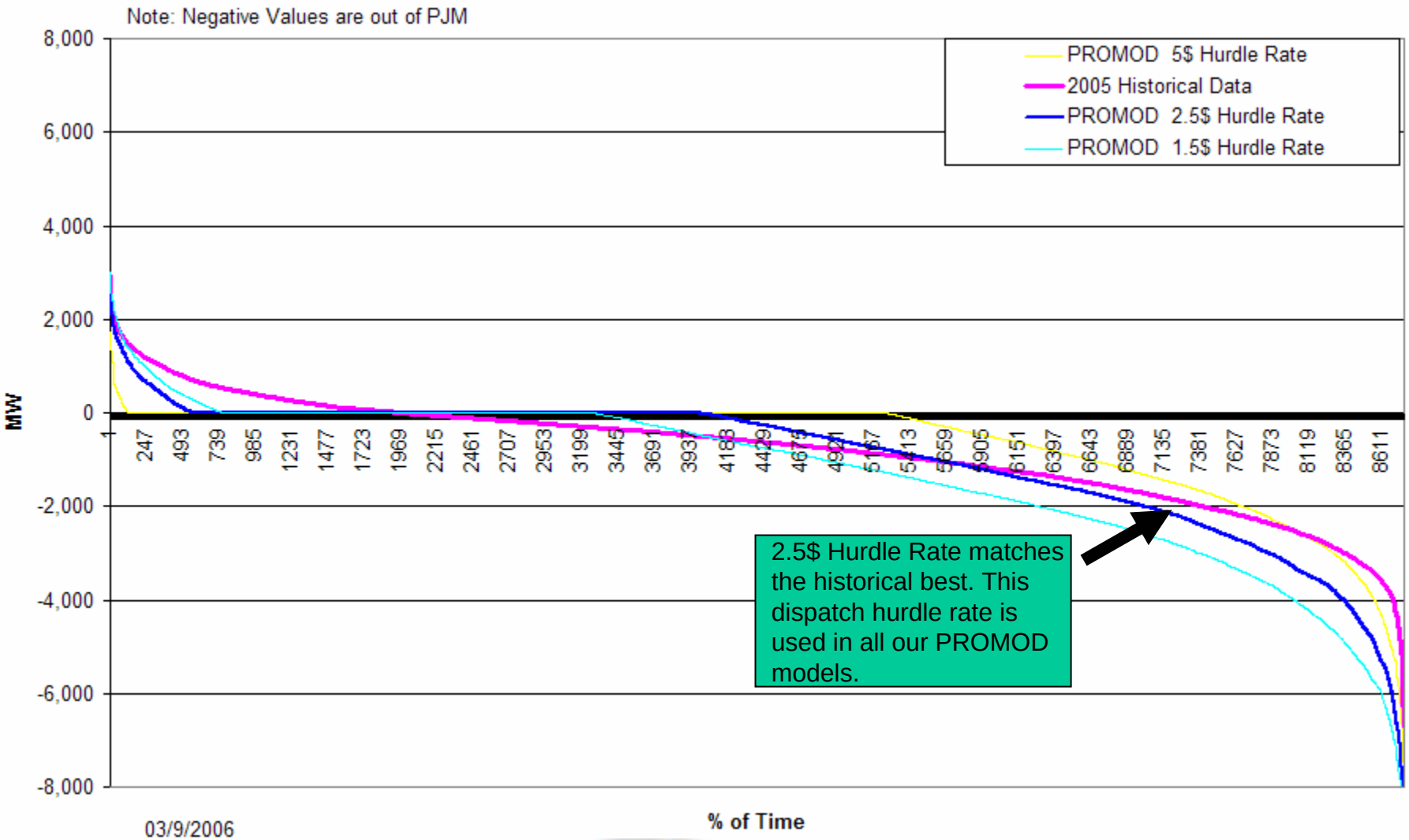
The scheduled interchange benchmark served as the primary metric to determine the dispatch hurdle rate between MISO and PJM to be used in all other models:

