CONSIDERATIONS FOR OFFSHORE WIND IN MICHIGAN

A REPORT TO THE MICHIGAN ENERGY OFFICE[1]

FEBRUARY 2013

REVIEW OF GLOW COUNCIL REPORT

The Michigan Great Lakes Offshore Wind (GLOW) Council reports of 2009 and 2010[2] represented a significant step forward for Michigan to evaluate the potential for offshore wind energy in Michigan's waters of the Great Lakes. The 2010 report identified the most and least desirable areas for offshore wind energy based on a set of 22 criteria established by the council in 2009. Five specific areas were identified as favorable:

1. Southern Lake Michigan near Berrien County
2. Northern Lake Michigan near Delta County
3. Central Lake Superior near Alger County
4. Central Lake Huron (out from Saginaw Bay)
5. Southern Lake Huron near Sanilac County

The appropriate next step is to develop a regulatory framework that enables state regulators, developers and interested citizens to adequately assess the potential benefits and disadvantages of an actual offshore wind farm in Michigan's waters of the Great Lakes. The 2010 report addressed that step in part by providing input on a legislative framework for leasing Michigan's Great Lakes bottomlands and permitting offshore wind energy systems. The legislative framework outlined in the 2010 GLOW Council report includes a recommendation that the state offer certain parcels of Great Lakes bottomlands within the most favorable wind resource planning areas at a competitive public auction as soon as practicable following enactment of new legislation. It suggests permitting guidelines, leasing methods, and payment structures, and a proposed process for public input in decision-making.

Legislation was introduced into the Michigan House of Representatives in 2010 (House Bill 6564) based on the GLOW Council recommendations, but that legislation never received serious consideration by the legislature. Subsequent changes in state leadership, lingering backlash from an ill-fated 2009 private offshore wind proposal near Ludington, and changes in electric energy markets significantly slowed interest in moving legislation and the development of an offshore

[1] This report was prepared by Victoria Pebbles, Program Director at the Great Lakes Commission under contract to the Michigan Energy Office. The views expressed herein do not necessarily reflect those of the Great Lakes Commission.

[2] http://www.michiganglowcouncil.org/

wind regulatory framework in Michigan. Without a clear process for evaluating offshore wind proposals, the state remains in a regulatory limbo concerning offshore wind.

LACK OF REGULATORY FRAMEWORK: IMPLICATIONS

Although Michigan has a suite of environmental and coastal management laws, there is no framework to efficiently and effectively evaluate offshore wind projects for their potential impacts on Michigan's environment or the economy. Had the proposed 2010 legislation passed, rules would have been developed to implement that legislation which would have articulate a process by which offshore wind proposals could be appropriately evaluated by state regulators and other relevant state authorities, and by which the public could have appropriate input into that process. (The 2010 GLOW Council report addressed the issue of public input in decisionmaking which was included as part of the proposed 2010 legislation.) Absent adequate institutional mechanisms to properly evaluate such proposals—and a formal structure to engage the public offshore wind decisionmaking—state regulators are poorly-equipped to make well-informed decisions about the merits and disadvantages of a proposed project. Similarly, the public and coastal communities are left to decipher the pros and cons of a without the benefit of a robust analysis that considers the full array of impacts, both positive and negative, based on vetted criteria and a democratic decisionmaking process. The situation makes it ripe for offshore wind proposals to receive reactionary responses from local communities and the public. It further puts state decisionmakers in the potentially difficult position of having to review a proposal without specific regulatory framework in place—leaving the results of any review ripe for a legal challenge. Moreover, the lack of a framework may well send a message to developers that the state is not interested in even considering offshore wind.

