Why Offshore Wind?
Wind Resources of the Great Lakes

The wind resources over large portions of Great Lakes are classified by the National Renewable Energy Laboratory as “excellent,” “outstanding,” and “superb.”
Charge to the Council

“The state’s five best Wind Resource Areas

“…identify the most favorable areas to lease…”
Why Clean Energy Technology

• Create jobs, secure new investment, diversify Michigan’s economy
• Energy security
• Environmentally benign power
• Balance Michigan’s energy portfolio
Huge Global Opportunity

- International Energy Agency- $20 trillion by 2030; $45 trillion by 2050
- ASES - $4.5 trillion in economic benefit to U.S. by 2030
- 37 Million jobs by 2030
- By 2030, 1 in 4 jobs will involve clean energy technology
Wind Power

High Growth:

• Capital investment flowing in

• Generation capacity
  – 2004 - 2% of new capacity
  – 2008 - 42% of new capacity

• 2009 added over 10,000 MW
  (39% increase in national capacity)
Michigan’s Strengths

- Advanced manufacturing and robotics expertise
- Superior supply chain capacity
- Available skilled, labor force
- Outstanding universities
- Excellent community college system
- 35 Deep water ports
- Outstanding wind power assets
Energy Security

US

• US uses 19.5 million barrels per day – 25% of global consumption
• Import 13 million barrels per day
• Cost: $380 billion per year (@$80 pb)

Michigan

• $24+ billion per year
• 100% of coal used for power generation
• 96% of transportation fuels
• 75% of natural gas
Cost of fuels will increase

- Increasing demand – China and India
- Rising costs of extraction and transportation
- Diminishing supply
- Carbon regulation
Note: Projections for Wind and Concentrated Solar do not exist beyond 2020. Data trend from 2000 to 2020 is continued through to 2035.

Sources:
Fossil Fuel data: EIA Annual Energy Outlook 2010 (Distillate Fuel Oil, Residual Fuel Oil, Natural Gas, Steam Coal prices averaged together for “Fossil Fuel” bundle). Note: EIA information was provided in a $ per million Btu method. This was converted to $ per kWh for comparison.

Evolving Climate Consensus

- 192 Countries will ultimately reach agreement on reducing GHG emissions
- 80% GHG reduction by 2050 in industrialized countries
- 50% GHG reduction in non-industrialized countries
Solar

- Dow Chemical – Midland
  - 6,100 jobs
- GlobalWatt – Saginaw
  - 2,768 jobs
- Clairvoyant Energy Solar Panel Mfg., Inc. – Wixom
  - 5,343
- Suniva – Hemlock
  - 1,848

Solar Jobs: 20,993

- Evergreen Solar – Midland
  - 596 jobs
- Hemlock Semiconductor – Hemlock
  - 576 jobs
- United Solar Ovonics – Greenville/Auburn Hills
  - 3,762 jobs

Investment: $3,139,195,000
Advanced Energy Storage Investments

- A123 Systems – Livonia
  - 2,217
- Sakti3 – Ann Arbor
  - 230
- Dow Kokam – Midland
  - 2,644
- Johnson Control Saft - Holland
  - 3,143
- Ford – Wayne/Sterling Heights /Dearborn
  - 34,490 jobs
- Xtreme Power – Wixom
  - 7,211 jobs
- Toda America – Battle Creek
  - 148 jobs
Advanced Energy Storage Investments

- LG Chem – Holland
  - 1,261 jobs
- Fortu Power – Muskegon
  - 1,971 jobs
- GM – Brownstown/Flint/Bay City/Detroit
  - 3,863 jobs
- Azure Dynamics – Oak Park
  - 83 jobs
- Techno SemiChem – Northville
  - 1,673 jobs
- Magna Electronics – Holly
  - 1,766 jobs

