

**Congestion Severity Index**

The lists on the following tabs are sorted by the Congestion Severity Index of the constraints. The Congestion Severity Index is based on the theoretical potential maximum number of dollars paid into the market by load serving entities due to congestion on the constraint in question. It is the maximum potential amount of money (in millions of dollars) that could have been saved over the course of this time period had the constraint not been bound. Both directions of the constraint are captured (there are a few constraints in ATC that have been bound in different directions at different times).

**Hours**

The "hours" measurements provided on the table is a measure duration of constraint binding. The number given is the total number of "hours" that the constraint occurred. RT data may have partial hours since RT constraints are bound in five minute intervals.

**Day Ahead and Real Time**

Day Ahead (DA) constraints indicate that MISO committed generation out of economic order in the Day Ahead market, meaning that more expensive generation is committed for the next day in order to avoid constraints that would occur if only the cheapest generation was scheduled to run. Real Time (RT) constraints show up when MISO did not anticipate overloads on the system in the Day Ahead market. Adjustments must be made to the generation mix during the operating day in order to mitigate constraints.

**Potential Solution**

Potential solutions have been provided for some constraints listed. These solutions may not have been designed for the sole purpose of alleviating the listed constraints and therefore will not necessarily fully mitigate the constraints, but will reduce the constraint's frequency and severity under normal operating conditions.

Severity Index	Hours	Constraint	Potential Solution
<b>4.76</b>	<b>546</b>	<b>Total for all ATC Day Ahead constraints - May 2011</b>	<b>Solutions listed in ATC TYA unless otherwise noted</b>
1.36	18	Granville - Butler 138 kV flo Granville - Tosa 138 kV	Terminal Equipment Replacement at Butler Substation (Proposed 2011)
1.08	106	Kenosha - Lakeview 138 kV flo Pleasant Prairie - Zion 345 kV	Pleasant Prairie - Zion Energy Center 345 kV line (Proposed 2014)
0.58	72	Presque Isle Area Load	Widespread area outage under investigation
0.48	47	Minnesota to Wisconsin Exports Interface (MWEX)	Monroe County - Council Creek 161 kV line (Proposed, 2013) North La Crosse - Madison 345 kV line (Proposed 2018)
0.33	16	Granville - Butler 138 kV flo Granville - Arcadian 345 kV	Terminal Equipment Replacement at Butler Substation (Proposed 2011)
0.24	30	Indian Lake 138/69 kV Transformer T2 flo Indian Lake 138/69 kV Transformer T1	Flow Control Device (Proposed, 2014) Indian Lake - Hiawatha 138kV line (Proposed, 2014)
0.17	12	Granville - Tosa 138 kV flo Granville - Butler 345 kV	Upgrade and Replace Terminal Equipment at Tosa Substation (Proposed 2011)
0.13	20	Saukville - Edgewater 345 kV flo Point Beach - Sheboygan Energy Center 345 kV	ATC is investigating a future 345 kV N-S path in the Fox Valley corridor
0.12	86	Nordic - Felch Tap 69 kV flo Chandler 138/69 kV Transformer T1	Arnold 345/138 kV Transformer (Provisional, 2015) Flow Control Device (Proposed, 2014) Second Chandler 138/69 kV Transformer (Proposed, 2012)
0.08	7	Pleasant Prairie - Zion 345 kV flo Cherry Valley - Silver Lake 345 kV (ComEd)	Pleasant Prairie - Zion Energy Center 345 kV line (Proposed 2014)
0.05	11	Racine - Oak Creek 138 kV flo Elm Road - Racine 345 kV	Area Generation outages may have contributed to this constraint
0.04	3	Kewaunee 345/138 kV Transformer T10 flo Kewaunee - North Appleton 345 kV	Area Transmission and Generation outages may have contributed to this constraint
0.03	21	Flow South PTFD	Flow Control Device (Proposed, 2014)
0.02	5	Pleasant Prairie - Zion 345 kV flo Zion - Arcadian 345 kV	Pleasant Prairie - Zion Energy Center 345 kV line (Proposed 2014)
0.01	31	Rudyard Tap - Pine River 69 kV flo Pine River - Nine Mile 69 kV	Uprate Pine River - Nine Mile 69 kV line (Proposed 2016)
0.01	13	New Holstein - St. Nazianz 69 kV flo Northeast - Shoto 69 kV	Shoto - Custer 138 kV line (Provisional 2022)
0.01	5	McGulpin - Straits 138 kV ckt 3 flo McGulpin - Straits 138 kV ckt 1	Flow Control Device (Proposed, 2014)
0.00	6	Pine Grove Tap - 3 Mile 69 kV	Area Generation outages may have contributed to this constraint
0.00	3	Nine Mile - Kincheloe Main Tap 69 kV flo Hiawatha - Roberts 69 kV	Uprate Pine River - Nine Mile 69 kV line (Proposed 2016)
0.00	2	Masonville - Lakehead Rapid River 69 kV flo Chandler - Delta 69 kV	Chandler - 18th Road 138 kV line (Proposed 2014)
0.00	5	Petenwell 138/69 kV Transformer T31	Area Transmission outages may have contributed to this constraint Replace Petenwell 138/69 kV Transformer (Provisional 2015)
0.00	1	Straits - Evergreen 69 kV flo Straits - Pine River 69 kV	Flow Control Device (Proposed, 2014)
0.00	1	Nine Mile - Kincheloe Main Tap 69 kV	Uprate Pine River - Nine Mile 69 kV line (Proposed 2016)
0.00	1	Nine Mile - Pine Grove 69 kV	Uprate Pine River - Nine Mile 69 kV line (Proposed 2016)
0.00	24	Manistique Transformer T1	No solution - virtual activity causing congestion

