

Paddock-Rockdale Need Analysis Results

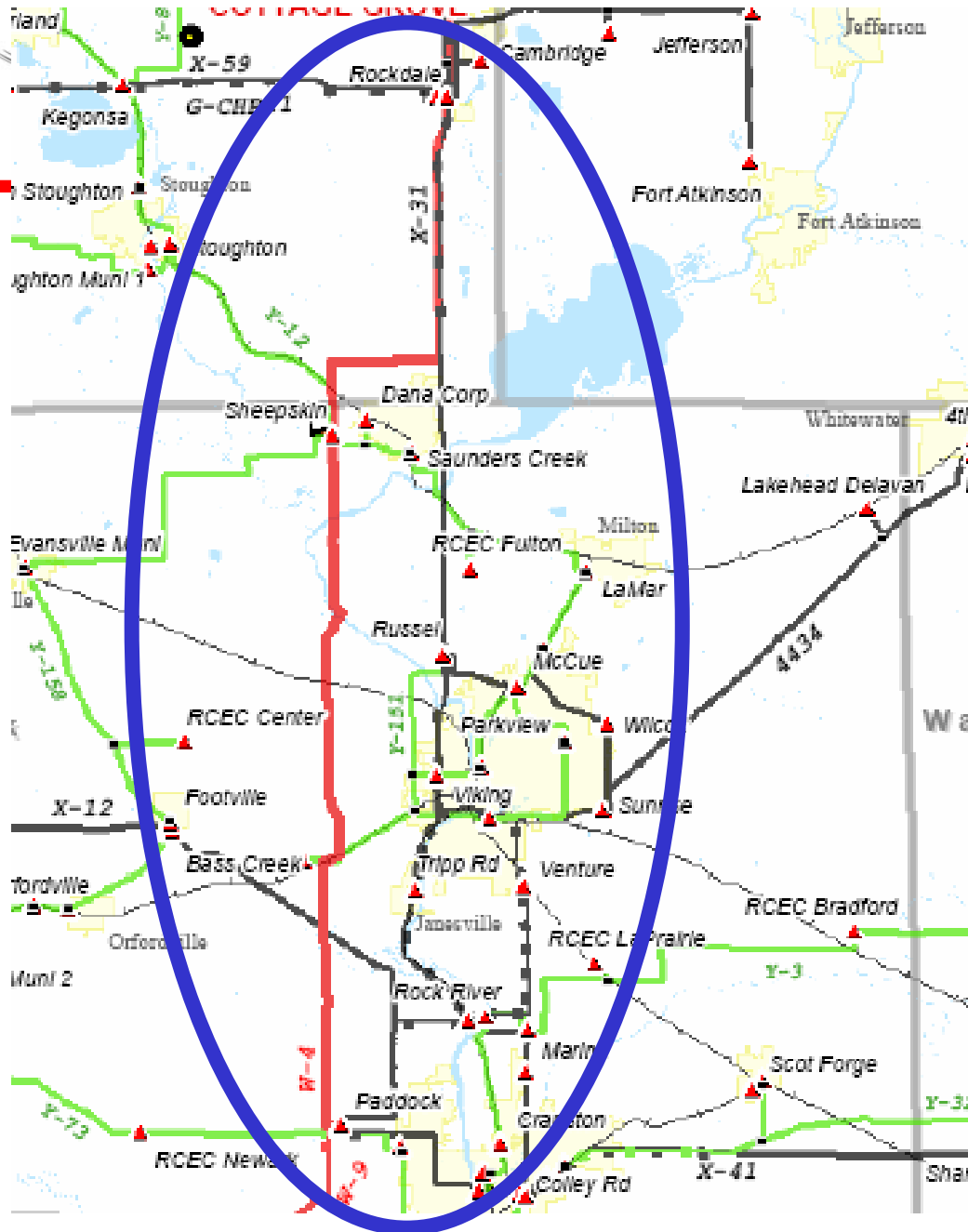
Stakeholder Presentation

September 25, 2006

Updated: September 26, 2006

- ATC staff has recommended conceptual approval of project scope and are proceeding with authorization of Paddock Rockdale 345kV Access Project to be in-service on June 1, 2010

Project Map Study Area



Project Package

- Add 345 kV circuit to existing W4 345kV Paddock Rockdale line
- Replace the Rockdale transformer
- Upgrade the Portage-Trienda 138kV line to increase capacity



