



Great Lakes Wind Collaborative

**Best Practices for Sustainable
Wind Power Development
in the Great Lakes Region
and Beyond**

**Victoria Pebbles
Great Lakes Commission
June 29, 2011**

Great Lakes Wind Collaborative

A multi-sector coalition of wind energy stakeholders working to facilitate the sustainable development of wind power in the bi-national Great Lakes region.

*A forum for dialogue
and information
exchange*

- ✓ Advance science and knowledge to inform decision-making
- ✓ Coordinate a broad array of interests
- ✓ Build consensus on issues affecting wind power

www.glc.org/energy/wind



Project Goal

***Overcome barriers
and
impact the market for wind energy
Through
development and
strategic dissemination
of
information tools on best practices.***

Methods and Tasks

Identified existing
land based policies
for wind
development



State and Provincial Land-Based Wind Farm Siting Policy in the Great Lakes Region: Summary and Analysis



Benlon County Wind Farm, located near Earl Park, Indiana. Photo © John Scharlaub.



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Great Lakes Commission January 2010

Methods

- Literature review
- Develop criteria to evaluate and rank policies and practices
 - What makes a policy or process “better” or “best”?
- Compiles candidate practices and policies
- Applied criteria
- Conducted online survey of top candidates
- Conducted interviews:
 - ENGOs
 - Industry
 - Regulators
- Project Advisory Team engaged throughout

Evaluation and Ranking Criteria

- **Administratively Efficient**
- **Cost-Effective**
- **Engages Public**
- **Environmentally and Culturally Protective**
- **Scientifically Sound**
- **Preferential to Clean Energy Sources**
- **Creates and/or Maintains Jobs**
- **Encourages Proactive Approaches**
- **Respectful of Landowner and Community Interests**
- **Adaptable**
- **Coordinative and Collaborative**

Final Practices Selected by Workgroup Members from:

Federal, state and local
government regulators

**Best
Practices**

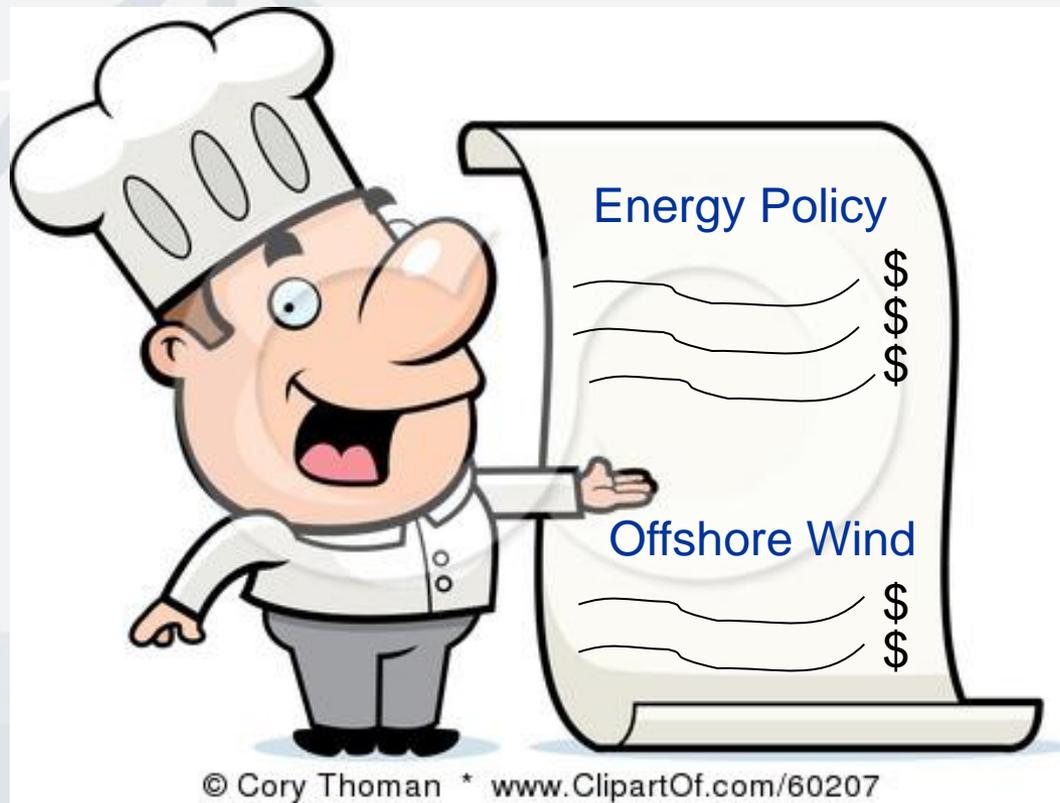
Environmental
groups

Wind
Industry

dreamstime.com

Each best practice is considered as part of a “menu” of preferred options from which regulators, communities and developers can choose .

Best Practices Menu



**Clean Energy States Alliance (CESA)
and the Great Lakes Wind
Collaborative (GLWC) Present:**

***Best Practices for
Sustainable Wind Energy
Development in the
Great Lakes Region***

June 29, 2011

Anne Margolis, CESA

Guest: Victoria Pebbles. GLWC

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Clean Energy States Alliance: Working with State Clean Energy Programs

CESA is a multi-state coalition of clean energy programs that develops & promotes clean energy technologies through:

- **Information Exchange**
- **Partnership Development**
- **Joint Projects**
- **Technical Assistance**



AK, CA, CO, CT, HI, IL, FL, MA, ME, MD, MN, NH, NJ, NY, OH, OR, PA, VT, WI, DC, LIPA, & SMUD

Overview of the States Advancing Wind Project

Clean Energy States Alliance (CESA) was awarded a two-year grant from the U.S. Department of Energy to develop new organizational and analysis activities to advance outreach and provide technical assistance to state agencies and officials across the nation regarding the merits, approaches, and policy tools available to accelerate wind project development.



