Comments to the
Commonwealth of Virginia State Corporation Commission
Case **PUE-2005-00101**

submitted on March 29, 2006 by

Rick Webb[1] and Dan Boone[2]

These comments concern the application of Highland New Wind Development, LLC for a certificate to construct and operate a generating facility in Highland County. They are submitted on behalf of Virginia Wind, a not-for-profit organization addressing the need for effective environmental assessment prior to utility-scale wind development in the western Virginia and central Appalachian region.[3] We submit to the Commission that the proposed Highland New Wind Development (HNWD) project presents a risk of unacceptable environmental harm and that the potential benefits of the project are minimal.

Environmental Harm

The issues related to environmental harm have been reviewed by the Department of Game and Inland Fisheries (DGIF) (DGIF, 2006), the Department of Conservation and Recreation (DCR) (DCR, 2006), and the U.S. Fish and Wildlife Service (FWS) (FWS, 2003a, 2005, 2006), and it is clear that the wildlife specialists associated with these agencies have taken exceptional care in conducting their reviews.

We will thus only briefly address the following key points concerning potential environmental impacts:

1. **Nocturnal Passage Rates**: The developer's consultant observed consistent and high use of the project site by nocturnal migrants (birds and bats) and noted that passage rates were the highest observed in the eastern U.S. (Plissner et al., 2006). The DGIF responded, stating that this observation may translate into the highest mortality rates in the east (DGIF, 2006). This belief is consistent with prevailing perspective that holds wildlife concentration and abundance as an indicator of wildlife risk at wind project sites (Anderson et al., 1999; Young et al., 2004). Moreover, concern about the risk associated with this exceptionally high passage rate is reflected in FWS guidance to avoid siting wind projects in areas of known bird and bat concentration (FWS, 2003b). It should also

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[3] See www.VAwind.org. The Virginia Wind website provides access to *A Landscape Classification System: Addressing Environmental Issues Associated with Utility-Scale Wind Energy Development in Virginia* and serves as a clearinghouse for information related to assessment of wind projects.

be noted that while bat mortality has been substantial at other central Appalachian wind projects, there are no proven mitigation measures (BWEC, 2004).

2. **<u>Pre-Permitting Studies</u>**: The state and federal wildlife agencies have indicated the need for multiple-year, multiple-season studies of bird and bat usage at the proposed project site (DGIF, 2006; DCR, 2006; FWS, 2003a, 2005). The FWS guidance for wind project siting also indicates the need for multiple year, multiple-season studies when wind projects are proposed for areas of suspected bird and bat concentration (FWS, 2003a). Such studies are needed to adequately understand bird and bat behavior and migration patterns in relation to seasonal and weather variation at wind project sites and to provide an informed basis for development of mitigation strategies. To be meaningful, such studies need to be conducted prior to permitting decisions and prior to development of permitting conditions. Monitoring during fall migration at the proposed HNWD site found the highest ever recorded passage rate of low flying bird and bat migrants (Plissner et al., 2006). Notably, a radar study on Jack Mountain in WV found higher low-flying wildlife migration rates in the spring compared to the fall period (Woodlot Alternatives, 2004; 2005). Given these findings, there is an especially strong need for this project to assess the abundance of nocturnally migrating birds and bats during both spring and fall seasons over a 3-year period –as recommended by FWS guidance.

3. **<u>Risk to Raptors</u>**: Mortality of raptors, including golden eagles, red-tailed hawks, and kestrels, is a well-documented and unresolved problem associated with wind turbines (Smallwood and Thelander, 2005; GAO, 2005). Both golden and bald eagles are frequently present in the general area of the project site (Spahr, 2003; DGIF, 2006). The western Highland County area, which includes the site of the proposed project, is within one of the few areas in Virginia where golden eagles are reliably found. Concentrated hawk migrations are also known to occur in western Highland County (Brooks, 1971), although the extent and frequency of such migrations is unknown. Further study of raptor use, including a comprehensive review of existing data for the surrounding Allegheny Mountains region, is needed to support informed permitting decisions and development of permitting conditions.

4. **<u>Endangered Species</u>**: A number of species listed as endangered under the U.S. and Virginia Endangered Species Acts are documented in the project vicinity. The Virginia northern flying squirrel (federal and state), the Indiana bat (federal and state), the Virginia big-eared bat (federal and state), and the Southern water shrew (state) are present (FWS, 2003b; DGIF, 2006). In addition to the potential for direct impacts on these species and critical habitat, the construction and operation of a utility-scale wind facility may negatively impact future recovery efforts. We have previously recommended that areas supporting endangered species should be designated "unsuitable" for wind project development (Boone et al., 2005).

5. **<u>Independent Study</u>**: The environmental studies conducted by the consultants working for the developer did not involve consultation with or involvement of agency wildlife specialists in the design and execution of the studies. This was counter to the requests of the wildlife agencies (FWS, 2003a, 2005; DGIF, 2006) and counter to the recommendations of the FWS guidelines for wind project siting (FWS, 2003b). This presents questions about protocols and methods (whether there has been peer review), and thus raises additional questions about the validity of the results and interpretation.

6. **<u>Cumulative Impacts</u>:** The need to study the potential cumulative impact of wind projects in the region prior to further permitting of individual projects has been widely recognized (FWS, 2003a; Tuttle, 2005; Boone et al., 2005; DGIF, 2006). As observed by the DGIF, there are currently 88 operating, 457 permitted, and 480 proposed utility-scale turbines proposed or planned in the Allegheny Highlands region. Impacts commonly include site clearing (3-5 acres per turbine), road and transmission line clearing, and associated impacts on forest-interior habitat. Most of these projects will be built on forested mountain ridges and will thus affect residual wild landscape and ecologically significant habitat areas. Given that the Commission will certainly face additional wind project proposals, and that it may be tasked with the responsibility of establishing a state-level system for project siting, it is appropriate for the Commission to conduct its decision making in a context that considers regional cumulative effects. In this regard, it should be noted that the applicant has indicated an expectation that the proposed project will serve to catalyze extensive development of commercial wind energy in Virginia (HNWD, 2003).

7. **<u>The Laurel Fork Watershed</u>**: The Laurel Fork area is probably the least populated area of Virginia's least populated county. It is Virginia's only substantial example of an "Alleghenian" ecosystem. Other areas in the state, mainly in the southern Blue Ridge Province (e.g., Mount Rogers), have similar elevation and forest cover types (northern hardwood, red spruce, eastern hemlock, and white pine). However, Laurel Fork differs from these other areas with respect to the distribution of other northern and southern biota. The Laurel Fork area's uniqueness is exemplified by the presence of 90 known state-rare species, a total which is among the highest for any site in the Commonwealth (Fleming and Moorehead, 1996). Laurel Fork, which would be crossed by transmission lines associated with the proposed project, is a naturally reproducing native brook trout stream and one of a small number of streams granted Exceptional Waters status by the State Water Control Board. More qualitatively, the Laurel Fork area has a remoteness and wilderness aspect that is exceedingly rare and increasingly valuable in today's world. It is difficult to imagine a setting more inappropriate for industrial-scale development.