As a case in point, the backlash against offshore wind that Michigan is witnessing in the Ludington area stemmed from a foreign offshore wind developer (Scandia) who came to that local area with no knowledge of the local culture and without a state regulatory process that would ensure public input into any decisions regarding leasing of the states bottomlands. Had a state regulatory framework been in place, the proposal would have triggered that state process for evaluating the propriety of such a proposal; the citizens of Ludington and Michigan alike would have been able to rely on the democratic process to manage a civil dialogue about the propriety of the project that included an assessment of the economic, social and environmental costs and benefits to the community and to the state overall.

GREAT LAKES OFFSHORE WIND ENERGY CONSORTIUM

In March 2012, Governor Rick Snyder, along with four other Great Lakes governors, signed a bipartisan federal-state Memorandum of Understanding (MOU) establishing a Great Lakes Offshore Wind Energy Consortium (GLOWEC) to support the efficient, expeditious, orderly and responsible review of proposed offshore wind energy projects in the Great Lakes. This new regional forum sets the stage to revisit the issue of offshore wind from a regional perspective. The MOU recognizes state primacy for regulating Great Lakes bottomlands, while acknowledging that leasing, permitting, constructing and operating a wind farm will inevitably trigger multiple federal regulatory and review authorities. The GLOWEC provides an institutional arrangement to bring necessary state and federal agencies to the table to coordinate all regulatory and permit review interests related to offshore wind development in the Great Lakes. Further, the GLOWEC implicitly recognizes that

there are regional implications associated with the infrastructure needed to construct and maintain an offshore wind facility (vessels, transmission, etc.), even though a specific project is likely to be in the waters of a single state.

The GLOWEC is charged with developing a regulatory roadmap by June 30, 2013 that describes the regulatory review process and identifies current and anticipated data needed to inform efficient review of proposed offshore wind energy facilities in the Great Lakes. The MOU does not prescribe the development or implementation of new state or federal administrative rules or regulations pertaining to offshore wind development. However, by assessing existing rules, processes and regulations currently required under existing law and policy, as is required for the regulatory roadmap, the work of the GLOWEC is likely to uncover area where exiting policy and rules are insufficient to appropriately evaluate an offshore wind proposal.

The GLOWEC met in May, 2012. Subsequently, a template was developed to collect state and federal permitting information as called for by the MOU. Information about existing permitting that would affect offshore wind in Michigan has been compiled which partly satisfies the offshore wind regulatory roadmap for Michigan as required by the MOU. Additional work is needed to review and quality control the information compiled to date and to provide it in a "roadmap" format that will be useful to regulators and developers. The Great Lakes Commission is in discussions with the White House Council on Environmental Quality to secure resources to coordinate the Great Lakes the states in this endeavor to meet the June 2013 deadline as per the MOU.

KEY AREAS FOR FUTURE RESEARCH AND POLICY SUPPORT

The Wind Program of the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy is advancing a national strategy for offshore wind research and development.[3] The Wind Program is leading market analysis and technology development research that will overcome key barriers including the relatively high cost of energy, the mitigation of environmental impacts, the technical challenges of project installation, and grid interconnection. Several projects have been funded and are underway at the national and regional levels with import for offshore wind the Great Lakes.[4] Key issues for the Great Lakes are summarized below.

ICE AND TRANSMISSION

The primary technical barrier for offshore wind is the issue of ice. Although the icing is not as extreme in saltwater environments, lessons can be learned from those European offshore wind farms which contend with ice issues (e.g., they have ice breaking cones or barriers that break up the ice). Research is underway at federal agencies, federal laboratories and universities to try to design systems that can enable offshore wind farms to be built, operated and maintained without risks associated with ice.[5] There are two primary concerns related to ice: ice buildup on or around the

[3] *A National Offshore Wind Strategy: Creating an Offshore Wind Industry in the United States*, U.S. Department of Energy, 2011. http://www1.eere.energy.gov/wind/pdfs/national_offshore_wind_strategy.pdf

[4] Information about specific DOE-funded projects can be found online at http://www1.eere.energy.gov/wind/offshore_wind.html