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Program Guide: *Supporting On-Site Distributed Wind Generation Projects*



STATE CLEAN ENERGY PROGRAM GUIDE

STATE WIND ENERGY PROGRAM GUIDE: SUPPORTING ON-SITE DISTRIBUTED WIND GENERATION PROJECTS

Charles Kubert and Mark Sinclair, Clean Energy States Alliance
May 2010

INTRODUCTION

Commercial wind power installations in the U.S. continue to grow at a rapid pace, with over 35,000 MW of wind energy now installed. Even in 2009, during the height of the global recession and credit crunch, new installed wind capacity increased by 39% – or 10,000 megawatts – in the U.S. (AWEA 2010). However, this growth should not be viewed as an indication that there is widespread community acceptance of wind development. These projects still often go through extensive pre-development work only to be ultimately turned down by local officials or stymied by community opposition. In some areas of the country (e.g., the Northeast), large-scale wind development simply is not practical because of the lack of available open space, the presence of environmentally or visually sensitive areas (e.g., ridgelines), and high population density. Many communities may be supportive of wind energy in general but desire projects that are appropriately scaled and directly benefit the community.

Reflecting this reality, states, communities, institutions and private businesses increasingly are interested in advancing on-site, distributed wind generation projects. These are wind energy projects owned by or sited at municipal, other governmental, commercial, or industrial sites that are designed and sized to match the electricity needs of the host facility. There are several factors that make these projects attractive:

- **Builds community support for wind energy:** In a community where commercial wind development is occurring, or has the potential to occur, distributed wind energy projects allow residents to “kick the tires” of a wind turbine, and become more invested in wind energy in their community.

Reviews the following state-based programs and policies:

- Financial Incentives and Financing Assistance
- Site Assessment and Feasibility Support
- Net Metering and Interconnection Policies
- Regulations Allowing Third-Party Ownership
- Model Onsite Wind Zoning Ordinances
- Green Communities Laws

Program Guide: *State-Based Financing Tools to Support Distributed and Community Wind Projects*



STATE CLEAN ENERGY PROGRAM GUIDE

STATE-BASED FINANCING TOOLS TO SUPPORT DISTRIBUTED AND COMMUNITY WIND PROJECTS

Charles Kübert and Mark Sinclair, Clean Energy States Alliance
May 2010

INTRODUCTION

Commercial wind-power installations in the United States continue to grow at a rapid pace, with over 35,000 megawatts (MW) of wind energy now installed. Even in 2009, during the height of the global recession and credit crunch, 10,000 MW of new wind capacity was installed in the U.S., representing a 39% increase in total capacity (AWEA, 2010). A combination of state and federal policies are driving this robust wind project growth, including state renewable portfolio standards (RPS), the federal production tax credit, and key policy changes under the American Reinvestment and Recovery Act (ARRA). Of particular note, ARRA allows wind developers/investors to claim a 30% investment tax credit or 30% cash grant in lieu of tax credit rather than the 10-year production tax credit. These ARRA provisions have made projects more financially attractive and reduced dependency on the shrinking pool of tax equity project investors. Finally, state-based clean energy fund support for wind projects continues to be an important source of financing for wind projects, especially when designed to address private finance gaps.

To complement commercial wind development, states increasingly are recognizing the importance of supporting community¹ and distributed on-site² wind energy projects. These projects can play an important role in building public support for wind energy, have shorter development timelines, and can easily be integrated into electricity distribution systems. The purpose of this program guide is to review

¹ Community wind projects generally refer to wholesale wind energy projects in which no power is used on-site and the project has significant local ownership and management in the form of private landowners and investors, municipal electric utilities, or rural electric cooperatives. While there are no particular project size constraints, community wind projects would typically use megawatt-scale wind turbines.

² Distributed, onsite wind projects (sometimes referred to as "behind-the-meter") refer to projects in which most of the electricity generated is used by, although not necessarily owned by, an adjacent municipal, public, or commercial facility. Any excess power not used by the facility is sent onto the distribution grid and is "net metered" through a monthly or annual billing true-up.

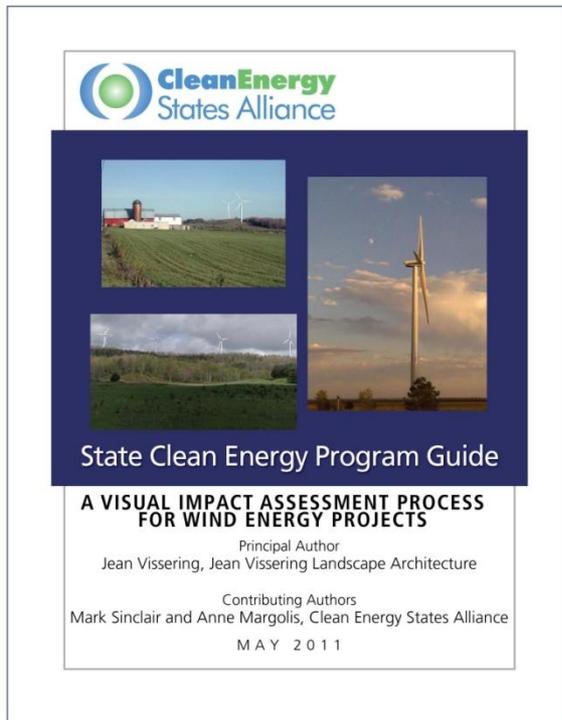
Reviews traditional and emerging financing tools, including:

- Federal Incentives: PTC, ITC, CREBs, Loan Guarantee Program, ARRA
- State Grants, Rebates/Incentives
- Feasibility Study Grants
- Predevelopment Loans
- Equipment Procurement Loans
- Construction (Bridge) Financing
- Permanent Financing
- Interest-rate Buydowns
- Production Incentives
- RPS Set-Asides
- Third-party Ownership

