



2007-09  
Long Term Access Goal  
Year End Discussion

Prior to ATC Board of Directors Meeting

1/30/2008

Draft 4 SME





# Agenda

- Review 2007-09 Long Term Goal
- Identify New Project Candidates
  - Project Analysis
- Regulatory Approval and Implementation
- Projects In Service in 2007
  - Results and Benefits
- Market Review for 2007
  - Locational Marginal Prices
  - ATC Constraints
  - ATC Market Flows – 2007 Imports, Exports and Bias
- Conclusions

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## 2007-09 Long Term Goal Access (10%)

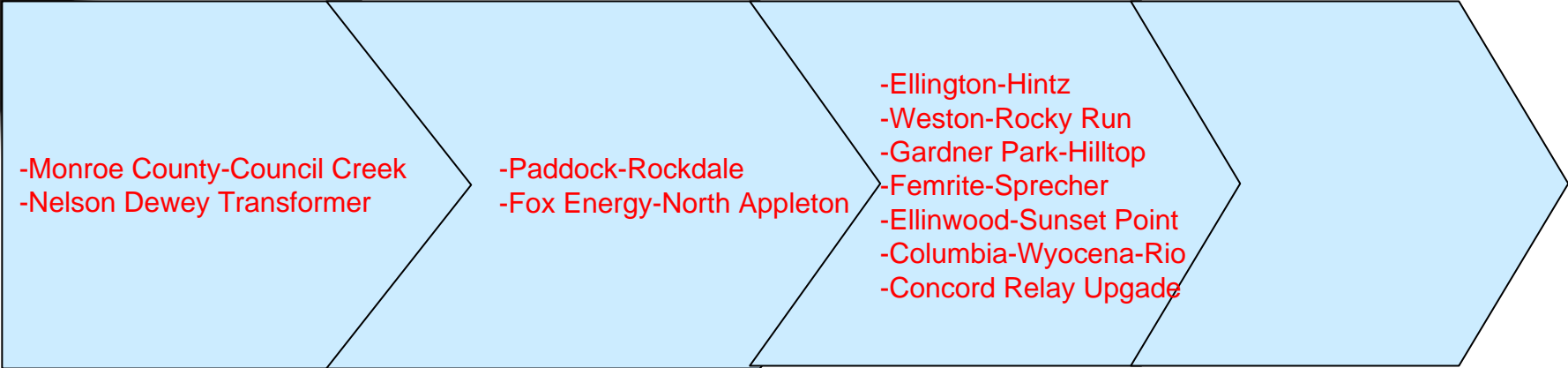
- Reduce congestion in ATC footprint as measured by Expected Net Ratepayer Benefits\*
  - i. In connection with each annual 10-year plan, identify new projects that reduce congestion costs.
  - ii. Prioritize projects and implement or seek regulatory approval, as appropriate.
  - iii. Annually calculate the net rate payer benefit for projects placed in service during the year.
  - iv. Annually review the market and LMP levels with the Board of Directors to place ATC's performance in market context.
  - v. Aggregate performance over the three-year cycle for assessment by the Board of Directors.

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• *\*Measured on an ex-ante basis*

# Project Process Pipeline

For Economics of Transmission Projects



Identify &  
Analyze

Approval &  
Implementation

In – Service  
(Evaluate  
Results  
& Benefits)

Market  
Impacts

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# Identify and Analyze New Projects

- Projects Currently Under Evaluation
  - Monroe County – Council Creek 138kV
  - Nelson Dewey Transformer 138 – 161kV
- Process Improvements
  - Economic Planning Section
  - Screening and prioritizing economic projects
  - Stakeholder-specified economic studies