<u>Energy Supply Benefits</u>

Although it is recognized that only a small amount of electricity could ever be produced by the proposed HNWD project, the argument is made that we need to start somewhere to solve our energy problems. We would argue instead that every wind project should be evaluated based on its individual costs and benefits. It is still instructive though to look at a broader context.

Table 1 indicates the generating capacity and annual capacity factor for the ten largest power plants in Virginia, the number of 1.5 MW wind turbines that would be required to equal the output of these plants, and the miles of ridgecrest these turbines would occupy, given the typical spacing of eight utility-scale turbines per mile of ridgetop.

The annual capacity factor represents the percentage of the total capacity that is actually produced during a 12-month period. For the listed power plants this ranges from 40% to 90%, with little seasonal variation in capacity factor for any given plant. In contrast, due to intermittency and seasonality of wind power, the annual capacity factor for wind projects is lower and the capacity factor is lower for summer than winter. The 30% capacity factor applied in this analysis is the approximate annual average for four operating wind projects which are located on ridgetops in the central Appalachian region. The annual and monthly capacity factors for these wind projects are plotted in Figure 1. The average summer capacity factor for these wind projects is about 15%, meaning that about twice as many turbines would be required to equal the output of the plants listed in Table 1.

As indicated in Table 1, wind energy has a large footprint in terms of the number of turbines and miles of ridgeline required to provide generation that is comparable to traditional power plants. This disadvantage is further compounded by both the seasonality of wind power, as indicated in Figure 1, and by the seasonality of electricity demand. The annual capacity profile of wind power and the annual electricity demand profile are inversely related, which means that wind generated electricity is least available when the demand for electricity is greatest (Figure 2). In addition, the need for new sources of electricity in the central Appalachian region is mainly

TABLE 1
The ten largest power plants in Virginia and the number of wind turbines needed to provide an equivalent annual output of electricity.

Facility Name	Capacity (MW)	Owner	Fuel Type	Annual Capacity Factor	# Wind Turbines To Equal Output[1]	# Miles Ridgecrest Covered[2]
North Anna	1,960	VEPCO	Nuclear	86%	3,752	469
Surry	1,695	VEPCO	Nuclear	91%	3,480	428
Chesterfield	1,353	VEPCO	Coal	60%	1,809	226
Clover	848	VEPCO	Coal	90%	1,693	212
Chesapeake	650	VEPCO	Coal	72%	1,040	130
Clinch River	713	Appalachian Power	Coal	63%	996	124
Yorktown	882	VEPCO	Waste Oil	40%	781	98
Yorktown	375	VEPCO	Coal	69%	574	72
Possum Point	348	VEPCO	Natural Gas	73%	562	70
Potomac River	514	Mirant Energy	Coal	46%	526	66

[1] Number of 1.5 MW wind turbines operating with 30% Annual Capacity Factor (the approximate average efficiency in region)

[2] Based on eight utility-scale wind turbines per mile of ridgetop (typical spacing)

Monthly and Annual Capacity Factors
For Four Wind Power Projects, a Coal-Fueled Power Plant, and a Nuclear Power Plant

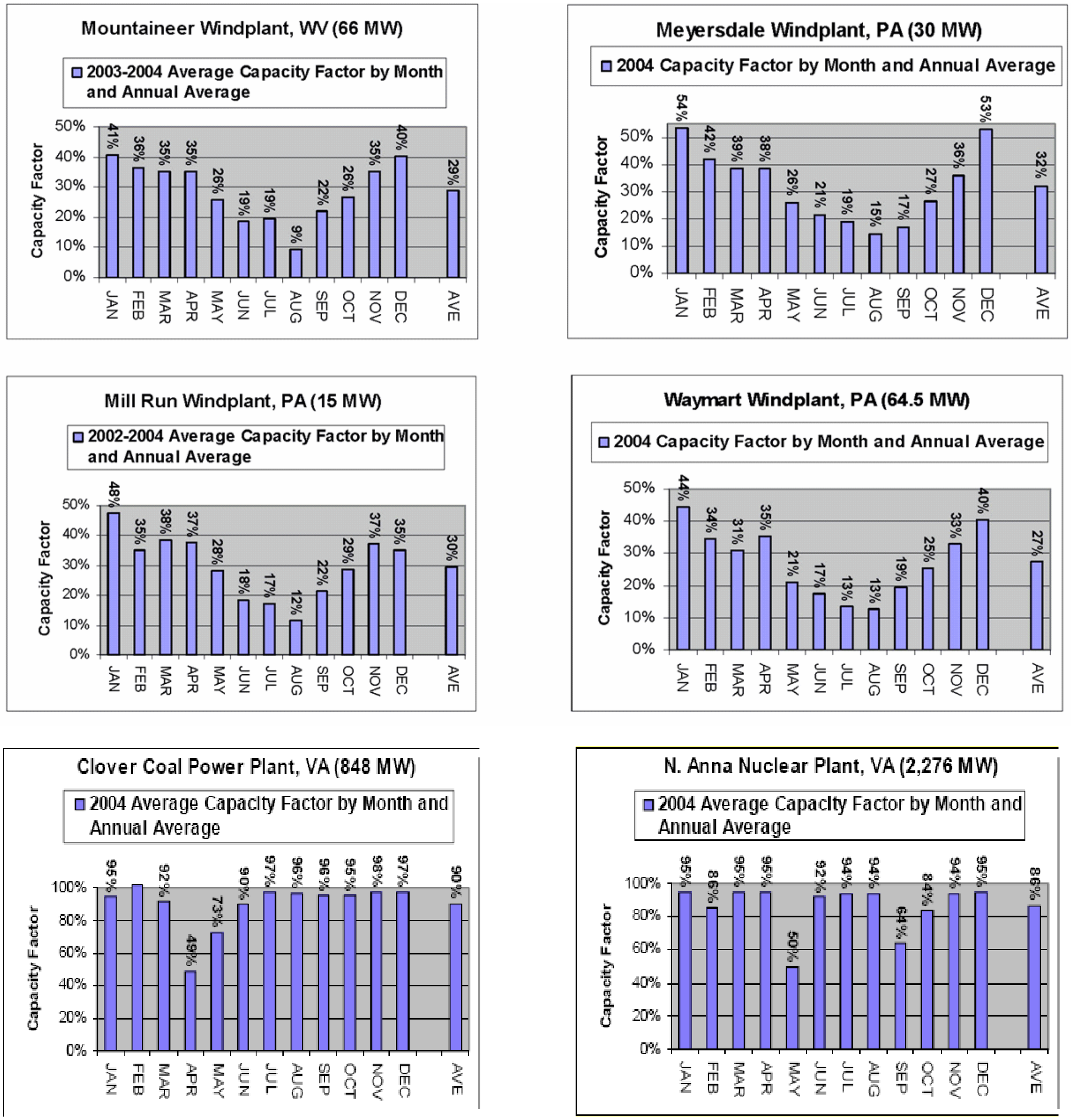

FIGURE 1
Capacity factor represents the fraction of “nameplate” (total generator) capacity that would have been required to operate continuously in order to yield the actual electricity (MWh) produced by the facility during a specified period of time. Due to intermittency, wind turbines generally achieve a much lower capacity factor than traditional power plants (see Clover and North Anna power plants - coal-fueled and nuclear facilities, respectively). All six of these plots are based on the USDOE Energy Information Administration’s 906/920 Monthly Time Series Data (www.eia.doe,gov/cneaf/electricity.page/eia906_920.html).

