



# **Eastern Wisconsin Planning Collaborative**

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# Eastern Wisconsin Study Area





# How will the Collaborative work

- Engage stakeholders in the planning process
- Discuss and obtain feedback from stakeholders regarding:
  - Issues in Eastern Wisconsin and prioritization
  - The assumptions for ATC's analysis of future transmission infrastructure needs in the Eastern Wisconsin.
- ATC recognizes the need to perform more detailed analyses in its footprint to understand the impacts on its transmission system and identify potential transmission solutions for system performance constraints.
- Effort to identify beneficial transmission upgrades in the Eastern Wisconsin area.



# Eastern Wisconsin Transmission Challenges

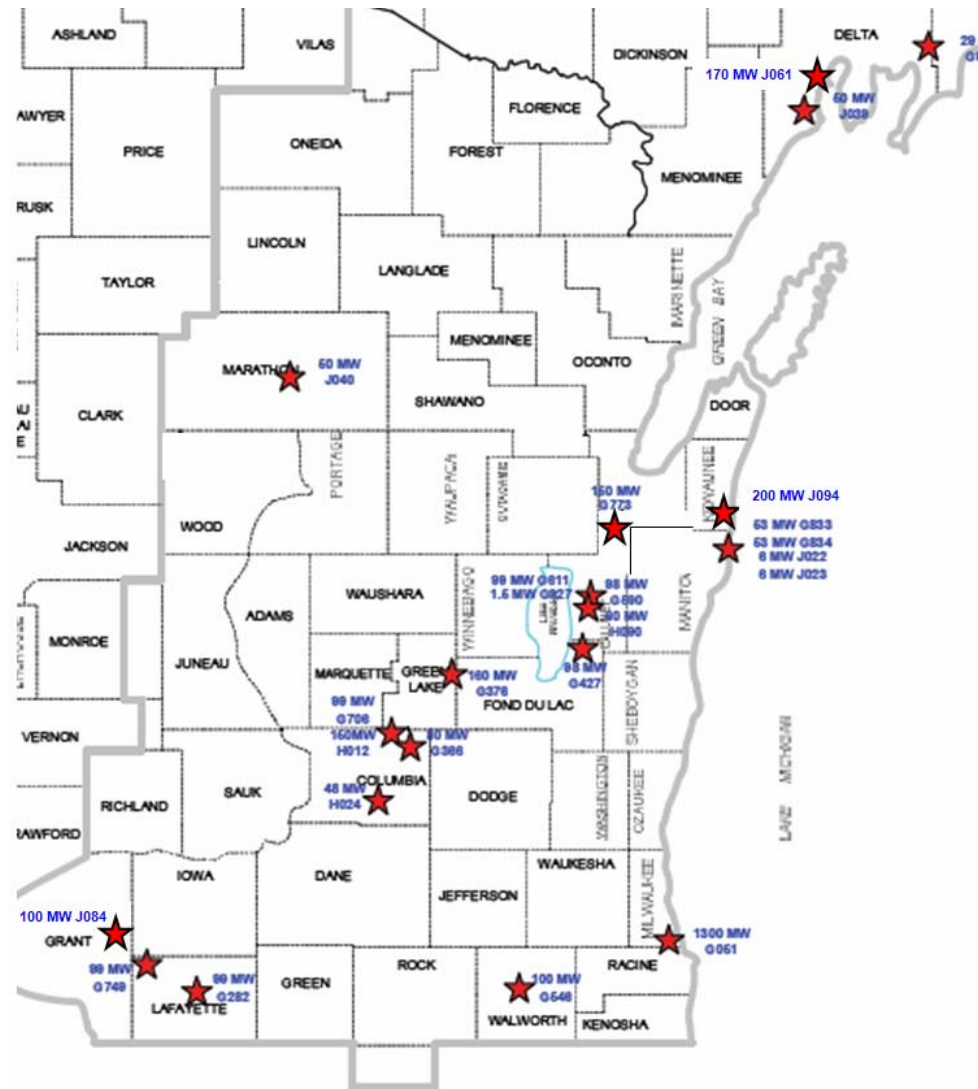
- *Potential Changes in Wisconsin Regulations*
- *Generator Interconnection Requests*
- *Integration of Local and Regional Renewable Resources*
- *System Stability Improvement need*
- *Operational and Maintenance Challenges*
- *Market Congestion*
  - *Lake Michigan area (Historical MISO Constraints)*
  - *ATC area (Top ATC Day Ahead Market Constraint Locations of 2009)*
- *Other system challenges identified by stakeholders*