Advanced Energy Storage Jobs: 60,700

Investment: $5,771,571,600
<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energetx – Holland</td>
<td>Holland</td>
<td>2,599</td>
</tr>
<tr>
<td>Ven Towers – Monroe</td>
<td>Monroe</td>
<td>290</td>
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<tr>
<td>Astraeus Wind Energy – Eaton Rapids</td>
<td>Eaton Rapids</td>
<td>125</td>
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<tr>
<td>LOC Performance Products – Plymouth</td>
<td>Plymouth</td>
<td>118</td>
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<tr>
<td>Merrill Technologies Group – Saginaw</td>
<td>Saginaw</td>
<td>125</td>
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<tr>
<td>Energy Components Group – St. Clair</td>
<td>St. Clair</td>
<td>513</td>
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<tr>
<td>MasTech/Mariah Power – Manistee</td>
<td>Manistee</td>
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<td>Danotek – Canton</td>
<td>Canton</td>
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<tr>
<td>Dowding Industries – Eaton Rapids</td>
<td>Eaton Rapids</td>
<td>358</td>
</tr>
<tr>
<td>ATI Casting Services – Alpena</td>
<td>Alpena</td>
<td>368</td>
</tr>
</tbody>
</table>

**Wind Jobs: 4,965**

Investment: $173,697,424
Clean Energy Jobs

86,658

Jobs for Michigan workers
Our Competition

- Ontario proposal
  - 20,790 MW
  - $83.2 billion investment
  - $233.5 billion in added GDP
  - 66,300 jobs

- Illinois
- New York
- Ohio
- Wisconsin
How Has the Council Done Its Work?
Council’s Process 2009

- Formed three work groups
  1. Mapping the “best and worst” places
  2. Bottomland leasing, permitting, and legislation
  3. Public engagement
- Council discussed the work group recommendations
- Adopted recommendations and reported to the governor September 1, 2009
September 1, 2009 Report:

Key Findings

- Existing Michigan bottomland leasing and permitting statute was not designed to address offshore wind
  - Comprehensive legislation for leasing and permitting is needed

- Agencies need to see least/most favorable areas
  - Council grouping of criteria shown on maps:
    - Most favorable (green)
    - Conditional (yellow)
    - Categorical exclusion (red)
Statewide Results of Council’s Mapping Criteria

SOURCE: UWM/MDNRE Institute for Fisheries Research. Data for some criteria not reflected.
Council’s Process 2010

- Mapping work group identified most favorable areas to lease
- Public engagement work group created plans to inform, engage, and solicit feedback on those locations
- Permitting and legislation work group advised on:
  - Proposed legislation and rule making
  - Compensation for leasing of bottomlands
- Report to the governor by November 15, 2010
Learning from Experience of Others

- Listen to expert testimony
- Learn from Europe and East Coast
  - Environmental study results
  - Risk assessment
  - Wind resource planning
  - Public acceptance
  - Compensation, royalty ideas
- Apply Michigan experience
European Offshore Wind Experience

- 18 years experience with offshore wind
  - 30 wind parks totaling 1,500 megawatts in 8 countries
  - European expansion is accelerating, 37,000 megawatts by 2015

Source: EWEA, 2009

Total: 37,441.83 MW

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18 Years and 350 Studies:
No Signs of “Unacceptable” Risks

- Danish Offshore Monitoring Program for Nysted and Horns Rev projects
- U.K. Strategic Zones and competitive rounds of projects
- Beatrice Wind Farm Demonstration, Scotland
- German research platforms in the North and Baltic Seas
- Netherlands – We@Sea
- IEA Annex XXIII

Source: Energetics
Institute for Fisheries Research (IFR) Supported the Council’s Mapping Work

- Computerized data layers were applied by GLOW council to see the combined effect of many factors.
- These aid planning and should be considered before permitting.
How the IFR Software Works –

*Base Map*
How the IFR Software Works –

*Shipping Lanes*

This representation of shipping lanes is known to be slightly inaccurate as of 03/2010.
Council’s Criteria

- Aids to navigation
- Buoyed navigation channels
- Coastal airports
- Military operation areas
- Submerged transmission lines
- Habitat/biological (5 criteria)
- Disposal sites
- Harbors/marinas
- Large river mouths
- Shoreline (6-mile nearshore view buffer)
- National park lakeshores
- Shoreline parks and wilderness
- Shipwrecks
- State bottomland preserves
- Underwater archeological sites
- Commercial fishing areas
- International and state boundaries
- Shipping lanes

Criteria are applied to mapping tool, or “decision support tool,” developed by UM/DNRE Institute for Fisheries Research (IFR).