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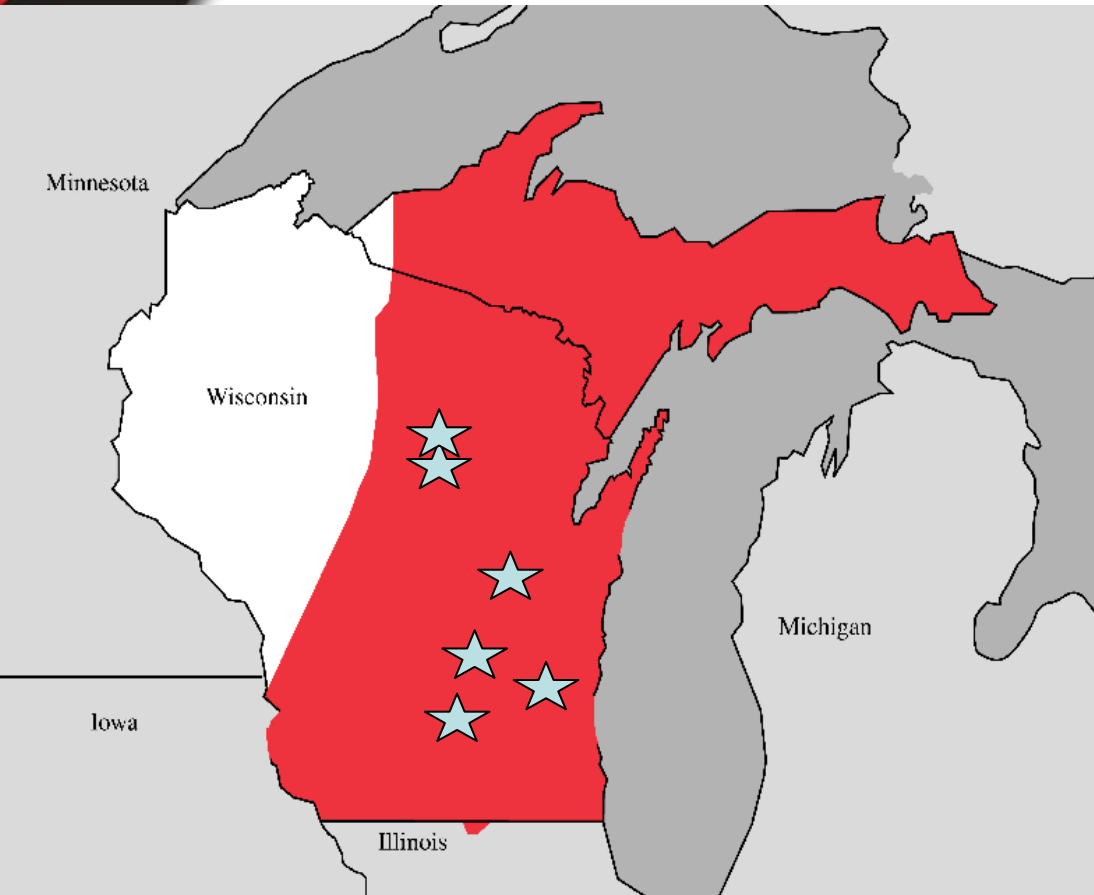


# Approvals and Implementation

- Paddock – Rockdale 345kV
  - Project identified in Access docket. CPCN filed and pending with the PSCW. In-Service 2010
- Fox Energy – North Appleton 345kV
  - Flow constraint identified in Winter 2006-07. Project design complete: scheduled for construction in Spring 2008
- Ellington – Hintz 138kV

**DRAFT** – East – West flow constraint identified in

# Results of In-Service Projects



- Projects were justified by Reliability Needs
- Projects also provided \$2.5 Million in 2007 economic benefit
  - Caveats
- Based on projection of 2007 savings, approximately 50% of project costs are offset by previously unvalued savings.

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# 2007 Project Analysis

## Economic Benefit of Reliability Projects

*Table 1: Present Value Benefit of 2007 Reliability Projects*

Benefits Metric	PV of Savings
APC <sup>1</sup>	\$7,453,302
70/30 <sup>2</sup>	\$41,493,522

1. APC = Adjusted Production Cost
2. 70/30 = 70% Adjusted Production Cost and 30% Load-Weighted LMP

*Table 2: Completed 2007 Projects Included in this Analysis<sup>1</sup>*

unding Project No.	Description	Total Expenditure (Sum of YOC Costs)
0833	Gardner Park - Hilltop	\$23,757,155
1241	Dane Co. Reliability Project	\$19,666,610
1393	Columbia-Wyocena-Rio New 69 kV line	\$7,029,070
1700	T-20 Install Cond and OPGW PH 2	\$10,895,977
1994	Concord Line 9042 Relay Upgrade	\$1,306,269
1353	Ellinwood-Sunset Point	Estimate - \$6,260,020
<b>TOTAL EXPENSES FOR PROJECTS LISTED</b>		<b>~ \$68,915,101</b>

1. See Appendix A for the list of assumptions used to determine projects for inclusion.

*Table 3: Present Value Customer Cost of 2007 Reliability Projects*

PV of Customer Costs
\$83,895,046

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## 2007 Market Review

- Portfolio of metrics
  - LMP Differentials into ATC
    - Annual
    - Monthly
  - Constraint hours
  - Top ten constrained elements