- 1.5 $/MWH
- 2.5 $/MWH
- 5 $/MWH

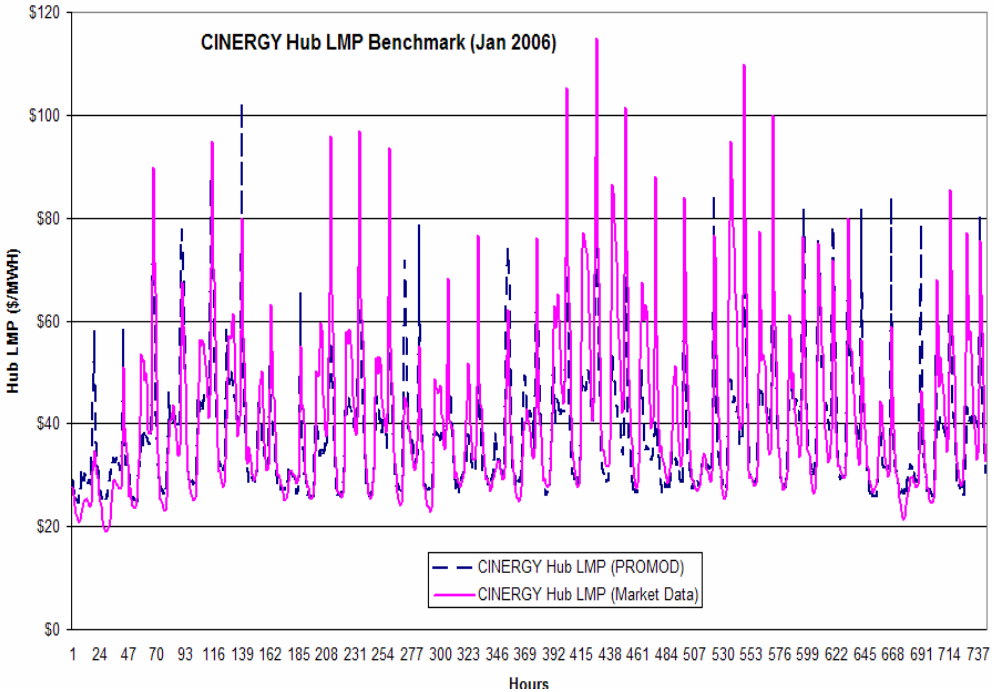
All cases used a $10/MWH Commitment Hurdle Rate

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

Model Benchmark – MISO/PJM Interchange (Cont')

