Theme: Construction Issues
ID Letter: II

Original Questions:

1. Are the roads in both counties in good enough condition to handle the weight of all the equipment that is involved in the assembly of these turbines? Will Duke pay for the repairs due to washouts on gravel/dirt roads, ruts in winter? Will there be a county road commission fund established by Duke for necessary repairs? Project specific but see response below to questions II2.
2. What is the amount of road widening and new roads (including access roads during construction) that will occur? Will access roads be paved? See response below.
3. Can we require the wind energy developers to bring our road conditions to better repair than they are currently at? See response to II2.
4. When under construction, how many acres of land are disturbed for the wind generator site, access roads, and infrastructure? See response below.
5. What is the quantity of Green House Gases (GHG) that is emitted from the manufacturing, transportation to the construction site and erection of a 495ft wind turbine? How does this compare with the GHG for solar energy? See response below.
6. How much concrete will it take to make this concrete pad? See response below.
7. What is the cubic area of the concrete pad of each tower? See response to question II6.
8. How much cost will the public bear in emergency response, roads, and other necessary public upgrades? See response to question D1, D4 and FF4 and Theme KK.

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.

II2. What is the amount of road widening and new roads (including access roads during construction) that will occur? Will access roads be paved?

Response: Typically, temporary access roads for construction are 40 feet wide to accommodate the vehicles travelling to and from the site. During construction, they are covered in gravel, but post-construction the size is reduced to 16 feet across. We Energies published a concise summary of the typical road construction procedures that occur during the creation of wind farms, called "Developing and Constructing Wind Energy," which is based upon their construction of the Blue Skies Green Fields wind farm in Wisconsin. This document is accessible at http://www.wiwindinfo.net/projects/BSGF%20photo%20book%209.16.08.pdf.

II4. When under construction, how many acres of land are disturbed for the wind generator site, access roads, and infrastructure?

Response: The scale of construction disruption varies based on the size of the project, the topography of the area, and the types of species that exist there. The National Wind Coordinating Collaborative's "Permitting of Wind Energy Facilities" handbook suggests that construction impacts about three to five percent of the total project area, depending on the size and type of development. This document is available online at http://www.nationalwind.org/assets/publications/permitting2002.pdf. According to the Department of Energy, per turbine, temporary construction can impact 0.2 to 1.0 hectares of land (page 111 of the "20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply" report, accessible at http://www.nrel.gov/docs/fy08osti/41869.pdf).

II5. What is the quantity of Green House Gases (GHG) that is emitted from the manufacturing, transportation to the construction site and erection of a 495ft wind turbine? How does this compare with the GHG for solar energy?

Response: It is difficult to isolate the GHG's produced from the construction phase of wind energy from other emissions, but estimates show that approximately 8-30 grams of CO_2 are produced per kWh of energy produced by an onshore turbine. Of this, 72-90% is from construction. In comparison to solar energy, at 43-73 grams per kWh, this is significantly less. These values are listed in a study called "An Assessment of the Life Cycle Costs and GHG Emissions for Alternative Generation Technologies", for more information on how these numbers were calculated and used, refer to the article, available online at http://www.worldenergy.org/documents/congresspapers/482.pdf

II6. How much concrete will it take to make this concrete pad?

Response: A typical foundation is approximately 15-20 meters in diameter and located between 1-2 meters below the surface (deeper in the center). The exact measurements will depend on the turbine selected and the underlying geology. According to WE Energies **"**Developing and Constructing Wind Energy" document, each turbine uses approximately 325 yards of concrete to create the foundation. This full document is online at http://www.wiwindinfo.net/projects/BSGF%20photo%20book%209.16.08.pdf.