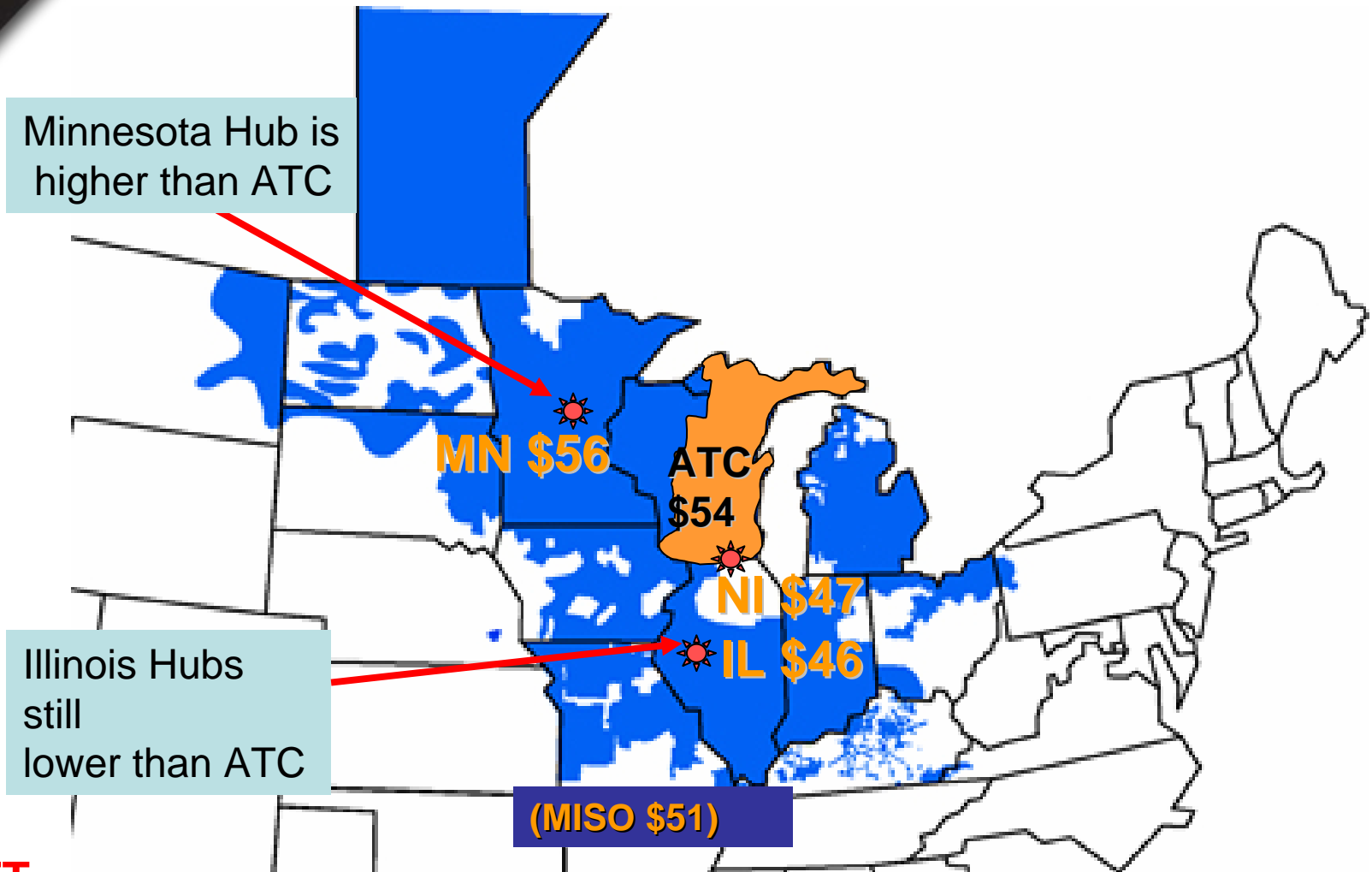
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# Market Review