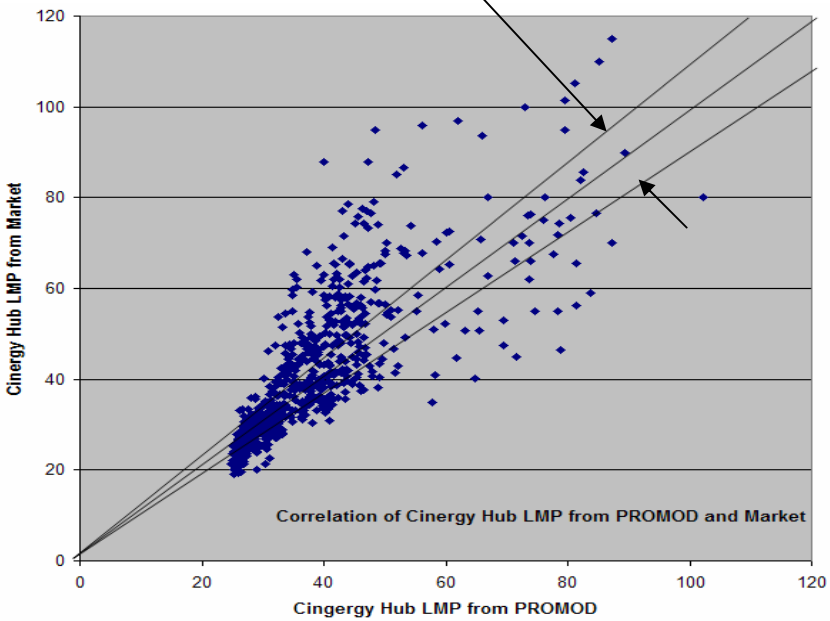


Model Benchmark: CIN Hub LMP

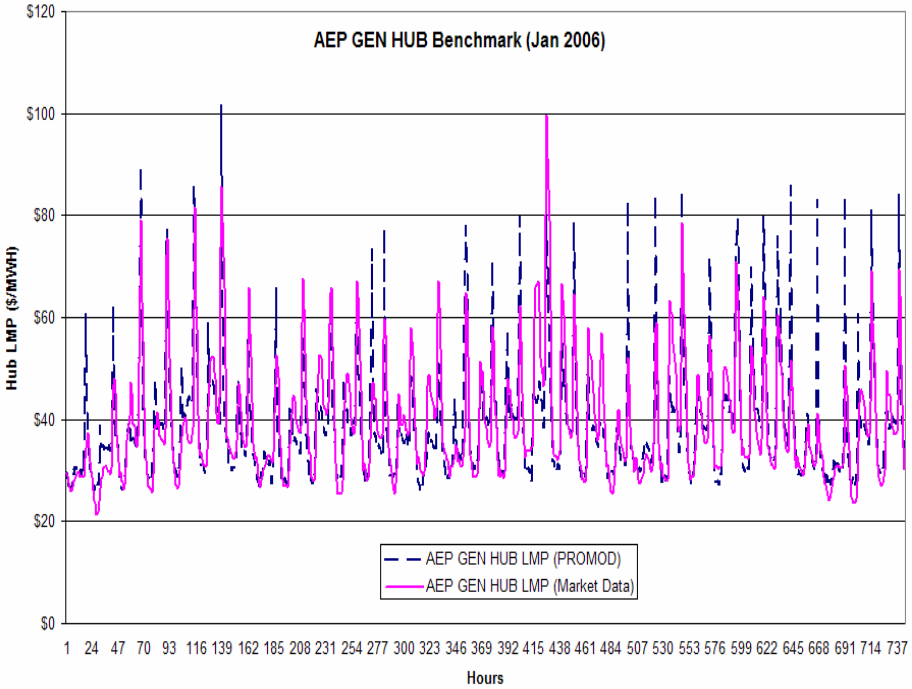


Correlation = 0.804
Average Error = 13.3%

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

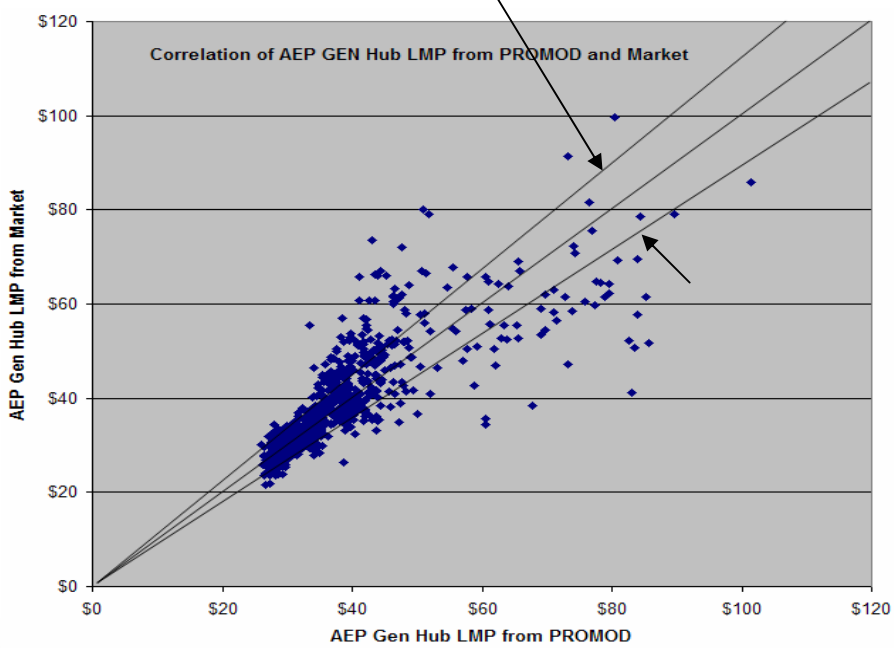


PROMOD Benchmark: AEP GEN Hub LMP



Correlation = 0.808
Average Error = 10.4%

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



LMP Spread

4 types of annual LMPs are calculated :

- Annual Average Generation LMP:

$$Annual_Average_Generation_LMP = \frac{\sum_{i=1}^{8760} Company's_Hourly_Gen_Weighted_LMP_i}{8760}$$

- Annual Generation Weighted LMP:

$$Annual_Gen_Weighted_LMP = \frac{\sum_{i=1}^{8760} Company's_Hourly_Gen_Weighted_LMP_i * Company's_Gen_i}{\sum_{i=1}^{8760} Company's_Gen_i}$$

