

*Table ZS-5  
ATC Day Ahead Market Constraints (January 1, 2007 through December 31, 2007)*

Shadow Price*	Hours Rank**	Constraint (Common Name)	Potential Solution
\$67,996	1	Paddock 345/138 kV Transformer T21	Paddock – Rockdale 345 kV (Planned, 2010)
\$55,278	2	Eau Claire – Arpin 345 kV	Arrowhead – Gardner Park 345 kV (Completed, 2008)
\$46,541	5	Hintz – Werner 138 kV	Substation upgrades (Completed, August 2007) Morgan – Highway 22 – Gardner Park (Planned, 2009)
\$43,654	8	Ellington – Hintz 138 kV	Increased line clearance (Completed, August 2007) Morgan – Highway 22 – Gardner Park (Planned, 2009)
\$43,250	13	Pleasant Valley – Arthur Road 138 kV	Reconductor of circuit (Planned, 2008)
\$22,782	4	Highway V – Preble 138 kV	Morgan – Highway 22 – Werner West 345 kV (Planned, 2009)
\$21,255	6	North Appleton – Werner West – Rocky Run 345 kV	No solution identified
\$19,625	3	Stiles – Pulliam 138 kV (Line 64451)	Morgan – Highway 22 – Werner West 345 kV (Planned, 2009)
\$14,466	7	Stiles – Pulliam 138 kV (Line 64441)	Morgan – Highway 22 – Werner West 345 kV (Planned, 2009)
\$9,118	19	Badger - Belle Plaine - Caroline - Whitcomb 115 kV	Morgan – Highway 22 – Gardner Park (Planned, 2009)
\$7,900	21	Lakeview – Zion 138 kV	No solution identified
\$6,575	20	McGulpin – Straits 138 kV	ATC Michigan Energy Collaborative will investigate potential solutions (2008).
\$5,365	22	Pleasant Prairie – Racine 345 kV	No solution identified
\$4,858	34	Morrison Avenue – Sherman Street 115 kV	New Gardner Park – Hilltop 115 kV line (Completed, May 2007) Weston - Sherman St. - Hilltop 115 kV rebuild (Completed, May 2007)
\$4,512	14	Flow South Stability Flowgate	Morgan – Highway 22 – Werner West 345 kV line (Planned, 2009) Construct Cranberry – Conover 115 kV line (Completed, 2008) Convert Conover – Plains to 138 kV (Planned, 2010)
<b>\$460,072</b>			<b>Total for all ATC Day Ahead constraints, 1/1/07 - 12/31/07</b>

*NOTE: Four constraints have been omitted from this list because they are caused by virtual market transactions in the Day Ahead Market.*

*\* Sum of shadow prices throughout year – i.e. the amount of money to be saved if this constraint is relieved by one MW.*

*\*\* Hours rank is based on the constraints that occur most often on the system, regardless of severity (shadow price).*

*Table ZS-6  
ATC Real Time Market Constraints (January 1, 2007 through December 31, 2007)*

Shadow Price*	Hours Rank**	Constraint (Common Name)	Potential Solution
\$104,383	2	Ellington – Hintz 138 kV	Increased line clearance (Completed, August 2007) Morgan – Highway 22 – Gardner Park (Planned, 2009)
\$62,007	3	Paddock 345/138 kV Transformer T21	Paddock – Rockdale 345 kV (Planned, 2010)
\$59,568	1	Eau Claire – Arpin 345 kV	Arrowhead – Gardner Park 345 kV (Completed, 2008)
\$21,491	7	Blount – Ruskin 69 kV (Line 6904)	Special Protection System (SPS) on circuit (Expected, 2008) North Madison – Huiskamp 138 kV (Planned, 2009)
\$20,589	5	Stiles – Pulliam 138 kV (Line 64451)	Morgan – Highway 22 – Werner West 345 kV (Planned, 2009)
\$19,463	13	Badger – Belle Plaine – Caroline – Whitcomb 115 kV	Gardner Park – Highway 22 – Morgan 345 kV (Planned, 2009)
\$17,659	6	Highway V – Preble 138 kV	Morgan – Highway 22 – Werner West 345 kV (Planned, 2009)
\$15,043	8	Pleasant Prairie – Racine 345 kV	No solution identified
\$14,209	9	Pleasant Valley – Arthur Road 138 kV	Reconductor of circuit (Completed, 2008)
\$13,122	12	Stone Lake – Gardner Park 345 kV	Arrowhead – Gardner Park 345 kV (Completed, 2008)
\$11,969	4	Stiles – Pulliam 138 kV (Line 64441)	Morgan – Highway 22 – Werner West 345 kV (Planned, 2009)
\$9,228	17	Cornell Tap – Felch Tap 69 kV	ATC Michigan Energy Collaborative will investigate potential solutions (2008).
\$9,132	15	McGulpin – Straits 138 kV (Line 9901)	ATC Michigan Energy Collaborative will investigate potential solutions (2008).
\$8,640	34	Sand Lake – Port Edwards 138 kV	No solution identified
\$7,638	39	Kenosha – Lakeview 138 kV	No solution identified
<b>\$499,244</b>			<b>Total for all ATC Real Time constraints, 1/1/07 - 12/31/07</b>

\* Sum of shadow prices throughout year – i.e. the amount of money to be saved if this constraint is relieved by one MW.

\*\* Hours rank is based on the constraints that occur most often on the system, regardless of severity (shadow price).