# Potential Changes in Wisconsin Regulation

- *Wisconsin Senate Bill 450 proposes;*
  - *New thresholds for:*
    - *Greenhouse Gases*
    - *Energy Conservation Goals*
    - *Renewable Portfolio Standards*
  - *Addition of other resources (Hydro, etc) to qualify for RPS compliance*
  - *New development requirements for Nuclear Power Plant facilities*

# Generator Interconnection Requests (as of 2/1/10)







- [<http://www.focusonenergy.com/Information-Center/Renewables/Wind-Maps-Data/>]

Features	Transmission Line Category	600 kV	Mean Speed at 100 m	17.9 - 19.0	9.0 - 9.5
City	Under 100 kV	735 kV	mph	19.0 - 20.1	9.5 - 9.9
Interstate Highway	100 MVA-161 kV	Step-Up	12.3 - 13.4	5.5 - 6.0	
County Boundary	100 MVA-161 kV	Step-Up	13.4 - 14.5	6.0 - 6.5	
Water Body	230 MVA-267 kV	DC Line	14.5 - 15.7	6.5 - 7.0	
	345 kV		15.7 - 16.8	7.0 - 7.5	
			16.8 - 17.9	7.5 - 8.0	

**AWS Truewind**

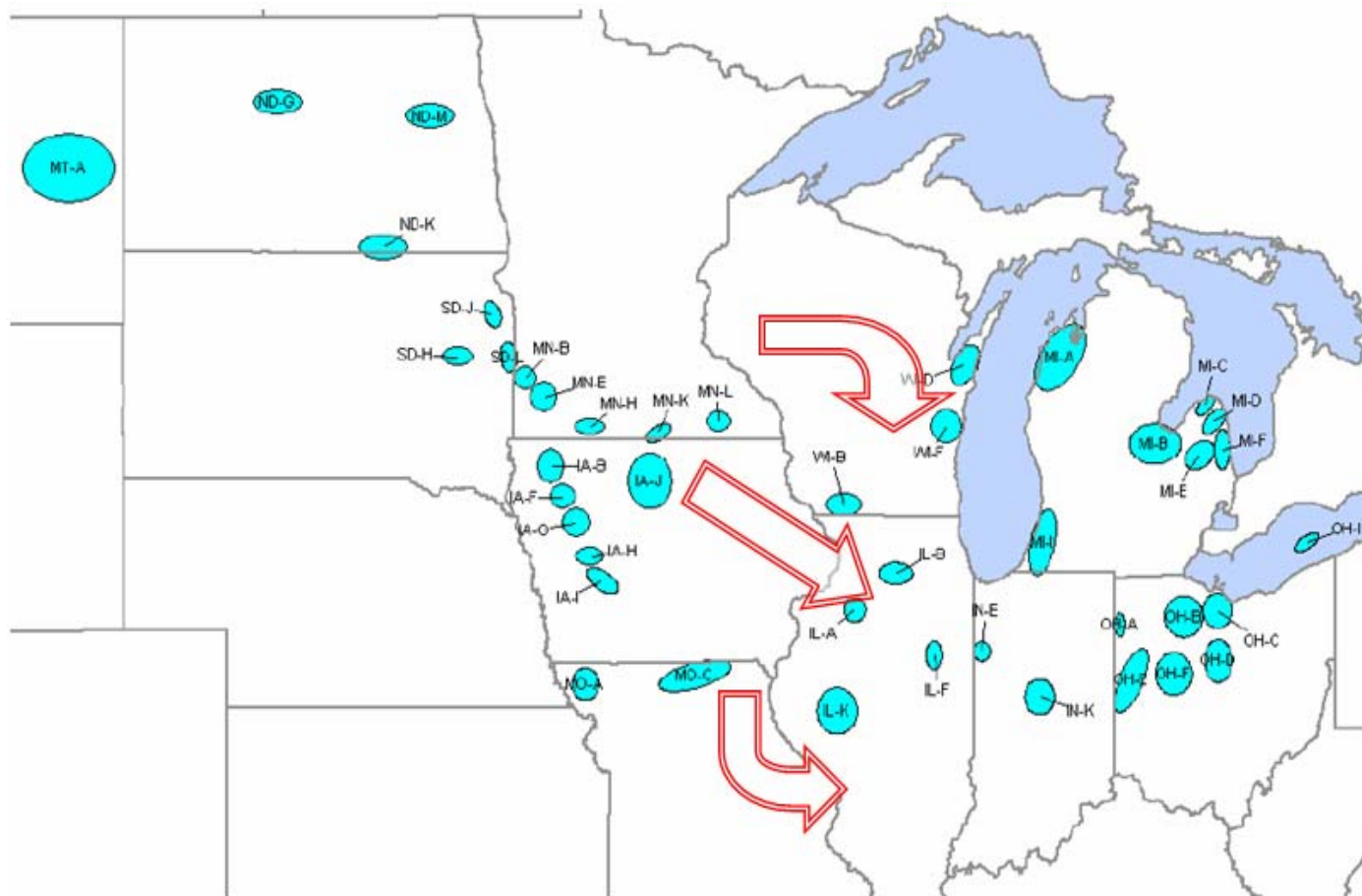
Projector: NAD 1983 WGS84 Transverse Mercator  
Spatial Resolution of Wind Resource Data: 20 m  
This map was created by AWS Truewind using the Mesoscale system, an historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement.

