From:
Sent: Thursday, February 07, 2013 11:13 AM

Subject: Lowell Mountain Reduced Production

http://theenergycollective.com/willem-post/53258/examples-wind-power-learnAll,
I am surprised GMP did not do a timely study of Lowell's impact on the NEK grid. As a result, the $10.5 million synchronous-condenser system for power factor correction (losses of up to 3%) will not be completed until about the end of 2013.

There are many factors reducing ridge line IWT CFs. Here is an excerpt from
http://theenergycollective.com/willem-post/169521/wind-turbine-energy-capacity-less-estimated

Below are some numbers regarding the much less than expected results of the Maine ridge line IWTs for the past 12 months.
http://www.coalitionforenergysolutions.org/maine_wind_thru_3q2012m1.pdf

Mars Hill, 42 MW 0.353; uniquely favorable winds due to topography.
Stetson I, 57 MW 0.254
Stetson II, 26 MW 0.227
Kibby Mtn 132 MW 0.238
Rollins, 60 MW 0.238
Record Hill, 50.5 MW 0.197

The Maine weighted average CF = (42 x 0.353 + 57 x 0.254 + 26 x 0.227 + 132 x 0.238 + 60 x 0.238 + 50.5 x 0.197)/(42 + 57 + 26 + 132 + 60 + 50.5) = 0.247; excluding Mars Hill, the CF would be 0.234.

Note: CF reduction due to aging is not yet a major factor, as all these IWTs were installed in the past 5 years.

Remember, the developers told Maine regulators their IWT projects would have CFs of 0.32 or greater, and 25-year lives to more easily obtain bank financing, federal and state subsidies and "Certificate of Public Good" approvals. The lesser ACTUAL CFs are likely due to:

- Winds entering 373-ft diameter rotors varying in speed AND direction under all conditions; less so in the Great Plains and offshore, more so, if arriving from irregular upstream or hilly terrain.

- Turbine performance curves being based on idealized conditions, i.e., uniform wind vectors perpendicularly entering rotors; those curves are poor predictors of ACTUAL CFs.

- Wind testing towers using anemometers about 8 inch in diameter; an inadequate way to predict what a 373-ft diameter rotor on a 2,500-ft high ridge line might do, i.e., the wind-tower-test-predicted CFs of 0.32 or better are likely too optimistic.

- Rotor-starting wind speeds being greater than IWT vendor brochure values, because of irregular winds entering the rotors; for the 3 MW Lowell Mountain IWTs rotor-starting speed with undisturbed winds is about 7.5 mph, greater with irregular winds.

- IWT self-use energy consumption up to about 4% for various IWT electrical needs during non-production hours (30% of the hours of the year in New England due to wind speeds being too low, too high, and

outages,) and up to about 8% for various IWT electrical needs, incl.
power factor correction, heating, dehumidifying, lighting, machinery operation, controls, etc., during production hours.
http://windfarmrealities.org/u-minn-and-vestas-reality-check/
http://theenergycollective.com/willem-post/53258/examples-wind-power-learn

- CFs declining due to aging IWTs having increased maintenance outages, just as a car.

- Reduced production for various reasons, such as: wind speeds being too slow or too fast; flow of one turbine interfering with another turbine's flow; the grid's instability/capacity being exceeded; power factor correction losses; abatement of excessive noise (nearby people need restful sleep for good health); abatement of excessive bat or bird kill.

Note: US bird kill = 1 bird/day x 39,000 IWTs x 365 days/yr =
14,235,000 birds/yr. US bat kill = 2 bats/day, or 28,470,000 bats/yr, for a total of 42,705,000 animals/yr.

The net effect of all factors shows up as ACTUAL CFs being about 0.25, instead of the vendor-predicted 0.32 or better, i.e., much less than estimated by IWT project developers to obtain approvals.

The terrain-induced, irregular air flows to the rotor cause significant levels of unusual noises, mostly at night, that disturb nearby people.
http://theenergycollective.com/willem-post/84293/wind-turbine-noise-and-air-pressure-pulses

Below are some articles of interest.

http://theenergycollective.com/willem-post/89476/wind-energy-co2-emissions-are-overstated
http://theenergycollective.com/willem-post/171561/co2-emissions-and-chevy-volt-vs-honda-civic-ex-l

Best Regards,

Willem

From: Rob Pforzheimer
Sent: Wednesday, February 06, 2013 6:52 PM
Subject: An Australian State will measure infrasound emitted by wind turbines

http://www.epaw.org/documents.php?lang=en&article=ns49

AT LONG LAST!

An Australian State will measure infrasound emitted by wind turbines

From: Annette Smith
Sent: Thursday, February 14, 2013 2:22 PM
Subject: Does Wind Energy in New England Reduce Fossil Fuel Consumption and GHG Emissions

After the siting commission's visit to the natural gas plant, I spoke at the public hearing in Brattleboro and raised questions about the claims being made that wind turbines in New England are reducing fossil fuel consumption and GHG emissions. With 767 MW of big wind in 4 New England states at a cost of at least $2 billion, we should have real world information now about what is happening.

Louise McCarren advised me to contact Anne George of ISO-NE, which I did. She punted to Eric Wilkinson. In 2009 or 2010, a pilot (who flies commercial jets) and I engaged in a round of back and forth with Eric Wilkinson and did not get our questions answered. Eric's responses this time were similarly not helpful.

I asked this question about wind turbines and fossil fuel/ghg emission reduction of Liz Miller in October when she was PSD Commissioner, I asked Chris Recchia in December when he became PSD Commissioner, and I asked Scott Johnstone at your last deliberative session. I think I understand enough now that the answer is pretty clear: no, not until we have either storage or gas peaker plants that are specifically designed to ramp efficiently in response to wind energy will New England be able to claim any reduction in fossil fuel consumption or GHG emissions, especially with natural gas displacing oil and coal (and nuclear) in the New England grid. Please tell me if I'm wrong or am missing something.

How does this relate to your charge? Between ISO-NE's curtailment of the already-constructed projects and the lack of evidence that wind energy in the ISO-NE grid is resulting in displacement of fossil fuels and reduction of GHG emissions, real questions exist about the PSB's due diligence in evaluating wind projects to date. How could the PSB approve projects for which there is not sufficient capacity on the grid? Why is the PSB accepting the wind developers' modeling studies about reduction of fossil fuels and ghg emissions?

Below is my correspondence with Eric of ISO-NE. I didn't not receive a response to my most recent email, and do not expect one. Read from the bottom up.

Annette

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Annette Smith
Date: February 1, 2013 4:41:32 PM EST
Subject: Re: ISO New England

Eric,

I appreciate you pointing me to the wind integration study

Past ISO in-depth studies have made some conclusions regarding wind that may be helpful. From New England Wind Integration Study:

"Flexible Generation: The ISO-NE system presently has a high percentage of gas-fired generation, which can have good flexibility characteristics (e.g., ramping, turn-down). Using the assumed system, the results showed adequate flexible resources at wind energy penetration levels up to 20%."

but that does not agree with what the president of the Granite Ridge natural gas plant in Londonderry NH told me last week when I attended the Vermont Energy Siting Commission's site visit. He said that his plant is the most efficient natural gas plant on the grid, it is a ramping plant rather than a baseload plant, and that it operates inefficiently when it ramps down to let the wind in. He said there are no flexible generation plants on the New England grid. The implication is that there is no fuel savings when his plant ramps in response to wind.