Existing Line Rating

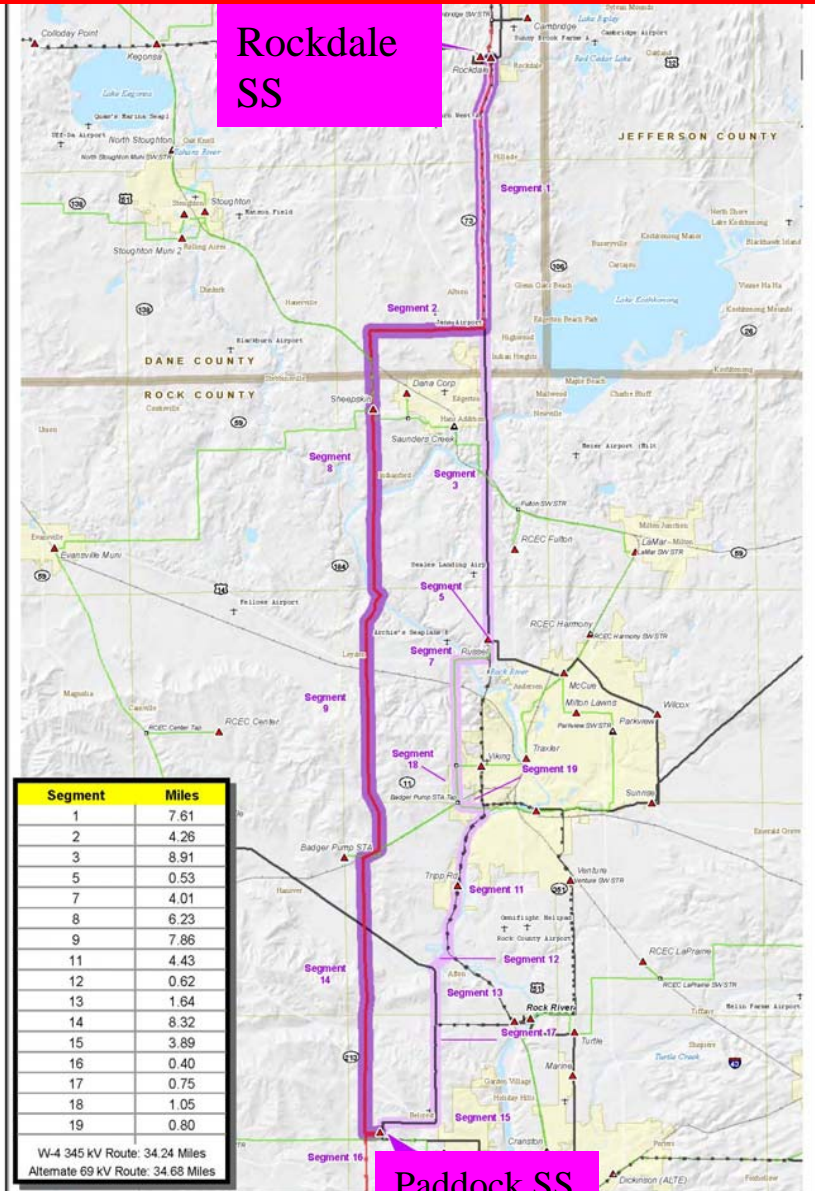
- 1214MVA, 181°F

Install Date of the Line

- 1975

Proposed and Alternate Routes

-  Proposed Route
-  Alternate Route



- Designed analysis to comply with PSCW Staff suggestions and serve as template
- Met with numerous stakeholders to test our analytical approach
- Used Strategic Flexibility approach
- Created and analyzed seven plausible futures
 - Robust Economy
 - With North LaCrosse to Columbia line
 - Without North LaCrosse to Columbia line
 - High Generation Retirements
 - High Environmental Regulations (CO2 tax)
 - Slow Growth
 - Fuel Supply Disruption
 - High Growth Wisconsin

Paddock-Rockdale Brief Process Review (cont)

- Modeled energy cost savings using PROMOD model
 - Analyzed two model years: 2011 and 2016
 - Used results to calculate cost savings over life of project
 - Each future run with and without Paddock-Rockdale
 - Calculated three metrics
 - Adjusted Production Cost (APC)
 - Load-weighted Locational Marginal Prices (LLMP)
 - RECB II metric (70/30) – 70% APC and 30% LLMP
- Compared benefits to cost estimates for different in-service dates (2010, 2011, 2013)
- Still estimating dollar value of “Other Benefits”

- Load growth inside and outside ATC footprint
- Availability of low-cost generation in Wisconsin
- Amount and source of renewable energy consumed in Wisconsin
- Nearby EHV transmission projects
- Natural gas, coal and fuel oil prices
- Availability of coal in Wisconsin
- Environmental regulations
- Availability of low cost-generation in MISO, ComEd

Futures Information

Assumptions in All Futures

2011

- Generation
 - 1200MW Oak Creek Expansion
 - 500MW Weston 4
 - 600MW Port Washington CC CT
- Transmission
 - Northern Umbrella Projects
 - Plains to Stiles
 - Cranberry Conover Plains
 - Arrowhead Weston
 - Gardner Park – Central Wisconsin
 - Morgan Werner West
 - Oak Creek Expansion Interconnection

2016

- Transmission
 - New Rockdale - West Middleton 345 kV line
 - New West Middleton -North Madison 345 kV line
 - New Huiskamp to Blount 138 kV and 69 kV lines
 - Spring Green to West Middleton 69 kV conversion to 138 kV

New Nelson Dewey Plant

- 2011 – Included in Robust Economy, High Environmental and Fuel Supply Disruption
- 2016 – Included in all futures except High Retirements

- **Robust Economy With** – high economic and energy growth, high amount of low-cost generation in Wisconsin, medium environmental, mid-high fuel prices, LaCrosse to Columbia line is built, 4,000-6,000 MW mine-mouth coal campus built in central Illinois
- **Robust Economy Without** – LaCrosse to Columbia line is not built
- **High Retirements** – mid-level economy and energy growth, large number of retirements, mid-level environmental, fuel prices vary, mid-level generation built outside Wisconsin
- **High Environmental** – medium economic growth, low-mid energy growth, coal retirements replaced by Nelson Dewey plant, Kyoto environmental, varying fuel prices, generation scenario reflecting \$44/ton CO₂ tax