The transmission line information was obtained by AWS Truewind from the Global Energy Database Velocity Suite. AWS does not warrant the accuracy of the information on line information.



# ***Integration of Local and Regional Renewable Resources***

**Primary Regional West to East parallel path flow routes**



**Source:** RGOS Technical Review Group Meeting, December 9, 2009





# ***System Stability Improvement***

- As generation is added the angular stability operating margin of the network can be reduced.
- System stability limitations require operating restrictions and/or additional transmission facilities to alleviate the risk to the system.

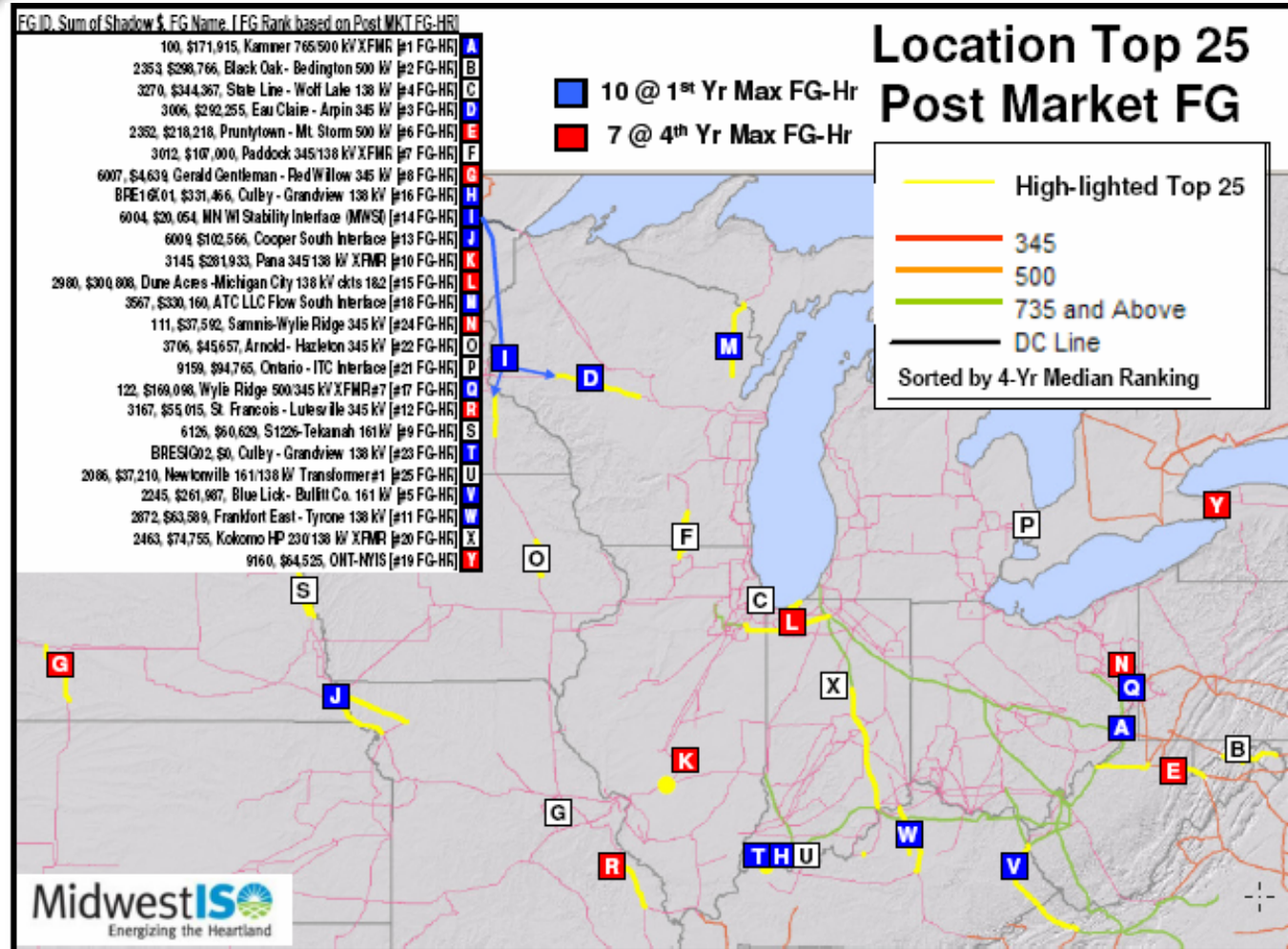


## ***Operational and Maintenance Challenges***

- System maintenance is increasingly difficult to plan.
- Under heavy import and export situations, facilities are constrained
- In regional reliability studies some ATC facilities limit regional transfers.

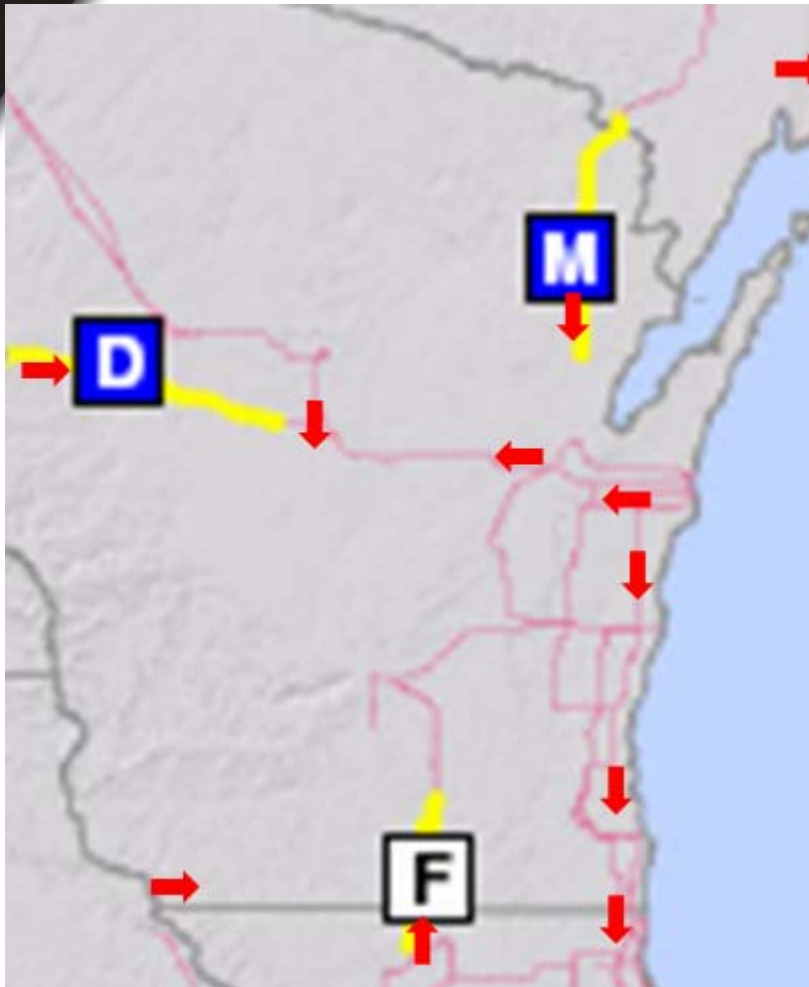
# Historical MISO Constraints

[Reference MTEP09 Figure 8.2-10]