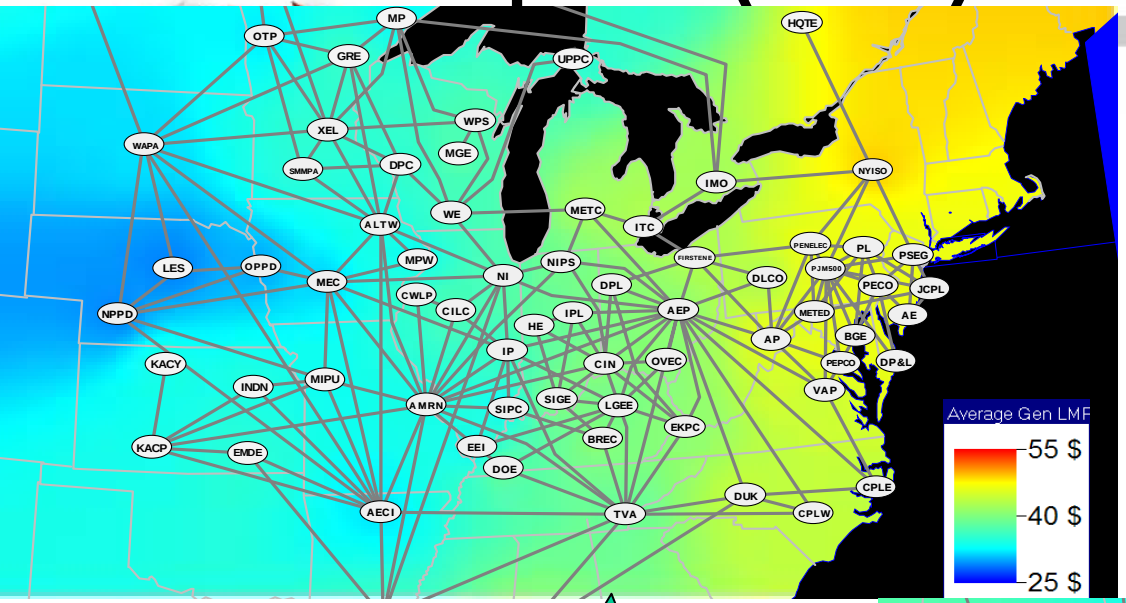
- Annual Average Load LMP:

$$Annual_Average_Load_LMP = \frac{\sum_{i=1}^{8760} Company's_Hourly_Load_Weighted_LMP_i}{8760}$$

- Annual Load Weighted LMP:

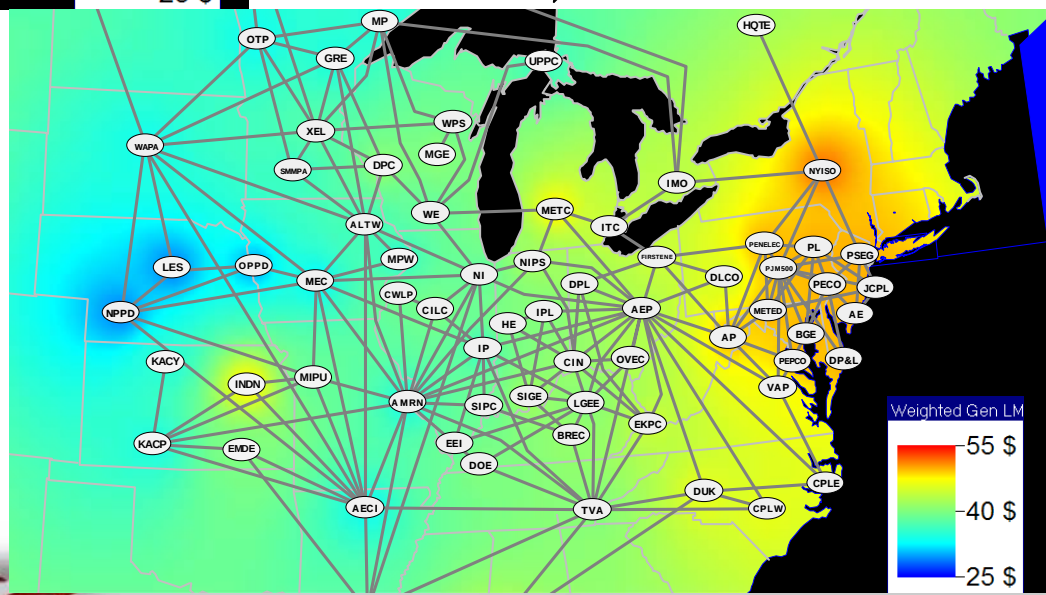
$$Annual_Load_Weighted_LMP = \frac{\sum_{i=1}^{8760} Company's_Hourly_Load_Weighted_LMP_i * Company's_Load_i}{\sum_{i=1}^{8760} Company's_Load_i}$$