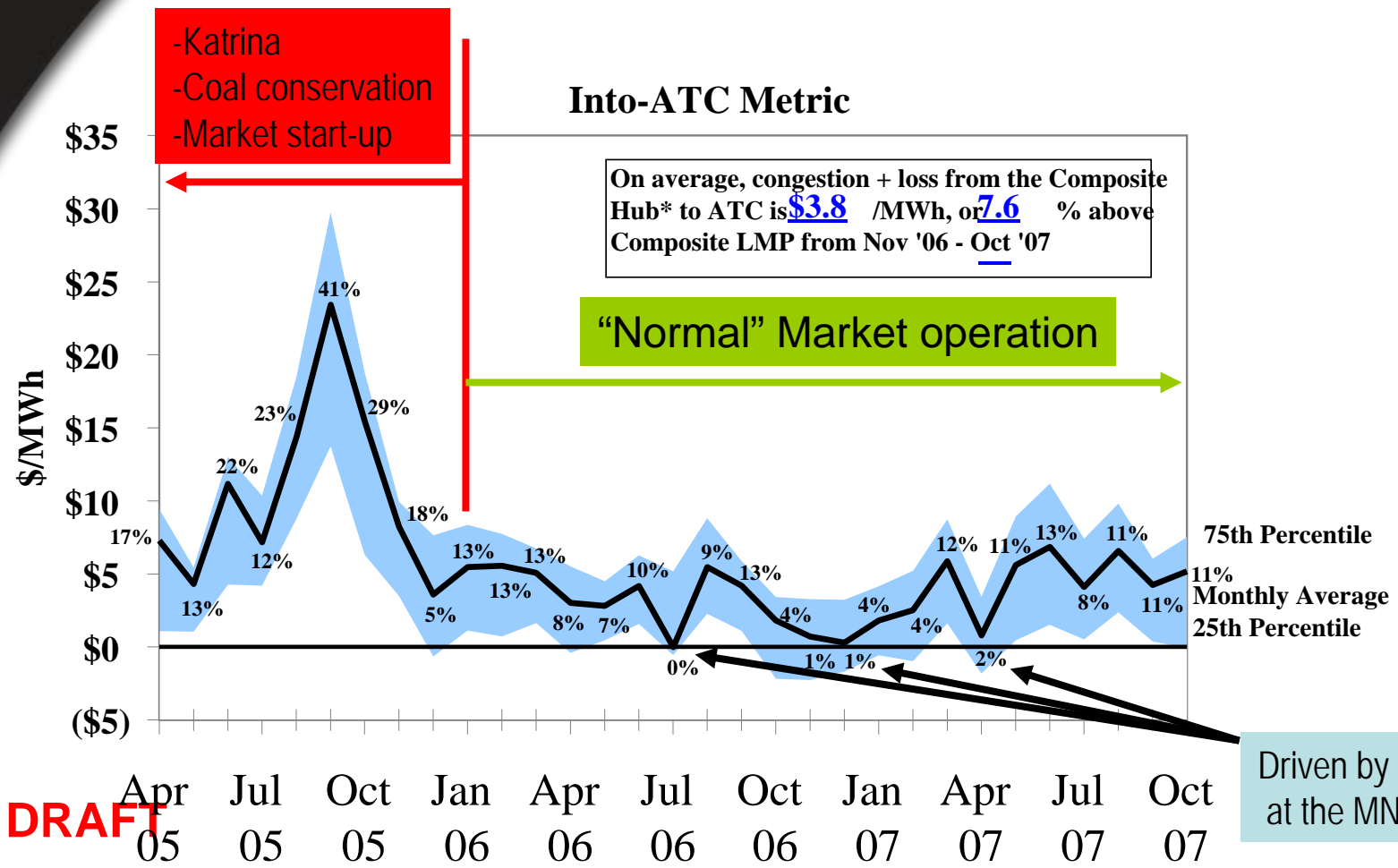
LMP Averages for ATC and Neighboring Hubs