Program Guide: *A Visual Impact Assessment Process for Wind Energy Projects*

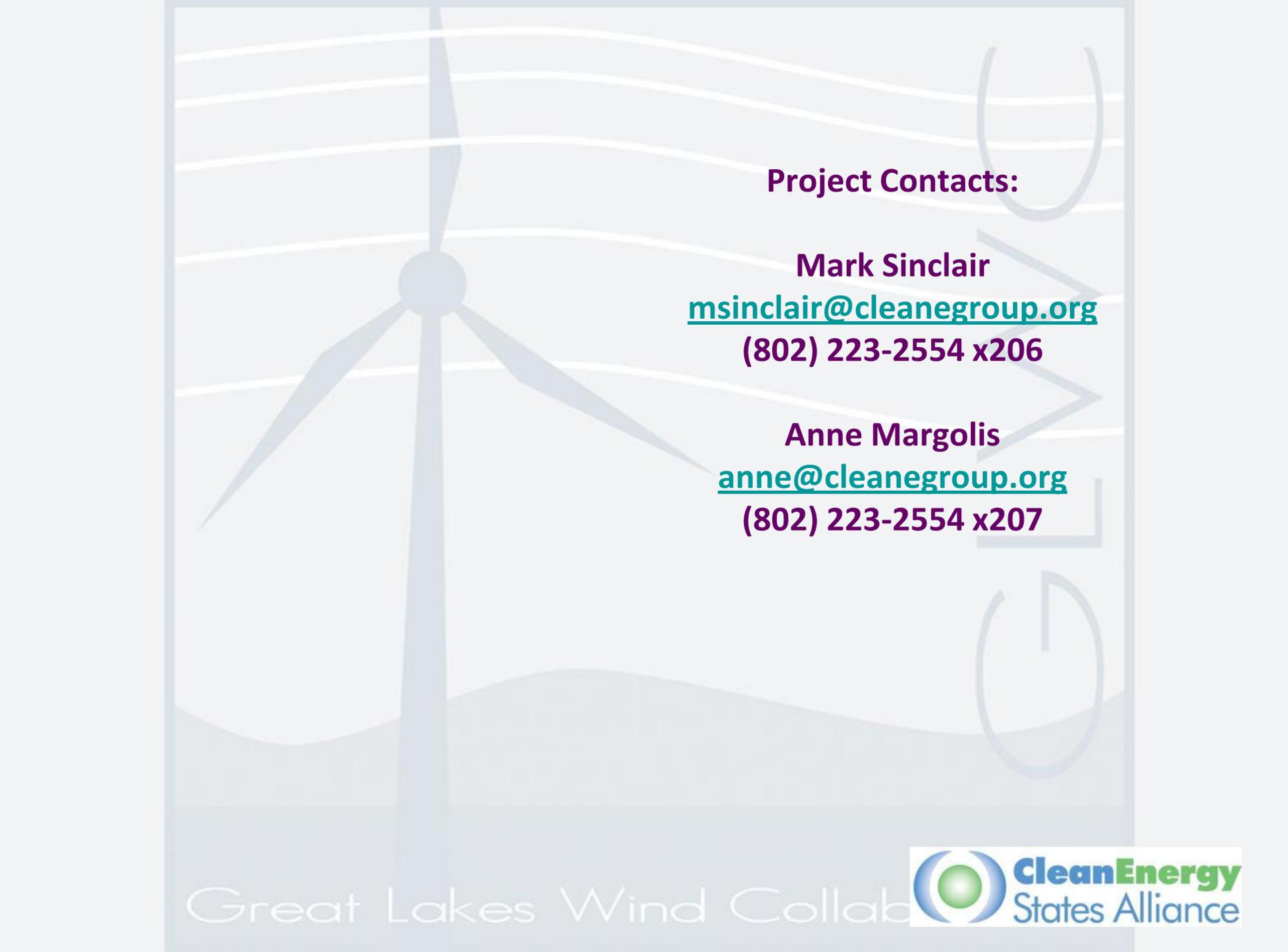
Outlines essential elements of a visual impact assessment process for use by state officials in reviewing proposed wind projects, including:

- List of Basic Graphic Information (project map, natural and cultural resources, viewpoints, etc.)
- Procedure for Evaluation of Visual Impacts
 - Would the Project have Adverse Visual Impacts? What are they?*
 - Would the Project have Unreasonable or Undue Visual Impacts?*
- Final version released in May



States Advancing Wind Webinars

- **Webinar #1 on 4/8/10: State policies and programs to advance Distributed Wind Projects**
- **Webinar #2 on 5/25/10: Effective public financing tools to support distributed wind development**
- **Webinar #3 on 10/14/10: How public officials can objectively assess the visual effects of wind development**



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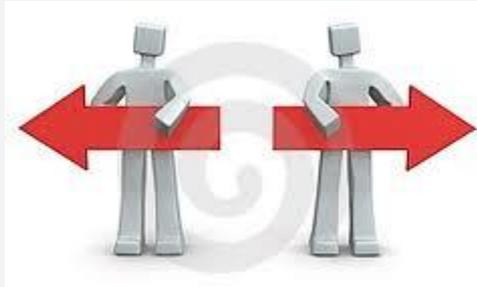
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Topics Addressed

- Siting, Planning and Permitting
 - Energy Policy
 - Public Engagement
 - Offshore Wind
-

maximizing economic opportunities



sensitive to community needs and concerns



minimizing environmental impacts

Energy Policy



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Balanced and Uniform Siting Policies

- **Regulators should create balanced and transparent policies that are uniform throughout a state or region to help protect communities and the environment, while enabling developers to propose wind farms that meet community approval.**
 - **Lack of planning and zoning uniformity often a major barrier to wind development.**
 - **All eight Great Lakes states are “home rule” states.**
 - **Local policies may differ substantially**



Case Example

- **Wisconsin Statewide Wind Siting Rules**
 - PSCW published final rules in December 2010 governing the siting of wind turbines in the state. Suspended as of March, 2011.
 - Gives local governments jurisdiction over wind projects that are under 100 MW, but require all larger projects to be sent to the PSCW for review.



