

**THE STATE OF NEW HAMPSHIRE**

**SITE EVALUATION COMMITTEE**

**DOCKET NO. 2012-01**

**APPLICATION OF ANTRIM WIND ENERGY, LLC**

**PRE-FILED TESTIMONY OF LISA LINOWES**

**INDUSTRIAL WIND ACTION GROUP**

**JULY 31, 2012**

**1) Please state your name and address for the record.**

My name is Lisa Linowes, and my address is 286 Parker Hill Road, Lyman, NH 03585.

**2) Please summarize your education and background as it relates to this matter.**

I serve as Executive Director of the Industrial Wind Action Group (Windaction.org) a New Hampshire corporation form in 2006. Prior to that time I was a founder, National Wind Watch, and served as its Vice President and spokesperson. In these respective, full-time capacities, I am responsible for tracking wind energy development worldwide with specific focus on the impacts of industrial-scale wind energy on the natural environment, communities, and the regional grid systems. I am a principal and regular contributor to MasterResource.org, a blog dedicated to analysis and commentary about energy markets and public policy. I co-host Wind Wise Radio, a weekly radio news show focused on the issues and impacts of large-scale wind energy development. I was the technical advisor of the award-winning documentary, *Windfall*, produced and directed by Laura Israel. *Windfall* tells the story of how residents in a small community in upstate New York responded upon learning that a utility-scale wind energy facility might be situated in their town.

1 I have testified before Congress<sup>1</sup> on the issue of tax subsidy programs for renewable energy and have been  
2 invited to speak on the topic of wind energy at numerous venues throughout the United States including the  
3 annual meeting of the Midwest chapter of the Energy Bar Association, the ISO-NE Regional System Plan  
4 meeting and the National Association of Realtors legislative meeting.

5 I have over fifteen years experience in land use and zoning issues and have served on local land use boards  
6 and conservation commissions in Windham and Lyman, New Hampshire. In addition, I've served as a  
7 director of the NH Association of Conservation Commissions. My formal education includes a Bachelor in  
8 Science in Software Science from the Rochester Institute of Technology and an MBA from Southern New  
9 Hampshire University.

10 **3) Why did you petition to become an intervenor in this matter before the NH SEC?**

11 Windaction.org subscribers number over 3,000 with the majority residing in eastern U.S. states including  
12 New Hampshire and its three bordering states. Our subscribers have a strong interest in ensuring wind  
13 energy proposals are considered in a deliberate and comprehensive manner with a keen focus on the costs  
14 of such development. Windaction.org subscribers who reside within the ISO-NE control area will be directly  
15 and substantially affected by the outcome of this proceeding.

16 **4) Do you oppose wind energy?**

17 No. There is a place for generation powered by wind. However, such development must be properly sited  
18 and provide sufficient, verifiable benefit that can justify any qualitative and quantitative environmental,  
19 economic, health and societal impacts.

20 **5) Are you familiar with the project application? What does your testimony address?**

21 Yes. I've review the project application as well as the testimony of Antrim Wind Energy LLC ("applicant") and  
22 his witnesses. In addition I've read the reports supplied in the appendices. My direct prefiled testimony  
23 addresses the economic benefits of the project, the analysis on property values impacts, assertions related  
24 to emissions reduction and the cost of the energy.

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<sup>1</sup> Lisa Linowes, *Testimony before the Committee on Science, Space, and Technology*, April 19, 2012,  
<http://science.house.gov/sites/republicans.science.house.gov/files/documents/hearings/HHRG-112-SY21-WState-LLinowes-20120419.pdf>

1 **6) The applicant worked with Dr. Ross Gittell and Matt Magnusson to prepare the report entitled**  
2 ***Economic Impact of the Proposed Antrim 30 MW Wind Power Project in Antrim, New Hampshire. Are***  
3 **you satisfied with the conclusions of the report? Please explain.**

4 I've read the report and found significant flaws in the methodology utilized by the applicant. The authors rely  
5 on the National Renewable Energy Lab's JEDI model ("Jobs and Economic Development Impacts") to  
6 estimate jobs, earnings, and economic output supported through the construction and operation of the Antrim  
7 wind project.