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How were the “most favorable” wind areas identified?
Outline

- Development of mapping criteria
  - Mapping work group comprised of council members
  - Review of other state and federal siting activities (e.g., State of Ohio)
  - MDNRE Institute of Fisheries Research (GIS mapping tool)

- Available square miles
  - Most favorable, categorical exclusions, conditional
  - Depth restrictions

- 5 Wind Resource Areas (most favorable areas in shallow water $\geq 20$ square miles)

- Mapping results for selected areas

- Conclusion
Development of Mapping Criteria

- Aids to navigation
- Buoyed navigation channels
- Coastal airports
- Military operation areas
- Submerged transmission lines
- Habitat/biological (5 criteria)
- Disposal sites
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Application of Criteria Using IFR Mapping Tool
Closer view of Northern Lake Huron
Closer view of Southern Lake Huron
Square Miles of Water at Different Depths

- Total state-owned bottomlands: 38,519 square miles

<table>
<thead>
<tr>
<th>Concil category</th>
<th>No depth restrictions (sq. mi.)</th>
<th>Depth of area ≤ 45m (sq. mi.)</th>
<th>Depth of area ≤ 30m (sq. mi.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Categorical exclusion (red)</td>
<td>1,715</td>
<td>512</td>
<td>345</td>
</tr>
<tr>
<td>Conditional (yellow)</td>
<td>23,467</td>
<td>9,167</td>
<td>7,039</td>
</tr>
<tr>
<td>Most favorable (green)</td>
<td>13,337</td>
<td>484</td>
<td>133</td>
</tr>
<tr>
<td>Total area sq. miles</td>
<td>38,519</td>
<td>10,648</td>
<td>7,869</td>
</tr>
</tbody>
</table>


- Offshore wind development of just 2% of “most favorable” and “conditional” areas (no depth restrictions) could supply 30% of total annual electrical energy use in Michigan.
Most Favorable Areas at Least 20 Square Miles:

*Five Wind Resource Areas (WRAs)*

(as of June 2010)

Berrien Wind Resource Area
with State Line & Coastal Airport Buffers Only
Berrien Wind Resource Area

*with Shipwrecks Added*
Berrien Wind Resource Area

with *Shipping Lanes Added*
Berrien Wind Resource Area
with Harbors & Marinas Added
Berrien Wind Resource Area
with 3-Mile Biological Productivity Zone Added
Berrien Wind Resource Area
with 6-Mile Viewshed Buffer Added
Berrien Wind Resource Area Close-up
Inner Saginaw Bay & Outer Saginaw Bay
Refined Outer Saginaw Bay
Central Lake Huron WRA
Central Lake Huron WRA
Conclusion

- Mapping tool continues to evolve
- Additional data layers added over time
- Dynamic tool to view multiple scenarios during a permitting process
- Helps future decision-makers
Legislative Recommendations
Offshore Wind Legislation

- Council’s September 2009 report recommended a package of legislative changes
- Goal was to help guide the development of offshore wind energy and to establish a clear, transparent process
Offshore Wind Legislation

Offshore wind legislation is needed:

1) to protect Michigan citizens from misguided development proposals, and

2) to ensure public engagement in siting and leasing decisions
Council’s Input on Legislation – Highlights

- An acknowledgement that current law (Part 325 Great Lakes Submerged Lands Act) would not regulate offshore wind energy facilities
- A process for identifying potential sites for offshore wind energy development
Council’s Input on Legislation – Highlights (cont.)