That wind integration study was done by GE and other groups that have an economic interest in promoting wind development. The language that you quote, "which *can* have good flexibility characteristics" leaves enough wiggle room to indicate maybe yes, maybe no. It does not say that it "*does*" have good flexibility characteristics. And why does it say "using the assumed system"? What is assumed? We have an actual system in place, and either the plants are able to ramp efficiently or they are not. I also note in reading that closely that it doesn't connect the ramping to reduction of fossil fuel consumption or greenhouse gas emissions. It just says they can ramp. No argument there.

And I am not disputing that wind contributed 1% of the electricity produced by generators in New England in 2012. What I am trying to get to the truth about is whether that wind energy is also resulting in reduction in GHG emissions and fossil fuel consumption as so many people claim, and as so many people seem to believe without any evidence.

So far it seems ISO-NE cannot answer that question.

Annette

On Feb 1, 2013, at 4:20 PM, Wilkinson, Eric wrote:

Annette:

The operation of the bulk electric system is very complex. Simple answers to the questions you have are not readily available.

Regarding emissions and wind (or any other generation resource) there are many overlapping factors that hinder a simple quantitative analysis. As noted in the DRAFT 2011 ISO New England Electric Generator Air Emissions Report:

"New England's power plant air emissions are directly dependent on the specific units that are available and dispatched to serve load for each hour of the year. Therefore, there could be wide variations in seasonal emissions, primarily due to changes in economic and reliability dispatch, unit availability, fuel consumption, fuel switching, transmission topology, and load levels. The amount of imports, the use of pumped storage and significant generator outages, such as a nuclear unit outage, could also affect emissions."

These factors make estimating the amount of fossil fuel consumption reduced due to wind resources extremely challenging.

The emissions report is available here: http://www.iso-ne.com/committees/comm_wkgrps/relblty_comm/pwrsuppln_comm/mtrls/2012/dec202012/index.html

Past ISO in-depth studies have made some conclusions regarding wind that may be helpful. From New England Wind Integration Study:

"Flexible Generation: The ISO-NE system presently has a high percentage of gas-fired generation, which can have good flexibility characteristics (e.g., ramping, turn-down). Using the assumed system, the results showed adequate flexible resources at wind energy penetration levels up to 20%."

To operate the system reliably, wind resources do not necessarily need natural gas peaking plants as backup. Other resources may perform this role.

ISO New England doesn't give out specific information about generators or their output because it could be considered market sensitive information. We do provide overall generation figures —see this web page:http://www.iso-ne.com/nwsiss/grid_mkts/enrgy_srcs/index.html

If you do the math, wind contributed about 1% of the electricity produced by generators in New England in 2012. (Math: 1,170 GWh of wind production / 116,935 GWh of total NE generation * 100 = ~1%)"

It is important to understand that the interconnection of some generation technologies, such as wind or solar, to weaker parts of the transmission system can be challenging and time consuming to study. Because of the complexity of the transmission system, the wide variation in size and type of generating resources, and the numerous contingencies that need to be analyzed, the ISO conducts interconnection studies individually for each proposed new generator.

Depending on the location, size and type of generation resource, upgrades to the transmission system may be necessary in order to ensure that the interconnection of the resource does not negatively impact the reliability of the grid. Transmission upgrades are often necessary before these facilities are allowed to interconnect with the New England transmission system. The costs of transmission system upgrades are generally borne by the generation developer.

Please keep in mind that our obligations are to operate the gird reliably; administer the wholesale energy markets; and plan the bulk power system. State and federal agencies are responsible for, among other things, setting and enforcing emission limits on power generators; siting generators; and establishing policies that promote renewable resources.

Regards,

Eric

Eric Wilkinson

External Affairs
ISO New England

From: Annette Smith
Date: January 31, 2013 7:23:23 PM EST

Subject: Re: ISO New England

Eric,

What you sent really doesn't answer my question. Here is what I want to know. This statement was made on the floor of the Vermont House to the entire Vermont legislature yesterday. I want to know how much fossil fuel consumption has been reduced in the New England grid now that we have 760 MW of big wind in the system.

That energy gain is real: every spin of that windmill blade reduces the need, somewhere, for burning coal or gas or oil; in New England, first of all, where we still have lots of fossil-powered electricity being generated. But it also reduces by some small amount the pressure on a Bangladeshi peasant farmer or a doctor fighting the spread of dengue fever.

I understand enough about how the grid operates to know that wind requires natural gas peaking plants to efficiently back up the wind energy, and the New England grid does not have any installed. I am looking for specifics about the operation of the New England grid. I am not looking for modeling and a 3 year old study. We have enough wind on the grid that there should be some ability to quantify something.

A lot of people's lives are being destroyed by wind turbines, and as the only source of this knowledge, I think you have an obligation to help the public have an informed dialogue about this important issue.

Are wind turbines reducing greenhouse gas emissions in the ISO-NE system?

Are wind turbines reducing the need for fossil fuels in the ISO-NE system?

If you cannot answer those questions, then I think we all have a really serious problem, because billions of dollars have already been spent, and billions more are in the works. We must understand not only what the potential is of this technology, but what is happening now and how long it will take to make the integration of more wind energy in the ISO-NE system more efficient. Given that these machines are proving to have a life of 10 to 15 years rather than the 20 to 25 that wind developers claim, I think it is important to understand how the system is planning to change to include more gas peaker plants, not just more wind and transmission but how the system is planning to adapt to the wind and how long it will take.

Annette

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

On Jan 31, 2013, at 10:08 AM, Wilkinson, Eric wrote:

Hi Annette,

Background

Anne George asked me to help with some information that you requested on wind resources. For a good overview please see our Regional System Plan for 2012 here: http://www.iso-ne.com/trans/rsp/index.html . In particular I would draw your attention to section 7 which covers fuel sources for electricity generation in New England. Section 7.6.5 focuses on wind. This section also provides a brief summary of a detailed wind integration study the ISO conduced in 2010. That study is available here: http:/www.iso-ne.com/committees/comm_wkgrps/prtcpnts_comm/pac/reports/2010/index.html.

Curtailment

Due to the market sensitive nature of the data, we can't discuss individual generators (such as the "Granite Renewable" project in NH) and their output. We do not have aggregated curtailment data on wind resources.

Regarding curtailment orders in general, the ISO is responsible for the reliable operation of the region's power system, including keeping the supply of electricity and demand for electricity in constant balance and ensuring that the electricity generated can be reliably transmitted to where it is being used. This is because electricity can't be stored in any significant amount, so it must be generated the instant it is needed. The ISO dispatches resources, including all types of generators, to increase or lower their production in order to match consumer demand for power while meeting reliability needs, including preparing for contingencies which could include loss of a resource or transmission line, and accounting for facilities unavailable due to required maintenance.