8 The JEDI model purports to enable calculating the state or local economic impacts resulting from building a  
9 potential wind energy facility. The model is designed to estimate job and economic benefits by (a) using  
10 various default assumptions provided in the model or (b) changing those assumptions to better fit the facts  
11 for a particular project. The default assumptions under JEDI produce unrealistically high estimates of  
12 economic benefit for localities in both potential jobs and potential economic activity. JEDI only looks at the  
13 positive impacts of a project and assumes that money spent is always beneficial. But that is not a safe  
14 assumption. For example, impacts on property values and energy prices that might have a tempering effect  
15 on project benefits are not factored in.

16 In a data request, I asked if Dr. Gittell's economic analysis considered the impact of above market energy  
17 prices to which he responded "there has been no contract for the sale of the power from the Antrim Wind  
18 Project at any price, therefore there is no foundation for the question and it cannot be answered." Regardless  
19 whether a contract was negotiated or not, the applicant has stated in his application that the project will  
20 require a power purchase agreement in order to succeed. Dr. Gittell's model ignores the fact that onshore  
21 wind in New England demands between 9-11 cents per KWh, more than twice the wholesale price of natural  
22 gas. More wind in the fuel mix will cause upward pressure on energy prices for the life of the power purchase  
23 agreements. As these agreements expire in 15-20 years, prices may drop but by that time the turbines will  
24 be coming to the end of their operating life.

25  
26 The Vermont Department of Public Service published the results of a study<sup>2</sup> that evaluated the  
27 consequences of adding just 50 megawatts of renewable energy at prices that were higher than market  
28 based alternatives. The report concluded that above-market energy costs due to higher electricity prices  
29 would have the deleterious effects of "reshuffling consumer spending and increasing the cost of production  
30 for Vermont businesses". It also stated that "increased costs for households and employers would reduce the

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<sup>2</sup> Vermont Department of Public Service, *The Economic Impacts of Vermont Feed-In Tariffs*, December 2009  
<http://publicservice.vermont.gov/planning/DPS%20White%20Paper%20Feed%20in%20Tariff.pdf>

1 positive employment impacts of renewable energy capital investment and the annual repair and maintenance  
2 activities". Without a similar analysis by the applicant for the project, the conclusions on economic benefits  
3 are incomplete and unreliable.

4 On the issue of jobs creation, the authors rely, in part, on information provided by Antrim Wind Energy LLC  
5 and Reed & Reed, Inc. in determining the non-default assumptions used in their JEDI model. The applicant  
6 has refused to release this information to the parties, making validation of Dr. Gittell's assumptions  
7 impossible. The authors provide no foundation for their claim that New England based projects average 2.0  
8 to 4.0 FTE [Full-Time Equivalents] jobs per MW installed (*Appendix 14b at 11*). They compare the New  
9 England figures to a national average range of 0.4 to 1.6 FTE jobs per MW installed but those numbers are  
10 also suspect having been sourced from job figures dating back to 2002-2004 (*footnote 10*) when the U.S.  
11 had less than 7,000 MWs of wind installed.

12 The authors ultimately decide that the average FTE for direct construction jobs in New England is 2.0-2.5  
13 jobs per MW installed because it's 'more appropriate' and then complain (*footnote 11*) that there are too few  
14 projects in the region and a reluctance by developers to share project data. It appears from the report that  
15 the authors only inquired about NH-sited projects. According to the ISO-NE CELT<sup>3</sup> report, New England has  
16 36 turbine installations interconnected to the grid with 11 with nameplate capacities between 11 MW to 132  
17 MW. Ten of these projects were built since 2008. Based on the information provided in Appendix 14b, the  
18 assumption used for FTE jobs per MW installed are as valid as numbers pulled from the air.

19 On page 11 of the report, the authors state that "the percentage [30%] of labor coming from local sources  
20 was a conservative estimate based on information provided by Antrim Wind Energy, LLC, Reed and Reed,  
21 Inc., and JEDI model default inputs". Again, the applicant has refused to share this information with the  
22 parties so validation of this assumption is not possible. It is useful to note that both the Sheffield Wind project  
23 in Sheffield, VT and the Granite Reliable Wind project in Coos County, NH were cited for failing to hire local  
24 workers<sup>4</sup>. In Illinois, at the Minonk wind facility project site in Woodford County only 6 of the 292<sup>5</sup> workers  
25 were local to the area. In all three cases, the permitting boards had been assured that a reasonable  
26 percentage of local workers would be hired.