\* This project not part of the ATC 10-Year Assessment

1. This constraint may have been bound for other contingencies as well.

Severity Index	Hours	Constraint	Potential Solution
<b>5.58</b>	<b>105</b>	<b>Total for all ATC Real Time constraints - May 2011</b>	<b>Solutions listed in ATC TYA unless otherwise noted</b>
1.42	10	Racine - Oak Creek 138 kV flo Elm Road - Racine 345 kV	Area Generation outages may have contributed to this constraint
1.07	47	Presque Isle Area Load	Widespread area outage under investigation
0.62	12	Granville - Tosa 138 kV flo Granville - Butler 345 kV	Terminal Equipment Replacement at Butler Substation (Proposed 2011)
0.52	7	Kenosha - Lakeview 138 kV flo Pleasant Prairie - Zion 345 kV	Pleasant Prairie - Zion Energy Center 345 kV line (Proposed 2014)
0.43	10	Granville - Butler 138 kV flo Granville - Arcadian 345 kV	Terminal Equipment Replacement at Butler Substation (Proposed 2011)
0.41	4	Pleasant Prairie - Zion 345 kV flo Zion - Arcadian 345 kV	Pleasant Prairie - Zion Energy Center 345 kV line (Proposed 2014)
0.36	3	Albers - Paris 138 kV flo Pleasant Prairie - Racine 345 kV	Area Generation outages may have contributed to this constraint
0.28	2	Flow South	Flow Control Device (Proposed, 2014)
0.25	2	Saukville - Edgewater 345 kV flo Point Beach - Sheboygan Energy Center 345 kV	ATC is investigating a future 345 kV N-S path in the Fox Valley corridor
0.10	2	Indian Lake - Valley Tap 69 kV flo Indian Lake Hiawatha 69 kV	Flow Control Device (Proposed, 2014)
0.03	1	Petenwell - Badger West 138 kV flo Eau Claire - Arpin 345 kV	Area Transmission outages may have contributed to this constraint
0.03	3	Eden - Mineral Point 69 kV flo Hillman - Darlington 138 kV	Area Generation outages may have contributed to this constraint
0.02	0	Kansas - Harbor 138 kV flo Kansas - Norwich 138 kV	Area Generation outages may have contributed to this constraint
0.01	3	Nordic - Felch Tap 69 kV flo Chandler 138/69 kV Transformer T1	Arnold 345/138 kV Transformer (Provisional, 2015) Flow Control Device (Proposed, 2014) Second Chandler 138/69 kV Transformer (Proposed, 2012)
0.01	0	Minnesota to Wisconsin Exports Interface (MWEX)	Monroe County - Council Creek 161 kV line (Proposed, 2013) North La Crosse - Madison 345 kV line (Proposed 2018)
0.01	0	Rudyard Tap - Pine River 69 kV flo Pine River - Nine Mile 69 kV	Uprate Pine River - Nine Mile 69 kV line (Proposed 2016)
0.00	1	Werner West - Rocky Run 345 kV flo Highway 22 - Gardner Park 345 kV	Area Transmission outages may have contributed to this constraint

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