Wisconsin Statewide Wind Siting Rules

- **All projects larger than 100 MW must apply for a Certificate of Public Convenience and Necessity (CPCN). CPCN report must include:**
 - **Technical information**
 - **Siting and supply alternatives**
 - **Construction processes**
 - **Substation and transmission information**
 - **Public outreach**
 - **Visual simulation**
 - **Environmental impact assessments**
 - **Wetland permits**
 - **Noise and shadow flicker information**

Financing Mechanisms and Financial Incentives

- Regulators should provide clear, consistent, and well-designed financing mechanisms or financial incentives that assure developers they will be able to recoup costs in a competitive market.
 1. Feed-In Tariffs (FITs)
 2. Tax Credits
 3. Loan Guarantees
 4. Net Metering
 5. Payment in Lieu of Property Taxes
 6. Revolving Loan Funds for Renewable Energy Projects
 7. Renewable Portfolio Standards (RPS)



Case Example

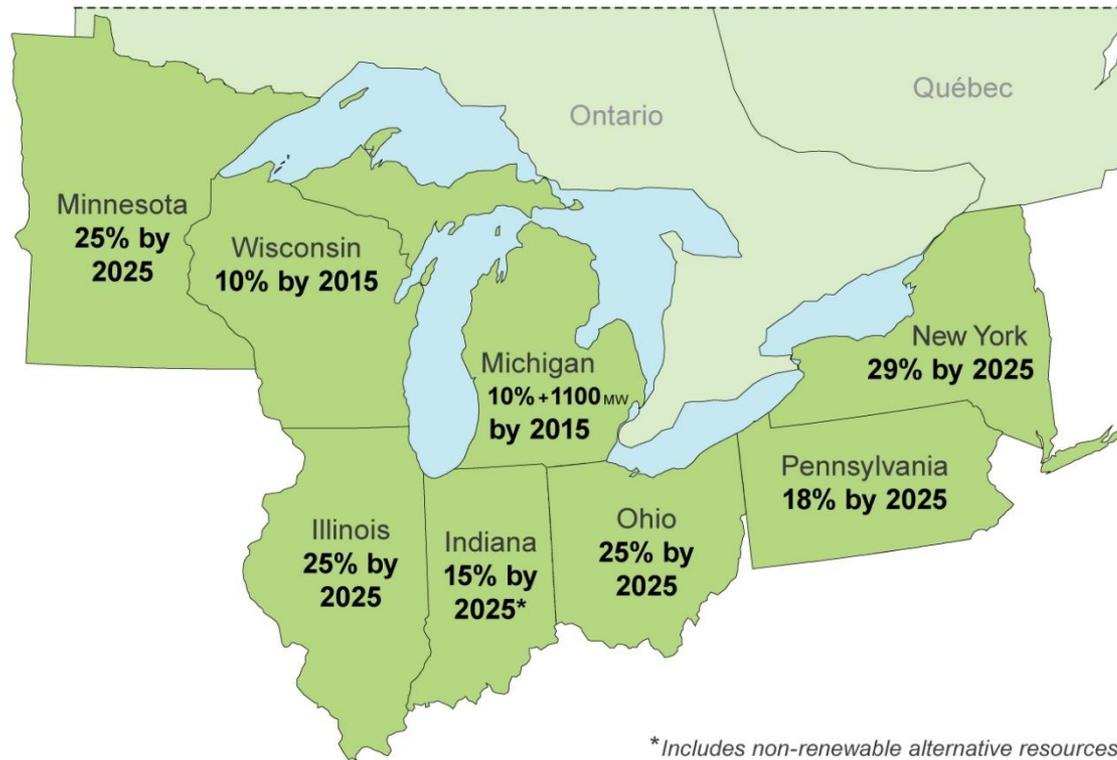
- **Ontario's Feed-in Tariff Program**
 - North America's first comprehensive guaranteed pricing structure for renewable electricity production
 - Enabled by the *Green Energy and Green Economy Act of 2009*. Signed into law May 14, 2009
 - Ontario Power Authority implements
 - Help Ontario phase out coal-fired electricity generation by 2014, the largest climate change initiative in Canada

- 13.5 cents per kWh for onshore wind



Renewable Portfolio Standards

Great Lakes State Renewable Portfolio Standards



- Jurisdictions should maintain RPS programs and increase state/provincial RPS/RES targets over time.

RPS Case Examples

- **Wisconsin RPS**

- requires electricity providers to meet a gradually increasing percentage of their retail sales with renewable resources
- overall statewide renewable energy goal of 10 percent by Dec. 31, 2015

- **Massachusetts RPS**

- 1% each year until 15% by 2020
- 1% each year thereafter

Integrated Resource Planning (IRP), Transmission Planning and Advanced Grid Management

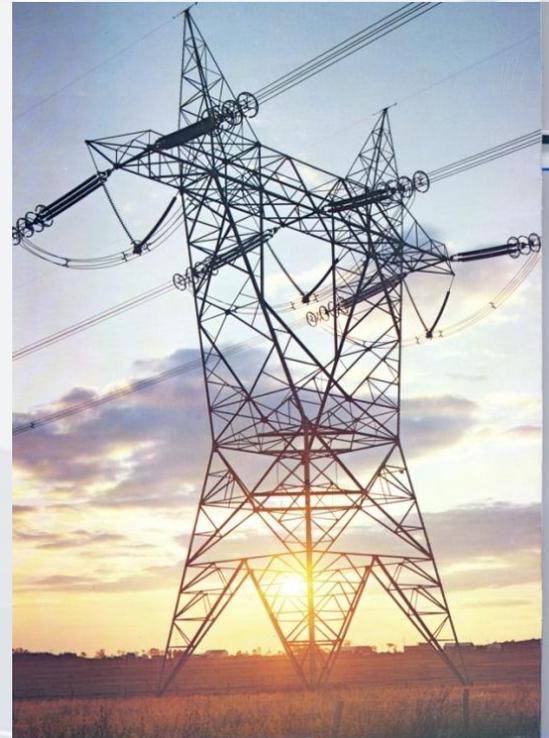
- Regulators should implement transmission policies supporting the development and implementation of Integrated Resource Planning (IRP) and advanced grid management, consistent with federal and state/provincial legislative authority.
 - Inter-jurisdictional transmission planning and siting must be strengthened to optimize future investments and ensure the grid accommodates renewables
 - Cost allocation measures can improve system adequacy to lower overall costs of integration across multiple jurisdictions



Case Example

Minnesota Integrated Resource Planning (IRP)

1. Regulated utilities required to file IRPs every 2 years
2. Must include a 15-year demand forecast and the utility's proposed capacity additions to meet the demand
3. The MPUC approves, modifies or rejects the resource plans of rate-regulated utilities.
4. Law prohibits new or refurbished *nonrenewable* energy facility unless the utility has demonstrated that a renewable facility is not in the public interest.