LMP Spread (Cont') – Annual Gen LMP

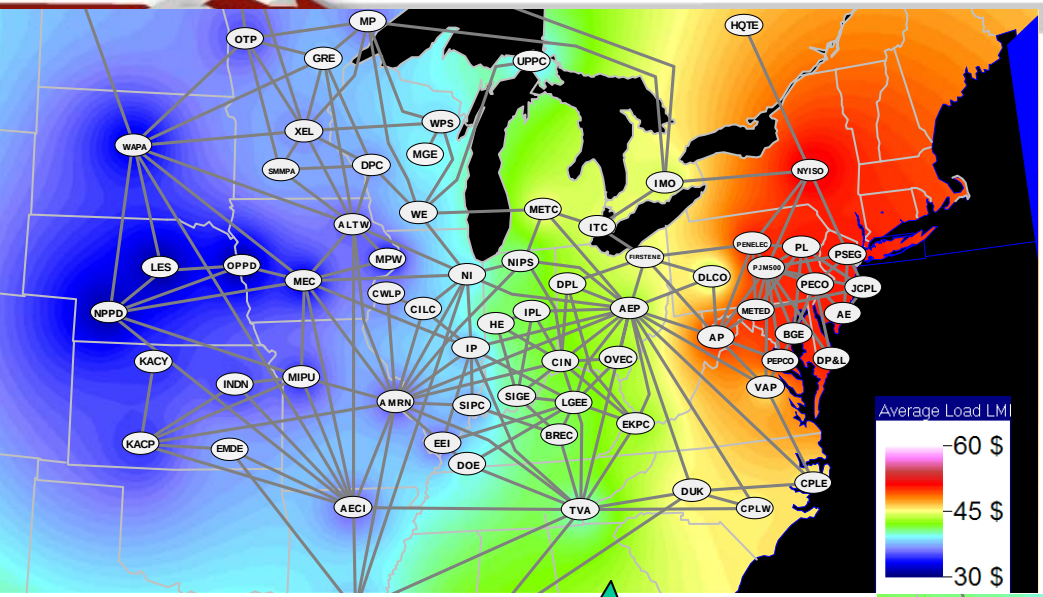


Annual Generation Weighted LMP

Annual Average Generation LMP

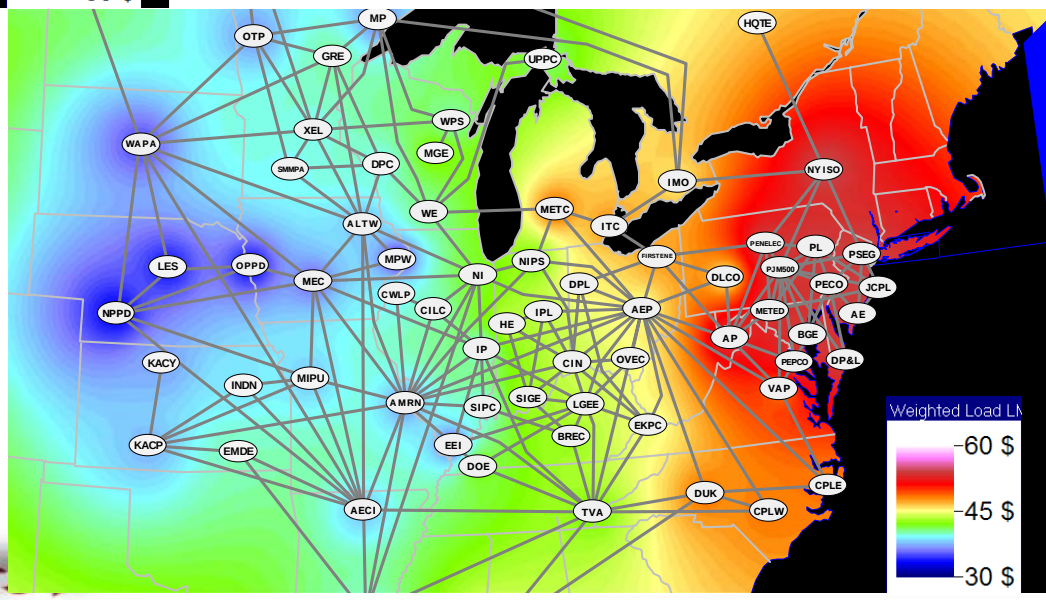


LMP Spread (Cont') – Annual Load LMP