The ISO may curtail resources for several possible reasons. When the amount of electricity generated in a certain area exceeds the transmission system capability, the ISO must decrease the generation in that area and increase the generation in another area. Sometimes these generation adjustments are preventative measures required to avoid overloading the transmission system following the loss of a resource or transmission line. Also, in some instances, newer resources have interconnected to areas of the system that have limited transmission capability – if the transmission lines are full, for instance, the resources will not be able to get all their power out.

Please feel free to contact me directly if I can be of further assistance.

Regards,

Eric Wilkinson

External Affairs
ISO New England

From: Rob Pforzheimer
Sent: Thursday, February 14, 2013 10:27 AM

Subject: Cape Vincent passes resolution calling for halt on wind farm siting process

http://www.watertowndailytimes.com/article/20130214/NEWS03/702149877

Cape Vincent passes resolution calling for halt on wind farm siting process

By JAEGUN LEE
TIMES STAFF WRITER

THURSDAY, FEBRUARY 14, 2013

CAPE VINCENT — The Town Council, at a special meeting Wednesday, passed a resolution calling on the state Public Service Commission to halt "any discussion, consideration or determination" regarding wind turbine noise impacts until the effects of infrasound and low frequency noise are properly assessed.

Local officials said they also reached out to other municipalities and were able to convince the town boards of Macomb and Richland to adopt similar resolutions urging the state to enact a moratorium on industrial wind development.

What sparked the movement was a resolution adopted by the Wisconsin Towns Association last month advising the Wisconsin Public Service Commission to ban wind development, citing the need for further studies.

Wisconsin Towns Association's decision was based on an infrasound and low frequency noise study report submitted to Wisconsin's PSC.

In the Dec. 28 report, several noise consultants — including Hessler Associates Inc., BP Wind Energy's noise consultant for the proposed Cape Vincent Wind Farm — recommended that more in-depth impact studies be conducted.

In their resolution, Cape Vincent officials do not specifically call for a moratorium as did the Wisconsin Towns Association, but requests that all deliberations and decisions concerning turbine noise under the state Article X siting process be put on hold until the "Wisconsin studies on infrasound and low frequency noise are completed and the final report is made available for public review and study."

Town Councilman John L. Byrne, who has been spearheading the effort, said the wording of Cape Vincent's resolution was tweaked slightly but "accomplishes the goal."

Mr. Byrne said he is also trying to get more municipalities and the New York State Association of Towns to support the movement.

From: Rob Pforzheimer
Sent: Thursday, February 14, 2013 10:13 AM

Subject: "The biggest government sponsored fraud in the history of our country" (Australia)

"Wind turbines should not be classed as renewable energy as the industry is unsure of whether they are actually reducing greenhouse gas emissions or not. Studies of performance based data suggest that wind turbines do not reduce emissions. Definition of fraudWind turbines are industrial power generators that require base-load power to operate and are inefficient, intermittent, damaging to the environment and very expensive to the electrical consumer in Australia."

http://www.windaction.org/documents/37374

"The biggest government sponsored fraud in the history of our country" (Australia)

February 12, 2013 by Alby Schultz MP

Summary:

The following speech was given on the floor of the Australian Parliament, House of Representatives, by the Member for Hume, Alby Schultz. Mr. Schultz addresses the failure of the Waubra wind farm and others to operate within the limits of their permits, the high cost and inefficient operation of wind turbines and, what he deems fraudulent issue of RECs to shell companies overseas.

The Renewable Energy Target was designed to assist with climate change by reducing Australia's green house gas emissions. The unfortunate reality of this is that it has become what I have described as "the biggest government sponsored fraud in the history of our country".

Yesterday, Senator John Madigan asked questions of the Department of Climate Change and Energy Efficiency regarding the operation of the Waubra Wind Farm in Ballarat, Victoria. The Waubra wind farm is not compliant with its planning approval. Under the Renewable Energy Act of 2000, state planning compliance is a pre-requisite for a power station's eligibility for commonwealth accreditation. Without lawful accreditation, a power station is not eligible to receive government subsidy. In this case, I'm referring to being issued with Large-scale Renewable Energy Certificates by the Clean Energy Regulator. The issuing of RECs via fraudulent applications could well be considered to be the proceeds of crime. A white collar crime that is ultimately financed by fleecing the Australian electrical consumer.
Waubra

I have recently sighted written communication from Mr Paul Jarman*, of the Department of Planning and Community Development in Victoria, which confirms that the Waubra Wind Farm is non-compliant with planning legislation. The Clean Energy Regulator has issued the Waubra Wind Farm with Large-scale RECs illegally since it began operation in July 2009. As per the Renewable Energy Target, the monetary value of the Large-scale REC's issued to Waubra exceeds $80.6 million dollars. This wind farm has not ever satisfied the terms of state planning compliance for accreditation.

Current court cases suggest that non-compliance with state planning legislation is common in the wind industry in Australia. Since the implementation of the Renewable Energy Target in April 2001, over 195 million RECs have been created by the Clean Energy Regulator. RECs issued are expected to exceed 50 Billion dollars. In my electorate of Hume, the REC subsidy for new turbines, excluding existing ones, is set to reach $500 million to $1 billion per year. Wind turbine developments are issued with Large-scale RECs to the value of approximately $500,000 per turbine per year. I am starting to be provided with proof of developments that have issued falsified information in relation to planning and noise compliance. There are many cases of wind farms that have been

approved with grossly inaccurate environmental assessments in New South Wales, Victoria and South Australia.

RECs are being issued fraudulently to $2 shelf companies that follow the model of declaring bankruptcy only to be reborn under a new name. Australia's biggest corporate collapse of Babcock and Brown in 2011, recorded losses upwards of 10 Billion dollars. Babcock and Brown Wind was then renamed Infigen Energy. The large majority of Australian wind farms are owned by foreign companies. That's billions of dollars, going overseas to fraudulent corporations under the guise of renewable energy. Queensland's Ergon Energy confirmed to the Senate Inquiry in October 2012, "That energy costs would be the predominant driver of increased electricity prices due to the Renewable Energy Target placing upward pressure on wholesale electricity prices." We are all paying more for our electricity. And for no evidential benefit to the environment.

Wind turbines should not be classed as renewable energy as the industry is unsure of whether they are actually reducing greenhouse gas emissions or not. Studies of performance based data suggest that wind turbines do not reduce emissions. Definition of fraudWind turbines are industrial power generators that require base-load power to operate and are inefficient, intermittent, damaging to the environment and very expensive to the electrical consumer in Australia. We have people in the Gillard Government who have vested interests in the electricity prices continuing to sky rocket.