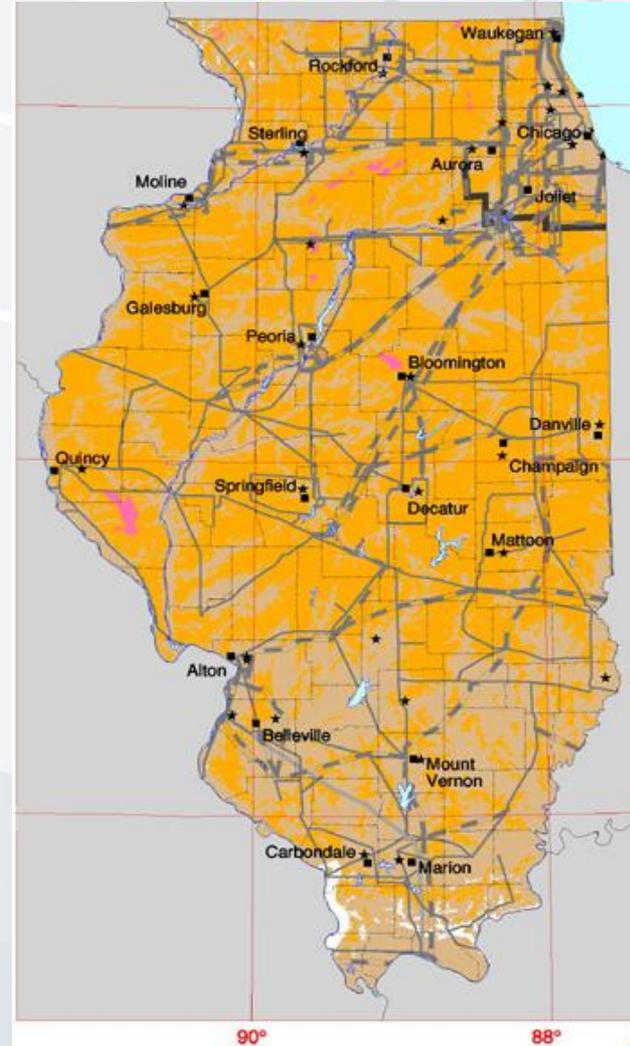
Strategic Siting for Efficient Transmission Management

- **Strategically site wind developments to take advantage of existing transmission capabilities when possible and develop new electric transmission system infrastructure as needed to provide access to premier renewable energy.**
- **Issues**
 - **Cost – Who Pays?**
 - **Rights of Way**
 - **Land Use / Landscape Values**



Case Example

- **Illinois Electric Transmission Grid**
 - **Strong wind resources and well-developed transmission grid**
 - **Wind farms can tie into this**
 - **Lesser developed jurisdictions must invest millions of dollars building transmission lines to access their renewable resources**
 - **Companies opting to harness wind closer to existing transmission**
 - **As wind power expands, less of an option**



Siting, Planning & Permitting



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Comprehensive Environmental Assessments

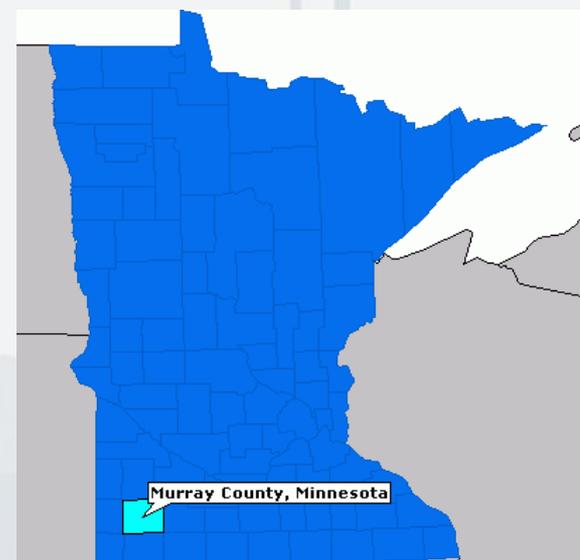
- **Siting process should include steps to minimize both environmental and social impacts.**
 - 1. Avoid areas with protected wildlife**
 - 2. Consult with resource management agencies, local conservation groups and landowners to determine where there are environmental sensitivities.**
 - 3. Establish or be signatories of state-industry cooperative agreements.**
 - **Use environmental studies to provide guidance and consistency for development of wind project sites.**



Case Example

Chanarambie Wind Power Facility Murray County, Minnesota

1. 57-turbine, 85.5 MW wind farm is in SW MN; approximately 6,000 acres.
2. Permits must:
 1. Analyze potential environmental impacts
 2. Proposed mitigation measures
 3. Identify unavoidable impacts
3. Exclusion and avoidance criteria were used in the selection of the project site.
4. Surveys and studies of the proposed project site were undertaken.
5. Applicant required to conduct an avian study to determine the effect of the turbines on avian mortality.



