Jon Boone's Data Response No. 3 to Synergics' Data Request No. 3

3.1 **Please provide a list of all studies, reports, analysis or evaluations undertaken involving the Project and provide a copy if not produced in response to another data request.**

See my direct testimony for most of the studies and reports I used for my analysis. See my response to DNR's Data Request No. 1, a copy of which I sent to Synergics dated September 2, 2005. Together these form the core of my understanding for this Project.

3.2 **Please list the sites in Garrett County where you believe wind power generation projects should be placed.**

There are a number of ways to respond to this question. First, smaller scale, perhaps newer horizontal wind generation systems should be explored as local supplements to water pumping stations and as experiments connected to testing electricity battery storage units for home use—and these could be placed on a number of plateaus around the farmlands north and south of the county. Second, assuming the question is really posing wind turbines at the scale Synergics is now seeking, I would answer the question only if Mr. Rogers revealed where he would put 19-425 foot high wind turbines in Anne Arundel County, his place of residence, or around the Chesapeake Bay, the state's most wind rich area. Perhaps they would be very effective at the juncture of the Severn River and the Annapolis Harbor, elevated on 3200 foot high platforms above the water.

Third, a chamber of my mind sometimes thinks they belong next to the residences of each of the county's commissioners and their three top administrators. One surely belongs near the house of the county delegate, George Edwards. The remaining dozen might be placed in several phalanxes around the resort communities overlooking Deep Creek Lake, an arrangement that might be jeopardized when Synergics tries to sell the Deep Creek Property Owners Association on the “verities” of the NREL's Renewable Energy Policy Project report “demonstrating” how windplants such as those Synergics proposes may even enhance their property's value.

In the final analysis, wind installations like Synergics' belong nowhere in the county or in the state. I've lived in many other areas of Maryland. In each, the political, economic, and environmental turmoil would be enormous, given the scale proposed. Rightly so. Especially when people discover that those facilities have more to do with delivering tax shelters to remote investors than in producing meaningful energy.

3.3 **Please provide the scientific basis and calculations that the construction of wind turbines would have a similar air pollution effect as constructing a bicycle path and the Washington Beltway.**

This is the actual analogy one should consider: Wind energy in the uplands of the Eastern US will have the same impact on global warming and air pollution as the building of a bicycle path around the DC Beltway would have on reducing the amount of automobile traffic in the region.

First imagine that the bicycle path building business and an assortment of bicycle manufacturers got together to convince the Maryland legislature to give guaranteed contracts to build portions of the bike path, hiring influential former legislators as lobbyists for their campaign. Imagine further they successfully lobbied Congress for bike path construction tax credits to induce investors to finance their plans, using their contacts (many of whom are paid bike consultants who later find employment in the bicycle industry) at the National Bicycle Energy Lab within the Department of Energy as research support. Then imagine that they worked with environmentalists and physicians appropriately concerned about the deleterious health consequences flowing from our reliance on fossil fuels, and, as a result, created an "environmental consensus" that bicycle paths would displace the need for many of the automobiles whose exhausts create so many of our health problems—using this consensus to promote their product to the public as a panacea for improving the environment. With all this as leverage, the bike path finally gets built. But....

All other conditions being equal, there are now more cars on the road than ever, even though the bike path is getting fairly heavy use. And many of the cars are SUVs and Hummers, guzzling gas and throwing out ever more hydro-carbons—because no one chose to address the issue of limiting the production and sale of these vehicles, calculating that bicycles would ultimately replace them without imposing unpopular and burdensome government regulations. And statistics such as the number of asthma cases in the US doubling every five years get worse while the politicians defend their progressive environmental support of the bike path industry.

With this in mind, let's connect the dots about the circumstance for the wind industry.

- As I showed in my testimony, electricity generation remains a minor part of our national energy production. Sixty percent of the nation's energy use does not involve the making of electricity. Therefore wind would not be a player in abating the problems caused by home heating and transportation, for example—most of which involve heavy use of fossil fuels. Against this, it is folly to suggest that even thousands of wind turbines blanketing the mountains of the region would do anything of significance to mitigate the bulk of these other energy forces evidently increasing the warming of the planet. Wind only generates electricity. It would take 100 windplants like the one Synergics proposes, spread over nearly 300 miles of ridgetop, to generate as much electricity as one 1600 megawatt coal plant. Even if industrial wind were

somehow magically transplanted in the next thirty years to the deep oceans, where the real wind potential is, generating ten percent of the nation's electricity supply from this location, it would not staunch the fossil fuel emissions thought to be involved in accelerating global warming, given our nation's increasing energy consumption and given that wind only can intermittently (about 30 percent of the time) address the electricity portion of the problem, the minor portion.