27 The study adds INDUCED benefits, which further exaggerate the project's economic benefits since these  
28 figures are abstract and cannot be verified. Induced benefits are those derived from someone earning an

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<sup>3</sup> ISO-NE CELT report - [http://www.iso-ne.com/trans/celt/report/2012/2012\\_celt\\_report.xls](http://www.iso-ne.com/trans/celt/report/2012/2012_celt_report.xls) May, 2012

<sup>4</sup> *Ironworkers union complains locals not hired for wind farm* <http://www.windaction.org/news/31994> May 20, 2011.

<sup>5</sup> *Wind farm workers not from Woodford*, <http://www.pjstar.com/news/x1052259928/Wind-farm-workers-not-from-Woodford>, July 17, 2012.

1 income from the project. This type of counting is two levels removed from the wind farm and is inherently  
2 unreliable.

3 NREL's JEDI model provides a gross analysis only, it does not consider how building a renewable energy  
4 facility might displace energy or associated jobs, earnings, and output related to other existing or planned  
5 energy generation resources (e.g., jobs lost or gained related to changes in electric utility revenues and  
6 increased consumer energy bills, among other impacts).

7 In other words, the model is one-sided, only considering the benefit side of a cost-benefit comparison and  
8 ignores everything else.

9 **7) You state in question #6 that the project might negatively impact property values. The applicant's**  
10 **witnesses, Gittell and Magnusson ("the authors") state otherwise both in Appendix 14b and in**  
11 **Appendix 14a. Do you agree with Gittell's and Magnusson's analysis? Please explain.**

12 No. Again, the methodology utilized in evaluating impacts of the Lempster Wind project on property values is  
13 faulty for many reasons.

14 All of the studies mentioned on Page 10 of Appendix 14a have limitations, and in some cases fatal flaws  
15 which render their results misleading and likely invalid. Hoen (2006) which was cited by the authors,  
16 captured some of these limitations in his report on the Fenner wind project but the authors omitted any  
17 reference to this in their own report. Instead, they proclaimed - without reservation - that almost all of the  
18 studies found that a statistical analysis of actual property transactions had "not revealed a statistically  
19 significant change in property values resulting after the construction of wind energy projects."

20 Sterzinger (2003) not only concluded that property values were not negatively impacted but it found that sale  
21 prices grew faster within the viewshed of the turbines. Gittell and Magnusson stress that Sterzinger is the  
22 only study that considered a wind facility in New England, the 11MW facility in Searsburg, Vermont.  
23 However, key flaws of Sterzinger include:

24 a) the authors made no attempt to discern those properties in the study which had a view of the  
25 turbines from those with no view. In fact, sixty-six percent of the homes sampled did not see the wind  
26 facility at all;

27 b) Sterzinger's analysis made no distinction between homes near the turbines and those five miles  
28 away thus assuming the effect of the turbines was equal on all properties regardless of proximity;

1 c) the sales transactions studied by Sterzinger included all transactions including those where the  
2 buyer, seller, or both may have been unwilling parties (divorce, estate sales, sales between family  
3 members).

4 There is no good explanation for why Gittell and Magnusson omitted the limitations of Sterzinger from their  
5 report.

6 Gittell and Magnusson also looked at Hoen (2009) which uses a "hedonic regression method" to determine  
7 the marginal contribution of specific independent variables -- i.e. view of the turbines -- to the sale price.  
8 Three other reports that Gittell and Magnusson looked at (Hoen (2006), Hinman, and Carter) rely on the  
9 same method as Hoen (2009).

10 I was one of about 20 reviewers of Hoen (2009) and have written several critiques of Hoen's methodology. I  
11 also presented my work before the National Association of Realtors legislative meeting. Below is an excerpt  
12 of my comments highlighting the one of many egregious flaws in his methodology. My full report can be  
13 accessed at the link in the footnote<sup>6</sup> below.

A host of property characteristics are omitted making it impossible to segment out the influence of these characteristics despite their omission. We cannot understand why the study looked at exterior finish but omitted the number of bedrooms or the availability of a garage.