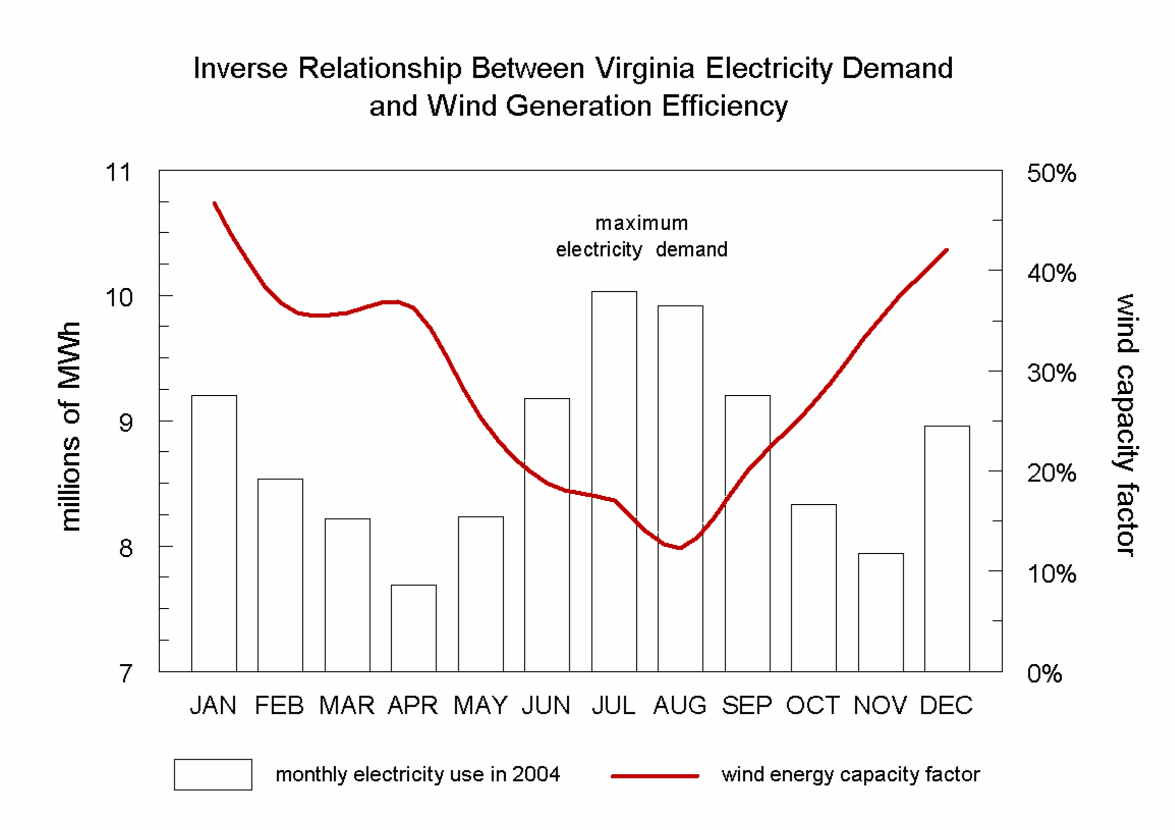

FIGURE 2
Monthly capacity factors for wind generation are based on values indicated in Figure1. Monthly electricity demand in Virginia is based on 2004 electricity consumption data. (http://www.eia.doe.gov/cneaf/electricity/page/sales_revenue.xls).

driven by peak summertime demand (see Reynolds, 2005). Wind energy therefore contributes little in terms of meeting the need for new electricity generation sources.

Continuing growth in demand for electricity means that, at best, wind energy offsets the need for new generation sources. In the face of dramatically increasing demand, wind energy development cannot reduce demand. Electricity demand in the U.S. is projected to double between 2000 and 2025 (Asbakken, 2005). In Virginia, electricity consumption increased an average of 2.52% per year during the 1994–2004 period (EIA, 2004). If this growth rate continues, the 105,424,173 MWh of electricity consumed in Virginia in 2004 will double by 2032.

It is informative to consider the capacity for wind generation in Virginia in relation to the prospective growth in electricity consumption. Estimates of total technical capacity for wind generation were made in conjunction with a recent study of renewable energy potential in Virginia (Bird et al., 2005). After applying various land use and other exclusions (e.g., conservation lands, 50% of remaining National Forest, areas with steep slopes) this study determined there may be an onshore wind energy capacity of 1959.5 MW. Less capacity was determined when additional constraints, including distance to transmission lines and line capacity, were applied.

1959.5 MW of capacity would require 1306 1.5 MW turbines, occupying approximately 163 miles of ridgecrest. The limited promise of utility-scale wind energy development in Virginia's mountains is evident given this estimate of maximum onshore wind capacity. In fact, complete build-out of this capacity would not be sufficient to satisfy the net growth in electricity demand over a two-year period. As indicated in Figure 3, potential onshore wind energy development has little importance in relation to growth in demand.

