**Theme: Turbine Location and Placement**
**ID Letter: DD**

**Original Questions:**

1. Is it better to build large wind projects (100+ turbines) off-shore or on-shore? Please compare the pros and cons of each location? See response below.
2. How close can turbines be to Lake Michigan? See response below.
3. Can we join together to assure that a wide corridor (5-10 miles) of land running along the Lake Michigan shoreline be declared off-limits to utility wind turbines or any other industrial energy development that would spoil our unique land trust? This land already has its mandated purpose: natural recreational retreat. Considering the critical need for places where whole-person health may be restored, this use of Michigan's northwestern lands deserves to be our first priority. Industrial energy production belongs in places where the land is open, plain and uninhabited. Many other states are better suited for utility wind development, such as Texas. Comment not question.
4. Are the numbers of turbines limited at this time to 112 or can the number increase higher and higher? Project specific.
5. Is there or will there be some sort of density restrictions so we don't end up with continuous wind towers along the entire West Michigan coast and in the lake itself? See response below.
6. How can we control widespread development, versus contained development, of utility turbine projects to prevent them weaving in and through our most beautiful, pristine lands? How can we limit the expanse of acreage developed and the footprint of developments? How can we put a cap on, or set a maximum allowance for the number of turbines in a project, preventing unlimited future growth and guarding against increasing dominance of an agricultural/residential/natural region? See response below.
7. Can an overlay district for wind only include certain areas of the township? See response below.
8. Can you provide innovative examples of turbine siting that address residential areas within agricultural districts, taking into consideration density, parcel size, etc.? See response below.
9. What is the distance between each tower? See response below.
10. When you see large turbine installations out west or in Indiana near the highway or in other states, you don't see any residential units near them. Why would it be okay for a large industrial wind energy project to be placed near residential homes? Value judgment.
11. Why is Denmark proposing banning on-shore wind? See response below.
12. I would like to know whether Duke Energy, or any other energy company, has developed plans, or is in process of developing plans, to install industrial wind towers in Leelanau County. Project specific.
13. For that matter, how do we know that the Blaine-Gilmore township boundary is the real and firm northern boundary of the project and that Duke hasn't tried to secure leases outside those two townships? I understand the property rights involved in this situation, but the secrecy does not contribute to a transparent and trustworthy process that you and others are working to create. Project specific.
14. Are thousands of 400 foot-plus, wind towers in our agricultural community an acceptable answer to our energy needs? Value judgment.
15. According to the 2007 Michigan wind siting document, designated scenic areas are not to be encroached upon; is the township authorized to designate this or is there some other way it has to be designated? See response below.

**Questions and Responses:**

*These questions may have been recategorized and reorganized. Some may have been sent to another "theme" area (this will have been explained in red under the "Original Questions" section). In other cases two or more questions will be answered with one response.*

DD1. Is it better to build large wind projects (100+ turbines) off-shore or on-shore? Please compare the pros and cons of each location?

**Response:** Offshore wind farms offer some opportunities for wind energy that would not be viable on land, but they can also have significant drawbacks. When deliberating over the pros and cons of on-shore versus off-shore wind farms, many considerations must first be made about the specific location and requirements of the proposed farm. In some areas, off-shore generation may be a more effective option, while in other places it should not be considered. The West Michigan Wind Assessment's report on the subject, "Offshore Wind Energy: Public Perspectives and Policy Considerations", offers a good list of potential pros and cons to consider:

| **Some advantages of offshore wind:** | **Some drawbacks of offshore wind:** |
|---|---|
| ▪ Stronger and more consistent winds<br>▪ Larger and faster turbines<br>▪ Closer proximity to large cities and energy centers<br>▪ Located where noise is less likely to disturb people | ▪ Public acceptance (more complex opposition)<br>▪ Higher construction costs<br>▪ Could negatively affect people's connection to a landscape |

This report is available online at http://www.gvsu.edu/cms3/assets/E72B5288-BE34-4625-761F7F3984B33D8C/wind_brief_3.pdf.

DD2. How close can turbines be to Lake Michigan?

**Response:** See the response to question H10. Although both government agencies and nongovernmental actors have developed guidelines for wind farm location considerations, there are currently no set distance restrictions between Lake Michigan and wind farms. For instance, the U.S. Fish and Wildlife Service recommends a 3-mile buffer zone between turbines and Lake Michigan. Meanwhile, local governments can require that turbines not be built in areas due to threats to wildlife or natural resources, which in many cases will restrict project development in that given area. The "Michigan Renewable Energy Program" responds to this question in more depth – see http://www.michigan.gov/documents/mpsc/FAQ_Guidelines_for_Siting_Near_Great_Lakes_Shorelines_321044_7.pdf

DD5. Is there or will there be some sort of density restrictions so we don't end up with continuous wind towers along the entire West Michigan coast and in the lake itself?