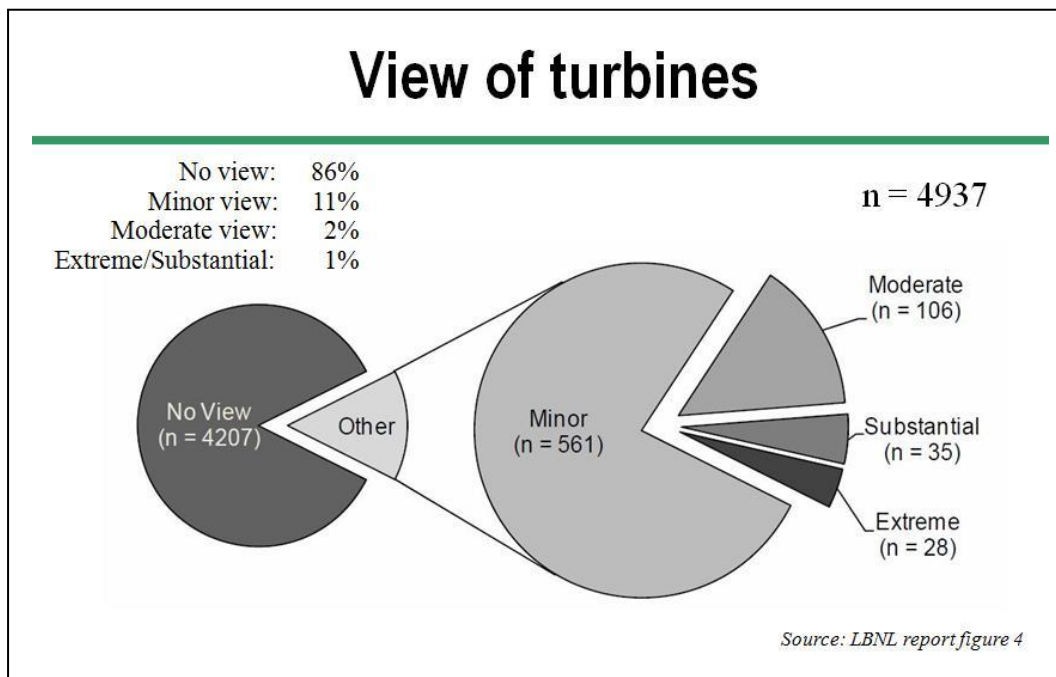
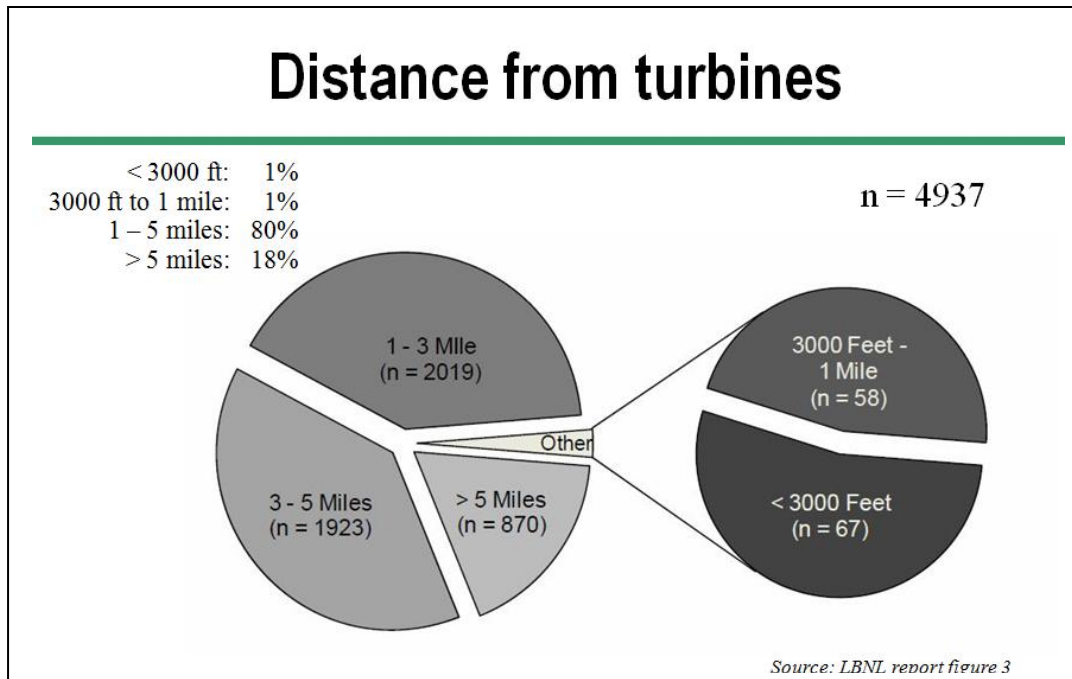
The Hedonic analysis method argues that the coefficients of the regression may be quantitatively interpreted as the marginal contribution of specific independent variables to the sale price. If a coefficient is accurate it should reflect only the contribution of the specific variable to the sale price. However, when variables are omitted from the model, such as number of bedrooms, the effect may be to inflate the size of the other coefficients by the omitted variable's contribution. There is no way to know the effect of not including number of bedrooms in the model unless the authors rerun the analysis with that variable included.