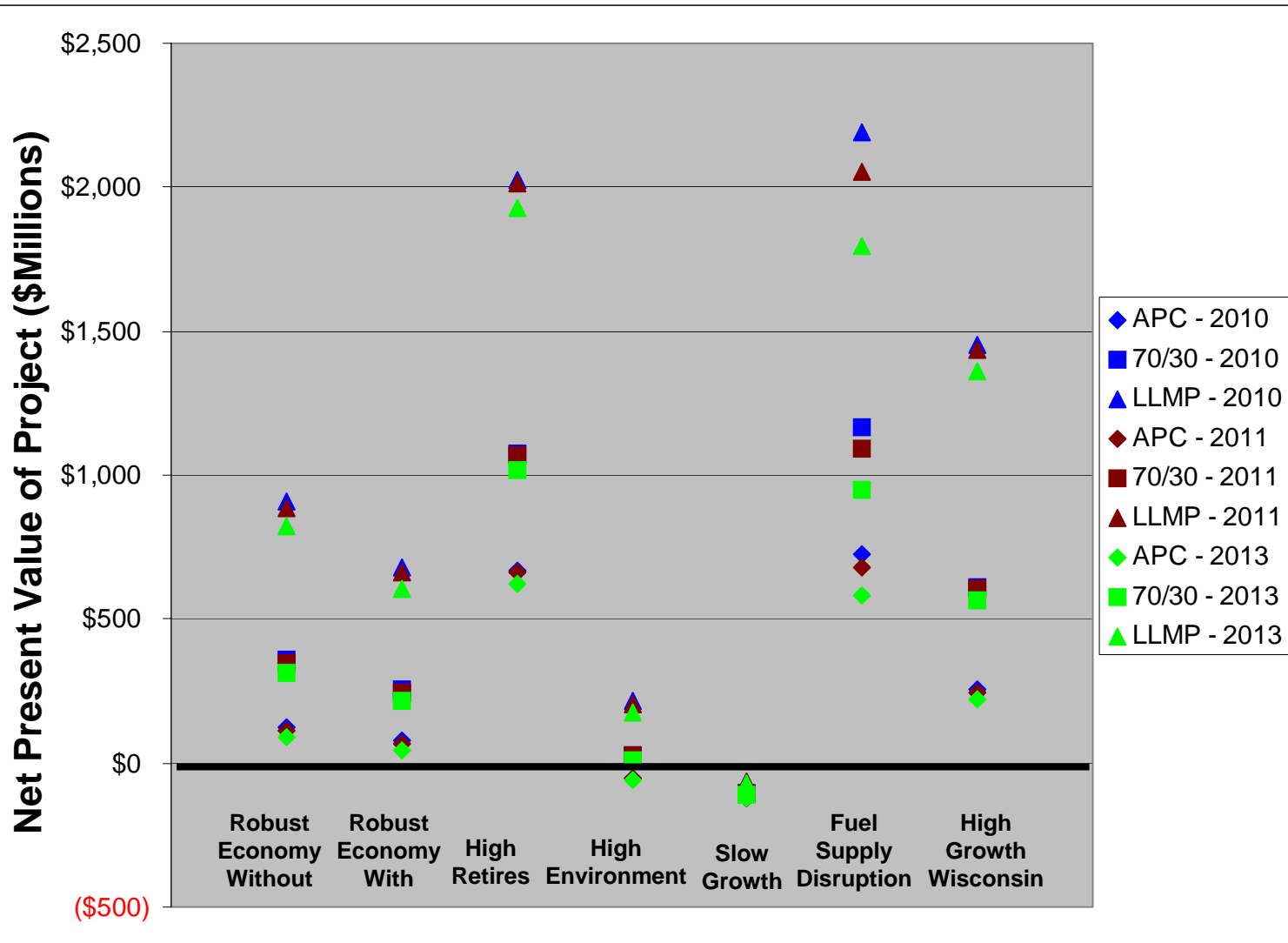
- **Slow Growth** – low economic and energy growth, some coal retirements, low environmental, low-mid fuel prices, low level generation built outside Wisconsin
- **Fuel Supply Disruption** – natural gas supply disrupted, low-mid economic and energy growth, high level of new coal generation, additional use of coal generation creates coal availability problems, high fuel prices, mid-high environmental, 3,750 MW mine-mouth coal campus built in central Illinois
- **High Growth Wisconsin** – economic development creates high economic and energy growth in Wisconsin while surrounding areas are mid-low economic and energy growth, some coal retirements and Nelson Dewey is built, mid-level environmental, mid fuel prices, mid-level generation built outside Wisconsin

- Energy Cost Savings from PROMOD
 - Adjusted Production Cost
 - Load-weighted LMP
 - RECB II proposed measure = 70% Production Cost + 30% Load-weighted LMP

 - Total cost to customers under existing regulatory regime and market structure:
 - Cost of supply at load LMP
 - Minus: LMP revenues to utility
 - Plus: cost of utility generation
 - Minus: FTR revenues to utilities
 - Will be calculated for filing

Net Present Value

PROMOD Benefits Less Project Costs



- ✓ **APC** – Adjusted Production Cost
- ✓ **70/30** – 70% Adjusted Production Cost + 30% Load-Weighted Locational Marginal Price
- ✓ **LLMP** – Load Weighted Locational Marginal Price



Net Present Value PROMOD Benefits less Project Costs

	Robust Economy - No LaCrosse to Columbia	Robust Economy with LaCrosse to Columbia	High Retirements	High Environmental	Slow Growth	Fuel Supply Disruption	High Growth Wisconsin
2010 In-Service Date (\$ Millions)							
Adjusted Production Cost	\$123	\$76	\$670	(\$51)	(\$123)	\$727	\$253
70% APC + 30% Load LMP	\$359	\$258	\$1,077	\$29	(\$106)	\$1,165	\$613
Load LMP	\$910	\$682	\$2,026	\$217	(\$66)	\$2,189	\$1,452
2011 In-Service Date (\$ Millions)							
Adjusted Production Cost	\$115	\$68	\$662	(\$52)	(\$121)	\$678	\$247
70% APC + 30% Load LMP	\$347	\$246	\$1,067	\$26	(\$104)	\$1,090	\$603
Load LMP	\$888	\$661	\$2,013	\$207	(\$65)	\$2,053	\$1,435
2013 In-Service Date (\$ Millions)							
Adjusted Production Cost	\$91	\$45	\$623	(\$61)	(\$124)	\$581	\$222
70% APC + 30% Load LMP	\$311	\$213	\$1,015	\$11	(\$108)	\$946	\$564
Load LMP	\$825	\$604	\$1,930	\$178	(\$72)	\$1,798	\$1,363

- Increased Competitiveness
 - Reviewed changes in structural measurements of market power
 - Residual Supplier Index (RSI)
 - Pivotal supplier hours
 - Estimated economic value of increased competitiveness through three alternative approaches
 - Cal ISO
 - Tabors study
 - Independent Market Monitor approach
 - Estimated value under lower levels of market-based generation to reflect a cost-of-service environment
 - Will also review changes in Herfindahl-Hirschman Index (HHI)

- Change in FTR value
 - Additional FTR Value on Imports from Illinois
 - Increase in Available FTRs * Hourly Outside-WUMS Congestion Price Differentials
 - Change in Existing Import FTR Value
 - Existing Import FTRs (MWs) * Hourly Congestion Price Differentials
 - Change in Existing WUMS Internal FTR Value
 - Existing Internal FTRs (MWs) * Hourly Congestion Price Differentials
- Long Term Resource Cost Advantage of Imports
 - Total cost advantage of being able to source supply from outside resources (including capital and fuel costs) net of import related congestion costs
 - Limited by amount of increased simultaneous import capability created by Paddock-Rockdale
 - Increase in simultaneous import capability estimated at 222 MWs

- Losses
 - Capacity
 - Reduction in capacity needed due to reduction in losses * MWs valued at CT price
 - Estimated capacity reduction approximately 7 MWs
 - Energy
 - Internal generation for internal load * Marginal Loss Differentials from PROMOD * 0.5 MISO adjustment
- Reliability
 - Impacts for this project are not a driver
- Emissions
 - Emissions impacts across the MISO-PJM footprint are insignificant