**Response**: It is unlikely that the entire coast of West Michigan will contain wind energy systems. While the Model Zoning Ordinance for Wind Energy Systems in Michigan does not contain provisions suggesting a density restriction, or the number of towers allowed within a community, region or within the state, there are only certain areas that have been determined to possess enough wind to support development.

The Michigan Wind Energy Resource Zone Board (WERZB) was established by Public Act 295 of 2008 (PA 295). PA 295 is a comprehensive energy legislation that contains a provision for the WERZB to identify a list of areas in the State with the highest wind energy potential. WERZB identified four regions of highest wind energy potential in the State of Michigan. The final report includes a number of maps that show where the

WERZB designated areas with the highest wind potential are located. These can be viewed at http://www.dleg.state.mi.us/mpsc/renewables/windboard/werzb_final_report.pdf

Note that the maps exclude roads, airports, wetlands, Great Lakes shoreline, and other natural and man-made features to determine the land available for potential use by wind energy systems (see "NOTE" in Exhibit 2 on page 4 of the WERZB report). It is in these areas that have the greatest wind potential and therefore the most likely be developed

The WERZB continues to recommend that decisions regarding wind energy siting be determined by local communities. Through setback requirements, consideration of natural features, wildlife protection, requirements of the industry to show wind potential and other development restrictions, the siting of wind turbines will be site specific and limited to certain regions.

Subject to the limitations discussed in Question D1, individual local governments can place reasonable restrictions the construction of wind towers, including on the density of wind towers.

DD6. How can we control widespread development, versus contained development, of utility turbine projects to prevent them weaving in and through our most beautiful, pristine lands? How can we limit the expanse of acreage developed and the footprint of developments? How can we put a cap on, or set a maximum allowance for the number of turbines in a project, preventing unlimited future growth and guarding against increasing dominance of an agricultural/residential/natural region?

**Response:** Concerns like these are ultimately the decision of township officials, guided by citizen input. Many of these issues can be addressed through the master planning process. Arcadia and Bear Lake Townships in Manistee County and Blaine and Gilmore Townships in Benzie County have agreed to partner in developing a collaborative master plan and implementation strategy. When completed, it will provide a master plan to serve the needs of each township but also identify opportunities for collaboration which may encompass service sharing and joint efforts involving economic development, tourism, recreation, agriculture, agribusiness and others. The project will begin in January 2012 and be completed during the first quarter of 2013, assuming full funding is secured by the Alliance for Economic Success to coordinate the project.

DD7. Can an overlay district for wind only include certain areas of the township?

**Response**: Yes. Subject to limitations discussed in the response to question D1, a township can make reasonable determinations about the locations that are generally most suitable for wind power in the township, and enact a planned unit development (PUD) or special use permit (SUP) zoning amendment to address wind generation within the overlay district.

DD8. Can you provide innovative examples of turbine siting that address residential areas within agricultural districts, taking into consideration density, parcel size, etc.?

**Response**: The National Wind Coordinating Committee's Siting Workgroup studied communities' reactions to local wind development projects, with the goal of identifying welcomed projects from projects that were not accepted by communities. They also examined changes in community perceptions before, during, and after project construction, as well as recognizing what wind project developers can do to address the concerns that often recur at wind project sites. Many case studies are presented, including from southwestern Minnesota, central New York, and southcentral/western Oklahoma. This document is available in the AES repository under the file "Case Studies".

Also see project case studies on the Macalester College research website, at www.macalester.edu/windvisual/.

DD9. What is the distance between each tower?

**Response:** The distance between wind turbines is determined by the specific characteristics of the wind farm terrain and location, with every project having different layouts. The design of the wind farm will be decided upon by the developer, based on data about wind speed and direction, the local topography, the size of the turbines, and other technical and economic factors. The New York State Energy Research and Development Authority's "Wind Power Project Site Identification and Land Requirements" report provides a good description of how wind farm layout is determined, and gives some examples of turbine distances in different locations. This report is available online at http://www.greenergylist.com/RED/kb/Publications/Farm-Ranch%20info/windpowerprojectsite.pdf

DD11. Why is Denmark proposing banning on-shore wind?

**Response:** Our research has not found any evidence of such a ban in Denmark.

DD15. According to the 2007 Michigan wind siting document, designated scenic areas are not to be encroached upon; is the township authorized to designate this or is there some other way it has to be designated?

**Response**: Without specific reference to this particular document, yes, a township can identify viewsheds that it determines are worth protecting, in accordance with the limitations described in question D1. Most ideally, these areas would be identified in the township Master Plan. Also see the response to question V1.