Standard Environmental Survey Protocols

- **Should be developed by resource management where they do not currently exist.**
- **Developers should adhere to those standardized environmental survey protocols for both pre- and post-construction monitoring.**
 - **Assess bird and bat activity**
 - **Design pre-permitting and operations monitoring plans**
 - **Develop impact avoidance, minimization, and mitigation measures**



USFWS Voluntary *Draft* Guidelines

- **“Tiered approach” for assessing potential effects on fish, wildlife, and their habitats from wind development on land**
 1. **Basis for developing state-specific protocols**
 2. **Survey methods “scientifically robust” and consistent with USFWS guidelines, or existing state protocols.**
- **Draft Eagle Conservation Plan Guidance**
 1. **Methods and metrics for site assessments, surveys, and monitoring**
 2. **Information for conducting a risk assessment and developing an eagle conservation plan, and post-construction monitoring.**
 3. **Early coordination with fed/state agencies.**



Case Example

- **Ohio Department of Natural Resources Terrestrial Wind Energy Voluntary Cooperative Agreement**
 - **For wind farms larger than 5 megawatts.**
 - **Signed by ODNR administrators and wind developer.**
 - **How best to avoid, minimize, and/or mitigate potentially adverse impacts to wildlife and native plant resources.**
 - **Includes:**
 - **bird and bat pre- and post-construction monitoring protocols.**
 - **Pre and post-construction survey requirements**

Stormwater Pollution Prevention Plans (SWPPP)

- **Steps and techniques used to reduce pollutants in stormwater runoff leaving a construction site**
- **Costs of an SWPPP adds to overall project costs and development timelines**
 - **May deter developers from doing anything above and beyond what is required by law.**
 - **Should incorporate handling of hazardous spills (in conjunction with Hazardous Materials Management Plan).**

Construction Impact Mitigation

- **Developers should ensure the construction of wind projects complies with general construction regulations and uses best management practices to minimize the construction footprint.**
 1. **Eliminate or reduce runoff (e.g., SWPPP)**
 2. **Seasonal restrictions that reflect site characteristics**
 3. **Minimize vegetation and soil disturbance**
 4. **Maintain roadways during**
 5. **Save excavated topsoil for reclamation later**
 6. **Dispose of waste properly and effectively control dust**
 7. **Restore the construction site as needed.**
 8. **Mitigation measures such as acquisition of replacement habitat**
 9. **Hazardous Materials Management Plan**
 10. **Educate workers on the consequences of unauthorized collection or sale of fossils or cultural artifacts.**
 11. **Implement standard safety precautions and practices**



Using Brownfields for Wind Projects

- **Explore as candidate sites for wind development project**
- **Select over undeveloped greenfields in areas where both types are available**
 1. **Need only be cleaned up to levels required for commercial or industrial land uses.**
 2. **Generally closer to load centers requiring less transmission infrastructure.**
 - **Could particularly be useful for small distributed generation projects where interconnection can be much easier.**
 3. **Innovative use of delinquent properties**
 4. **Community Winner**

Case Example

Steel Winds Project – Lackawanna, New York

- Just south of Buffalo on a portion of the former Bethlehem Steel facility (closed in the mid-1980s leaving a 1,600-acre site blighted and contaminated.
- Circa 2000: Changes in NY State and federal environmental laws
 - financial and legal incentives to investigate and remediate the site.
- 2001: University of Buffalo report – stimulated interest
 - 30 acres of the site removed from RCRA list & placed under NY's Brownfield Cleanup Program
 - BCP financial assistance received; 30 acres remediated
 - Late 2000s: construction of 8 turbines
- Capacity to generate 20 MW; power 6,000 homes



Steel Winds Project on the Buffalo Waterfront

Offshore



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Adaptive Regulatory Roadmap for Offshore Wind

- **Sets out:**
 - **which agencies must or should be consulted**
 - **Information requirements**
 - **Timing of review/approvals**
- **Individual federal and state agencies should develop**
- **Should be integrated into a single Regulatory Roadmap for offshore wind in the Great Lakes**
- **Should include mechanisms to streamline processes based on lessons learned**

Bottomlands Leasing Policy

Enact policies which provide a clear, coordinated and fair process for leasing lake bottomlands to facilitate appropriate offshore wind development.