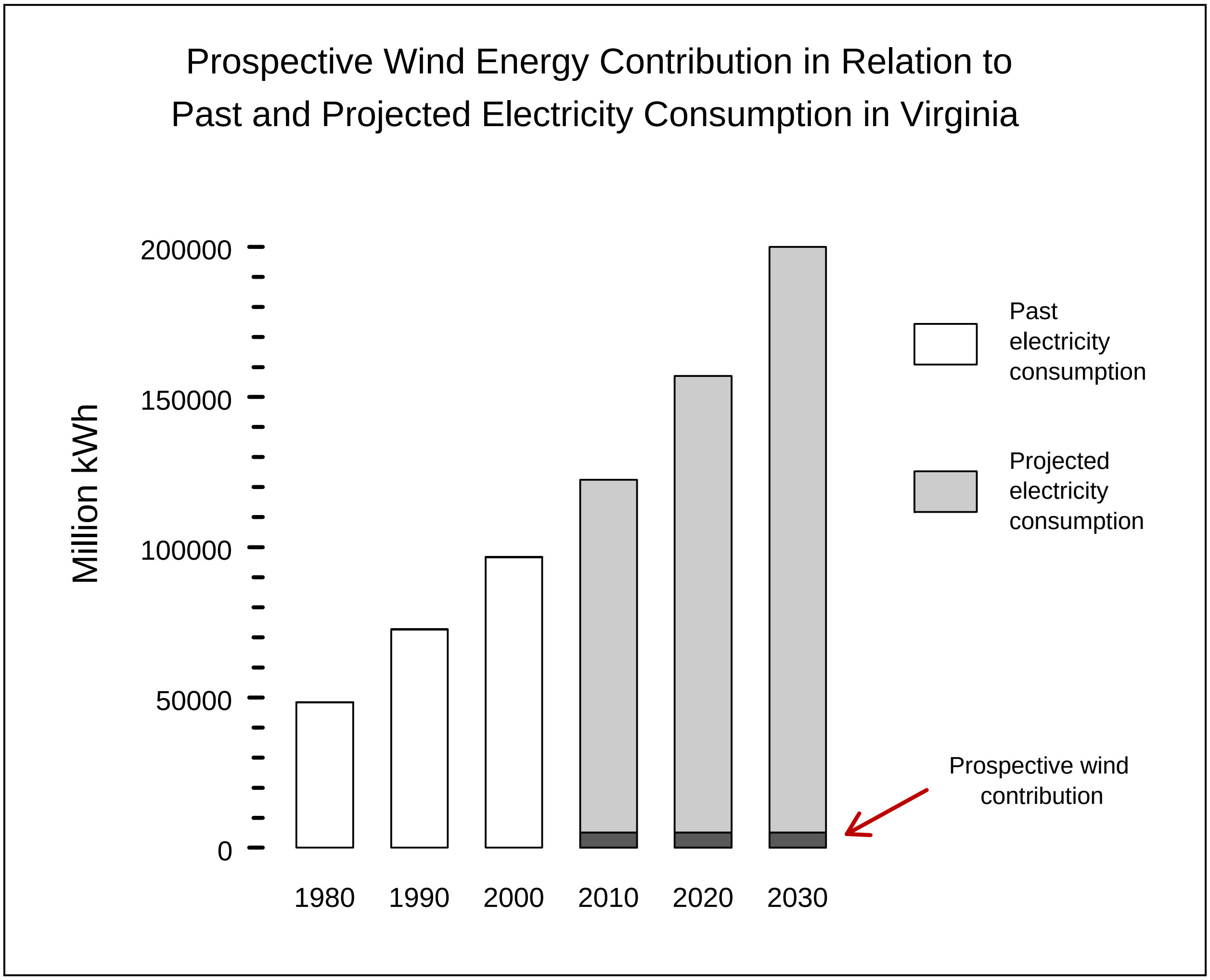

FIGURE 3
Observed and projected increase in electricity consumption in Virginia, in relation to total estimated onshore wind generation capacity. *The prospective contribution of the proposed HNWD project is less than 2% of the indicated total onshore wind generation capacity.*

Increase in demand is based on an average 2.52% annual growth rate for 1995–2004. Data source: http://www.eia.doe.gov/cneaf/electricity/page/sales_revenue.xls

Prospective wind contribution is based on 1959.5 MW of technical capacity. Data source: http://www.energy.vt.edu/Publications/Incr_Use_Renew_Energy_VA_rev1.pdf

In view of this analysis, it's not surprising that the proposed HNWD project, with 38 MW of capacity, will contribute very little in terms of electricity production (see Table 2). The estimated annual production for the HNWD project would be less than one-tenth of one percent of total annual Virginia electricity consumption. The estimated annual production for the HNWD project would effectively provide about eight hours of Virginia's total annual electricity requirement. The estimated August production for the HNWD project would effectively provide about 16 minutes of Virginia's total electricity requirement during this summer month.

TABLE 2

Summary of Estimated Electricity Generation for the Proposed Highland New Wind Development Project

Period	Capacity Factor[1] %	HNWD: Estimated Generation[2] MWh	Virginia Demand[3] MWh	HNWD: Percentage of Virginia Demand[4]	HNWD: Hours of Virginia Demand[5]
January	46.8	13,217	9,198,934	0.144	1.07
February	36.8	9,384	8,526,185	0.110	0.74
March	35.8	10,107	8,216,078	0.123	0.92
April	36.3	9,918	7,694,073	0.129	0.93
May	25.3	7,139	8,232,483	0.087	0.65
June	18.8	5,130	9,175,610	0.056	0.40
July	17.0	4,806	10,025,860	0.048	0.36
August	12.3	3,463	9,921,743	0.035	0.26
September	20.0	5,654	9,198,970	0.061	0.46
October	26.8	7,563	8,334,086	0.091	0.68
November	35.3	9,644	7,936,366	0.122	0.87
December	42.0	11,874	8,963,786	0.132	0.99
Annual	29.4	97,853	105,424,174	0.093	8.13

[1] Capacity factor is the percentage of total ("nameplate") capacity actually realized in practice. The values provided here are based on the monthly electricity generation reported during 2004 for four wind energy projects which are sited on ridgetops in the Central Appalachian region.

[2] Estimated as 38 MW x capacity factor x hours per time period

[3] Electricity sales for 2004 (www.eia.doe.gov/cneaf/electricity/page/sales_revenue.xls)

[4] (Estimated HNWD generation / Virginia demand) x 100

[5] HNWD percentage of Virginia demand x hours per time period

Air Quality Benefits

The issues that limit the value of wind as an electricity source in Virginia also limit its value for achieving air quality improvements. These issues, as described above, are limited generation capacity and rapidly increasing consumption and demand for electricity. In addition, as discussed below, several important pollutants associated with electricity generation and fossil fuel combustion are already subject to changes in emission levels (either decreasing or increasing). These changes in emission levels substantially exceed any potential changes in emissions that may be associated with onshore wind development in Virginia. In this context, wind energy development in Virginia's mountains can have little significance in relation to air pollution.

To objectively consider the potential benefits of wind energy development it is important to consider the sources of electricity and the pollutant emissions associated with each source. Figure 4 indicates the percentage of electricity generation associated with coal, nuclear, and natural gas in Virginia and the relative percentages of carbon dioxide, nitrogen oxides, and sulfur dioxide emissions associated with each generator type. Together, these nonrenewable electricity sources produce about 97% of the electricity generated in Virginia.

As indicated in Figure 4, most of the electricity production and most of the pollution emissions in Virginia are associated with coal-fueled generators. Comparatively little electricity is provided by generators fueled by natural gas. In addition, natural gas is associated with proportionately less emission of pollution for the amount of electricity produced. This difference has significance with respect to pollution benefits associated with wind generation. In general, wind energy development will obtain the more-limited benefits associated with displacing natural gas instead of the greater benefits associated with displacing coal. This is due to the intermittency of wind generation and the fact that natural gas generation is more readily dispatchable (it can be brought on and off line more quickly) than coal generation. The extent of coal versus natural gas offsets associated with wind energy development, however, is difficult to determine or quantify without very detailed records comparing electrical energy production and flows in the distribution grid with the energy output potential from proposed wind projects. (Detailed information that is collected to quantify the energy potential of a project's site is generally treated as confidential by developers – and not available for review or study.) Thus, for the following analysis of potential emissions offsets, we have adopted the assumption that wind generation will displace the average of emissions associated with all sources of electricity, rather than emissions associated with natural gas and/or coal.

Here we examine the potential benefits of onshore wind development in Virginia with respect to displacement of emissions of SO_2, NO_x, and CO_2. Emissions of SO_2 and NOx are associated with harm to human health, acidic deposition, and visibility reduction. Emissions of NO_x are also associated with ozone formation. Emissions of CO_2 are associated with global warming.