A major developer of wind farms in South Australia is Pacific Hydro, a company under the control of trade union industry superannuation funds that have close links in the Gillard government. Pacific Hydro operates the Clements Gap wind farm and now wants to develop wind farms at Keyneton and Gulnare. The Clement Hill wind farm is worth approximately $13.5 million a year and $21 million in RECs issued. The chairman of Pacific Hydro is Garry Weaven, of the Australian Council of Trade Unions. Pacific Hydro is owned by Industry Super Holdings through the Australian Infrastructure Fund.

The snouts in the easy money making renewable energy trough are many and varied. There is an urgent need to eliminate conflicts of interest within our government. The only reason people are not rioting in the streets about the unjustified increase in their power bills is that they simply have no idea what is going on. There is enough evidence of fraudulent behaviour and corruption to justify a Royal Commission.

Email re Waubra wind farm

From: Paul.Jarman@dpcd.vic.gov.au
Sent: Tuesday, 5 February 2013 8:56 AM
To:
Cc: bart.gane@dpcd.vic.gov.au; peter.giudice@dpcd.vic.gov.au
Subject: Re: Waubra Wind Farm

Acciona submitted a revised report and then advised that it was not happy with parts of its own methodology.

We are now consulting with the EPA on the scope of further testing. As such the Minister has not yet signed off on any noise compliance associated with the Waubra wind farm.

Paul Jarman
Assistant Director Regional Projects
Planning Statutory Services
Department of Planning and Community Development

Web link: http://www.albyschultz.com.au/News/MediaReleases/t... **Download File(s):** 120213 Alby Schultz Renewable Energy Hansard.pdf (34.79 kB)

From: Pam Arborio
Sent: Wednesday, February 13, 2013 9:44 PM
Subject: Fwd: Wind Rush CBC documentary on youtube

Please watch the entire movie, it's extremely well done!

Sent from my iPad
Begin forwarded message:

From: Rob Pforzheimer
Date: February 11, 2013 10:33:02 AM EST

Subject: Wind Rush CBC documentary on youtube

The CBC Doc Zone documentary, "Wind Rush" is now posted on you tube.

A growing anti-wind movement says giant turbines have gone up without sufficient research into health impacts.

In the rush to embrace wind power, have the people who live among the wind farms been forgotten?

http://www.youtube.com/watch?feature=player_detailpage&v=JiCQabGuKFk

From: Luann Therrien
Sent: Wednesday, February 13, 2013 6:46 PM
Subject:

This is the testimony I gave at the State House on 1/31/2013

My name is Luann Therrien and I live in Sheffield with my husband Steve and our two children.

Have no idea what we have done or who we've done it to to deserve what we are being put through.

We consider ourselves to be hearty people. Living off grid and in the middle of no where is not easy but we love where we live.

We have lived at our home in Sheffield, for almost 17 years. The land has been in my husbands family since the 70's. Since Nov. 2011, our new neighbors are 16 turbines that line the ridge behind our home.

Before the turbines were built, we felt we did not know enough about Industrial Wind to have an informed opinion. We did not oppose them being built. We did not oppose the many inconveniences during construction that comes with a project this size. We did not oppose the project, not until it was up and running and creating noise. Creating noise that unlike what the wind developers will try and make you believe- IS distinguishable above natural sounds. I have never heard anything in nature make a repetitive whoosh whoosh whoosh sound for up to five days straight. And the only thing I have heard sound like a jet flying overhead, except for these wind turbines, is a jet flying overhead. This has now been going on for over a year.

To have no one believe or understand just what we are going through is like being constantly beat down. Having people say we are making it up or worse yet putting the blame on having children. Until you live with what we are dealing with you can not understand what it is like to walk in our shoes. People have openly scoffed at us because they paid a visit to a project and think they have the slightest clue what it is like to live day after day, month after month beside a project. One person had the nerve to say they had visited a project and the noise was no worse than their dishwasher. Well, I guarantee if your dishwasher was to run day and night you'd shut it off before five days were done.

It has been said that with all power comes sacrifice and problems. The problem is, my family and other families are the sacrifice.

In order to stop the continuing damage to our health and sanity we will have to sacrifice the land where we have lived, loved and planned to spend the rest of our lives. But when it comes to sacrificing our dreams or ourselves there really is no choice. We may have no choice but to sell out for whatever we can get just so we can move. Not only will we have to give up the land that we love but also at a reduced price.

The noise for us is at its worst when the wind is coming from the South/SouthEast. When we are not getting the worst of it, other families are. The prospect of more storm systems blowing up the coast is about as frustrating as the noise itself. Know it's coming and not a thing we can do about it.

My husband is feeling desperate because there is nothing he can do to protect his family. I've been feeling more agitated and working on unreasonable. Not a good combination with two little ones.

Since November both my husband and myself have been prescribed antidepressants. I honestly had no idea just how bad I had gotten because it came on gradually. About a month ago my son said something that made me laugh out loud. It was then the realization hit me that I had not done that in a long time and have not done much since, even with an increase in my medication. I used to laugh all the time, dance with my children and make up silly songs. I want to do these things again.

I have a constant ringing in my ears that can be very distracting.

My husband has been feeling so bad that he is currently unable to work, his doctor has pulled him from his job. It's impossible to work when you cannot concentrate due to lack of sleep, a constant pulsing in your head like a painless migraine and have the constant feeling of a head rush no matter what you are doing. He wakes up startled during the night in a panic state and can not go back to sleep.

Both of us have a lack of concentration. Many days we have this odd pressure in our heads. Can feel the pressure in our foreheads, cheeks even in the front teeth with a feeling of pressure as if something is pressing on the bridge of the nose.

We know if we do not feel well, our children do not feel well. They cannot tell us verbally, but they do in other ways. We see a noticeable change in our son's behavior. He goes from being a normally active 3 year old with an attitude problem to an unreasonable uncontrollable active 3 year old with an attitude problem, that doesn't end because he goes to sleep. Most nights both of our children have restless nights and both regularly cry out in their sleep. We are getting so tired of feeling like hell everyday. We feel as bad when we get up as when we go to bed.

Frustrating isn’t even the right word to described how it feels to get up in the morning already feeling tired, angry and agitated.

Our children deserve better. We deserve better.

We went through hell to have our children. It certainly was not my choice to have our first child at 40. We went through loss (one at five months along), tests, and operations. On our fifth try we had a healthy boy, and we now have a one year old baby girl. And instead of the joy of raising our babies, there is a feeling of being helpless and hopeless.

Helpless to protect our children from the Industrial Wind Project that has been built behind our home. Unable to protect them from the constant noise, annoyance and sleepless nights with all the side effects that go along with it.

Now, most people would advise us to move as our Dr. has done. We would gladly move, if we had the money. But as most people in this area, we aren't even close to even being considered middle class. Know very few who are.

We have contacted First Wind. Their only worry is that they are in compliance, and cannot set precedent by giving a homeowner money. We told them we would need $100,000 to $150,000 to move a doublewide home (low end) onto a lot in Derby. They say they are in compliance and everything is fine.

Some pro wind experts say 1/2 to 3/4 of a mile is too close, other studies say 1.5 miles is too close. The 16 turbines are all from just under 3/4 of a mile to just under 2 miles from our home. So almost all 16 are too close for some studies. The human factor of living with the constant annoyance of these machines does not matter to the wind companies.

