

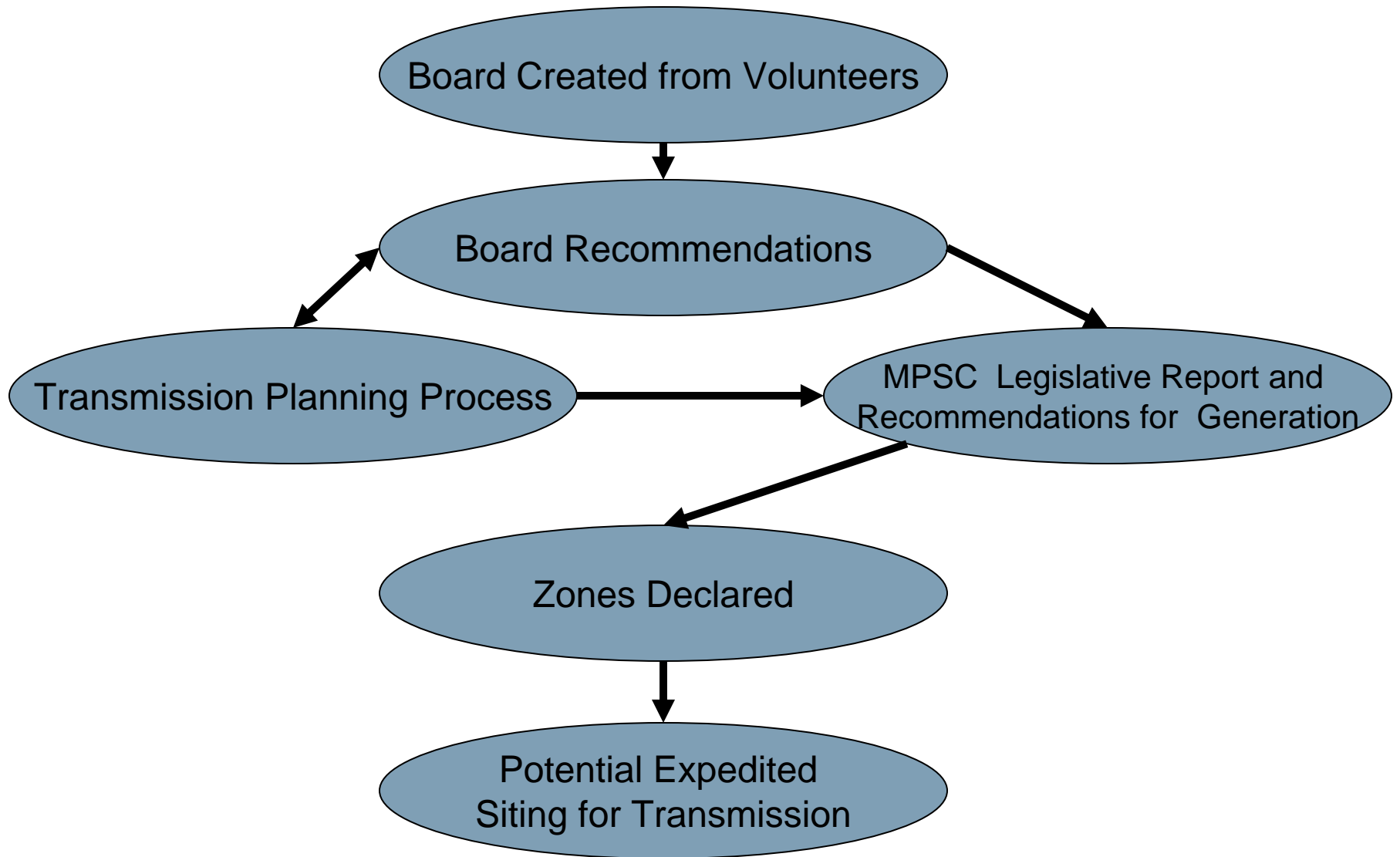
# Wind Energy Resource Zone Board

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October 9, 2009  
Michigan Wind Working Group  
Julie Baldwin, MPSC Staff