Nov 06 to Oct 2007



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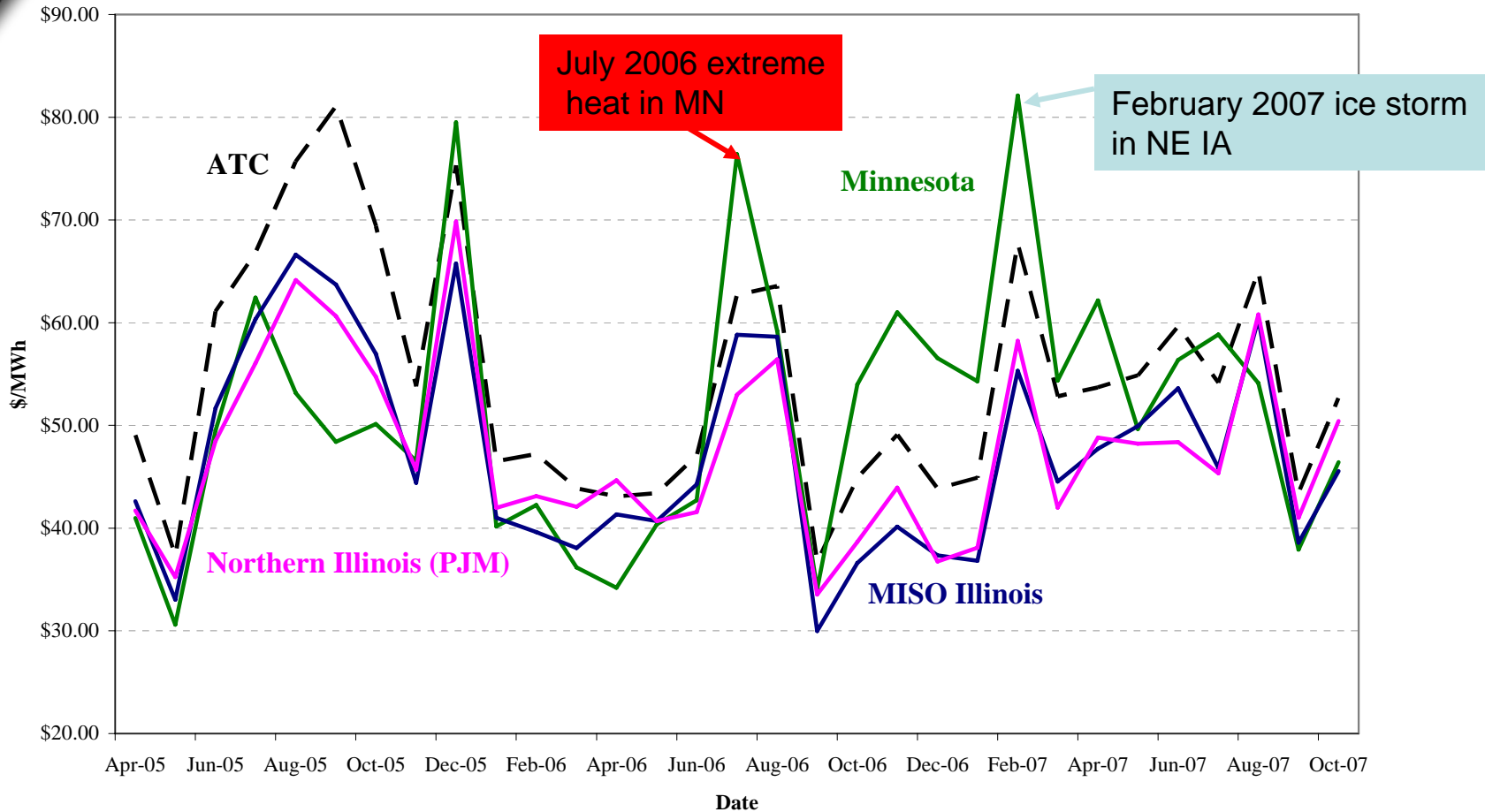
# Into-ATC LMP Differentials



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# Monthly Weighted Average LMP Comparison

Comparison of Load Weighted Average Day-Ahead LMPs between ATC, Northern Illinois (PJM), MISO Illinois, and Minnesota

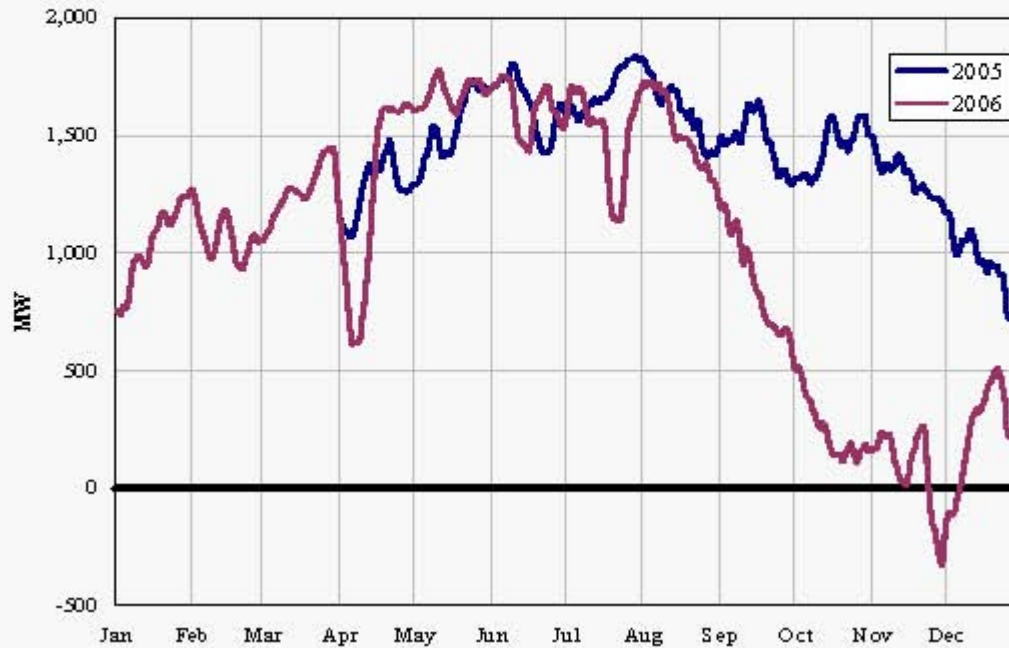


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# Figure 2: Manitoba Hydro Imports