Sulfur dioxide (SO_2) and nitrogen oxides (NO_x)

In the U.S. about 67% of anthropogenic SO_2 emissions and about 27% of NO_x emissions are associated with the burning of fossil fuels for electricity generation (USEPA, 1998). The largest source of SO_2 emissions is coal combustion; the largest source of NO_x emissions is transportation (USEPA, 2000).

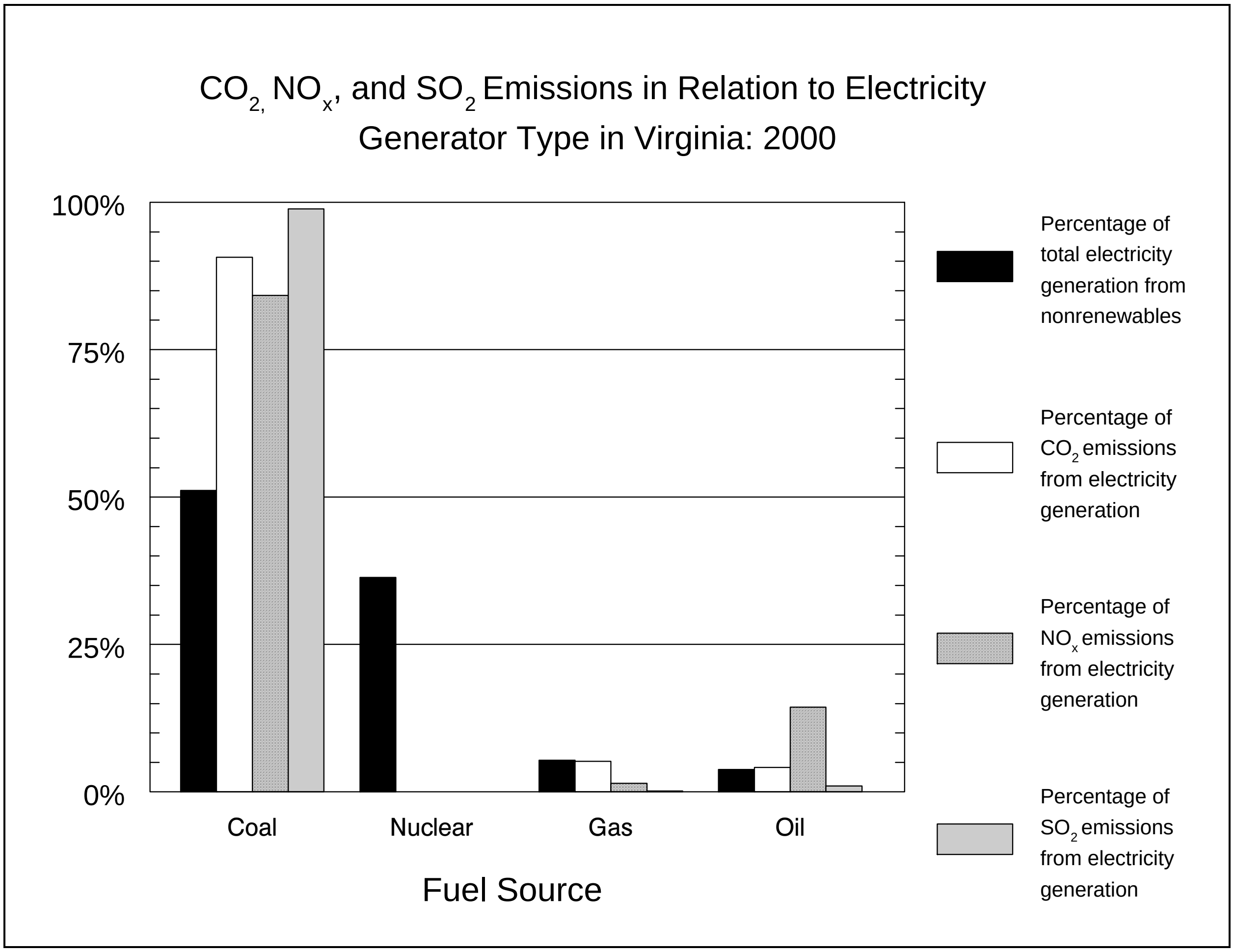

FIGURE 4
Percentage of nonrenewable electricity generation in Virginia provided by generator types in relation to the percentage of pollutants emitted from all electricity generation in Virginia. Data source: http://www.epa.gov/cleanenergy/egrid

Any reduction in SO_2 and NO_x emissions associated with development of wind energy will occur against a background of substantial emission reductions obtained through the Clean Air Act and other regulatory programs. Between 1970 and 2004, SO_2 emissions in the U.S. declined 51% and NO_x emissions declined 30% (USEPA, 2006). Most of the reduction in SO_2 emissions was due to control of emissions from electric utilities, while most of the reduction in NO_x emissions was due to control of emissions from other sources.[4] Current regulatory programs mandate either national or regional caps on emissions of SO_2 and NO_x, and additional reductions of both pollutants are projected even though demand for electricity is growing rapidly. Figure 5 indicates the past and projected decrease in SO_2 and NO_x emissions from electric utilities in relation to the past and projected increase in electricity generation.

[4] Examination of U.S. emissions data for 1970–2003 indicates that emissions of SO_2 from electrical generating units declined 37% while emissions of NO_x from electrical generating units declined only 9%. (see http://epa.gov/airtrends/2005/pdfs/detailedtable.xls)