[5] The Icebreaker offshore wind project off the coast of Cleveland proposes to use monopile foundations designed to reduce ice loading. Research on icing and wind turbines is being conducted at the University of

turbine (floes, driving ice, etc.) and the buildup of ice on wind turbine blades due to the spray of a breaking wave (which could result in ice throw). A second, but no less important technical issue is constructing submerged electric transmission systems and connecting them to the existing grid.[6]

Ecological Impact Data and Information

Research on ecological impacts from offshore wind in the Great Lakes is just beginning. Although there are currently no U.S. state offshore wind permitting programs for the Great Lakes, existing state environmental rules, and proposed state rules and legislation designed to address offshore wind, indicate that ecological information will be required to for states to properly evaluate and make permitting decisions related to leasing and operating wind farms in the Great Lakes. Additionally, the placement of structures in navigable waters of the U.S. will require an Environmental Impact Statement or Environmental Assessment under the National Environmental Policy Act. At the present time, the body of scientific literature about ecological impacts of wind energy is still relatively young.

Great Lakes region-specific research, particularly as it relates to offshore wind, is notably lacking. Answers are needed to questions such as: What are acceptable levels of take for a species? What are appropriate buffers from important ecological areas? How is "ecologically-defensible" determined? Research is needed to answer these questions, which may take years and possibly decades. State regulators and other decisionmakers may not have the luxury to have all of the answers about ecological impacts before needing to make a decision regarding offshore wind. Some type of standardized survey and monitoring protocols are needed as part of a regulatory framework that can allow wind development proposals to be evaluated and decisions to be made that uses the best information available.[7] A 2012 workshop hosted by the Great Lakes Wind Collaborative brought European experts to the Great Lakes region to discuss research findings related to offshore wind impacts on fish. The workshop summary to be released in early 2013 will help define the key regulatory and research questions with respect to potential fishery impacts.[8]

Michigan, among other universities in the region. More information about icing patterns on the Great Lakes is provided by Wang, J., 2012. *Spatial and Temporal Variability of Great Lakes Ice*. Presented at the 2012 GLWC Workshop: Offshore Wind Energy – Understanding Impacts on Great Lakes Fishery and other Aquatic Resources http://www.glc.org/energy/wind/fishimpact/pdf/Wang-WindEnergy-AA-Nov29-2012.pdf

[6] *Transmission-Related Policy Options to Facilitate Offshore Wind in the Great Lakes.* University of Michigan School of Natural Resources Masters Project prepared for the Great Lakes Wind Collaborative. April, 2011 http://www.glc.org/energy/wind/publications/pdfs/Transmission-Policies-for-GL-Offshore-Wind_FINAL.pdf

[7] *State of the Science: An Assessment of Research on the Ecological Impacts of Wind Energy in the Great Lakes Region*. Great Lakes Wind Collaborative, October, 2011. http://www.glc.org/energy/wind/sosworkshop/pdf/Scientific-Assessment-Report-final.pdf

[8] Neihnhuis, S. and Dunlop, E.S., 2011. *Potential effects of offshore wind power projects on fish and fish habitat in the Great Lakes*. http://www.mnr.gov.on.ca/stdprodconsume/groups/lr/@mnr/@aquatics/documents/document/stdprod_103058.pdf

A late 2012 U.S. Department of Energy award to the Great Lakes offshore wind project, *Icebreaker,* affords Michigan and other Great Lakes states an opportunity to learn from the environmental permitting process (and content) that will be undertaken as part of that project in 2013.

Decision Support Tools

The Great Lakes Wind Collaborative is working with its membership to build on Michigan's Lakebed Alteration Assessment Tool (which was used to inform the GLOW Council's work) and the Great Lakes Wind Atlas to develop of a Great Lakes-wide wind siting tool. The concept is to establish a user-friendly GIS-based mapping tool that allows users to see if certain areas of the lakebed are more or less suitable for proposed activities—including offshore wind. Such a tool could assist the state of Michigan in evaluating offshore wind proposals. It would serve as a screening tool, much like the Michigan Water Withdrawal Assessment Tool helps proponents and regulators screen proposed water withdrawals in the state.

