Testimony before the Michigan House Committee on Energy and Technology regarding Offshore Wind Legislation (HB-6564)

November 30, 2010

Thank you for the opportunity to testify. My name is Jim MacInnes and I am the CEO and co-owner of Crystal Mountain Resort located in northwest lower Michigan. Crystal Mountain is a four-season resort that is the largest employer in Benzie County and we purchase 8 million kilowatt-hours of electricity annually. My background includes developing some of the early renewable power projects under PURPA, serving on the Great Lakes Offshore Wind Council, and I am a licensed Professional Engineer in Michigan.[1]

I urge Michigan Legislators to approve the proposed Offshore Wind enabling legislation as soon as possible for the following reasons:

1. It creates a carefully structured permitting process so the waters held in trust for the people of the state of Michigan are protected. It streamlines and lowers the cost of government.

2. It enables significant opportunities to create long term Michigan job growth. Michigan companies like Astraeus, Dow, Merrill Technologies Group and Energetix are working on advanced manufacturing techniques for the wind industry, but they also need the opportunity of offshore wind to keep them in Michigan. In addition to manufacturing company jobs, offshore wind projects would provide good paying port-side facility and shipping development jobs. The international marine technology company, Global Marine Systems, is also interested in helping to create and would consider investing in such facilities located along the Great Lakes.[2]

3. It capitalizes on two of Michigan's competitive strengths: 1) the availability of huge offshore wind energy resources, and 2) close proximity to one of the world's largest electric "batteries," the Ludington Pumped Storage facility.[3] The GLOW Council identified 13,339 square miles of bottom lands classified as "most favorable" for wind energy development. It is estimated that developing only **5 percent** of the "most favorable" areas (no depth restrictions) could provide nearly **30 percent** of the electrical energy needed for the entire state of Michigan.[4] If policymakers can agree on a selection of about 500 square miles to develop we have a good shot at creating a new industry here, and we can capture some international investment.

4. Great Lakes offshore wind has significant advantages over Michigan onshore wind projects in that it: 1) would allow for operations at a much higher capacity factor ~40% as compared on onshore wind with a

capacity factor that ranges from 25% to 30% and, 2) can be built at large utility scale, hundreds of megawatts at a time, vs land-based projects that are typically much smaller due to local land use constraints.

5. Michigan imported about 36 million tons of coal and exported $1.36 billion to pay for this coal in 2008. We are the 9th most dependent state on net imports as a share of total power use at 60 percent.[5] **The cost of coal increased at a compound annual growth rate of 10.4% during the five year period between 2004 - 2009** according to the US Energy Information Administration.[6] As the easy-to-mine coal fields are depleted, the cost of extracting remaining coal reserves will go up, similar to the trends seen in oil production.

According to several recent reports, US coal supplies are much more constrained than is widely understood. Michigan gets over 40% of its coal from the Power River Basin (PRB). The remaining life for many of these PRB coal-mines is 20 years or less.[7-9] With existing mine reserves depleting and becoming less economically mineable, the planning horizon for building alternative power production infrastructure will likely be much shorter than the often cited "200 year supply of coal."

Offshore wind has virtually no fuel costs, so this technology would help to mitigate the risks of almost certain exponential growth in fuel costs over the next 50 years of coal plant operations.

6. Finally, when comparing the cost of offshore wind with other power supply alternatives, it is important to use **"full cost accounting."** This includes accounting for hidden costs or externalities (spillover costs) such as the cost of energy subsidies and energy production related health impacts.

For example, fossil fuel subsidies now cost American taxpayers about $10 Billion annually as reported by the Environmental Law Journal.[10] Environmental externalities such as public health impacts from Nox, Sox, CO_2 and Mercury emissions from coal burning plants cost an additional **$100 Billion per year** according to a 2010 report by the Clean Air Task Force.[11] These costs include over 1.6 million lost work days, 9,700 hospital admissions and 13,200 deaths annually. Even rural Benzie County is not immune to these negative health effects and is subjected to some of the highest Ozone levels in the country.[12]

Fossil fuel subsidies and health externalities are "socialized costs" that represent an additional 3 to 11 cents per kwh for coal fired generation according to a report from the National Academy of Sciences.[13] Traditional fossil fuel subsidies need to be taken into account in any realistic power supply cost comparison.