# ATC Area Market Congestion

(Top ATC Day Ahead Market Constraint Locations of 2009)



- A number of these historical DA constraints are in the study area
- Some of these constraints are being addressed by planned or proposed projects
- *As additional Midwestern generation resources are interconnected it is anticipated that changing flow patterns will exacerbate existing or produce new constraints*



# Top ATC Day Ahead Market Constraints of 2009

Severity Index	Hours (hits)	Constraint	Potential Solution
20.81	1,501	Paddock - Town Line Road 138 kV flo Paddock - Blackhawk 138 kV	Paddock - Rockdale 345 kV (Planned 2010)
14.69	851	Minnesota to Wisconsin Exports Interface (MWEX)	Monroe County-Council Creek 161 kV (Proposed 2012) North La Crosse - Madison 345 kV (Provisional 2017)
14.34	319	Southwest Wisconsin Interface	Area Transmission outage may have contributed to this constraint
7.34	825	Indian Lake 138/69 kV Transformer T2 flo Indian Lake 138/69 kV Transformer T1	ATC Michigan Energy Collaborative investigating potential solutions (2010)
6.62	877	Indian Lake 138/69 kV Transformer T1 flo Indian Lake 138/69 kV Transformer T2	ATC Michigan Energy Collaborative investigating potential solutions (2010)
6.11	261	Granville - Butler 138 kV flo Granville - Tosa 138 kV	Elm Rd. Phase 1 (Completed 2009)
4.88	109	SE Wisconsin Interface (Pleasant Prairie - Zion 345 kV & Arcadian - Zion 345 kV & Lakeview - Zion 138 kV)	Area Transmission outage may have contributed to this constraint
4.70	346	Pleasant Prairie - Zion 345 kV flo Cherry Valley - Silver Lake 345 kV (ComEd)	Limiting Equipment is in ComEd system Bain - Zion 345 kV line (economic analysis 2010)
3.13	451	Pleasant Prairie - Zion 345 kV flo Zion - Arcadian 345 kV	Limiting Equipment is in ComEd system Bain - Zion 345 kV line (economic analysis 2010)
2.42	201	Point Beach - Sheboygan Energy Center 345 kV flo Cypress - Forest Junction 345 kV	Uprate of the Point Beach - Sheboygan 345 kV line (Planned, Spring 2010)
2.30	65	Rocky Run 345/115 kV Transformer T1 flo Werner West - Rocky Run 345 kV	Monroe County-Council Creek 161 kV (Proposed 2012)
2.01	196	Paddock 345/138 kV Transformer T21 flo Wempletown - Rockdale 345 kV	Paddock - Rockdale 345 kV (Planned 2010)
1.94	93	Point Beach - Forest Junction 345 kV flo Point Beach - Fox Energy 345 kV	
1.70	273	Flow South PTDF	Conover - Plains 138 kV line (Planned 2010)
1.40	78	Point Beach - Sheboygan Energy Center 345 kV flo Arcadian - Forest Junction 345 kV	Uprate of the Point Beach - Sheboygan 345 kV line (Planned, Spring 2010)





## **Constraint Resolution Potential Example “Pleasant Prairie to Zion”**

- Shared tie line between ATC and ComEd.
- The present “normal summer rating” of 973 MVA is associated with a wavetrap at the ComEd Zion substation.
- If the wavetrap is replaced, the potential rating improvement would be:
  - Summer Emergency from 1069 to 1096 MVA (+27 MVA)
  - Winter Emergency from 1143 to 1604 MVA (+461 MVA)



# Considerations for Planning

- Address transmission facilities that are constrained.
- Provide for future expansion.
- Efficiently use what transmission capacity is available.
- Develop plans that help address a number of concerns.

# Stakeholder Input Session

- *Potential Changes in Wisconsin Regulations*
- *Generator Interconnection Requests*
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# Contact

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