# Process Flowchart

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# **Board Composition**

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- 1 member representing the commission.**
- 2 members representing the electric utility industry.**
- 1 member representing alternative electric suppliers.**
- 1 member representing the attorney general.**
- 1 member representing the renewable energy industry.**
- 1 member representing cities and villages.**
- 1 member representing townships.**
- 1 member representing independent transmission companies.**
- 1 member representing a statewide environmental organization.**
- 1 member representing the public at large.**

## **Board Charge- To Study:**

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- **Wind energy production potential and the viability of wind as a source of commercial energy generation in this state.**
- **Availability of land in this state for potential utilization by wind energy conversion systems.**
- **Conduct modeling and other studies related to wind energy, including studying existing wind energy conversion systems, estimates for additional wind energy conversion system development, and average annual recorded wind velocity levels.**
- **The board's studies should include examination of wind energy conversion system requests currently in the applicable regional transmission organization's generator interconnection queue.**

## **Board Charge- The Report Shall Include:**

- **A list of regions in the state with the highest level of wind energy harvest potential.**
- **A description of the estimated maximum and minimum wind generating capacity in megawatts that can be installed in each identified region of this state.**
- **An estimate of the annual maximum and minimum energy production potential for each identified region of this state.**
- **An estimate of the maximum wind generation capacity already in service in each identified region of this state.**

# Board Consultant Team

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- **A request for proposals was issued for a technical consultant.**
  - **The board selected the team of the Michigan State University Land Policy Institute and Public Sector Consultants.**
- **The Land Policy Institute previously developed the Wind Prospecting Tool which provided the framework for the analysis.**
- **A second request was issued to assist in the board in report writing and public comment gathering.**
  - **The same team was selected with Public Sector Consultants as the lead.**