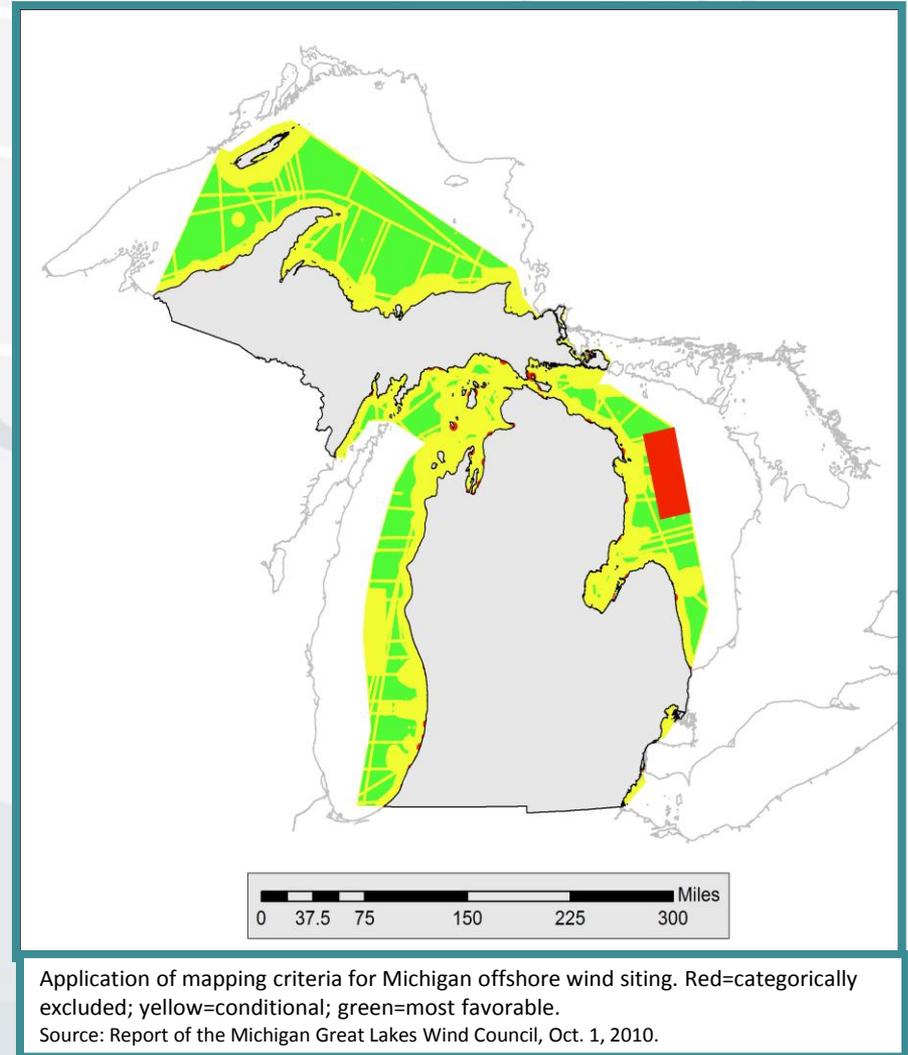


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Case Example

Michigan Legislation to Guide Leasing of Great Lakes Bottomlands

Red= categorically excluded
Yellow=conditional
Green=most favorable



Decommissioning



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Decommissioning and Reclamation

- **Developers should create provisions for future site decommissioning and reclamation.**
 - **Outline the expected end of the project life.**
 - **Explain when and under what circumstances it should occur.**
 - **Include a proposed schedule**
 - **Describe the anticipated manner in which the project will be decommissioned**
 - **Plan for Minimizing environmental impacts:**

Decommissioning and Reclamation (cont'd)

- **Decommissioning Plan should also include:**
 - Decommissioning costs net of salvage value in current dollars, and how the plan will be secured (e.g., bonds, contract)
 - Scrap value credits may be able to offset some demolition costs.
 - Site reclamation procedures – focus on restoring native vegetation to enhance wildlife habitat value.
- **Decommissioning Plan shows “good faith effort” to community**
 - Careful and well-planned deconstruction – site will be properly taken care of upon dismantling instead of abandoned and left in disrepair for the community to contend with or even pay for.



Case Example

Ontario Renewable Energy Approvals

- **Requires Utility managers to submit a Decommissioning Report, including:**
 - **Planned procedures for the dismantlement or demolition of the facility after its lifespan;**
 - **Activities related to the restoration of any land and water that have been negatively affected by the facility;**
 - **Planned procedures for the management of excess materials and waste (including emergency response actions).**

Public Engagement



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Community Support through Public Engagement and Outreach

- **Developers should maintain a high level of transparency, cultivate relationships with the surrounding communities and increase support for their projects by incorporating public involvement early in the planning process and continuing with public outreach throughout the life of a project.**
 - 1. Gather information from local conservation groups, landowners and community residents – valued landscapes, cultural resources, etc.**
 - 2. Educate community about**
 - 1. proposed project**
 - 2. related public policy issues.**
 - 3. Engagement vs. Outreach**

Community Support through Public Engagement and Outreach

- Choose outreach mechanisms that will facilitate dialogue and ensure that questions are answered.
- Build in adequate time and resources for multiple outreach events.
- Make information readily available to the public – i.e. tools that will ensure fair and equitable land lease and easement agreements.
 - Model land lease agreements
- Early and ongoing outreach and community engagement
 - Reach broader segments of a community who may not have yet formed an opinion.
 - Vocal opposition does not necessarily mean a majority opposition.
 - No ‘one size fits all’ approach.



Case Example

Cuyahoga County (Lake Erie offshore pilot project) Community Stakeholder Engagement Tactical Plan

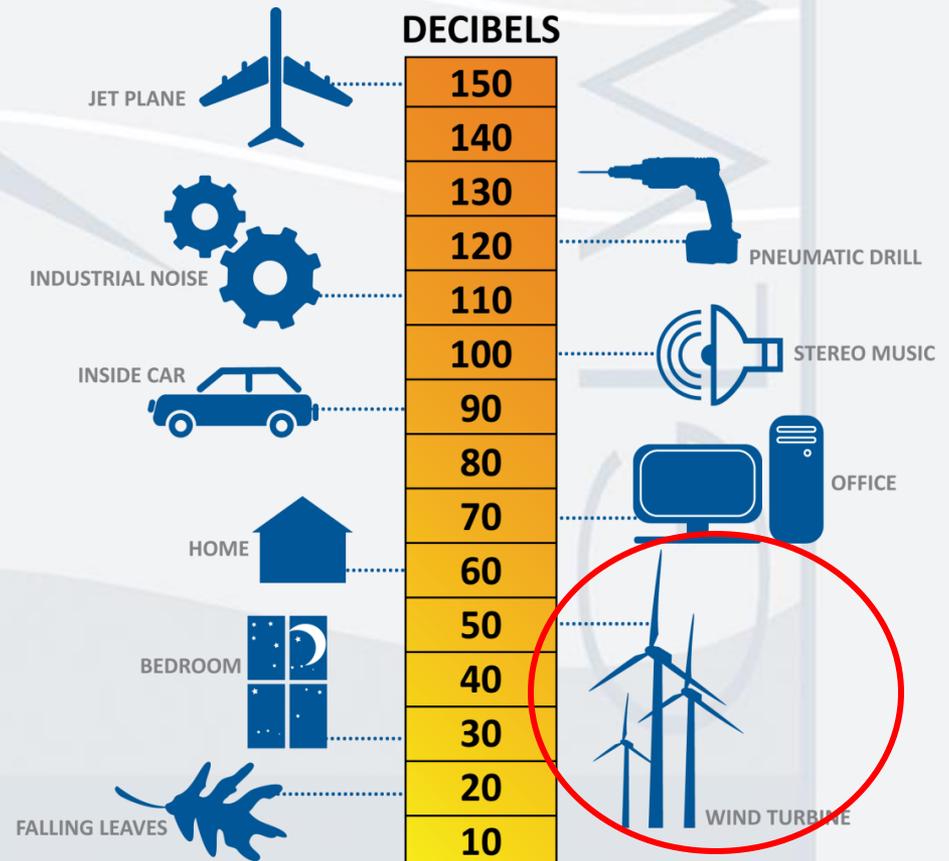
- ***Calls for:***
 - Release of the Feasibility Study findings to the public
 - Raising awareness of economic development opportunities;
 - Building relationships with local, regional and national stakeholders and media;
 - Demonstrating a commitment to transparency and fiscal responsibility;
 - Establishing the County as an advocate for responsible wind energy development and advanced energy;
 - Highlighting success stories; and
 - Ongoing engagement of local stakeholders



Noise Impact Assessments

- Developers should use available noise models to assess noise impacts from wind energy projects.