Notes:

1. Additional related background includes: working as a power engineer on a wide range of electric generating technologies for Ebasco Services, Inc., the company that designed and built the Ludington Pumped Storage Facility; membership in the Electrical Engineer's professional association, the IEEE, for over 30 years; membership in the Michigan Chamber of Commerce Energy, Telecommunications & Technology policy committee; BSEE and MBA degrees from the University of California; and, testifying about energy supply issues and options before the Michigan Senate Energy Policy Committee in 2008. http://www.energy-101.org/wp/wp-content/uploads/2009/10/Senate-Energy-Committee-testimony-6-12-08.pdf.

2. Global Marine Systems is a world leading Marine Technology and Engineering Company. They have extensive involvement with offshore wind development in Europe. I have personally spoken with Joel Whitman, Director of Marketing and Strategy, about offshore wind development in Michigan. Joel is originally from Michigan and very interested in our state's progress. http://www.globalmarinesystems.com

3. The 1872 MW Ludington Pumped Storage Facility is one of the world's biggest electric storage "batteries." Ludington can provide energy at a moment's notice. Its ability lies in its 27-billion gallon reservoir and a set of six turbines that drive electric generators. Those same turbines double as giant water pumps to fill the reservoir with water from Lake Michigan. http://www.consumersenergy.com/content.aspx?id=1830

4. This assumes 12.85 MW of generating capacity per square mile according to estimates by the National Renewable Energy Labs (NREL) along with a 40% capacity factor. This results in estimated electricity production of 45,026 MWH per square mile. This also assumes 105,781,271 MWH of total energy sales in Michigan (2008) according to the US Department of Energy, Energy Information Administration.

5. Michigan's Dependence on Imported Coal, Union of Concerned Scientists http://www.ucsusa.org/assets/documents/clean energy/UCS-BCBC-factsheet-Michigan.pdf (Attachment I)

6. Electric Power Monthly, March 2010, Table 4.2. Receipts, Average Cost, and Quality of Fossil Fuels: Electric Utilities, 1995 through December 2009, US Energy Information Administration. http://tonto.eia.doe.gov/ftproot/electricity/epm/02261003.pdf

7. Coal Supplies Constraint Report 2009: Planning for the Future, Clean Energy Action. Section VIII.A, page 55-58 of this report shows remaining life spans of 20 years or less for most existing PRB coal mines. http://www.cleanenergyaction.org/coal-supplies;

8. The End of Cheap Coal, Nature magazine, November 18, 2010 http://www.nature.com/nature/journal/v468/n7322/full/468367a.html

9. Hubbert's Peak, The Coal Question and Climate Change, by Professor David Rutledge, California Institute of Technology, http://rutledge.caltech.edu/,

10. Estimating US Government Subsidies to Energy Sources 2002 - 2008, Environmental Law Institute, 2009. http://www.elistore.org/Data/products/d19 07.pdf (Attachment II contains a graph from this report)

11. The Toll from Coal, Clean Air Task force, September 2010. http://www.catf.us/resources/publications/files/The Toll from Coal.pdf (Attachment III)

12. Air in northwest Michigan Sometimes the Worst in the Nation, The Michigan Messenger, July 28, 2008, http://michiganmessenger.com/1612/air-in-northwest-michigan-sometimes-among-worst-in-nation

13. Hidden Costs of Energy: Unpriced Consequences of Energy Production and Use, National Academy of Sciences, National Academy of engineering, Institute of Medicine, National Research Council, October, 2009. http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12794