# Timeline for Analysis and Roles

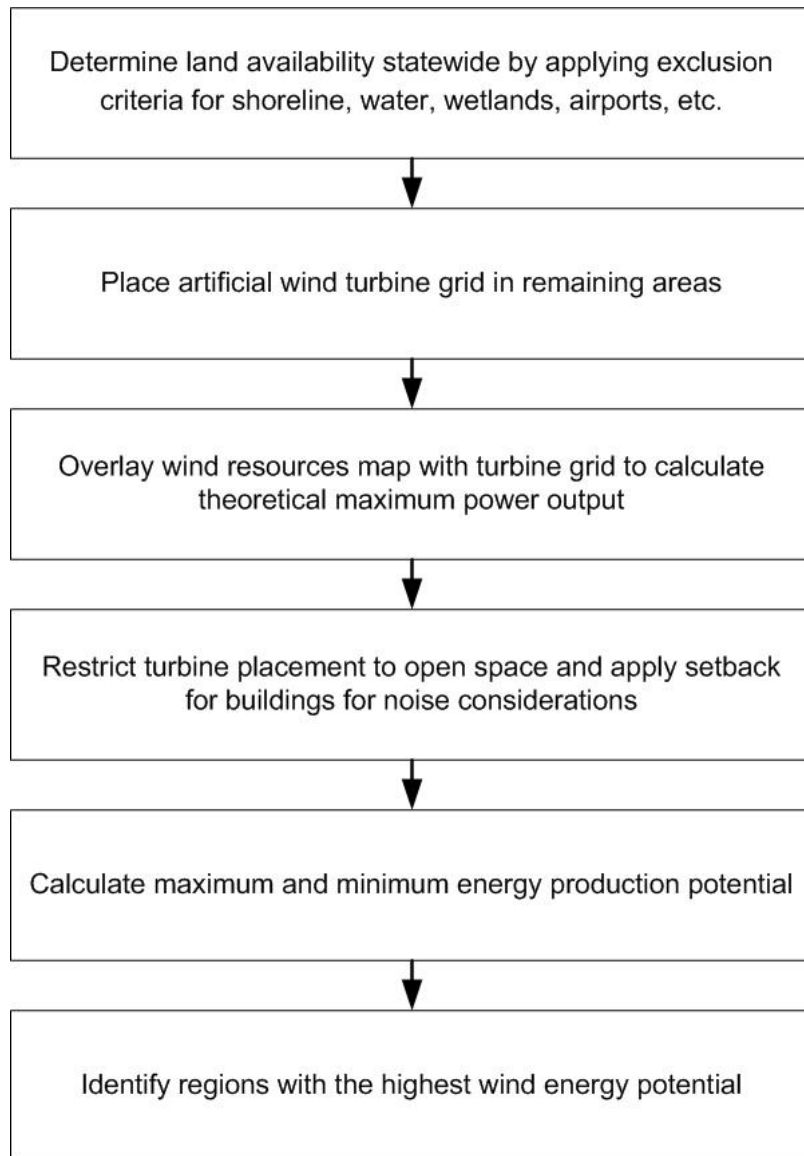
## Wind Zone Designation Timeline



## Roles Related to Wind Energy Zone Planning and Designation

Wind Energy Resource Zone Board	Conduct studies and issue proposed and final reports identifying the regions in the state with highest wind potential Accept comments from local governments and hold at least one public hearing prior to issuing a final report
Local governments	Consult with the WERZ Board and provide comments on the board's proposed report; carry out any existing duties and authorities for local siting of wind turbines
MPSC	Designate one or more wind zones in the state; represent the state in RTO transmission planning processes; review and approve applications for an expedited transmission siting certificate; provide report to legislature on the effect of setback requirements and noise limitations under local zoning or other ordinances after holding public hearings in various parts of the state to receive public input
Transmission owners and electric utilities*	Identify transmission infrastructure to deliver wind energy production potential from identified regions
Regional transmission organizations (RTOs)	Review proposed transmission facilities and facilitate related stakeholder processes under FERC-approved tariff
Public and other stakeholders	Provide comments as part of the board's public hearing(s), MPSC processes,** and RTO stakeholder processes

# Methodology Overview



## Class 3 or Higher Areas at 50 Meters



# Exclusions

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Great Lakes shoreline	A one-mile buffer inland from each of the Great Lakes was removed to minimize considerations related to disruption of the view, tourism, and potentially ecologically sensitive areas close to shore, i.e., sensitive dune habitat
Areas not defined as “open space”	Limited turbine placement to areas with open space classification, which consists of six land cover types: agricultural land, shrub scrub, forest land, barren land, pasture, and grassland
Airports	Excluded areas within 10 miles of commercial airports, 6.32 miles of local airports, and 1.25 miles of small airports
Wetlands	Excluded emergent, forested, and shrub-scrub wetlands, from the National Wetland Inventory, greater than 5 acres
Lakes and rivers	Excluded areas within specified distance based on turbine height (i.e., 120 meters or 150 meters)
Housing and other structures	Excluded areas within 200 meters of built areas, as defined by National Oceanic and Atmospheric Administration
Roads	Excluded areas within specified distance of all public roads (i.e., 120 meters or 150 meters)
State land	Examined three options based on state land availability: (1) State lands were not excluded (that is, state lands were treated like non-state land and turbines were modeled in state lands, including parks, forests, and management areas); (2) All state land excluded; and (3) Turbines limited to state forest management areas only
Slope	Land with slope greater than 20% excluded
Urban areas	Excluded all urbanized areas