Annual Load Weighted LMP

Annual Average Load LMP



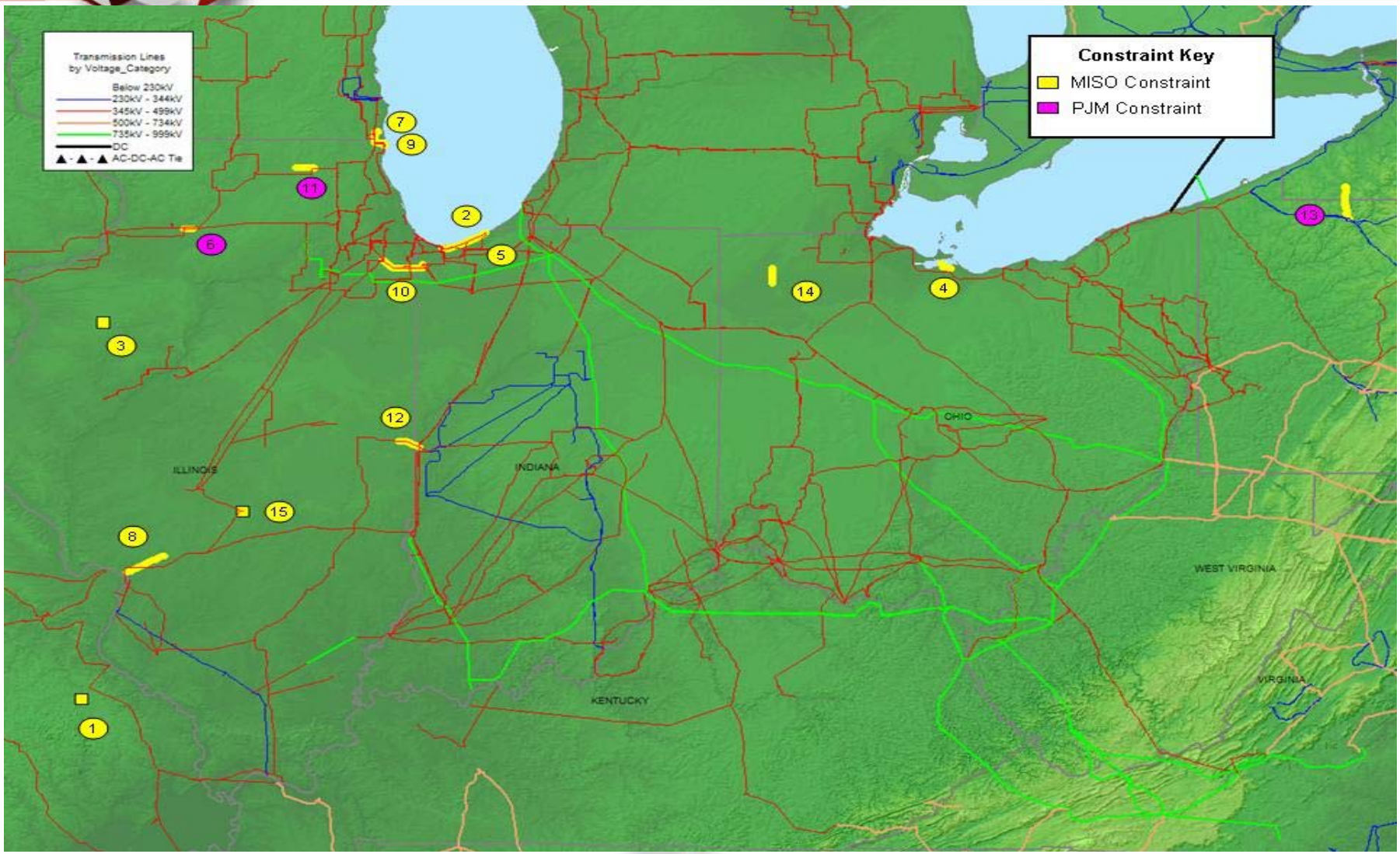
Different LMP contours show the same LMP spread pattern in east interconnection:
LMPs increase from west to east