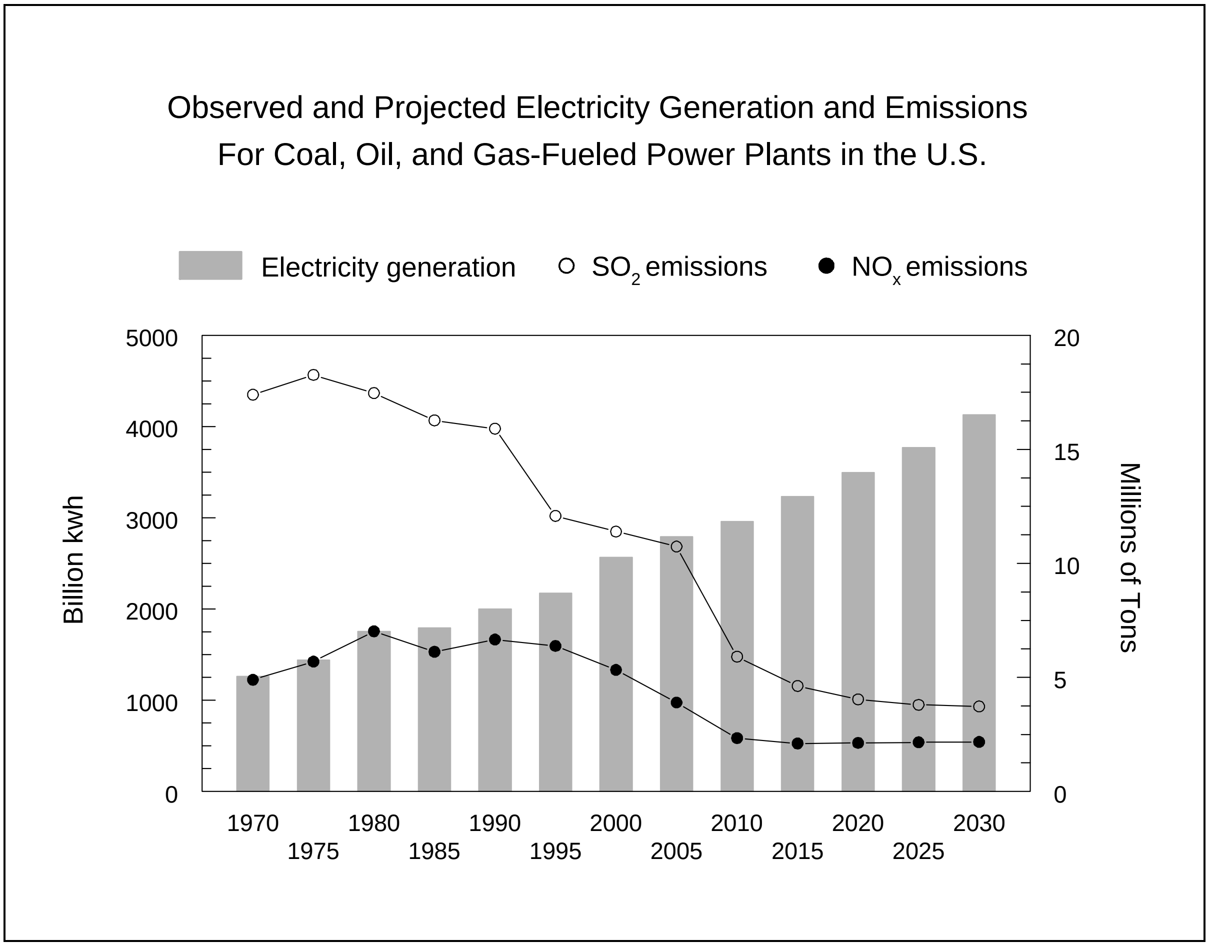

FIGURE 5
The past and projected decrease in SO_2 and NO_x emissions from electric utilities in relation to the past and projected increase in electricity generation. Data through 2000 are actual; data for 2005–2030 are projected.

Data source for electricity generation through 2000:
http://www.eia.doe.gov/emeu/aer/pdf/pages/sec8_9.pdf

Data source for emissions associated with electricity generation through 2000:
http://epa.gov/airtrends/2005/pdfs/detailedtable.xls

Data sources for electricity generation and associated emissions for 2005–2030:
http://www.eia.doe.gov/oiaf/archive/aeo05/pdf/aeo_base.pdf
http://www.eia.doe.gov/oiaf/aeo/pdf/appendixes.pdf

As indicated in Figures 6 and 7, SO_2 and NO_x emissions have also been reduced in Virginia and further reductions are anticipated. The observed emissions from all sources (electric utilities, industry, transportation, etc.) are indicated for 1990 and 2001. Projected emission levels for all sources for 2015 are based on emissions caps mandated by current regulatory programs. The indicated potential pollution offsets associated with wind development are shown in relation to the size of the reductions required to comply with the emissions caps. It is not known whether these potential offsets will contribute to actual reduction in total emissions. The extent to which these potential offsets result in reduction of emissions will depend upon the implementation of the cap-and-trade programs and the extent to which emission caps are further reduced by retirement of emission allowances as wind projects are developed.

Note that the potential pollution offsets indicated in Figures 6 and 7 apply to the total estimated technical capacity for onshore wind development in Virginia (Bird et al., 2005). This estimate is provided in an appendix to *A Study of Increased Use of Renewable Energy Resources in Virginia* (Karmis, 2005). Additional information provided in the same report suggests that only 400 MW of the estimated 1959.5 MW of total technical capacity could be developed in the next ten years, or by 2015. Also, it should be noted that the potential electrical output of the proposed HNWD project represents less than 2% of the estimated total technical capacity for onshore wind. The potential pollution offsets associated with this amount of wind capacity are too small to depict in Figures 6 and 7.

Carbon dioxide (CO_2)

In Virginia, electrical generation is responsible for 35% and transportation is responsible for 41% of CO_2 generation from fossil fuel combustion. In 2000, power plants emitted about 46 million tons of CO2. However, CO2 emissions from all sources in VA topped 133 million tons in that same year. From 1990 to 2001, CO2 emissions from all sources increased by an annual growth rate of over 2.1% (USEPA, 2005).

Any reduction in CO_2 emissions associated with development of wind energy will thus occur against a background of increasing CO_2 emissions. Figure 8 indicates observed CO_2 emissions for 1990 and 2001 from fossil fuel combustion and projected CO_2 emissions for 2015, assuming that the 2.1% annual growth rate continues. As indicated in Figure 8, any reduction in CO_2 emissions obtained through development of onshore wind energy capacity will be relatively small compared with increasing emissions. In fact, complete development of the estimated onshore wind energy capacity will be limited to offsetting just a single year's growth in emissions of CO_2.

Note that the caveats applied above to consideration of potential offsets of SO_2 and NO_x emissions also apply to consideration of potential offsets in CO_2 emissions. Actual wind energy development by 2015 will probably be much less than the estimated total onshore technical capacity. And again, the potential offsets associated with the proposed HNWD project are much too small to be depicted in Figure 8.