## Moving Average of Net Imports from Manitoba 2005 and 2006



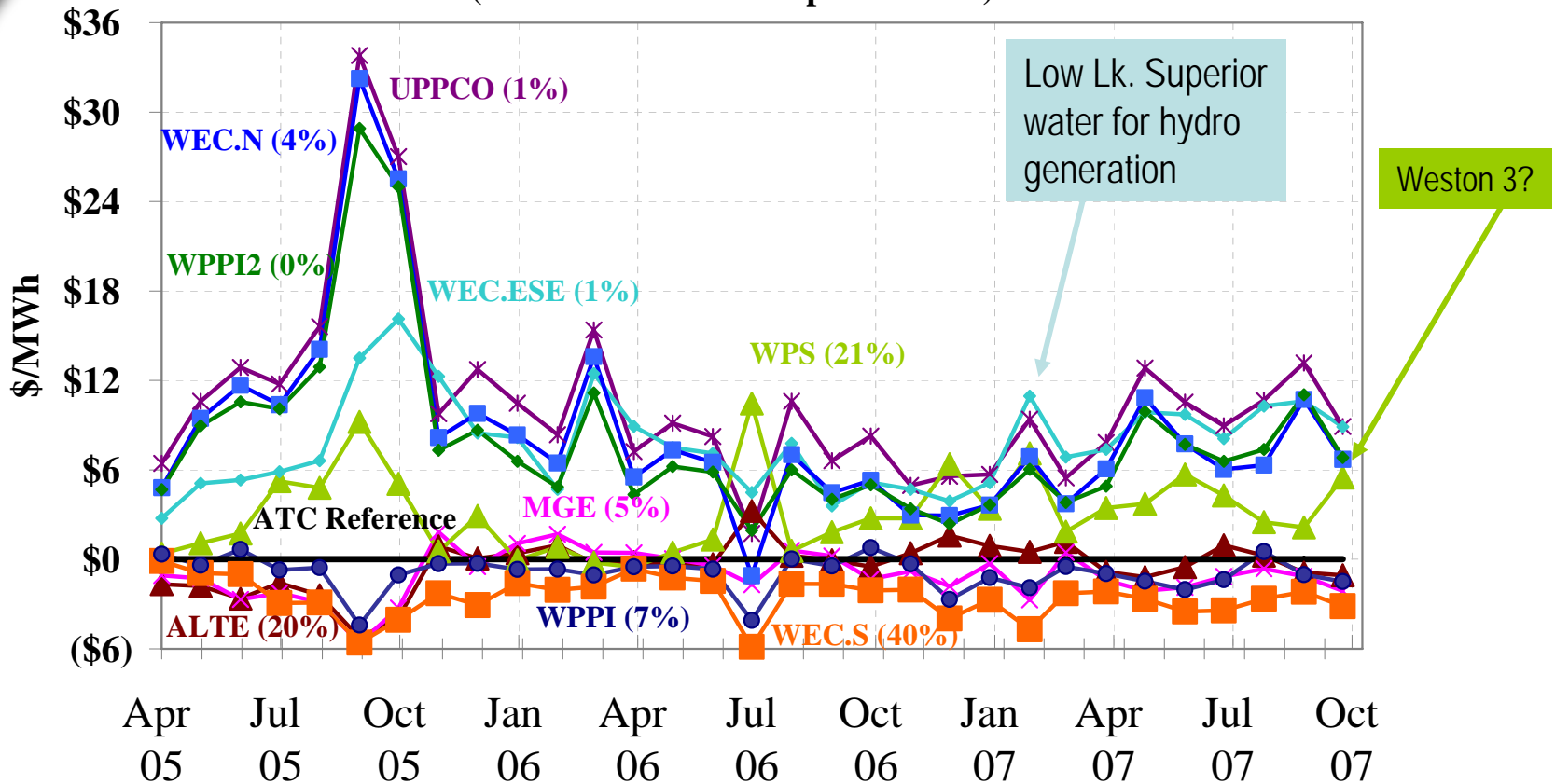
Source: 2006 State of the Market Report, Midwest ISO, May 2007, p.203

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# Zonal LMP Differentials to ATC Reference

LMP Differentials Among Zones Within ATC  
(Load MWh shares in parentheses)

Day-Ahead



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# Market Review

## 2007 ATC Top Ten Congested Elements

#3 Hintz – Werner  
#4 Ellington – Hintz  
#8 N Appleton – Werner West  
Weston Unit 4 (2008)  
Gardner Park – Hwy 22 (2009)