Next Steps for Offshore Wind In Michigan

The next logical step for Michigan would be to implement the GLOW Council recommendations through a combination of regulatory and administrative rulemaking, legislation, guidance documents, and decision support tools. Some of the GLOW Council recommendations, such as payment structures will require new legislation, while other activities, such as leasing methods, could be accomplished by modifying existing rules. Still, other recommendations, such as permitting guidelines, could be developed by the lead executive agency (DEQ) without any formal legislative or regulatory action. State guidelines for offshore wind would likely to be the most efficient and effective next step given political divisiveness and competing priorities within the Michigan legislature. Michigan state guidelines were developed in the past for onshore wind siting; it would be reasonable for the state to issue offshore wind guidelines on offshore wind permitting. This could be accomplished relatively easily by using the information gathered through the GLOWEC with the information and recommendations of the GLOW Council. This would provide some clarity to potential developers, provide the public with the much-needed assurance that the state has thought through the key issues related to offshore wind and is prepared to establish a process for public input in decisionmaking.

Michigan's Public Trust Responsibilities

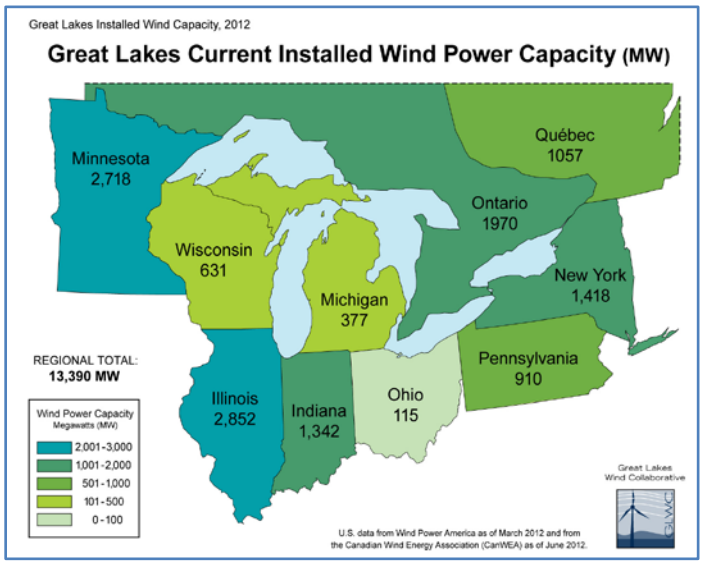
Because adjacent communities would likely reap more of the impacts of offshore wind, both positive and negative, it is reasonable that their voices should be given additional weight in the consideration of offshore wind proposals. However, the bottomlands of the Great Lakes belong to the state of Michigan,[9] not the communities adjacent to the lake. The decision about what happens

[9] As per the Public Trust Doctrine, Great Lakes bottomlands are held in trust for the citizens of the state.

to those bottomlands should be made by the state.[10,11]

JOBS AND ECONOMIC DEVELOPMENT IMPACTS

A 2008 analysis by the National Renewable Energy Laboratory[12] for the GLWC showed that an additional 1,000 MW of wind development in each of the 8 Great Lakes states (8,000 MW) would produce more than $9 million in lifetime economic output impacts, including 97,000 jobs over the 20 year life of the project. This same analysis showed that a commensurate reduction in fossil fuel generation would eliminate 23 million tons of CO_2 emissions and save 11 million gallons of water *each year*. That same analysis also showed that a 20% wind scenario for the region would create nearly 750,000 jobs (not including manufacturing) with more nearly $80 billion in lifetime economic output. What is significant about these figures from 2008 is that at the time the analysis was performed, the U.S. was purchasing all of its turbines from overseas and the analysis assumed no U.S. manufacturing or any jobs associated therewith.