- May be required as part of environmental review or local laws
- Include wildlife impacts
- Implement mitigation measures
- Effectively communicate to the community



Case Example

Port Alma, Ontario Wind Farm Noise Impact Assessment

- Performed tests to find the ambient noise level at various monitoring sites.
- Details the classification of affected area and the sources of noise.
- Explains different parts of the proposed wind farm that will produce noise, and their cumulative effects throughout the area



Construction of Port Alma Wind Farm

Report concluded:

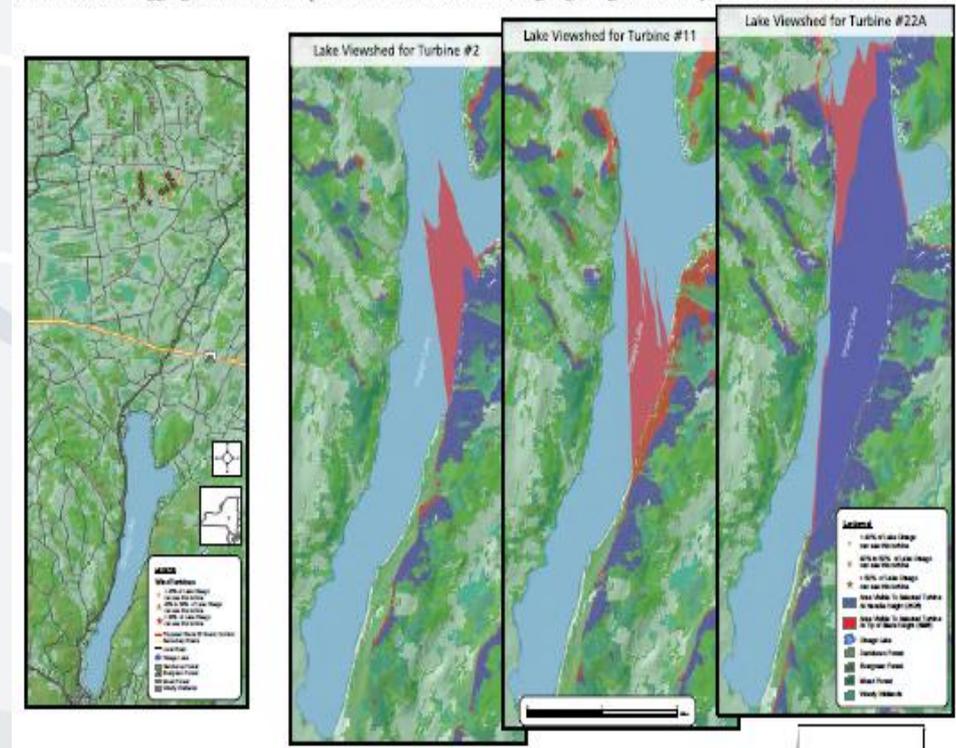
- Noise impact does not exceed the most restrictive nighttime noise limits
- No need for mitigation measures or further studies

Visual Impact Assessments

- **As part of the public engagement process, developers should conduct a visual impact assessment.**
 1. **Early planning: assessment of visual resources – involve relevant agencies and the public.**
 2. **Prepare spatially accurate and realistic photo simulations of wind turbines in the proposed location.**
 3. **Assessment should include the nature and magnitude of potential visual impacts.**
 4. **May not be required by regulatory agencies – however, if not done, may put the project at risk of delay or cancellation.**

Case Example

- **Viewshed Analysis for Proposed New York Wind Farm**
 - Jordanville, NY windfarm – analysis of Otsego Lake.
 - Lake is an historic district with views and scenery barely changed for the past 100 years.
 - Stone Environmental conducted analysis: which of proposed 76 399-foot turbines would be visible from the lake?
 - Turbines modeled at two heights: nacelle height (262 ft.), and tip-of-blade height (399 ft.).
 - Produced a location map and 76 maps showing what area of the lake was visible for each of the 76 turbines.
 - Custom queries aggregated results in tables and charts, highlighting statistically, the most visible turbines.



Location map on left; examples of three views of turbines that could be seen from the lake – red being the most visible viewpoints of that turbine.

Acknowledgments

Great Lakes Wind Collaborative – Best Practices Workgroup Members

- Argonne National Laboratory
- Baker & Hostetler LLP
- Cedarburg Science, LLC
- Clean Energy States Alliance/Clean Energy Group
- DTE Energy
- Grand Valley State University
- Great Lakes Renewable Energy Association
- HDR Engineering, Inc.
- Huron County (MI) Planning, Building & Zoning Department
- Indiana Department of Natural Resources
- JFNew
- Mackinaw Power
- Marine Services Diversified, LLC
- Michigan Energy Office
- Minnesota Department of Commerce
- National Renewable Energy Laboratory
- NRG/Bluewater Wind
- Ohio Department of Natural Resources
- Public Service Commission of WI
- The Nature Conservancy
- Wisconsin Department of Natural Resources

Cooperating Partners

- Clean Energy States Alliance
- Great Lakes Legislative Caucus
- Midwestern Governors Association
- Department of Energy - EERE



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Best Practices Toolkit

- **Compiled document**
- **Online Toolkit**
 - 18 Best Practices
 - *Action/Rationale*
 - *Challenges and Benefits*
 - *Who Should Implement This Practice?*
 - *Case Example*
 - *Timeline*
 - Available online at www.glc.org/energy/wind

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Join the GLWC—become a wind stakeholder at www.glc.org/energy/wind



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