- The uplands of the Eastern United States have finite wind potential, as I have shown in my testimony, yielding only about five percent of the nation's total wind potential. Maryland has less than one-tenth of one percent of this potential—as I have also shown.

- The uplands of the Mid-Atlantic region, which contain about one-half of one percent of the nation's wind potential, will accommodate only a finite number of reasonably functional wind machines (according to data compiled in a report produced by the US Energy Information Agency and then extrapolated to include all class 3 and higher windy land areas within 20 miles of existing transmission lines, and excluding all urban and environmentally sensitive areas, 50% of forest land, 30% of agricultural land, and 10% of range land. Please see this table in my direct testimony).

- Using spacing requirements from the wind industry (see my direct testimony), it is not difficult to calculate the number of wind turbines needed to saturate all the wind rich areas of the uplands in this region. The estimate I projected in my testimony was about 30,000 large turbines similar to those Synergics is proposing. Perhaps DNR's experts will refine this number.

- Knowing the approximate number of wind machines that could be fitted into the wind rich regions of the Mid-Atlantic uplands, it is not difficult to make a reasonably informed projection about the amount of electricity that those machines would likely generate, using known capacity factors.

- Using a fairly conservative calculus, I show in my testimony that all the wind energy conversion systems necessary to saturate the uplands of the Mid-Atlantic (in the very unlikely event that could all be built within the next several years) might together produce enough electricity to satisfy about one-fourth of the current (2002) regional demand.

- However, I also show in my testimony that demand for electricity nationally will increase at two percent each year, likely into the far future. According to MaryPirg, the demand for electricity in Maryland is likely to increase annually at a rate of 2.5 percent. In any event, in little more than 30 years, the demand for electricity will likely double in our region, as it did nationally from 1970-2000.

- In about 15 years, this increased rate of demand will absorb any yield produced by windpower, necessitating additional energy sources to supply it. Unless wind turbines

fill up the Chesapeake Bay and are constructed off the state's ocean shore, the projected additional future power sources will not come from wind, for the industry will be tapped out on land. Wind energy development of the region's uplands—at its realistic maximum-- will not result in a net reduction of greenhouse gases or cut the present rate of the burning of coal and other fossil fuels. *The very best case scenario for windpower in the Mid-Atlantic region is that future wind energy development will only slightly lessen the rapidly increasing rate in the growth of demand for electricity from "dirty" power sources.*

- And even if this best-case scenario magically obtains, the cost of adding wind energy would be enormous, as I showed in my supplemental testimony. The intermittent nature of wind energy might not pose much of a problem to the region's electricity grid at present levels. However, increasing the percentage of wind energy to higher percentage levels would require significant—and extremely expensive technological modifications to the grid itself and to the various transmission systems out to the end user. It would also, as it has in Germany, present major challenges to the grid's management. *The fundamental problem with supplying demand for electricity is that electricity cannot be stored at industrial levels. Once generated, electricity must be delivered and consumed immediately* owing to technical difficulties with, and the prohibitively high cost of, storage. "In this regard, electricity is perhaps a unique commodity in that the rate of its production must balance the rate with which it is consumed at all times. As one might expect, demand for electricity does not remain constant and fluctuations in load occur" (See page12, "The Costs of Generating Electricity," Phil Ruffles (Chairman of the Study Steering Group), The Royal Academy of Engineering, March, 2004, London).

- Unless some currently unforeseen technological breakthrough in nuclear energy production occurs or increased public acceptance of the nuclear power option is achieved (since it is unlikely future hydro systems will be built, or solar will morph into an industrial form, or bio-mass will generate industrial energy quantities), even more demand will probably be made upon fossil fueled power plants.

- Therefore, the wind industry saturating the uplands of our region will not make the air cleaner in any meaningful way, with dire economic, aesthetic, and health consequences for the public.

- The proposed Synergics plant might generate about 125 million kilowatt hours annually to the PJM grid, although it is ridiculous to state, as Synergics does, that any of this directly powers homes without those homes having expensive battery storage systems. But given that the total annual energy volume produced by the grid is approaching 500 billion kilowatt hours, Synergics' supply would be a minute fraction of one percent of the grid's production. The annual increase in the rate of demand would immediately engulf Synergics' contribution. This is why I have described it as "meaningless," in light of the desire to make the air cleaner, improve public health, and arrest global warming—the reasons for windpower's tax subsidies.

I think the analogy with a bike path around the Washington Beltway is compelling and instructive. If Synergics and other windplant applicants are successful, we'll have coal plants still puffing away *and* wind turbines littering the landscape. This is not an either-or circumstance, as Wayne Rogers has stated. Similar to the bicycle path analogy, the public health will continue to deteriorate while the politicians crow about their environmental acumen, evidenced by their support for massive windplants in the mountains of the state, far removed from their own jurisdictions.