- Price Risk Mitigation (Insurance Value)
 - Paddock-Rockdale can partially insure against “the worst” occurrence on the system as well as different market-based futures
 - Developing “insurance sensitivities” based on prior experiences
 - Estimating the “severity” and “frequency” of these events
- Liquidity
 - Developing a qualitative discussion of the benefits of PR2 on liquidity within WUMS and in gaining access to liquid trading hubs outside WI

Net Present Value Other Benefits (Preliminary)

2010 In-Service Date (2006 \$ Millions)

	Robust Economy - With LaCrosse to Columbia	High Retirements	High Environment	Slow Growth	Fuel Supply Disruption	High Growth Wisconsin
Competitiveness	\$10	\$10	\$9	\$9	\$9	\$8
Change In Value of Firm						
Transmission Rights	N/A	N/A	N/A	N/A	N/A	N/A
Long-Term Resource Cost						
Advantage of Imports Value	(\$15)	\$28	\$29	\$93	\$8	\$68
Reduced Line Losses	\$18	\$16	\$28	\$13	\$19	\$16

Other Benefits Not Included

- Change in the Value of Firm Transmission Rights – refining the analysis
- Reliability benefits – impacts from this project are insignificant
- Emissions - over the MISO-PJM footprint, the emissions change is effectively zero
- Insurance Value – refining the analysis

Description	Cost
Rebuild the existing 35 mile partial double circuit 345/138 kV Rockdale-Paddock line to double and triple circuit	\$102.7 M
Rockdale Substation – Breaker and a half configuration, replace 5 overdutied breakers and replace existing transformer with 500 MVA	\$ 12.3 M
Christiana Substation – Replace 5 overdutied breakers	\$ 1.1 M
Paddock Substation – Upgrade protection system and use existing breaker position	\$ 0.3 M
Environmental Impact Fee	\$ 6.4 M
Congestion costs	\$ 3.2 M
Total Project Cost In Service June 1, 2010 (2010\$) Approval Requested for June 1, 2010 In-Service Date	\$126.0 M
Total Project Cost In Service June 1, 2011 (2011\$)	\$133.0 M
Total Project Cost In Service June 1, 2013 (2013\$)	\$150.2 M

- Go/No go decision
 - Explain rationale for decision
- Go decision
 - Refine analysis
 - Perform insurance analysis
 - Finalize Other Benefits
 - Calculate energy savings to ratepayers
 - Project Authorization by ATC Board of Directors
 - Prepare and file CPCN

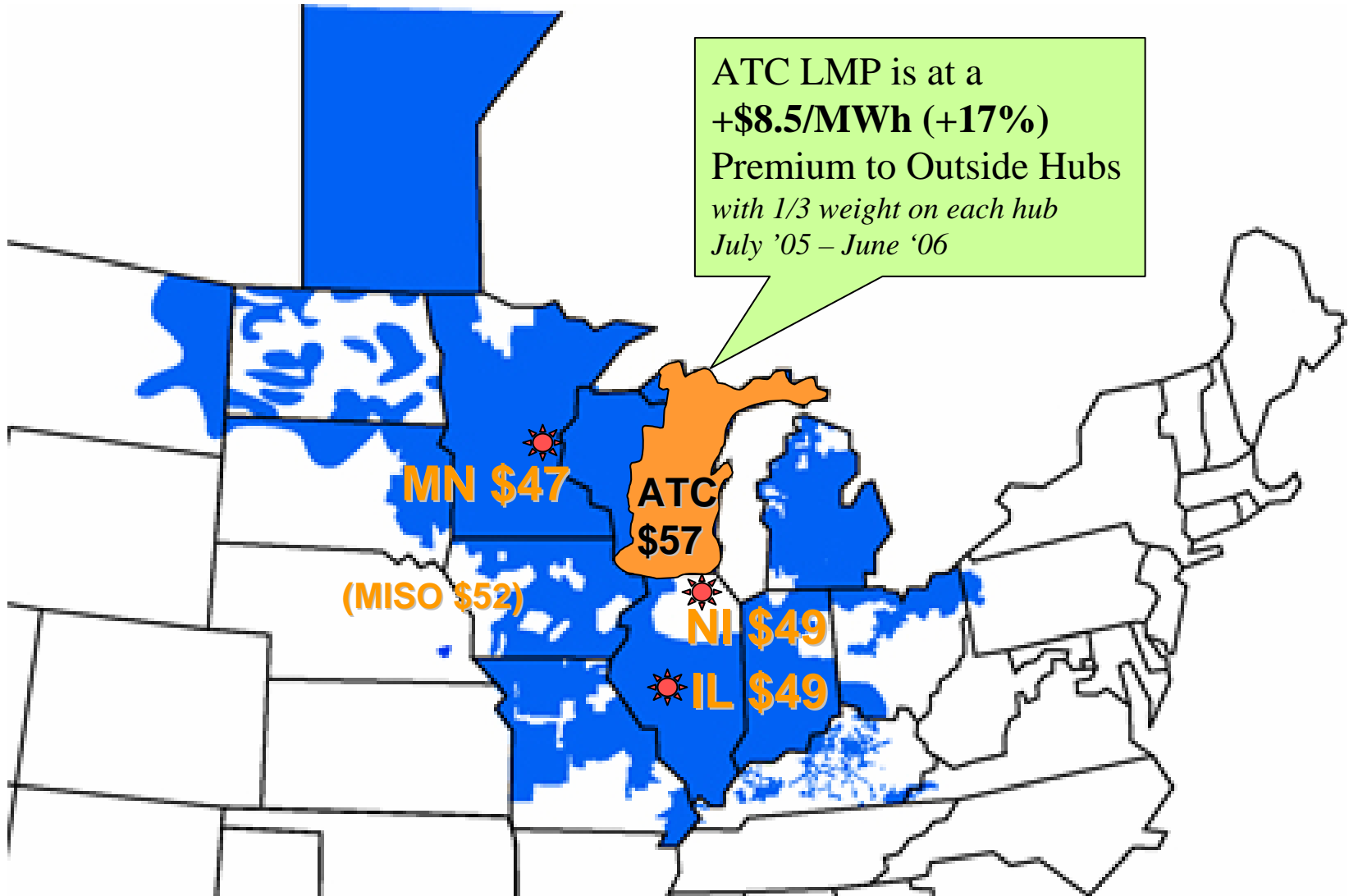
- Note: This presentation is in the form of a preliminary draft or status report for purposes of presentation to interested stakeholders.