The authors [Hoen et.al.] argue that despite some omitted variables, the restricted model performs well producing an adjusted R2 of 0.78 and that adding additional variables did not significantly improve the model's performance. The IAAO [International Association of Assessing Officers] would disagree with the authors' conclusion. The IAAO standard for regression models states the estimate-to-sale price "should be within 5 percent of the overall estimate-to-sale ratio for all strata; and the overall estimate-to-sale level should be within 10 percent of the desired level of 100 percent. An R2 of 0.78 is not good enough according to the IAAO.

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<sup>6</sup>Linowes, *Comments to Hoen/Wiser regarding property value study* <http://www.windaction.org/documents/24178> September 2009.

- 1 The two figures below demonstrate other obvious flaws in Hoen (2009) related to small sample sizes for
- 2 properties within 3,000 feet of the turbines and those with a view of the turbines.



1 Gittell and Magnusson would be wrong to assume that because their findings are consistent with previous  
2 studies that they must be accurate

3 The report on Lempster raises a number of concerns. For one, Gittell and Magnusson seem to begrudgingly  
4 admit that Heintzelman found impacts, but repeatedly try to discount the findings claiming the phenomenon  
5 might be temporary and likely to disappear. Note that all the studies cited by Gittell and Magnusson, with the  
6 exception of Heintzelman, are industry/DOE funded, or part of the heavily subsidized Illinois State  
7 University's renewable energy program which receives funding from Iberdrola, Horizon Wind and other wind  
8 energy vested corporations.

9 The applicant has refused to provide actual sales data so that others can validate the findings in the report.  
10 Thus, we are unable to check addresses, to see if the < 1 mile sales or < 3 mile sales were larger homes  
11 selling at the same price per square foot as lower quality smaller homes located further away. In addition, the  
12 authors did not conduct any analysis of marketing times, or sale price as a percent of list price.

13 Like Hoen (2009) the Lempster study had very few transactions within close proximity to the turbines, and  
14 limited sales of properties with views of turbines. Gittell and Magnusson warn that caution must be used in  
15 interpreting these results but then go on to state "the analysis also did not find any evidence to indicate that  
16 distance to turbines had any impact on sales price." It's not clear how credible that conclusion is given the  
17 lack of house sales near turbines.

18 Rather, Gittell and Magnusson seem to bury the fact that there may be numeric indications of lower values  
19 nearby in Lempster, but dismiss them as being "isolated". Their conclusion that "*there is no evidence to*  
20 *suggest that the Lempster Wind Power Project has had any consistent, observable, statistically-significant*  
21 *impact on property values in Lempster or the communities surrounding the Project.*" should raise a red flag  
22 for anyone interested in the truth:

23 They might as well have stated that *impacts varied from house to house, at least for the limited depth they*  
24 *investigated the actual impetus of these sales, and it would seem the entire area was not decimated!* In  
25 short, the authors appear to use words to dismiss the numbers they didn't like, while using others to give the  
26 appearance that all is business as usual and going well in Lempster.

27 Property owners in Antrim, particularly those within the viewshed of the towers, should be very wary of the  
28 Lempster study. The Site Evaluation Committee would be remiss if it accepted this report as indication that  
29 property values will not be diminished.