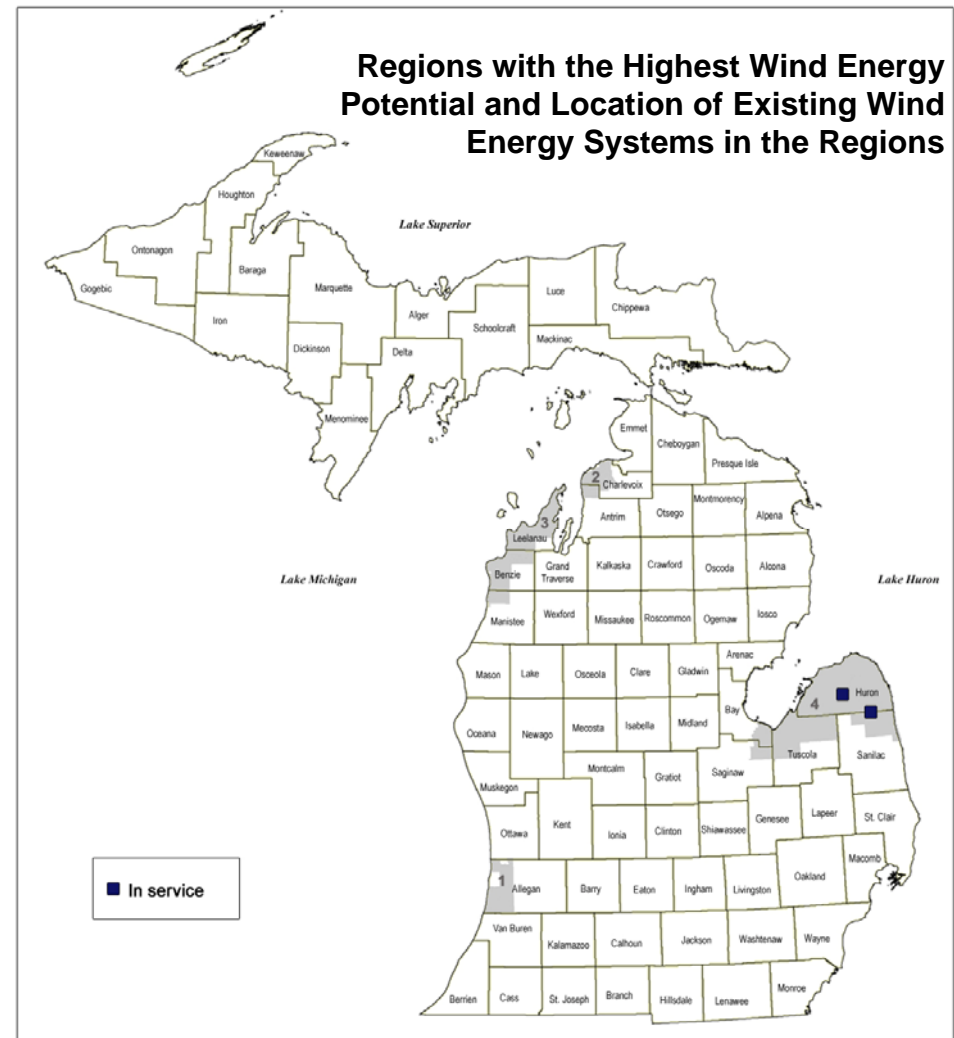
# Calculation of Maximum

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- **The total generating capacity in megawatts (MW) was calculated by multiplying the nameplate capacity of each turbine by the total number of turbines in the township.**
- **The annual energy production potential in megawatt-hours (MWh) was calculated for each turbine based on average wind speed, the power curves of the specified turbines, variability of wind speeds, interconnection efficiency, and other factors.**
- **The total annual energy production within each township of the state was calculated by summing the potential of all wind turbines that were placed within the township for this analysis.**
- **This resulted in theoretical estimate of capacity and energy production potential by township based on the hypothetical placement of the turbines.**