ATC continues to review and evaluate this project, and reserves the right to add to, amend, or delete any of this information in subsequent presentations regarding this project. Some of the material in this presentation is based upon proprietary and confidential business information and upon data and analysis provided by expert consultants retained by ATC counsel. ATC reserves the right to claim that this information is confidential and/or subject to the attorney-client work-product privilege.

Impact of Paddock-Rockdale on Future LMP Differentials Inside and Outside ATC

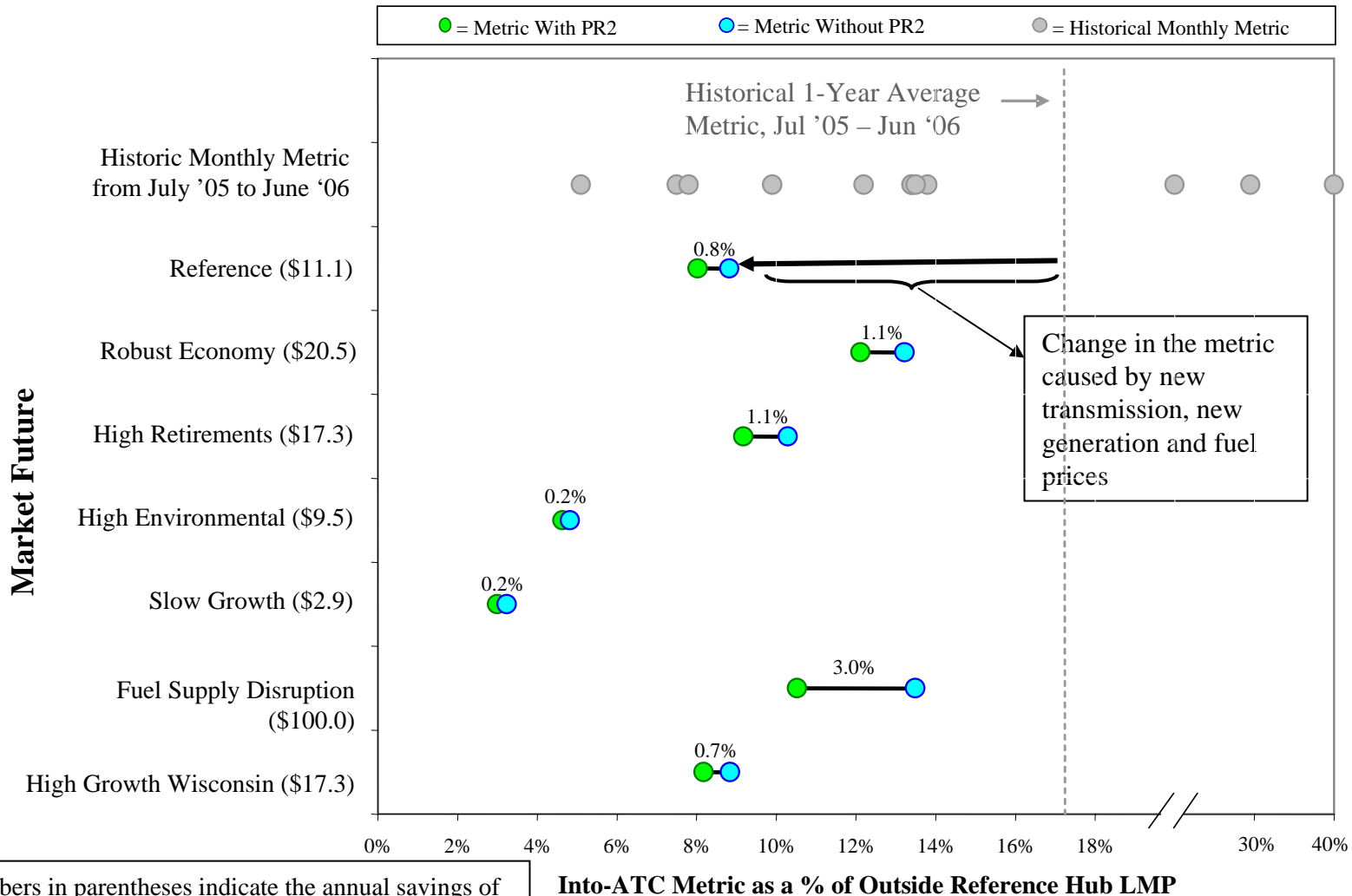
Into-ATC Metric: LMP Premium to Neighboring Hubs

ATC LMP is at a
+\$8.5/MWh (+17%)
Premium to Outside Hubs
with 1/3 weight on each hub
July '05 – June '06



Into-ATC Metric in 2011 (%)