**8) Moving on to the project's purpose, do you have any comment on generation from wind?**

Wind energy is an intermittent resource that will generate capacity only when the wind is blowing and within a specific speed. If the winds are light, we get little or no generation from the facility. If the winds are gusty with considerable fluctuation within limited intervals (10-15 minutes) the intermittency becomes more pronounced. While traditional sources of electricity generation produce within 5-20% of nameplate capacities, the electricity output for a wind-powered facility and the timing of that output is a function of the local wind profile. The nameplate capacity represents only the maximum production of the generator. The applicant has asserted in his application that the anticipated average capacity factor for the project would be 37.5% – 40.5%. (30MW installed and producing >106,000 MWh per year).

The applicant will be using the Acciona AW-12 116/3000 turbine standing 495 feet tall from base to blade tip with a 116-meter rotor diameter. Acciona has not commercialized this turbine yet and no installation in the world includes an operating model of this turbine. The applicant presumably believes he can achieve the high capacity factors based on turbine hub height and rotor diameter but there is no verifiable proof of this fact. No wind energy facility in the northeast has achieved this performance. In fact, this performance exceeds even the anticipated capacity factor for Cape Wind (39%), the proposed 468MW to be sited offshore in Nantucket Sound.

**9) Why would it matter to New Hampshire whether the project achieved the high capacity factor? Isn't the applicant taking the risk if he overstates his capacity factor?**

The performance of this project is very much a matter of concern for the public because it represents the one benefit the applicant has to offer i.e. emission-free generation. It is the duty of the Site Evaluation Committee to weigh whether the emission-free energy produced from the project outweighs the impacts of the energy. The SEC must also find that a project addresses the State's need for an adequate and reliable supply of energy but in the case of intermittent resources like wind this requirement cannot be primary.

In my opinion, the SEC must find a way to quantify the benefits of the project as well as its costs in order to determine whether the project should be certificated.

**10) Will building this project enable New England to avoid having to build other power facilities to meet energy demand?**

1 Since wind is an intermittent and unpredictable generator, the firm capacity it can supply to the grid is  
2 inherently limited, and will not eliminate the need to build more reliable forms of generation in the region. In  
3 other words, if we build wind turbines and accept their attendant impacts, it will still be necessary to build  
4 more substantial generation, whether it be renewables (biomass, land fill gas, small hydro, and even solar  
5 which can produce during peak demand), or more traditional generation (nuclear, natural gas).

6 **11) Dr. Colin High provides an analysis of the emission reduction the project will provide. Do you**  
7 **have any comment on the analysis conducted by Dr. High?**

8 I read Dr. High's analysis and had several concerns with his report. In his prefiled testimony (*page 7 of 8 Ins*  
9 *18-19*) he concludes the project result in significant air emissions being avoided if the project is built. He  
10 adds that the specific environmental benefits include reducing the occurrence of high ozone days in New  
11 England and Eastern Canada. High ozone days in New England occur on hot summer days and these are  
12 the days when demand for energy is the highest and the output from wind facilities is the lowest. In any  
13 event, wind energy cannot reliably be expected to produce at that time in the year.

14 Also, from his prefiled testimony (*page 7 of 8 Ins 3-4*) he states that avoided greenhouse gas  
15 emissions will aid in meeting state- and regional-greenhouse gas emissions goals. The State has already  
16 achieved it greenhouse gas reduction goals under RGGI.

17 In his report on page 6, tables 4 and 5, Dr. High lists the modeled number of megawatt hours of energy by  
18 fuel source (gas, oil, and coal) that will be avoided if the project is built. At the technical session on June 27-  
19 29, Dr. High stated the source used for his information dated back to 2005, seven years ago. Since 2005,  
20 New England has made substantial changes to its power plant fleet. For example, according to the ISO-NE  
21 2011 Regional System Plan, the percentage of energy produced by oil units decreased from 22.0% in 2000  
22 to 0.4% in 2010. Dr. High's numbers overstate the environmental benefit of the project in two ways:

23 a) His study relies on likely inflated average capacity factors;

24 b) His study bases emission reductions on data from 2005 which is no longer representative of emission  
25 levels in the region.

26 **12) Dr. High concludes on page 9 of his report that "At the present time the development of**  
27 **commercial wind power, other than energy efficiency and conservation is one of the more cost**

1 **effective means of reducing carbon dioxide emissions and therefore of mitigating the pending**  
2 **climate crisis. Do you agree?**

3 I evaluated this question in relation to the price of CO2 emission savings and also on value of the energy  
4 produced.