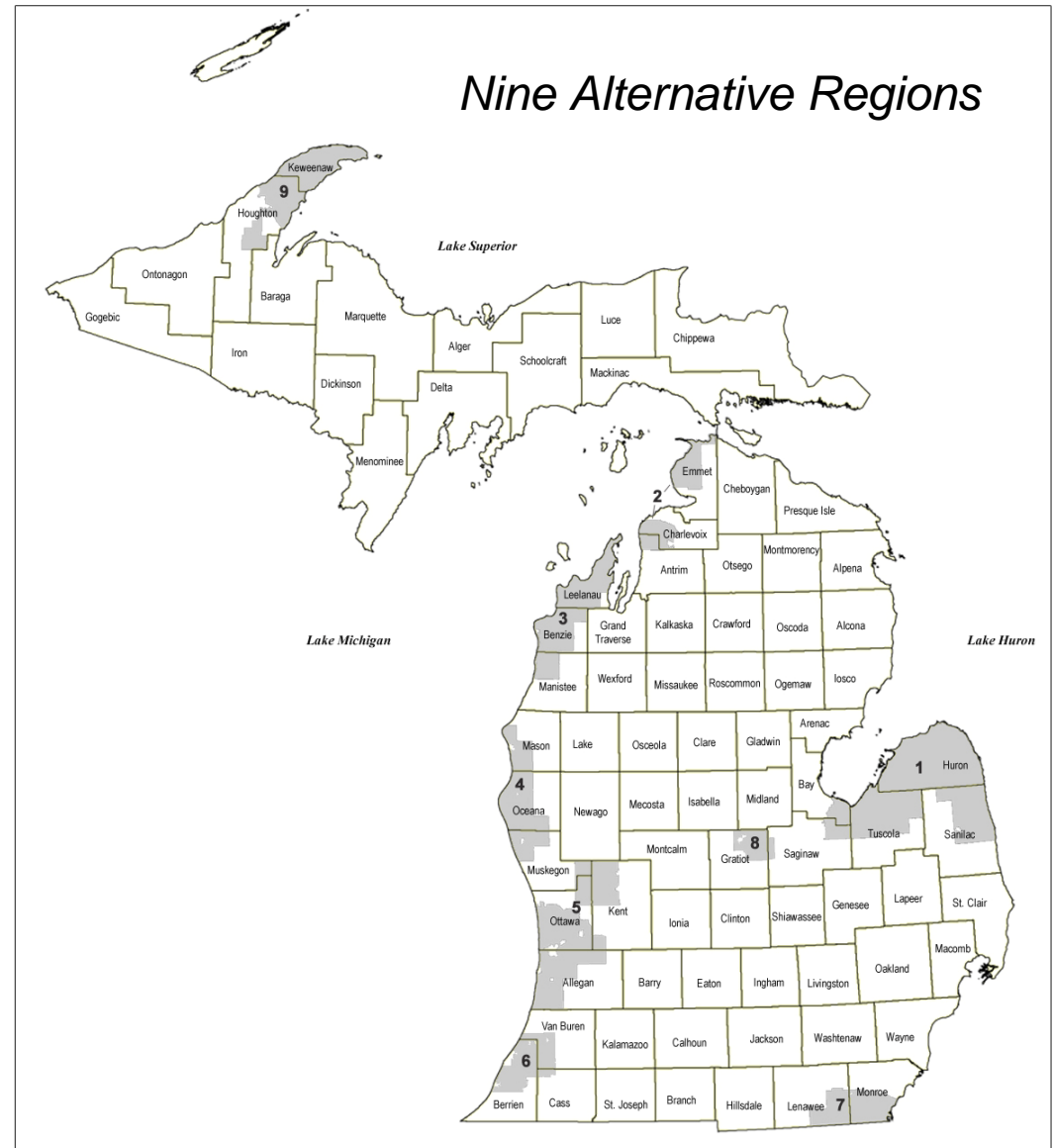
# Selection Process and Regional Map

- These tiers were established using a statistical method to group together townships with similar characteristics in terms of the wind potential.
- The board selected only those clusters of townships that were in the top tier out of five tiers total.
- The board also included within the region the adjacent townships that were in the second tier (i.e., next highest) and an additional ring of adjacent townships beyond that (to account for potential error in the wind speed data).



# Alternate Selection and Map

- The board also considered an alternative classification model based on 15 tiers, with the townships in the top five tiers selected as the core of the region.
- In this alternative approach, the immediately adjacent townships were included to derive a region.
- This approach identified nine candidate regions.
- However, the board did not use this alternative approach because it believed only the regions with the highest wind potential should be selected.