- An **auction process** for assigning development rights to the identified sites
- A **detailed set of requirements** for required plans:
  - Site assessment
  - Development
  - Construction
  - Operation
  - Decommissioning
- A process for **public involvement** in decision making, including notice and comment opportunities throughout the auction, site assessment, and development process
Requirement that lease payments and operation royalties will be collected

Funds will:
1) Monitor the impacts of offshore wind facilities and offset any impacts through habitat protection and improvement in the Great Lakes,
2) Foster renewable energy and energy efficiency, and
3) Pay for the regulatory program.
Process Moving Forward

- Council provided input on legislation to House and Senate (available on council’s website)
- Legislature is now revising and will hold hearings on bills
What about public input during offshore wind permitting?
A Reminder…

- This 29-member council has a very specific job description from the governor.
  - The council does not review applications or make recommendations related to site-specific development proposals.
  - Site review is going to be conducted by the Michigan Department of Natural Resources and Environment (MDNRE) in tandem with federal agencies.

- The permitting and related public engagement processes outlined here are proposed by the council.

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Public Engagement in Siting of Offshore Wind Energy Systems

- Coordinated/concurrent with other state/federal reviews
- Public will be asked to contribute to both:
  - Permitting (what is allowed)
  - Leasing process (where it is allowed)
Coordination with Other Reviews

- The state public engagement process shall be coordinated and, where practical, concurrent with:
  - Michigan Public Service Commission
  - Federal Aviation Administration
  - Federal Communications Commission
  - U.S. Coast Guard
  - U.S. Department of Homeland Security
  - U.S. Army Corps of Engineers.
Overview of Input Opportunities Proposed by Council

- Pre-leasing
  - MDNRE-public hearing, fact finding

- MDNRE Lease Auction Notice
  - Proposed Lease – 60 days for comment
  - Final Notice – 21 days before lease

- Site Assessment Plan
  - Applicant-informational meeting with public input

- Permit and Lease
  - MDNRE public hearing + 30 days for comment

- Construction and Operation Permit
  - MDNRE public hearing + 30 days for comment

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Pre-Leasing

- Prior to offering parcels for lease, the department shall hold a public hearing and conduct fact-finding in the county nearest to the wind resource area or proposed offshore wind development parcel(s)
Proposed Lease Auction Notice

- Proposed Lease Auction Notice issued with 60-day comment period, followed by Final Lease Auction Notice
- Notice includes:
  - Area available for leasing
  - Proposed and final lease provisions and conditions, including, but not limited to size, term, payment and performance requirements, and site-specific lease stipulations
  - Auction details, including bidding procedures, deposit amounts, lease award method, etc.
  - Bidding or application instructions
  - Lease form
  - Criteria to evaluate competing bids or applications
  - Award procedures

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Lease Issuance

MDNRE shall...

- Issue for public comment a notice of draft permit and lease that contains:
  - How site assessment activities are to be conducted and the presentation of results
  - Information on compensation to the state for the use and occupation of the bottomlands

- Hold at least one public hearing in the county nearest the proposed offshore site(s)
  - Comment period extends 30 days after the public hearing
Public Engagement—Council’s Recommended Permitting Process

- 30-60 day comment period
- Public meeting in nearest county

Application Received by MDNR

- MDNRE requires field studies
- Public meeting in nearest county

Site Assessment Plan Received

- 30 day comment period
- Public meeting in nearest county

Construction & Operations Plan Received

- APPROVAL

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Agency Response to Comments

- MDNRE summarizes all comments received and provides agency response, including changes that were accepted and rejected
Expected Timeline

- Could take several years for developer to conduct the necessary studies and work through state and federal permitting processes

- Lease terms:
  - Site Assessment Lease: 3–5-year term
  - Construction and Operation Lease: 25-year term with 10-year extensions for the operational life of the facility
Many Ways Council Takes Input

• Surveys and comment sheets during public meetings in Bay City, Escanaba, Muskegon, Grand Rapids and Dearborn
• On website: www.michiganglowcouncil.org
• By e-mail: info@michiganglowcouncil.org