5 **CO2 emissions** - Dr. High argues that the project will avoid an estimated 59,573-70,682 tons of CO2 per  
6 year. This assumes a megawatt hour of wind will back out a megawatt hour of fossil, which is an  
7 oversimplification of energy dispatch in New England. Nonetheless, if we assume Dr. High's models are  
8 reasonable, carbon allowances under the Regional Greenhouse Gas Initiative (RGGI) are trading at the floor  
9 price of \$1.92/ ton. Since the CO2 cap under RGGI is already satisfied, the price is unlikely to go up this  
10 decade. Reducing CO2 emissions by 70,682/ton should only cost \$135,709. Clearly, there are far less costly,  
11 less impacting and more appropriate methods for reducing carbon then building massive wind towers in  
12 Antrim, a few thousand feet from where people live.

13 **Energy price** - Since wind has no fuel cost, many assume that the price of wind energy would be less  
14 expensive than other fuel sources.

15 With natural gas selling at record lows prices and supplies expected to be abundant through this decade,  
16 wind developers are under pressure from investors to secure power purchase agreements (PPAs) with  
17 utilities. Most PPAs for onshore wind we've reviewed lock in purchases for 15+ years at roughly twice the  
18 wholesale price of fossil and nuclear resources within their respective regions. In some cases the prices are  
19 fixed regardless the time of day the energy is delivered or number of years into the contract; others apply  
20 adjustments for on- and off-peak energy and may include annual escalators. In states where renewable  
21 portfolio standards have been adopted, utilities likely have no choice but to accept above market rates which  
22 are passed through to the rate base.

23 Wind agreements are negotiated after a project has taken full advantage of available federal and state  
24 incentives so the costs of the incentives are not factored into the energy price. Other costs not accounted for  
25 include the build-out of wind-related transmission, system improvements to accommodate wind's  
26 intermittency and costs to cover capacity resources required during low wind conditions. These costs are  
27 ultimately imposed on rate and/or taxpayers outside the PPA.

1 Within New England, wholesale pricing for onshore wind is between 9 and 11 cents per KWh. In the  
2 Midwest, contracts are around 6-7 cents and in regions with better wind regimes, gentler terrains and/or  
3 limited or no permit requirements the costs could run lower.

4 The New England ISO (ISO-NE) operates using a day-ahead auction where generators are required to offer  
5 firm levels of production for each hour of the next power day. The energy price, in turn, is determined based  
6 on those bidding into the system; all generators receive the same price per megawatt hour of generation.  
7 Significant penalties are applied if a generator is unable to meet his commitment.

8 Since the production from a wind resource cannot be reliably forecasted, the ISO does not require wind to  
9 schedule any of its production in the day-ahead energy market. Instead, wind resources are permitted to  
10 operate exclusively in the real-time market i.e. a pure spot market carrying no penalties for non-performance  
11 and where prices are generally less than the prices paid for the day-ahead energy market. Those selling into  
12 the real-time market are paid at the clearing price of the real-time market.

13 The day-ahead market for the ISO-NE represents roughly 90% of the available generation with the real-time  
14 market holding only a 10% share.

15 The price paid for ninety-percent of the generation is established twenty-four hours in advance of the power  
16 day. Any low or zero--cost participation from wind will have only a marginal impact on prices limited to those  
17 resources operating within the real-time market.

18 While above-market, long-term power purchase agreements may have a stabilizing effect on energy prices  
19 for wind, they do so at an excessive price to the ratepayers. When the utility sells the wind energy to the grid,  
20 the energy will be sold at the lower cost spot energy market price, but the wind developer will be paid the  
21 above-market price. Ratepayers have the burden of making up the difference.

22 The combination of low carbon values and high power purchase rates make wind one of the most expensive,  
23 least cost-effective means of reducing carbon.

24 **13) Are there any further comments you would like to make at this time?**

25 The applicant has, thus far, been uncooperative with the parties in sharing information necessary to vet his  
26 claims. His opposition to sharing the information is inconsistent with RSA 162-H:1 which states "all entities

1 planning to construct facilities in the state be required to provide full and complete disclosure to the public of  
2 such plans." I reserve the right to update my testimony should the applicant provide the missing information.

3 **14) Does this complete your pre-filed testimony?**

4 Yes.