Top 15 Binding Constraints in MISO/PJM

Rank	From Bus Name	From Bus Number	To Bus Name	To Bus Number	Contingency Detail	Binding Hours	Annual Total Shadow Price (k$)	Solution Proposed
1	RIVMIN 1	31609	RIVMIN 2	31610	LUTESVIL 345-ST FRANC 345 1 (AMRN-AMRN)	**215**	**278.56**	N
2	17DUNACR	28027	17MCHCTY	28053	05DUMONT 765-WILTO; 765 1 (AEP-NI)	**2522**	**278.02**	Y
3	GALESBR5	64411	GALESBRG	32415	ELECT; B 345-NELSO; B 345 1 (NI-NI)	**1362**	**83.65**	N
4	02GRNFLD	21581	02LAKVEW	21691	02BEAVER 345-02DAV-BE 345 1 (FE-FE)	**3311**	**53.73**	Y
5	17DUNACR	28027	17MCHCTY	28053	17DUNACR 138-17MCHCTY 138 1 (NIPS-NIPS)	**2008**	**40.25**	Y
6	NELSO; R	37039	NELSO;RT	37037	DIXON;7B 138-NELSO; B 138 1 (NI-NI)	**149**	**24.36**	Y
7	KENOSH45	39345	LAKEVIEW	39362	ZION ; R 345-PLS PR2 345 1 (NI-WE)	**431**	**21.38**	Y
8	GILSP TP	32298	LAC N TP	32291	COFFEEN 345-ROXFD IP 345 1 (AMRN-IP)	**774**	**20.9**	N
9	PLS PR2	38849	ZION ; R	36421	CHERR; R 345-SILVE; R 345 1 (NI-NI)	**1402**	**17.55**	Y
10	CRETE;BP	37646	17STJOHN	28013	05DUMONT 765-WILTO; 765 1 (AEP-NI) 17WOLFLK 138-SLINE; R 138 1 (NIPS-NI)	**1525**	**16.28**	N
11	MAREN;RT	36953	P VAL; R	37119	CHERR; R 345-SILVE; R 345 1 (NI-NI)	**274**	**14.29**	N
12	05EUGENE	22663	BUNSONVL	32385	05BREED 345-CASEY 345 1 (AEP-AMRN)	**1075**	**13.53**	N
13	WARREN	281	FALCONER	76527	NO OUTAGE	**1575**	**12.32**	Y
14	02RICHLN	21890	02RDGVL	21879	02 NAOMI 138-02RICHLD 138 1 (FE - FE) 02 NAOMI 138-02WAUSEO 138 1 (FE-FE)	**183**	**9.79**	Y
15	PANA	31445	PANA	31446	COFFEN N 345-COFFEEN 345 1 (AMRN-AMRN)	**519**	**9.25**	Y

Yellow means solution proposed

Top 15 Binding Constraints in MISO/PJM (Cont')



Solution to Top 15 Binding Constraints - 1

No.2: Dune Acres to Michigan City 138 kV line with loss of Dumont to Wilto765kV line
And
No.5: Dune Acres to Michigan City 138 kV line with loss of another Dune Acres to Michigan City 138 kV line

Proposed Project:
Project A: Dune Acres-Michigan City CT upgrade and State Line - Wolf Lake upgrade;
Project B: Dune Acres-Michigan City Re-conductoring upgrade and State Line - Wolf Lake upgrade

Effect on No. 2 Constraint

	Binding Hours	Total Shadow Price (k$)
Original Case	2522	278.02
Project A	906	65.68
Project B	0	0

Effect on No. 5 Constraint

	Binding Hours	Total Shadow Price (k$)
Original Case	2008	40.25
Project A	1667	31.82
Project B	9	0.33

Solution to Top 15 Binding Constraints - 2

No.4: Lakeview to Greenfield 138 kV line

Proposed Solution: a new substation in Hayes which is tapped in between Greenfield and Beaver

	Binding Hours	Total Shadow Price (k$)
Original Case	3311	53.73
Upgrade Case	3098	46.68

No.6: Nelson to Nelson Tap 138 kV line

Proposed Solution: open the Nelson 138kV bus tie (37038 – 37039)

	Binding Hours	Total Shadow Price (k$)
Original Case	149	24.36
Upgrade Case	10	4.6

Solution to Top 15 Binding Constraints - 3

No.7: Kenosha to Lakeview 138 kV line
And
No.9: Plains Prairie to Zion 345 kV line

Proposed Solution: a new 345 kV line from Pleasant Prairie (ATCo) to Zion (ComEd).