A 2012 study by Illinois State University on the Jobs and Economic Development Impact of Offshore wind in the Great Lakes looked at the jobs and economic development impacts from low, medium and high offshore wind installations in the Great Lakes. This study which *did* incorporate domestic manufacturing content indicated that 2,000 megawatts of installed offshore wind in the Great Lakes

[10] The landmark U.S. Supreme Court decision, *Illinois Central Railroad v. Illinois,* established the state's trustee responsibilities for submerged lands.

[11] Shafer, C., 2008. *The Public Trust Doctrine and Offshore Energy Facilities: Modern Application of an Ancient Doctrine*. Presented at the 2008 International Submerged Lands Conference. http://www.submergedlands.com/conferences.html

http://www.mcatoolkit.org/pdf/ISLMC_08/The_Public_Trust_Doctrine_and_Offshore_Energy_Facilities_Modern_Application_of_an_Ancient_Doctrine.pdf

[12] Lantz, E., 2008. Great Lakes Region Economic, Carbon, and Water Impacts from Wind Power, summary of impacts, methodology, and considerations. Wind Powering America

by 2020 would generate more than 50,000 jobs during construction. Of these, more than 20,000 would be supply chain-related (i.e., manufacturing) and more than 1,500 total jobs would be created per year over the life of the project (20 years).

Scenario	2,000 MW by 2020	10,000 MW by 2030
Construction Period Jobs	Jobs	Jobs
Project Development and Onsite Labor Impacts	6,446	50,445
Construction and Interconnection Labor	5,026	43,345
Construction-related Services	1,420	7,101
Turbine and Supply Chain Impacts	23,635	198,028
Induced Impacts	20,370	165,730
Total Impacts	**50,451**	**414,203**

Great Lakes Offshore Wind Jobs and Economic Development Impact Analysis, 2012

A scenario with 10,000 megawatts of installed wind in the Great Lakes by 2030 would create more than 400,000 jobs during construction, including nearly 200,000 manufacturing-related jobs. These studies are examples of how this industry might evolve across *the region*; other studies may use different assumptions and produce different results across the region or within individual states.

MICHIGAN AND THE GREAT LAKES WIND COLLABORATIVE

The Great Lakes Wind Collaborative (GLWC) continues to serve as the forum for Great Lakes states and provinces to network with business interests, utilities, environmental groups, academic institutions, and wind developers on technical, scientific and regulatory aspects of wind energy development. Secretariat services for the GLWC are provided by the Great Lakes Commission, ensuring relevant state and provincial agency access to the information generated by and priorities pursued by the GLWC.

The GLWC will continue to serve Michigan's interests related to wind energy, and offshore wind energy in particular by identifying and promoting best practices, sharing relevant knowledge and information, developing decisions support tools like the Great Lakes Wind Atlas, and facilitating dialogue and building consensus among diverse interests. The following resources are available at the GLWC web site to assist the state of Michigan in developing appropriate and timely policies, initiatives, and programs related to wind energy in the Great Lakes region (http://www.glc.org/energy/wind) include:

- *State of the Science: An Assessment of Research on the Ecological Impacts of Wind Energy in the Great Lakes Region* , October, 2011
- *Best Practices for Sustainable Wind Energy Development in the Great Lakes Region* July, 2011
- *The Role of the Great Lakes-St. Lawrence Seaway Ports in the Advancement of the Wind Energy Industry,* September, 2010
- *State and Provincial Land-Based Wind Farm Siting Policy in the Great Lakes Region: Summary and Analysis,* January, 2010
- *Offshore Siting Principles and Guidelines for Wind Development on the Great Lakes,* October, 2009
- *Preparation for Offshore Wind in Lake Michigan: Information Solicitation Options for Michigan and Wisconsin,* August, 2009