

Original Questions:

1. How much electricity is produced by foreign oil in the United States? **See response below.**
2. How do Oil and Gas companies (Jordan Development, Presidium Energy) feel about Duke Energy coming in and offering more on a wind turbine lease per year, than on a gas/oil lease? **Project specific.**
3. How many of the four township boards are currently making a living (50% or better) from oil/gas production? **Beyond scope of project.**
4. How many full time jobs do gas/oil production support in the same four townships? How many of these jobs will be lost due to wind power coming to our area? **See response below.**
5. What percentage of oil/gas production is being used for electric production? What percentage is being stored? What percentage is being exported from Michigan? **See response below.**
6. Can the windmill project in any way restrict the production of oil or natural gas? **See response below.**
7. How many waste disposal sites from oil/gas production are in our 4 townships? (Large pits with rubber liners to contain waste products.) How long will they remain? What permits are needed to place one on a property? Does the public get a question and answer opportunity to place a waste storage area? Can this waste contaminate our drinking water wells? **Beyond scope of project.**
8. Are there any bi-products from oil/gas production or use that can be recycled to produce anything useful? **See response below and to question L12.**
9. How much property does it take to build a natural gas electric generating facility? Are there any of these being built in our area or in Michigan? How many are being proposed? **See response below.**
10. Is the price of energy generated from fossil fuels expected to go up in the future? Are fossil fuel generators exposed to price risk on fuel inputs and emission outputs (i.e. SO₂, NO_X, Carbon and Mercury)? Do wind energy generators have price risk on either fuel input or emission output? Can wind energy replace some of America's dependence on foreign countries for its energy needs? **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.

Y1. How much electricity is produced by foreign oil in the United States?

Response: Every day, the US consumes on average 19.1 million barrels of petroleum products, 49% of which comes from other countries. Oil, and particularly foreign oil, meets many of our domestic energy needs. Yet, oil and petroleum products are used generally for transportation, and not electricity generation in the United States. Though oil accounts for 2/3 of all transportation fuel, it only generates 1% of electricity in the U.S. Most electricity produced in the United States is derived from coal, natural gas, and nuclear sources.

For more information on the role of foreign oil and energy in the U.S. see:

http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm.

For more information on electricity production in the U.S., see:

http://www.eia.gov/cneaf/electricity/epa/epa_sum.html.

- Y4. How many of these jobs [from oil and gas production] will be lost due to wind power coming to our area?
Response: Jobs created by wind development would not directly displace jobs that have already been created by the oil and gas industry, but rather add to the total number of jobs created by energy development in the area. This is because wind energy proposals don't directly correlate with the decommissioning of other energy projects. In general, while the number of jobs for each wind energy project varies based on the size of the project, it is estimated that for every 100 MW of installed energy, 6-10 permanent jobs are created. For more information on job creation and the economic impacts of wind energy, see the National Renewable Energy Laboratory document at <http://www.nrel.gov/docs/fy04osti/33590.pdf>
- Y5. What percentage of oil/gas production is being used for electric production? What percentage is being stored? What percentage is being exported from Michigan?
Response: Though oil is generally used for transportation and not electricity, natural gas is a primary fuel for electric production. In Michigan, oil accounts for 1% of electric production and natural gas accounts for 11% of electric production. Coal is the largest source of energy for Michigan, and generates over 60% of the state's electricity. For more information, see: http://www.ucsusa.org/assets/documents/clean_energy/UCS-BCBC-factsheet-Michigan.pdf.
- Though Michigan is a net importer of electricity, and spends \$26 billion dollars annually importing energy from other states and countries, it is a net exporter of natural gas. In 2009, Michigan imported 12,216 million cubic feet of natural gas while it exported 673,318 million cubic feet. This data is available at http://www.eia.gov/dnav/ng/ng_move_state_dc_u_smi_a.htm.
- Conversely, Michigan is a net importer of oil, and imports 82% of the state's oil and petroleum needs. This data is available at <http://www.dleg.state.mi.us/mpsc/reports/energy/energyoverview/>
- While the data for Michigan's stored energy is unavailable, according to reports from 2009, the country as a whole has a petroleum reserve of 727 million barrels. For more information, see: http://www.eia.gov/energyexplained/index.cfm?page=oil_home#tab2
- Y6. Can the windmill project in any way restrict the production of oil or natural gas?
Response: In general, wind energy proposals are aimed to generate new sources of renewable energy and do not directly deal with the decommissioning or restricting of other forms of energy production.
- Y8. Are there any bi-products from oil/gas production or use that can be recycled to produce anything useful?
Response: Oil and natural gas can be refined to create different products that we use on a regular basis. To read a complete lifecycle analysis of these energy sources, see the Alternative Forms of Energy Section, Question L12.
- Y9. How much property does it take to build a natural gas electric generating facility? Are there any of these being built in our area or in Michigan? How many are being proposed?
Response: Michigan is one of the largest producers of natural gas in the Great Lakes Region. Currently there are 9,700 wells producing gas from the Antrim Shale, and in 2010, 53 new permits were granted in Northern Michigan. Natural gas production includes the wells, pipelines, and generating facilities – all of which require land. Though the size of a natural gas processing plant varies by facility, a large plant can be anywhere around 60 acres. For more information on natural gas production in Michigan, see: http://www.michigan.gov/documents/deq/GIMDL-USGSOFR9575K_303059_7.pdf
- Y10. Is the price of energy generated from fossil fuels expected to go up in the future? Are fossil fuel generators exposed to price risk on fuel inputs and emission outputs (i.e. SO₂, NO_x, Carbon and Mercury)? Do wind energy

generators have price risk on either fuel input or emission output? Can wind energy replace some of America's dependence on foreign countries for its energy needs?

Response: Because of the volatilities in the energy market, the price of energy generated from fossil fuels is expected to increase. According to the Energy Information Administration, the price of a barrel of oil is expected to increase to \$125-\$200 by 2035. Prices could increase for two reasons – fossil fuels become scarce and/or a carbon tax is established. For more detailed energy price forecasts, see the Energy Information Administration's Annual Energy Outlook, published in 2011:
[http://www.eia.gov/forecasts/aeo/pdf/0383\(2011\).pdf](http://www.eia.gov/forecasts/aeo/pdf/0383(2011).pdf).

We interpret the question about price risk for fossil fuel generators to be asking about the externalized cost of pollution, and the same regarding wind energy. Currently, the cost of energy derived from fossil fuels does not internalize the social, environmental, and economic costs of pollution that are levied on people and environments. While the real price of fossil fuel energy depends upon the source, some economists have estimated that if you were to internalize all the impacts of natural gas, the price would jump from \$.03/kWh to \$.07/kWh. Different pricing systems, like a carbon tax, could internalize these costs. Wind energy, like other renewables, does not emit carbon dioxide or other pollutants. This means that the price of wind energy – \$.04/kWh on average – does not change when environmental externalities are internalized. To read more information about the internalized cost of energy, see:
http://www.awerbuch.com/shimonpages/shimondocs/VGlobal_0305.pdf.

To answer the last question, America depends on foreign countries for energy generated from different sources. For example, oil is imported from the Middle East and hydropower from Canada. While wind energy can certainly replace coal, natural gas, hydro electricity from foreign countries, it is more difficult for it to replace foreign oil as oil and petroleum products are generally used for transportation. To read more about foreign oil and domestic electricity, see the response to question Y1.