# **Reductions to Theoretical Maximum**

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- **To account for a variety of factors that would likely affect the placement and number of turbines the board reduced the theoretical calculations by 81 percent and 66 percent, respectively, to estimate the minimum and maximum wind generating capacity and annual energy potential for each region.**
- **These percentages were based on available information and general trends related to the factors listed below.**
  - **Land leases or easements**
  - **Land fragmentation**
  - **Local zoning restrictions**
  - **Competing land uses (development for other purposes)**
  - **Sensitive areas**
  - **Residential zoning**

# Regional Power Estimates

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Estimated Minimum and Maximum Number of Turbines, Capacity, and Annual Energy Production, by Identified Region

Region	Counties	Minimum			Maximum		
		Number of turbines	Capacity (MW)	Annual energy potential (MWh)	Number of turbines	Capacity (MW)	Annual energy potential (MWh)
1	Allegan	166	249	747,938	296	445	1,338,415
2	Antrim Charlevoix	109	163	470,062	195	292	841,164
3	Benzie Leelanau Manistee	435	652	1,991,679	778	1,167	3,564,058
4	Huron Bay Saginaw Sanilac Tuscola	1,578	2,367	6,723,472	2,824	4,236	12,031,477
<b>TOTAL</b>		<b>2,288</b>	<b>3,431</b>	<b>9,933,151</b>	<b>4,093</b>	<b>6,140</b>	<b>17,775,114</b>

# Wind Generation Currently Active

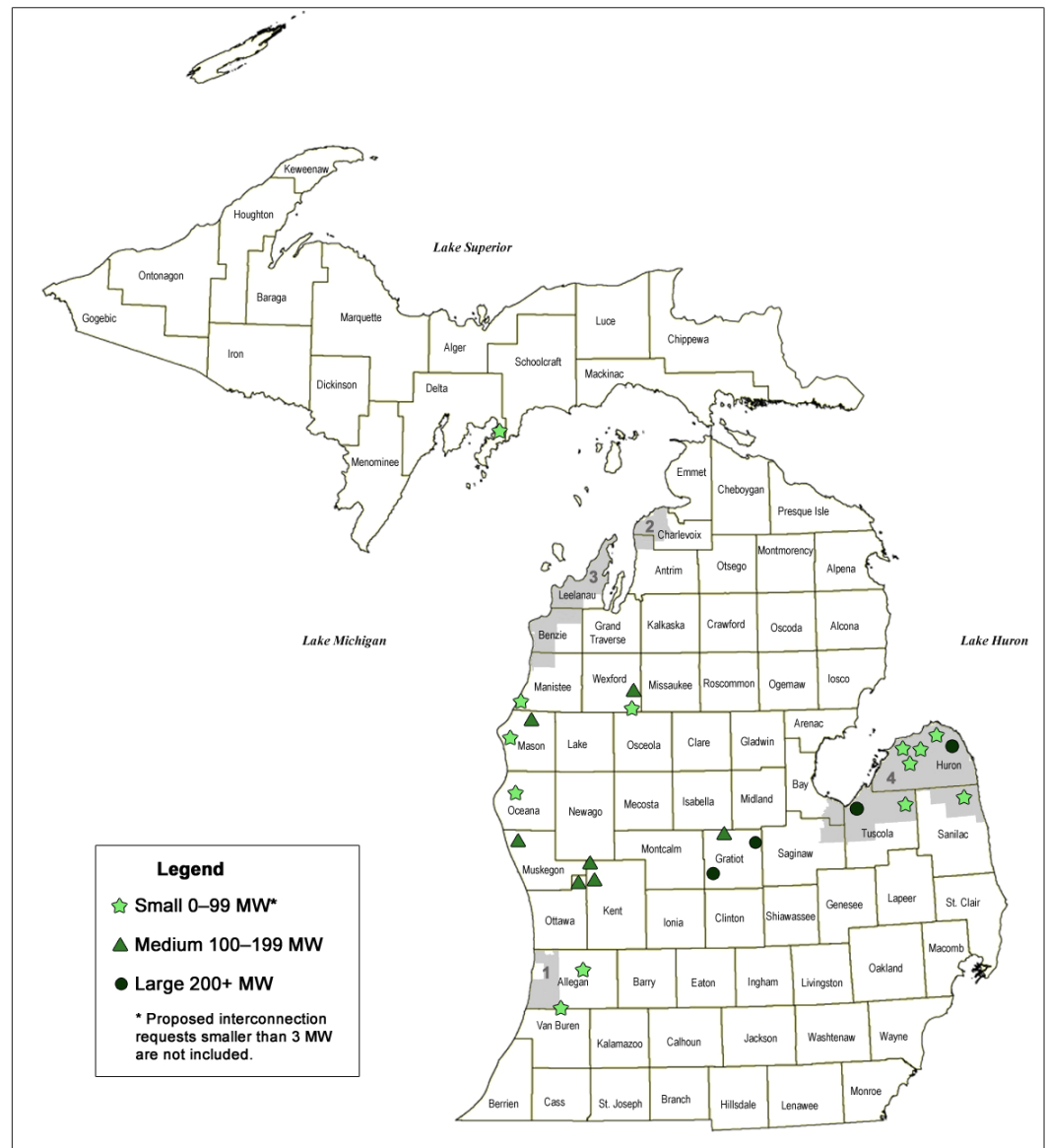
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## Wind Energy Systems in Service in Michigan, April 2009