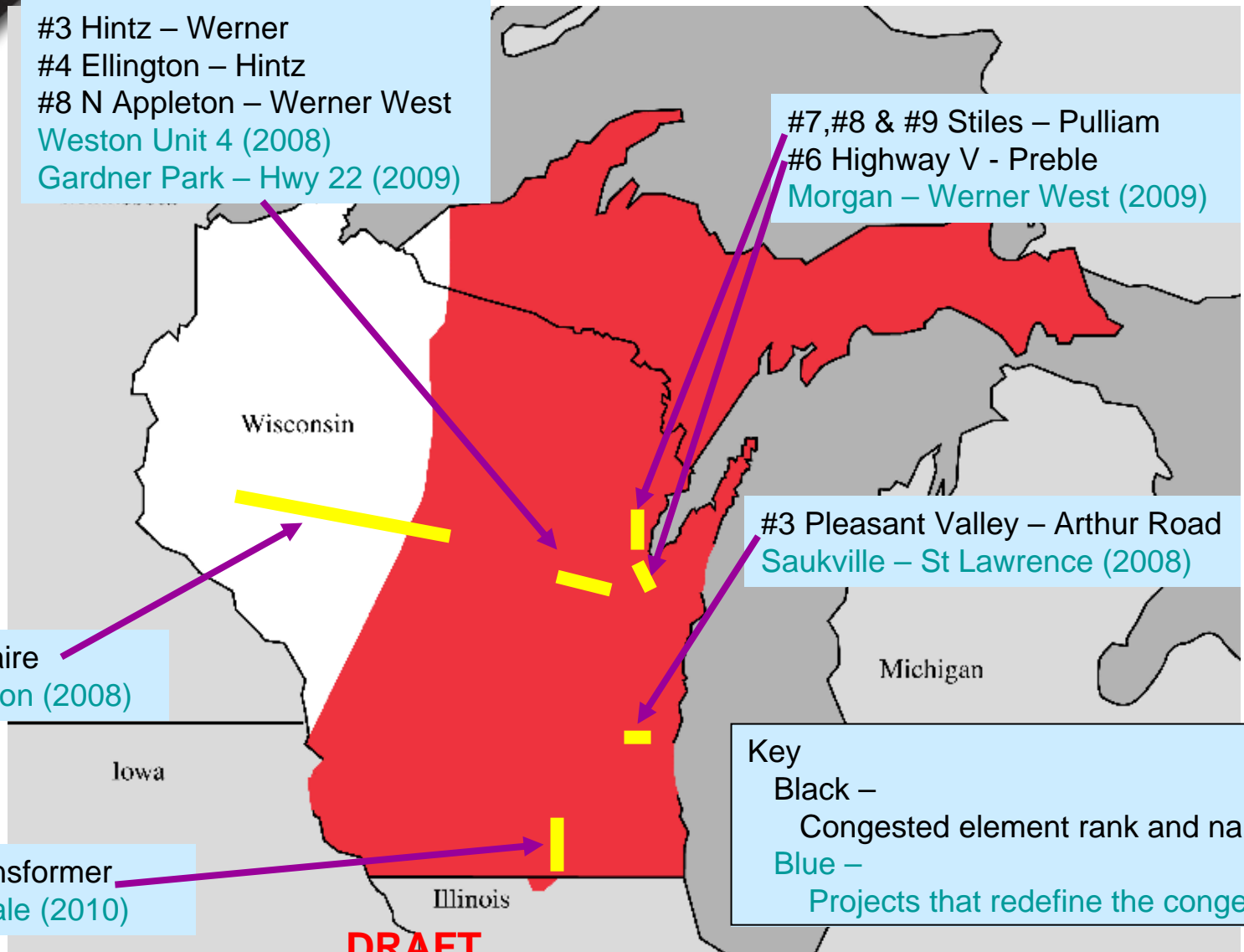
#7, #8 & #9 Stiles – Pulliam  
#6 Highway V - Preble  
Morgan – Werner West (2009)

#3 Pleasant Valley – Arthur Road  
Saukville – St Lawrence (2008)

#2 Arpin – Eau Claire  
Arrowhead – Weston (2008)

#1 Paddock Transformer  
Paddock-Rockdale (2010)

Key  
Black –  
Congested element rank and name  
Blue –  
Projects that redefine the congestion



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# 2007 ATC Top Ten Constrained Elements

January - December

Number of hours in which this constraint occurred	Constraint (DA Market)	Sum of Abs. Values of Shadow Prices
<b>11241</b>	<b>Total for all ATC Day Ahead constraints 1-1-2007 thru 12-31-2007</b>	<b>\$460,072.35</b>
1999	Paddock 345/138 kV Transformer T21 flo Wempletow n - Rockdale 345 kV	\$67,996.32
1409	Eau Claire - Arpin 345 kV	\$55,278.08
648	Hintz - Werner 138 kV flo North Appleton - Werner West 345 kV	\$46,541.00
523	Ellington - Hintz 138 kV flo North Appleton - Werner West 345 kV	\$43,654.23
290	Pleasant Valley - Arthur Rd 138 kV flo Saukville - Barton 138 kV	\$43,249.55
661	Highway V - Preble 138 kV flo Lost Dauphin - Red Maple 138 kV	\$22,782.43
529	Stiles - Pulliam 138 kV (64441) flo Stiles - Pulliam 138 kV (64451)	\$14,465.91
326	North Appleton - Werner West - Rocky Run 345 kV	\$13,171.41
441	Stiles - Pulliam 138 kV (64451) flo Stiles - Pulliam 138 kV (64441)	\$11,051.99
292	Stiles - Pulliam 138 kV (64451) flo Morgan-White Clay 138 kV	\$8,573.31