There really needs to be regulation put in place for when an Industrial Wind Project is built. For starters, not letting the fox guard the hen house. Currently the wind companies are allowed to hire their own sound monitoring company and oversee the whole process. This should be overseen by an unbiased, independent group that has nothing to gain or lose from the results, with the funding coming from the wind companies.

More regulation; it should be automatic that any homes within X distance from a project, the wind company should have to make things right with the homeowner. Nothing like this exists now, everything is in favor of the wind companies.

The current way this is done is unfair to the home owner. Your option is to place a complaint with the wind company to only be told they are in compliance, and to keep a daily noise log. To what end? Good question.

So what are the real options? Sell? Move? Suffer for others' gain and agenda?

Why should people have to sell or abandon their homes?

Please, I ask on behalf of every family that lives near or will live near a wind project to give this matter some much needed attention. Please pass a three year moratorium into law.

I thank you very much for your time.

Luann Therrien

From: Rob Pforzheimer
Sent: Wednesday, February 13, 2013 5:34 PM
Subject: Province (Ontario) knew about health effects from turbines

http://www.niagarathisweek.com/news/article/1580374--province-knew-about-health-effects-from-turbines

· Amanda Moore

Province knew about health effects from turbines

Released documents show ministry aware of concerns as far back as 2006

Province knew about health effects from turbines. Documents released through a Freedom of Information request reveal the government was aware of adverse health effects caused by industrial wind turbines as far back as 2006. *Toronto Star file photo*

Documents released through a Freedom of Information request from an Orangeville resident reveal the government was aware of adverse health effects caused by industrial wind turbines as far back as 2006.

While Ontario Progressive Conservative leader Tim Hudak says he is not shocked to learn the government kept this information from the public in relation to the 200-megaWatt Melancthon EcoPower Centre (located in Amaranth and Melancthon Township, near Shelburne, Ont.), he says he is disappointed.

"I wasn't surprised. Concerns have been raised across Ontario and in other jurisdictions," says Hudak, whose own riding of Niagara West-Glanbrook is poised for the installation of several industrial wind turbines.

"What it is, is disappointing. It appears as through they were trying to cover something up."

In the released document, ministry officials report "complaints of adverse health effects by area residents are for the most part justified.

"MOE Provincial Officers have attended at several of the complainant's [sic] residences and have confirmed that despite the noise emissions apparently complying with the applicable standard ... that the noise emissions are in fact causing material discomfort to the residents in and around their homes," reads the document, written by provincial officer Gary Tomlinson.

According to the ministry, to develop the guidelines for noise limits, ministry scientists and engineers consulted with local community members and noise experts including representatives from major acoustical consulting firms. At the time of the Melancthon project, there were no minimum setback distances, only a provincial noise guideline of 40 decibels, which was maintained in the Act.

The documents state that “at least two families have moved out of their homes due to noise impacts” and that the MOE was aware of “at least six cases where the wind developer bought out resident’s [sic] homes to address and silence their ongoing concerns.”

Tomlinson writes, “reasonable people do not leave their homes to sleep elsewhere for frivolous reasons.”

Melancthon is Canada’s largest wind energy installation to date. Construction on phase one began in 2005, and phase two was completed in 2007. The project has a capacity close to 200 megawatts — roughly 30 megawatts less than the largest project proposed for West Lincoln by Niagara Region Wind Corp.

The Melancthon EcoPower Centre, made up of 133 turbines, was approved before the province passed its controversial Green Energy Act. The Act established a minimum setback distance of 550 metres between residential dwellings and turbines, which is 100 metres more than the minimum setback distance used in the Melancthon project.

Projects approved prior to the passing of the GEA had to meet provincial noise guidelines but the setback distance was to be negotiated between the developer and municipality.

The Melancthon turbines, however, are much smaller than those proposed for parts of West Lincoln. NRWC is proposing to erect 77, three-megaWatt turbines designed by Japanese manufacturer Enercon, which is building facilities in Niagara to manufacture both the towers and electrical components. Fourty-four of those turbines will be built in West Lincoln, three in Wainfleet and 31 in nearby Haldimand County. The concrete towers of these turbines measure to a maximum of 145 metres to the hub, about the length of 13 school buses stacked bumper to bumper. The blades stretch close to 50 metres, roughly another five school buses across.

The turbines used in the Melancthon project are 1.5 megawatts and are manufactured by GE. They measure 80 metres in height, with blades nearly 40 metres long.

While some local residents claim Enercon suggests a greater setback distance for the model being used by NRWC, a company spokesperson said she was unaware of it.

“Enercon has to sign off on everything we put forward,” said Randi Rahamim. “They have signed off on the full design.”

Hudak’s colleague, Huron-Bruce MPP Lisa Thompson, wants to know why the government moved ahead with the Green Energy Act when it was aware of health concerns.

“I’m absolutely disgusted,” said Thompson, who is the PC energy critic. “It’s sad, because, at the end of the day, it hurts that the Liberal government chose to play word games with people’s health. It comes back to my point of how and why did this Liberal government become so arrogant that they can blatantly play with people’s health just to further their own agenda.”

Thompson was further disappointed with the response from Ontario’s environment minister, St. Catharines MPP Jim Bradley, to a letter she sent to him Jan. 9 in light of the FOI information.

“His response was that there is no direct impact,” said Thompson. “Of course, the odds of a blade falling off and hitting someone are rare. But too many people have come forward with concerns, and their complaints have gone nowhere.

“This further emphasizes the need for a moratorium, which I have tabled twice now,” said the MPP whose own riding not only includes the Bruce Power nuclear energy plant but is poised to see 1,700-1,800 wind turbines primarily along the shoreline of Lake Huron.

Thompson said her office is getting ready to table a motion when the house resumes Feb. 19.

“I will continue to put forward efforts to make this government accountable,” said Thompson. “I am not going to let go of these redacted documents... They point to a larger problem of this Liberal government: it doesn’t matter who is in charge, hiding things and driving its own agenda on the taxpayer’s back. It’s got to stop.”

Despite several attempts to reach Bradley, he did not provide comment on the recently revealed document. His press secretary did provide the following: “The ministry is aware of health concerns and has reviewed literature on the potential impacts of wind turbines, including the 2010 report from Ontario’s Chief Medical Officer of Health which found there is no scientific evidence of a direct causal link between wind turbine noise and adverse health effects.

“The ministry will continue to review emerging scientific and engineering studies to ensure Ontario’s requirements remain in line with the best available science.”

The FOI documents pertain to an abatement plan the ministry put in place in relation to the Melancthon project. The ministry worked with both the municipality and wind developer to address concerns which resulted in several turbines being shut off at night and sound barriers being built around a transformer.

Hudak says it appeared ministry staff were trying to be forthcoming in their reports but that the government withheld that information.

“We need a moratorium on these projects,” said Hudak. “It’s been a position that I took up shortly after I became leader in 2009 for a number of reasons.”