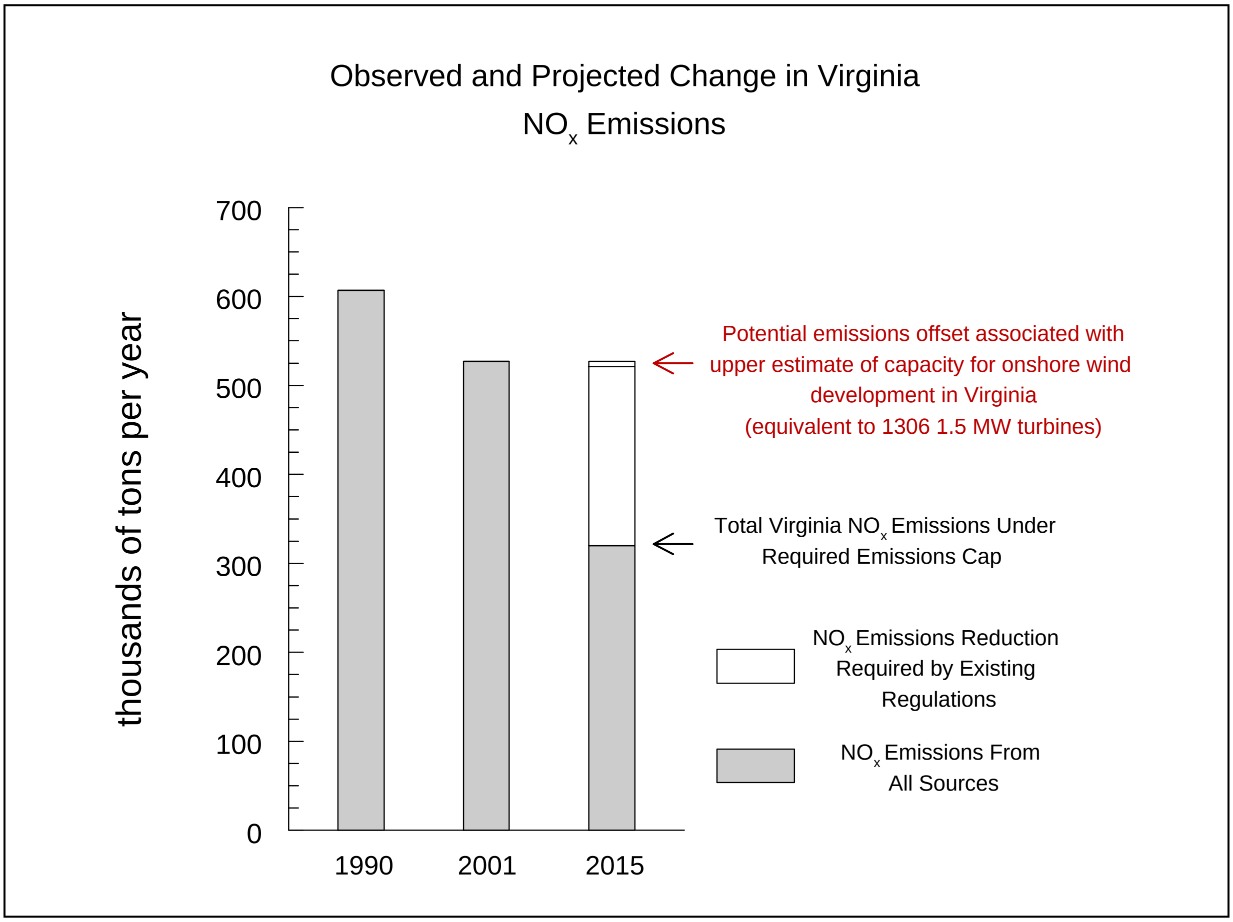

FIGURE 6
Observed and projected change in NO_x emissions in Virginia given existing air quality regulations. The potential emissions offset associated with 1959.5 MW of wind generation, an estimate for onshore technical capacity, is shown in relation to mandated emission reductions. As described in this report, this potential offset may not contribute to emissions reductions depending on implementation of the cap-and-trade program. *The potential offset associated with the proposed HNWD project is less than 2% of the potential offset for the estimated total onshore technical capacity.*

Data source for 1990 emissions data:
http://www.epa.gov/air/data/emcatrep.html?st~VA~Virginia

Data source for 2001 and 2015 emissions data:
http://www.epa.gov/interstateairquality/state/va.html

Data source for estimate of capacity for onshore wind energy development in Virginia:
http://www.energy.vt.edu/Publications/Incr_Use_Renew_Energy_VA_rev1.pdf

The emissions offset for NO_x is based on the average for NO_x emissions associated with all sources of electricity in Virginia (2.579 lbs/MWh), based on generation and emissions data for 2000. Data source: http://www.epa.gov/cleanenergy/egrid

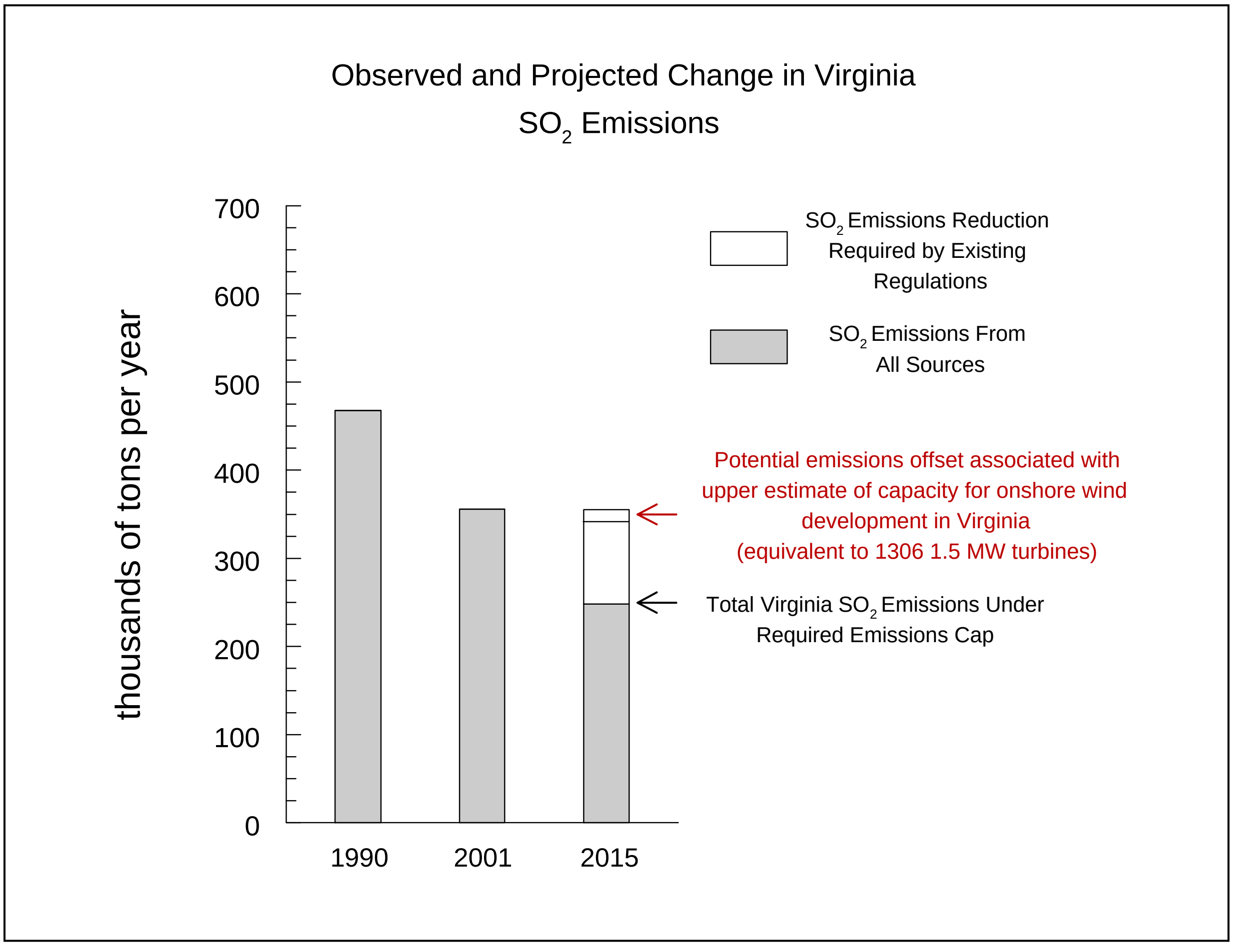

FIGURE 7

Observed and projected change in SO_2 emissions in Virginia given existing air quality regulations. The potential emissions offset associated with 1959.5 MW of wind generation, an estimate for onshore technical capacity, is shown in relation to mandated emission reductions. As described in this report, this potential offset may not contribute to emissions reductions depending on implementation of the cap-and-trade program. *The potential offset associated with the proposed HNWD project is less than 2% of the potential offset for the estimated total onshore technical capacity.*