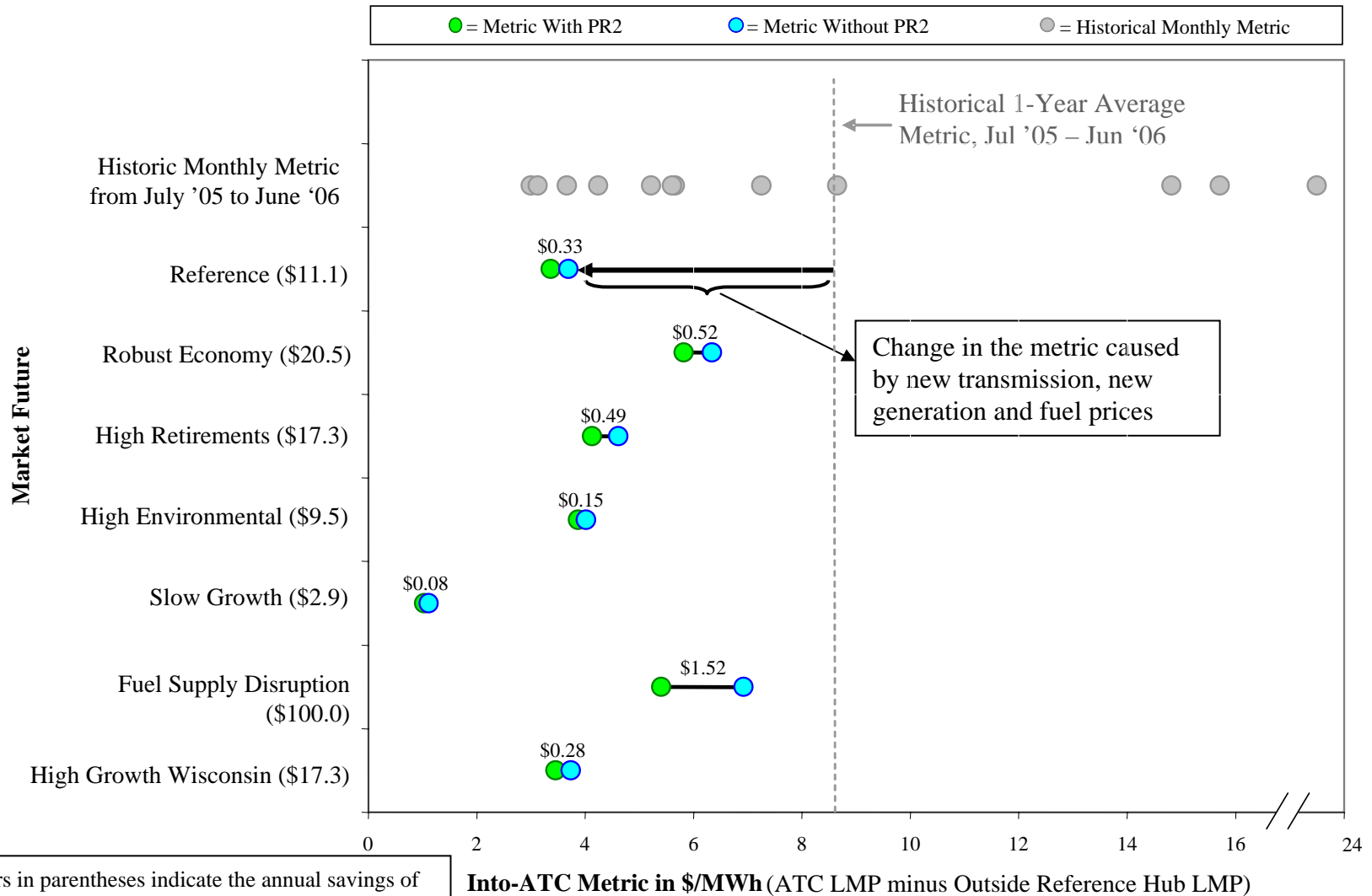
All Results



Numbers in parentheses indicate the annual savings of Paddock-Rockdale in millions using the 70/30 metric.

Into-ATC Metric as a % of Outside Reference Hub LMP

Into-ATC Metric in 2011 (\$)



Numbers in parentheses indicate the annual savings of Paddock-Rockdale in millions using the 70/30 metric.



Into-ATC Metric in 2011 (data)

Into-ATC Metric as a Percentage of Reference Hub LMP

2011								
Futures and Sensitivities	Into-ATC Metric [1]			Composite Hub Reference LMP [2]		Metric as % of Reference LMP [3]		
	with PR2	without PR2	Difference	with PR2	without PR2	with PR2	without PR2	Difference
Reference	3.36	3.69	0.33	41.92	41.84	8.03%	8.82%	0.80%
Robust Economy	5.82	6.34	0.52	48.07	47.96	12.11%	13.22%	1.11%
High Retirements	4.13	4.62	0.49	45.00	44.86	9.18%	10.29%	1.11%
High Environmental	3.87	4.02	0.15	83.42	83.40	4.64%	4.82%	0.18%
Slow Growth	1.03	1.12	0.08	34.61	34.59	2.99%	3.23%	0.24%
Fuel Supply Disruption	5.40	6.92	1.52	51.37	51.31	10.52%	13.49%	2.97%
High Growth Wisconsin	3.46	3.74	0.28	42.28	42.25	8.18%	8.84%	0.66%

[1] = (ATC LMP - Composite LMP).

[1],[2]: Composite LMP in 2011 equals the load weighted-average LMP at PJM NICA, NSP, and CIPS.

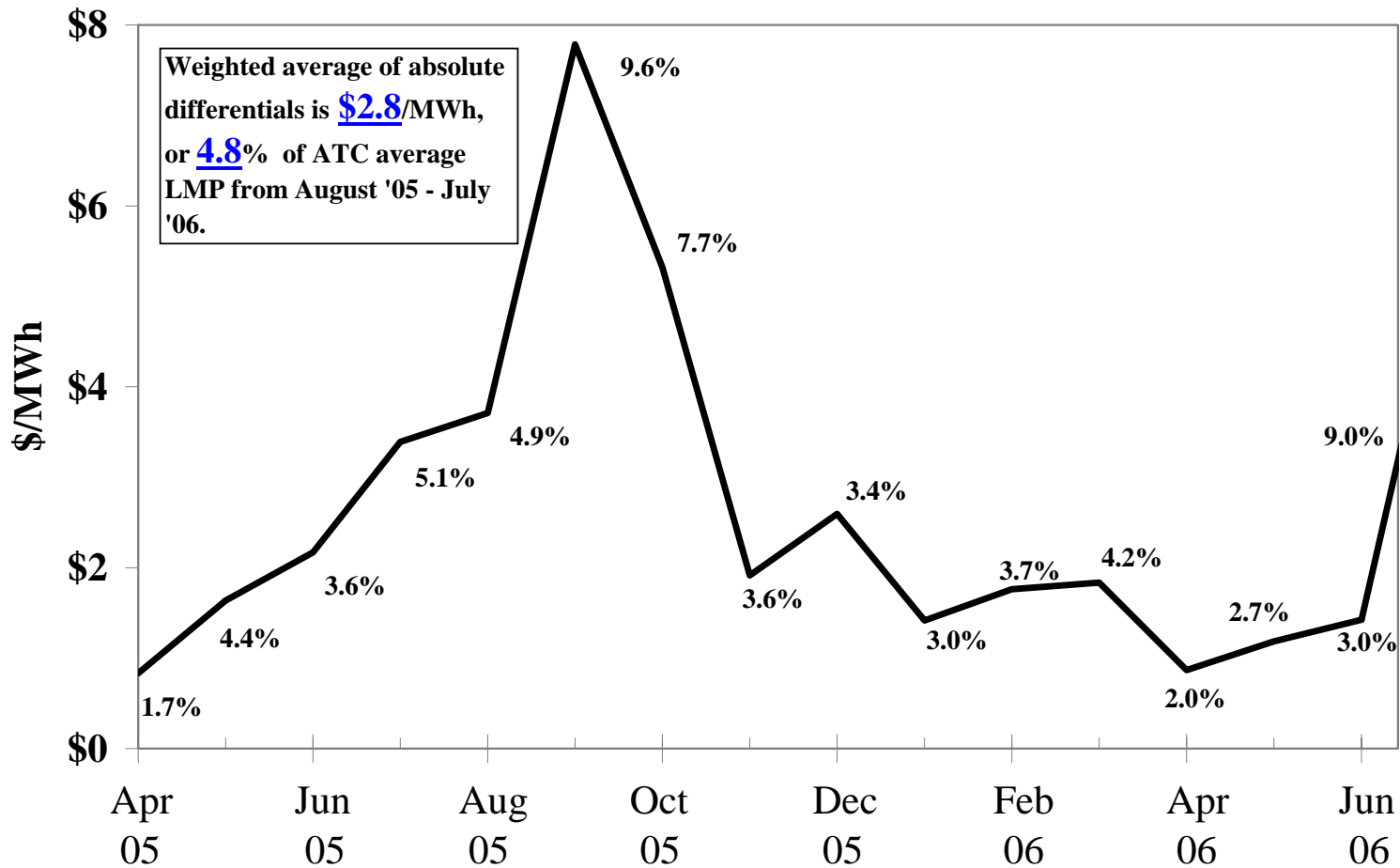
[3] = [1] / [2] x 100%.