**7118 = Total number of Top Ten Constraint hours (63%)**

## Summary

- Total number of constraints = 112
- Top-Ten Constraint Projects also address all other constraints over 100 hours (50 additional constraints)
- Remaining constraints may approach the NCA designation threshold of 500 constrained hours

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# Constraint Hours in 2005, 2006 and 2007

	Day Ahead Hours	Real Time Hours
2005	10,969	4,261
2006	10,490	2,922
2007	11,241	2,697
AVG	10,900	3,293

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# Import/Export Profile

ATC Interface Information													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YTD
<b>ATC Net Import/Export</b>													
Average Hourly Import	1,125 MW	1,427 MW	1,774 MW	1,063 MW	1,232 MW	1,447 MW	1,437 MW	1,097 MW	1,239 MW	881 MW	1,134 MW	1,091 MW	<b>1,315 MW</b>
Average Hourly Export	215 MW	0 MW	0MW	213 MW	193 MW	178 MW	53 MW	300 MW	303 MW	114 MW	152 MW	49 MW	<b>239 MW</b>
% Import Hours	99%	100%	100%	99.3%	99.2%	97.4%	99.9%	96.2%	99.6%	98%	99.7%	99.2%	<b>98.9%</b>
% Export Hours	1%	0%	0%	0.7%	0.8%	2.6%	0.1%	3.8%	0.4%	2%	0.3%	0.8%	<b>1.1 %</b>
Max Hourly Import (MW)	2,146	2,764	2,941	2,418	2,357	2,509	2,564	2,344	2,271	1,760	2,585	2,038	<b>2941</b>
Max Hourly Export (MW)	433	0	0	304	344	834	53	672	448	285	168	110	<b>834</b>
<b>Northeast (MI) Interface</b>													
% Import Hours	86%	99.4%	87.8%	98.5%	90.4%	82.4%	87.4%	79.5%	80.4%	75.4%	75.6%	87.9%	<b>85.8%</b>
% Export Hours	14%	0.6%	12.2%	1.5%	9.6%	17.6%	12.6%	20.5%	19.6%	24.6%	24.4%	12.1%	<b>14.2%</b>
Max Hourly Import (MW)	93	105	97	95	100	105	90	89	82	93	99	98	<b>105</b>
Max Hourly Export (MW)	26	13	29	4	23	34	31	36	40	40	36	37	<b>40</b>
<b>Southern (IL) Interface</b>													
% Import Hours	98.9%	100%	100%	96.4%	92.7%	91.1%	97.3%	81.2%	96.5%	76%	92.2%	94%	<b>93%</b>
% Export Hours	1.1%	0%	0%	3.6%	7.3%	8.9%	2.7%	18.8%	3.5%	24%	7.8%	6%	<b>7%</b>
Max Hourly Import (MW)	2,146	2,374	2,423	1,979	2,026	2,102	2,131	1,785	1,720	1,332	2,005	1,852	<b>2,423</b>
Max Hourly Export (MW)	320	0	0	826	697	1,088	555	893	568	888	396	426	<b>1,088</b>
<b>Western (MN) Interface</b>													
% Import Hours	55.6%	66.0%	87.5%	88%	93.9%	98.1%	88.3%	95.8%	99.7%	100%	96.5%	95%	<b>88.8%</b>
% Export Hours	44.4%	34.0%	12.5%	12%	6.1%	1.9%	11.7%	4.2%	0.3%	0%	3.5%	5%	<b>11.2%</b>
Max Hourly Import (MW)	682	642	936	870	984	1,089	1,077	1,029	1,060	1,073	746	766	<b>1,089</b>
<b>Max Hourly Export (MW)</b>	<b>466</b>	<b>368</b>	<b>301</b>	<b>292</b>	<b>333</b>	<b>110</b>	<b>356</b>	<b>106</b>	<b>56</b>	<b>0</b>	<b>250</b>	<b>187</b>	<b>466</b>

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# Discussion

- Reliability projects have contributed significant economic benefit
- LMP prices external to ATC continue to be lower than within ATC
  - The Minnesota Hub has shown more volatility than the Illinois hubs
- The top ten congested elements in ATC will be substantially ameliorated by 2010
- ??
- ??

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