Hudak’s issues with the Green Energy Act range from “expensive studies which fail basic economic sense” to how it strips away the decision-making powers of local governments.

Hudak and his PC government have called for several moratoriums on wind projects. In April 2010, at Queen’s Park, Hudak brought forward a bill to halt industrial wind turbine development. In March 2011, he was joined by West Lincoln Mayor Doug Joyner and Wainfleet Mayor April Jeffs at West Lincoln township hall to renew that call. This past June he was joined by his federal counterpart in the riding, MP Dean Allison, in demanding an immediate moratorium on industrial wind turbine development until a federal health study is complete.

Several other PC MPPs, including Thompson, have tabled similar motions.

The PC party will be introducing another motion when legislature resumes, both Hudak and Thompson confirmed.

“Lisa Thompson, in her capacity, brought forward motions in legislature for a moratorium. We will do that again, now that the house is back in after four months of inaction,” said Hudak, who has met with new Ontario Premier Kathleen Wynne.

“We discussed ideas for job creation and balancing the books. One recommendation I made was a moratorium on these types of projects,” Hudak said. “I’ve brought it to the premier, I hope she takes my advice.

“I’m not going to give up,” said Hudak. “I’m going to keep fighting for what I think is the right thing to do.”

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New post on **Ontario Wind Resistance**

Province knew about health effects from turbines

by OWR

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Trouble clicking? Copy and paste this URL into your browser:
http://ontario-wind-resistance.org/2013/02/13/province-knew-about-health-effects-from-turbines/

From: Annette Smith
Sent: Wednesday, February 13, 2013 9:58 AM
Subject: Sheffield First Wind Turbine Construction 9/10 - 7/11 on Vimeo

This 10 minute video contains all the photos from ANR reports and flyovers and others' site visits, in chronological order, of First Wind's Sheffield wind site:
https://vimeo.com/26936501

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Luann Therrien
Sent: Wednesday, February 13, 2013 9:33 AM
Subject:

Wind turbine syndrome is real!
How many studies need to be done, how many people have to get sick before someone steps in and help the innocent families that are impacted?
So glad the people responsible for inflicting these industrial projects live no where near them and can get a good nights sleep.

Sleep well tonight, I know my family will not tonight or any other night until we can move from here.

Unhappy in Sheffield
Luann Therrien

http://www.iberkshires.com/story/43241/Hoosac-Wind-Neighbors-Complain-of-Turbine-Noise.html

Hoosac Wind turbines can be seen above the homes of George Berne, right, and Michael Farineny on Moores Road.

Hoosac Wind Neighbors Complain of Turbine Noise
By Tammy Daniels
iBerkshires Staff
05:54PM / Tuesday, February 12, 2013

FLORIDA, Mass. — The stories they tell are similar — constant headaches, ringing ears, pounding hearts, sleepless nights.

The cause of their concern can be seen sweeping the sky outside their windows.

On a cold Tuesday afternoon, George Berne pointed to the wind turbines towering over the trees a few thousand feet from his home on Moores Road, just over the border in Monroe.

"When they first put them in and started them up I didn't even know they would be heard by me, or even seen by me," said Berne, who is deaf and wears hearing aids. "We're right in the epicenter of this whole deal."

Some residents living near Hoosac Wind Power say noise and flicker from the turbines are causing headaches and sleeping issues.

After a few seconds of listening, the hum of the turbines could be discerned over the whoosh of the wind.

Berne said the amplitude of the noise depends on the strength of the wind and its direction The wildlife has disappeared around his home, he said, and the humming and strobe-light effect of the blades wakes his grandchildren.

The 28.5-megawatt Hoosac Wind Power went online in mid-December after years of delays by a small contingent of neighbors and environmentalists who appealed the wetlands permitting for Iberdrola Renewables. The state's largest wind farm washeralded by Gov. Deval Patrick last December as shaping the future of energy.

Nineteen turbines standing some 340 feet tall were built on Bakke Mountain and Crum Hill, largely with the support of Florida and Monroe, which saw advantages to hosting a leading energy-generation farm that would provide jobs and tax dollars.

But neighbors who hadn't opposed the plans — or thought much about them — say their lives have been disrupted since the turbines started turning.

"We heard about the windmill project," said Mark Laveriere, who lives down the road from Berne. "Anything's a good idea, you have to give it a chance.

"Unfortunately, when they turned on was when the trouble started."

Laveriere, Berne and about a half-dozen others gathered at the home of Irving and Rosalyn Mullette on Tilda Hill Road, within sight of the turbines, to express their concerns and urge their neighbors to speak up.

"We're here today to get local people aware," said Michael Farineny, Berne's neighbor on the other side of the

town line in Monroe. Farineny is a member of The Friends of Florida and Monroe, a group formed last fall in response to the turbines. The group has met with town and state officials, as well as Iberdrola representatives.

Michael Farineny, left, and Rosalyn and Irving Mullette are encouraging neighbors to contact DEP with complaints, hoping that will push the state to action. The Mullette said the noise even bothers their cat.

"This problem has become so apparent to me that I'm trying to reach out to my neighbors and the people of the town," said Farineny, who's urging residents encountering problems with the turbines to contact the state Department of Environmental Protection. "If it's not done now, I'm very concerned that DEP will brush this stuff under the rug."

Despite ambitious plans for wind energy, Falmouth voters will decide whether toremove two municipal turbines; in New York, Iberdrola is being sued by 60 residents over noise pollution.

"At our Hoosac wind farm, we give serious consideration to all concerns regarding its operation," wrote Paul Copleman, communications manager for Iberdrola Renewables, in an email. "As a long-term community partner, we remain committed to working closely, as we have throughout the multi-year development and construction of the project, with the communities and individuals in and around the project."

Residents are specifically asking for noise monitoring, saying the turbines frequently exceed the state's 10-decibel limit and the guidelines don't take into account persistent low-frequency noise. Farineny said the state used a model for noise but never determined the actual ambient background in the wooded, low-density residential area.

State officials say they have received complaints about the noise and are working with Iberdrola. "MassDEP has been tracking complaints from residents in the area and we have been in contact with the company about those complaints," wrote Edmund J. Coletta Jr., director of the DEP's Office of Public Affairs. "Mass DEP requested, and the company recently submitted, a plan for performing noise monitoring. We are working with the company to ensure the plan will evaluate conditions around the turbines."

Coletta said he couldn't speak further on the issue but did add that the plan should be finalized "shortly" and the company will begin monitoring.

Copleman said sound "is a complex issue."

"We designed the project to be in compliance with all applicable regulations and we have an obligation to operate the project in accordance with those regulations," he wrote. "We have been made aware of concerns regarding sound from some of the project neighbors and we have been in communication with the Massachusetts DEP to discuss an appropriate sound monitoring plan." Some experts are calling the effects "wind turbine syndrome," a condition that disrupts lives through sleeplessness, depression, headaches, dizziness, nausea and more. Others see communication and shared annoyance as the main culprit, not turbines. An expert study by the Department of Public Health released last year says there is limited or insufficient evidence on whether turbines are directly responsible for causing health problems, but considers noise could play a role.