[1],[3]: Difference = without PR2 - with PR2.

All figures from PROMOD simulations.

Within-ATC Metric: Zonal LMP Differentials within ATC

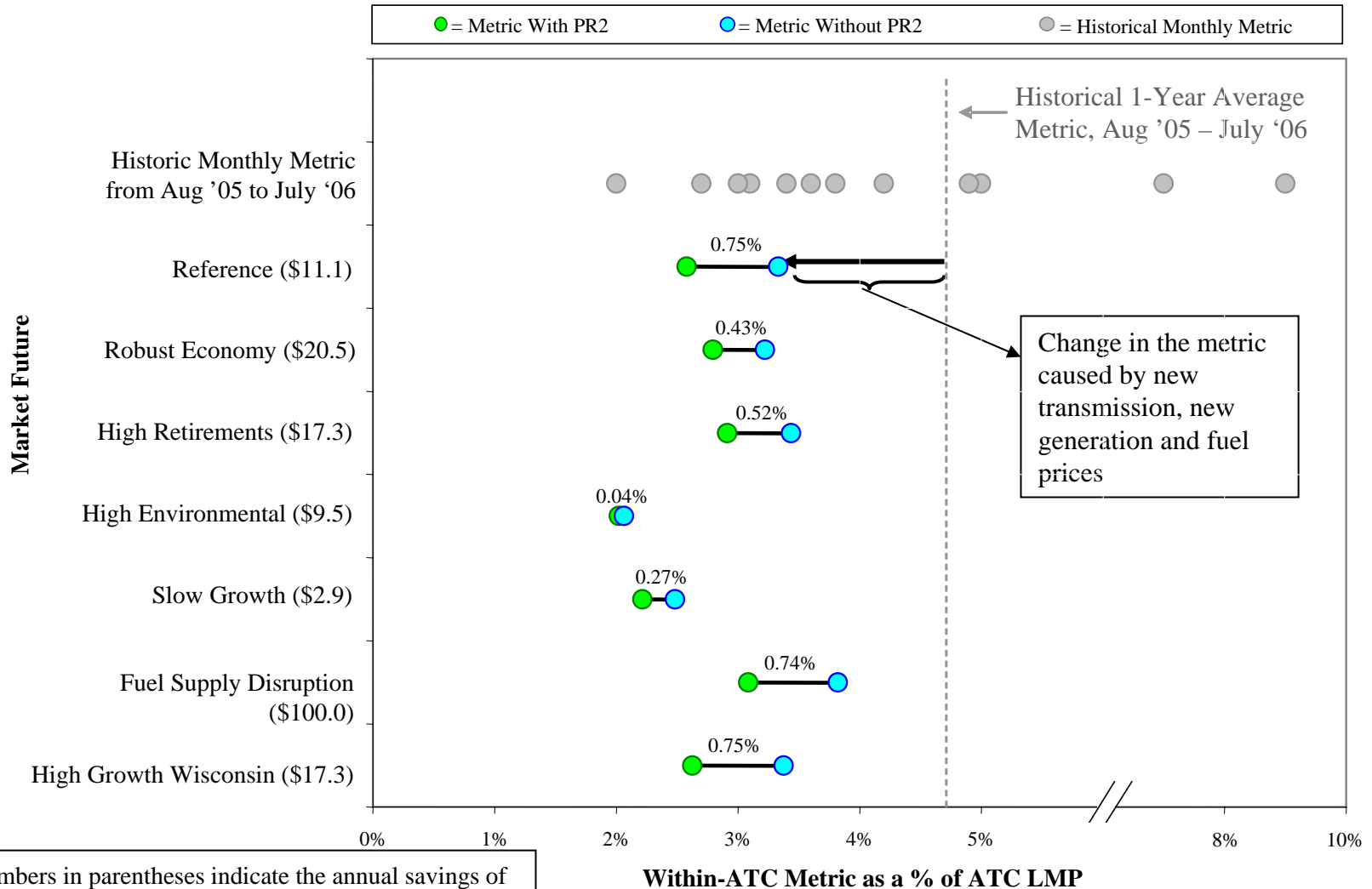
Weighted Average of Absolute LMP Differentials to ATC Reference