Data source for 1990 emissions data:
http://www.epa.gov/air/data/emcatrep.html?st~VA~Virginia

Data source for 2001 and 2015 emissions data:
http://www.epa.gov/interstateairquality/state/va.html

Data source for estimate of capacity for onshore wind energy development in Virginia:
http://www.energy.vt.edu/Publications/Incr_Use_Renew_Energy_VA_rev1.pdf

The emissions offset for SO_2 is based on the average for SO_2 emissions associated with all sources of electricity in Virginia (5.828 lbs/MWh), based on generation and emissions data for 2000. Data source: http://www.epa.gov/cleanenergy/egrid

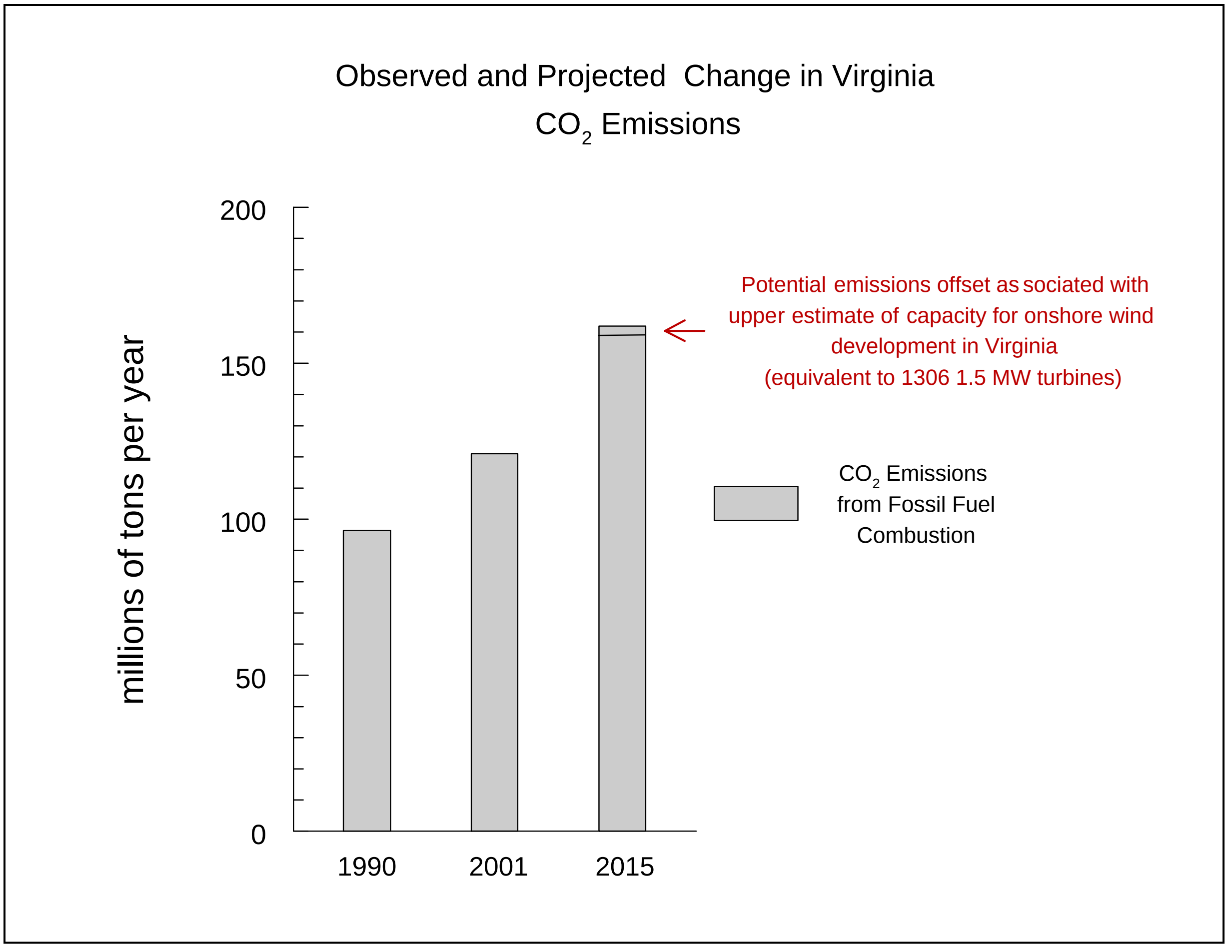

FIGURE 8
Observed and projected change in CO_2 emissions in Virginia. The potential emissions offset associated with 1959.5 MW of wind generation, an estimate for onshore technical capacity, is shown in relation to projected CO_2 emissions in 2015. Projected emissions for 2015 are based on a 2.1% growth in emissions observed for 1990–2001. *The potential offset associated with the proposed HNWD project is less than 2% of the potential offset for the estimated total onshore technical capacity.*

Data source for 1990 and 2001 emissions data:
http://yosemite1.epa.gov/oar/globalwarming.nsf/content/EmissionsStateEnergyCO2Inventories.html

Data source for estimate of capacity for onshore wind energy development in Virginia:
http://www.energy.vt.edu/Publications/Incr_Use_Renew_Energy_VA_rev1.pdf

The emissions offset for CO_2 is based on the average for CO_2 emissions associated with all sources of electricity in Virginia (1231.5 lbs/MWh), based on generation and emissions data for 2000. Data source: http://www.epa.gov/cleanenergy/egrid

Summary

- The risk of environmental harm associated with the proposed HNWD project is large and insufficient study has been conducted to allow informed development of mitigation strategies and permit conditions.
- Adherence to FWS guidelines for wind project siting and specific recommendations for the HNWD proposal is clearly warranted based on both the applicant's environmental studies and natural resource agency review comments. The guidelines and recommendations include: (1) avoidance of bird and bat concentration areas, (2) study of wildlife use over a period of three years and during all seasons, (3) involvement of agency and independent wildlife specialists in all wildlife studies, and (4) evaluation of cumulative impacts of potential regional-scale wind energy development.
- The potential for electricity generation associated with estimated total onshore wind development capacity in Virginia is relatively small compared with current and projected electricity demand, and the potential for electricity generation associated with the proposed HNWD project is insignificant.
- Wind energy development in Virginia's mountains will not obviate or significantly reduce the need for new power generation facilities to meet the increasing demand for electricity during summertime (when state and regional demand for power is at its highest) because the generation of electricity from industrial wind turbines sited in the Central Appalachian region is minimal and at its lowest level during the summer months.
- The potential for pollution offsets associated with estimated total onshore wind development capacity in Virginia is relatively small compared with total pollutant emissions associated with electricity production in Virginia, and the potential for pollution offsets associated with the proposed HNWD project is insignificant.

Citations

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