Effect on No. 7 Constraint

	Binding Hours	Total Shadow Price (k$)
Original Case	431	21.38
Upgrade Case	0	0

Effect on No. 9 Constraint

	Binding Hours	Total Shadow Price (k$)
Original Case	1402	17.55
Upgrade Case	0	0

Solution to Top 15 Binding Constraints - 4

No.13: Falconer to Warren 115 kV line
Proposed Solution: an operation guide (open this line when it is an actual or post-contingency limit on the PJM RTO or NY-ISO operation)

No.14: Richland to Ridgeville 138 kV line
Proposed Solution: re-conductor this line, and increases its rating to SE 300 MVA and WE 330 MVA

	Binding Hours	Total Shadow Price (k$)
Original Case	183	9,.79
Upgrade Case	0	0

Solution to Top 15 Binding Constraints - 5

No.15: North Pana autotransformer

Proposed Solution: add a new transformer in this substation with the same parameters

	Binding Hours	Total Shadow Price (k$)
Original Case	519	9.25
Upgrade Case	0	0

Sensitivity Run Results

Three sensitivity cases are ran:

- **JCM Case:** MISO and PJM form a joint common market, i.e., there is no hurdle rate between MISO and PJM;
- **High Load Case:** 2011 load is 3% higher than the forecasted values;
- **High Gas Oil Price Case:** 2011 gas and oil prices are 20% higher than the forecasted values.

Sensitivity Run Results – LMP Spread

Calculate each area and regions' LMP % difference between sensitivity case and base case. If these %s are close for all areas and regions, then we can conclude that the base case and sensitivity case have the same LMP spread pattern.

	Range of % difference of area/region LMP
JCM Case to Base Case	from 0.14% to 1.91%
High Load Case to Base Case	from -6% to -4%
High Gas/Oil Price Case to Base Case	from-17.73% to -12.82%

Observation: All cases have the same LMP spread pattern.

Sensitivity Run Results - Top 15 Binding Constraints

From Bus Name	From Bus Number	To Bus Name	To Bus Number	Contingency Detail	Ranking of Binding Constraints: Base Case	JCM Case	High Load Case	High Gas/Oil Price Case
RIVMIN 1	31609	RIVMIN 2	31610	LUTESVIL 345-ST FRANC 345 1 (AMRN-AMRN)	1	2	1	1
17DUNACR	28027	17MCHCTY	28053	05DUMONT 765-WILTO; 765 1 (AEP-NI)	2	1	2	2
GALESBR5	64411	GALESBRG	32415	ELECT; B 345-NELSO; B 345 1 (NI-NI)	3	3	3	3
02GRNFLD	21581	02LAKVEW	21691	02BEAVER 345-02DAV-BE 345 1 (FE-FE)	4	4	4	4
17DUNACR	28027	17MCHCTY	28053	17DUNACR 138-17MCHCTY 138 1 (NIPS-NIPS)	5	5	5	5
NELSO; R	37039	NELSO;RT	37037	DIXON;7B 138-NELSO; B 138 1 (NI-NI)	6	6	6	7
KENOSH45	39345	LAKEVIEW	39362	ZION ; R 345-PLS PR2 345 1 (NI-WE)	7	8	7	6
GILSP TP	32298	LAC N TP	32291	COFFEEN 345-ROXFD IP 345 1 (AMRN-IP)	8	7	8	10
PLS PR2	38849	ZION ; R	36421	CHERR; R 345-SILVE; R 345 1 (NI-NI)	9	9	10	8
CRETE;BP	37646	17STJOHN	28013	05DUMONT 765-WILTO; 765 1 (AEP-NI) 17WOLFLK 138-SLINE; R 138 1 (NIPS-NI)	10	10	13	9
MAREN;RT	36953	P VAL; R	37119	CHERR; R 345-SILVE; R 345 1 (NI-NI)	11	12	9	11
05EUGENE	22663	BUNSONVL	32385	05BREED 345-CASEY 345 1 (AEP-AMRN)	12	11	14	14
WARREN	281	FALCONER	76527	NO OUTAGE	13	13	12	12
02RICHLN	21890	02RDGVL	21879	02 NAOMI 138-02RICHLD 138 1 (FE - FE) 02 NAOMI 138-02WAUSEO 138 1 (FE-FE)	14	15	11	15
PANA	31445	PANA	31446	COFFEN N 345-COFFEEN 345 1 (AMRN-AMRN)	15	14	16	13

Base case, JCM case and high gas/oil price case have the same Top 15. High load case and Base case have the same Top 14.

- Questions
- Comments