George Berne said he moved to Florida years ago to get away from the noise and crime in Pittsfield. He didn't expect to hear turbine hum inside his secluded home.

For some of the turbines' neighbors, the syndrome is very real. They came to the hilltowns to get away from big-city noise, to find peace and quiet.

"You just can't get away from them, they're constantly going," said Rosalyn Mullette, 75, who had looked forward to spending her golden years with her husband in the home his father built. "We're concerned about the future and being able to stay in this home."

From: Rob Pforzheimer
Sent: Wednesday, February 13, 2013 9:11 AM
Subject: Hoosac Wind Neighbors Complain of Turbine Noise

http://www.iberkshires.com/story/43241/Hoosac-Wind-Neighbors-Complain-of-Turbine-Noise.html

Hoosac Wind turbines can be seen above the homes of George Berne, right, and Michael Farineny on Moores Road.

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8 comments

[Social Ranking \/]

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Janet Sinclair · Works at Acupuncturist

A sad example of a really bad idea. There are no appropriate places in Massachusetts for these large turbines. And if our governor would stop pushing them, giving milllions and millions away in subsidies (paid for by us), no on would build them. Conservation would get us a lot further down the road a lot faster, if it's the environment you are concerned about. see www.hoosacwindproject.com

Reply · 1 · Like · Follow Post · 9 hours ago

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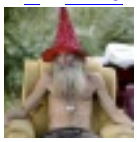
Clark H Billings

I told you so--these are dangerous to one's health.

Reply · 1 · Like · Follow Post · 9 hours ago



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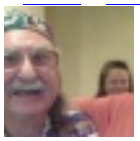
Mark J Cool · Follow · Top Commenter

The goal was to develop an alternative energy source. In that development, and now with operation, the

underpinning understanding has always been that this new infrastructure would reinforce the traditional character and development patterns of Florida and Monroe. The project was expected to be consistent with, and designed to suit the character of the communities.

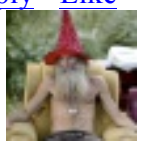
This new development, thought to be a good idea, has obviously placed portions of residents in Florida and Monroe at greater detrimental risk. I'm not familiar with the character desired by these towns. However, it's probably safe to say that it doesn't involve harming it's own townsfolk. A terrible mistake has been made. There's no room for debate... unless.... people in Florida and Monroe are OK with State authorities altering and modifying the traditional character of your towns. Unless people in Florida and Monroe are OK with dispensing with the community value of preserving acceptable living standards equally, for ALL in your communities.
Reply · Like · Follow Post · about an hour ago

. 

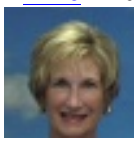
Marshall Rosenthal
Like it or not, Wind Turbine Syndrome is real. In Australia, where vast "wind farms" are operating, the rural residents have all fled, leaving ghost towns. In Ontario, Canada, folks are at the point of insurrection, making noisy protests in Toronto, calling for a state of Health Emergency in one county, and resorting to $60,000 in sabotage to stacked tower components in Halimand County. This was after the developers had an eagles' nest and the tree holding it removed. Even the wind power tamed environmentalists are ashamed of this act. Is this the state of affairs that we, here in the US, have come to? Are we now to witness the Orwellian prospect of "1984" in 2013 of Big Brother against the people?
I know we have come to the end of the road.
Reply · Like · Follow Post · 49 minutes ago

· **jamessklar** (signed in using yahoo)
I love seeing these wind turbines up on the mountain. They are a reminder that clean, renewable energy is here to stay. We absolutely must eliminate our petroleum-based economy, it's killing us.

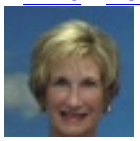
Long live CLEAN ENERGY!
Reply · Like · Follow Post · 35 minutes ago

o 

Mark J Cool · Follow · Top Commenter
I agree ~ long live CLEAN ENERGY properly sited ~ otherwise, like our petroleum based economy, clean energy will kill us too.
Reply · Like · 20 minutes ago

. 

Suzie Gor
I made this tongue-in-cheek statement to be thought provoking. If picturing these turbines on the top of Mt. Greylock is disturbing, then why should turbines be on any mountain and in anyone's backyard?
Reply · Like · Follow Post · about an hour ago

. 

Suzie Gor
They need to move those turbines to the top of Mt. Greylock.
Reply · Like · Follow Post · 11 hours ago

o

Brad Blake · Top Commenter · University of Maine
They should get rid of them, just like they are doing in Falmouth. Wind power is a big scam that has a plethora of negative issues. What these folks are experiencing is very real and they should not be subjected to the ill effects of these machines.
Reply · Like · 8 hours ago

.

Dave Charon
Keep them the HELL off of Mt. Greylock!!!
Reply · Like · Follow Post · 10 hours ago

From: Annette Smith
Sent: Wednesday, February 13, 2013 8:32 AM
To:
Subject: bird and bat studies, water quality monitoring/Sheffield Wind

I see in the newspaper article about the site visit to Sheffield that the bird and bat monitoring studies were discussed. Parties to that case have not received those studies and requests of ANR have not yielded them. If the Commission has copies of the bird and bat studies, may I please get a copy?

The Commission should be aware that any claims about water quality monitoring on the Sheffield site (or claims that it has improved) refer only to monitoring points more than a mile downstream. ANR approved permits that did not require any baseline water quality monitoring on the mountain, either the headwaters or downstream on the mountain. As with the Lowell stormwater permits, the monitoring locations are more than a mile downstream. Essentially the headwaters have been sacrificed, along with their aquatic life. No water quality monitoring on the mountain is required.

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Annette Smith
Sent: Wednesday, February 13, 2013 8:19 AM
Subject: Lowell Photos/Complete set

I read this quote by Robert Dostis in the paper: "Lowell also is different because the number of acres disturbed and turned into impervious road surface was more limited than at other wind sites at the urging of the state." I don't know what he's smoking if he believes that and expects you to believe that. The roads on the Lowell Mountains are wider than on Sheffield and wide enough for two big trucks to pass, and in some places are wider than the Interstates. GMP's Charlie Pughe said in testimony that they needed them that wide so they could run trucks both ways to meet the stimulus money deadline with four sets of work crews operating at a time. They turned a cool, wet, tree-covered mountain into a hot oven with acres of exposed rock heating up the headwaters (the ones that are left, that weren't filled), surfacing groundwater so there is now more surface water and it will now run off faster because ANR's permit underestimates the impervious surfaces by at least 20%.

This is the complete archive of the Lowell photos during destruction.

