Great Lakes Offshore Wind Resource Assessment Project

Lake Michigan, USA
MAREC is the realization of the SmartZone vision of the State of Michigan and the culmination of the cooperative effort involving the following organizations:

» Grand Valley State University

» The City of Muskegon

» Michigan Economic Development Corporation

» Muskegon Chamber of Commerce

» Michigan Public Service Commission

» Muskegon Area First

» Muskegon Community College

» Community Foundation for Muskegon County
The **MAREC objectives**: 

» To select and demonstrate the technical viability and economic performance of renewable and alternative energy technologies.

» To be the incubating center for new energy companies.

» To offer a wide range of educational programs.
WORKING TOGETHER to implement a comprehensive wind assessment review on Lake Michigan.

This project will feature LIDAR based extended season wind assessment and related environmental studies.
The Principal Objectives:

» Field test floating laser based remote sensing technology.

» Develop a better understanding of offshore wind resources.

» Understand other physical, biological and environmental conditions on the Great Lakes as a precursor activity to the future development of offshore wind energy technology.
MAREC’s REQUIREMENTS:

» A complete wind data collection system with a power supply to support all on-board data collection devices capable of long-term remote operation.

» Able to accurately gather wind data using LIDAR technology at wind turbine hub heights of approximately 50 meters, 100 meters, 150 meters.

» The system should also have the capacity to capture environmental, avian and bat data.

» The system should be easy to relocate, able to be removed from the lake during the winter or relocated to a second and third site, consistent with project design.
The Solution:

The AXYS WindSentinel
AXYS Ocean Renewables

35 years of offshore monitoring, covering the full range of solutions:
- Currents
- Winds
- Waves
THE AXYS WindSentinel:

» Built by AXYS – 35 years of offshore experience.

» ISO 9001:2008 certified

» The Vindicator® - 2nd generation solid state laser wind sensor.

» The NOMAD buoy – over 50 years of service in the harshest seas.

» The WatchMan500™ Controller – remote monitoring and data management.
Deployment:

In October, 2011 the WindSentinel was deployed for an initial period on Lake Muskegon.
Lake Michigan Deployment – November 2011
Communication And Data Transfer:

Data from the WindSentinel is transmitted in near real time, showing ten minute average wind data which is compared against a NOAA station 4 miles from the WindSentinel.
Achievements:

» An initial 60 day deployment on Lake Michigan

» Gathered data on three major storms, supporting significant boundary layer research

» Correlated data with NOAA Great Lakes Forecasting Models
Conclusion:

» The WindSentinel system has allowed the Great Lakes Offshore Wind Resource Assessment Project to undertake the first wind resource assessment work on Lake Michigan without the need for a fixed structure that would impact the local ecosystems.

» The data gathered will significantly enhance the Project’s ability to support the future development of offshore wind resources on the Great Lakes.
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