Name	Location	Capacity (MW)	Units	Turbine manufacturer	Developer/owner	Power purchaser	Year online
Michigan Wind I	Ubly, Huron County	69.0	46	GE Energy	Noble Environmental Power/John Deere Wind Energy*	Consumers Energy	2008
Stoney Corners Wind Farm	Richland Township, Missaukee County	5.0	2	Fuhrlander	Heritage Sustainable Energy	DTE Energy	2008
Harvest Wind Farm	Pigeon, Huron County	52.8	32	Vestas	John Deere Wind Energy	Wolverine Power Cooperative	2008
Mackinaw City	Mackinaw City	1.8	2	NEG Micon	Mackinaw Power	Consumers Energy	2001
Traverse City Light and Power	Traverse City	0.6	1	Vestas	Traverse City Light and Power	Traverse City Light and Power	1996

# Wind Generation Interconnections Pending

- There are 24 commercial wind energy projects proposed in Michigan that are categorized as active in the interconnection queue.
- These projects represent a total of nearly 2,700 megawatts of capacity.
- Projects of less than three megawatts seeking to interconnect to the distribution system are not shown.



## Expedited Siting – Six Months

- To facilitate the transmission of electricity generated by wind energy conversion systems located in wind energy resource zones, the commission **may issue an expedited siting certificate for a transmission line** to an electric utility, affiliated transmission company, or independent transmission company.

# **Expedited Siting: Process**

**The commission shall grant an expedited siting certificate if it determines that all of the following requirements are met:**

- The proposed transmission line will facilitate transmission of electricity generated by wind energy conversion systems located in a wind energy resource zone.
- The proposed transmission line has received federal approval.
- The proposed transmission line does not represent an unreasonable threat to the public convenience, health, and safety.
- The proposed transmission line will be of appropriate capability to enable the wind potential of the wind energy resource zone to be realized.
- The proposed or alternate route to be authorized by the expedited siting certificate is feasible and reasonable.

# Local Government and Public Comment

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- PA 295 established a 63-day comment period for local governments
  - Public Sector Consultants developed an on-line survey
- In August, the Board held public hearings in Bad Axe and Scottville
- Public comments included concerns about how close turbines could be located to homes
  - Noise
  - Vibrations
  - Flicker
- Board's final report will include analysis of all comments

# Next Steps

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- Board issues its final report on October 15
- Transmission analysis due on November 30
- Commission issues an order designating a primary wind zone and possibly additional wind zones
- In conjunction with issuing the order, the Commission will submit a report to the legislature on the effect of setback requirements and noise limitations under local zoning. The report will also include any recommendations for legislation addressing these issues.
  - Commission must hold public hearings in various areas of the state to receive public comment on the report.

# Questions?

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Michigan Public Service Commission

[www.michigan.gov/windboard](http://www.michigan.gov/windboard)