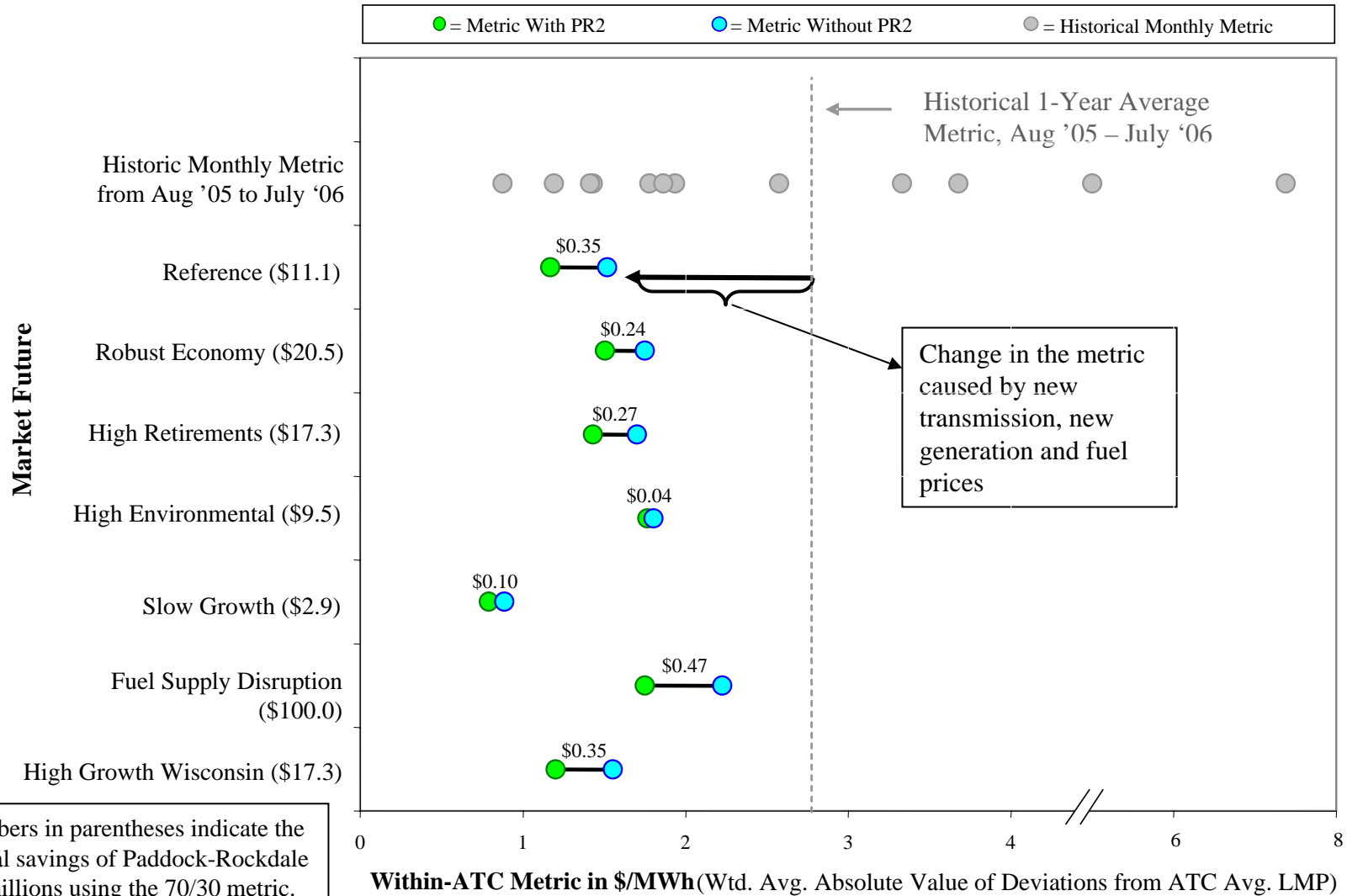
%'s show average LMP differential divided by average ATC price.

Sources : Day-ahead prices from Global energy Decision's *Velocity Suite* ; Prices weighted by ATC hourly load.

Within-ATC Metric in 2011 (%)



Within-ATC Metric in 2011 (\$)



Within ATC Metric in 2011 (Data)

Within-ATC Metric as a Percentage of Reference Hub LMP

2011								
Futures and Sensitivities	Within-ATC Metric [1]			Reference LMP [2]		Metric as % of Reference LMP [3]		
	with PR2	without PR2	Difference	with PR2	without PR2	with PR2	without PR2	Difference
Reference	1.17	1.52	0.35	45.29	45.53	2.58%	3.33%	0.75%
Robust Economy	1.51	1.75	0.24	53.89	54.30	2.79%	3.22%	0.43%
High Retirements	1.43	1.70	0.27	49.13	49.47	2.91%	3.44%	0.52%
High Environmental	1.76	1.80	0.04	87.29	87.42	2.02%	2.06%	0.04%
Slow Growth	0.79	0.89	0.10	35.65	35.71	2.22%	2.48%	0.27%
Fuel Supply Disruption	1.75	2.23	0.47	56.78	58.23	3.08%	3.82%	0.74%
High Growth Wisconsin	1.20	1.55	0.35	45.74	45.98	2.63%	3.38%	0.75%

Sources and Notes:

[1] = Within-ATC metric = $|\text{Balancing Authority LMP} - \text{WUMS LMP}| \times (\text{Balancing Authority Load} / \text{WUMS Load})$, summed over all balancing authorities in WUMS.

[2]: Reference LMP = WUMS load-weighted average LMP.

[3] = $[1] / [2] \times 100\%$.

[1],[3]: Difference = without PR2 - with PR2.

All figures from PROMOD simulations.

Summary – Into ATC Metric

- July '05 – June '06 Into ATC LMP premium is approximately 17%
- Approximately 8% reduction in ATC LMP premium attributable to changes in fuel prices, generation additions and other ATC projects to be placed in service by 2011
- Overall 0.8% reduction in metric directly attributable to Paddock-Rockdale being in-service
 - Annual Adjusted Production Cost (APC) Savings
 - \$10 million – 2011
 - \$13 million - 2016
 - Annual Load-weighted Locational Marginal Price (LLMP) Savings
 - \$14 million – 2011
 - \$52 million - 2016
 - Net Present Value
 - \$37 million based on Adjusted Production Cost
 - \$175 million based on 70% APC/ 30% LLMP
 - \$497 million based on Load Locational Marginal Price

Summary – Within ATC Metric

- August '05 – July '06 Into ATC LMP premium is 4.8%
- Approximately 1.4% reduction in ATC LMP premium attributable to changes in fuel prices, generation additions and other ATC projects to be placed in service by 2011
- This metric doesn't lend itself to benefit/cost analysis
- Paddock-Rockdale provides a stabilizing effect on the volatility of the pricing zones within ATC