EPSC Reports and DEC Site photos are archived here
http://lowellmountainsnews.wordpress.com/erosion-prevention-and-sediment-control-reports-dec-inspection-reports-discharge-reports-and-photos/

May 2011 pre-destruction
https://picasaweb.google.com/112246232055800335101/May2011Lowell?authkey=Gv1sRgCKXT1_uTjZeEUw
https://picasaweb.google.com/112246232055800335101/May192011Lowell?authkey=Gv1sRgCKLKs7Sc76n3hQE
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https://picasaweb.google.com/114098560210816181304/September222011?authkey=Gv1sRgCJ7E3ZyIpM6vVQ

https://picasaweb.google.com/114098560210816181304/LowellMountainsDECReport92211?authkey=Gv1sRgCJnQ0O6coN2lPQ

https://picasaweb.google.com/114098560210816181304/October3201102?authkey=Gv1sRgCPXxwvvQoN6GBA

https://picasaweb.google.com/114098560210816181304/October32011?authkey=Gv1sRgCO6O-POKsZ2iLw

https://picasaweb.google.com/114098560210816181304/October62011?authkey=Gv1sRgCIyhq-jBqYW1vAE

https://picasaweb.google.com/114098560210816181304/October72011AerialPhotosOfLowellMountains?authkey=Gv1sRgCNmK0qOlqMOmgAE

https://picasaweb.google.com/114098560210816181304/October72011?authkey=Gv1sRgCMqR_ar2mqCOsQE

https://picasaweb.google.com/114098560210816181304/October92011?authkey=Gv1sRgCLn2ueOfqPSMfQ

https://picasaweb.google.com/114098560210816181304/LowellMountainSiteWorkSept2011?authkey=Gv1sRgCOT-26-EwZ_EnAE

https://picasaweb.google.com/114098560210816181304/October222011OnTheLowellMountains?authkey=Gv1sRgCJLLiYexkYyE3QE

https://picasaweb.google.com/114098560210816181304/October22201103?authkey=Gv1sRgCOGJ4tytiO-XOw

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Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Rob Pforzheimer
Sent: Tuesday, February 12, 2013 10:00 AM
Subject: State rejects Antrim wind project

Home » News » Energy http://www.unionleader.com/article/20130212/NEWS05/130219776
February 11. 2013 9:53PM
State rejects Antrim wind project
By MEGHAN PIERCE
Union Leader Correspondent
ANTRIM - The state has rejected a wind energy project along the Tuttle Hill and Willard Mountain ridgelines, citing concerns over its size and proximity to the Willard Pond Wildlife Sanctuary.

The 6-3 decision by a subcommittee of the New Hampshire Site Evaluation Committee Thursday came as a surprise to Antrim town officials, who had supported the wind farm because of the revenue it would bring - up to $8,700,000 in taxes over the life of the project - as well as its clean-energy claims.

"We felt the majority of the town was in favor of the project and we were representing the majority of the town," Selectman Michael Genest said Monday.

The panel denied a certificate to the project for Antrim Wind Energy, a subsidiary of Portsmouth-based Eolian Renewable Energy.

"We are obviously disappointed by the decision and we disagree with the decision," Eolian CEO Jack Kenworthy said.

He said the company will wait to see the panel's decision in writing and weigh its options; Eolian will have 30 days to appeal.

The 10-turbine project would have had a 30-megawatt capacity.

"The committee deliberated for three full days after hearing more than 11 days of evidence and ultimately decided the project would cause an adverse effect to the aesthetics of the area primarily because of the visual impact," SEC attorney Michael Iacopino said.

The project's nearness to the New Hampshire Audubon-held Willard Pond Wildlife Sanctuary played a part in the decision, as well as the opposition voiced both in testimony and written statements.

"Audubon are very pleased with the decision," Michael J. Bartlett, president of New Hampshire Audubon, said Monday.

Iacopino said the size of the turbines - 500 feet from the tip of the blade to the base - would have made the wind turbines the largest standing structures in the state. He said the tallest building in Manchester is 275 feet.

Selectman Genest noted the state has approved other wind farm projects, including Groton and Lempster. A 37-turbine wind farm in the Newfound Lake-Mount Cardigan area has also been proposed.

"They put these up in other areas of the state that are just as beautiful as the Willard Pond area," Genest said.

The Willard Pond Sanctuary is about 1,600 acres, Audubon's Bartlett said, and is part of a super-sanctuary of 33,000 acres of undeveloped land.

"New Hampshire Audubon in general as an organization supports wind energy, but it always has to be qualified with 'properly sited' and we didn't think this project was properly sited and the Site Evaluation Committee agreed," Bartlett said.

Kenworthy said Eolian had made a number of compromises on the project, including a settlement with the Appalachian Mountain Club not to have nighttime lights.

"The way the agreement worked, there would be 808 acres that would be conserved and that would be on a project that would have a disturbance area of about only 60 acres," Kenworthy said.

Fred Ward of neighboring Stoddard said he is thrilled by the state's decision.

"Those would be the tallest turbines in the state," he said.

Ward said in his written testimony to the SEC that the turbines would have been the same distance to Stoddard center as the center of Antrim.

"Everybody objects about how they look, but I'm more concerned about the noise that comes from them," he said.

From: Rob Pforzheimer
Sent: Tuesday, February 12, 2013 9:19 AM
Subject: today's Caledonian Record editorial.

Caledonian Record editorial. 2/12/13

Simply Unreliable

The widespread opposition to wind turbines in the Northeast Kingdom usually centers on aesthetics, health effects and environmental damage. Others, like us and the Ethan Allen Institute, protest the multiple, compounded subsidies handed out to wind promoters, without which they couldn't exist.

An article in the British journal Energy and Environment, found in the Science and Environmental Policy weekly report of February 13, describes a study of the production from 21 [wind] farms spread out over the grid for eastern Australia which is described as the largest, most widely dispersed, single interconnected grid in the world. Unlike many studies, such as those by the US National Renewable Energy Laboratory (NREL) which relied on computer models, this study relies on hard data.

"The study focuses on the year 2010, which was, apparently, not significantly different from other years. The study uses an unusually low standard of 2% of installed capacity for the Minimum Acceptable Level (MAL). That is, the wind farm needs to produce at least two percent of its rated production at full-scale operation. It relies on data provided by the grid operator that covers average power output over five minutes. Shorter time periods are preferable and instantaneous output is ideal.

"For 2010, the entire fleet (the combined output of all wind farms) failed to produce 2% of installed capacity 109 times. The longest [outage] period was for 70 minutes. One wind farm, described as typical, failed 559 times in the six months. The longest period was for 2.8 days. Not only does the entire fleet fail frequently, but also it fails throughout the year. Clearly, such performance would be unacceptable for any traditional method of generating electrical power.

"After analyzing the data, the authors state that wind cannot be used for base load, the daily minimum requirement, and that the installed capacity of required back-up must be at least 80% of installed wind farm capacity. In eastern Australia the required back up is open cycle gas turbines (basically jet engines) which are far less efficient than closed cycle gas turbines. But the closed cycle systems cannot react sufficiently quickly to variation of wind power output. Further, the open cycle turbines must be operating constantly on stand-by mode, wasting energy when the electricity is not needed."

The SEPP authors conclude: "Wind power promoters, and their supporting politicians, are leading the public into an expensive wind trap." In Vermont, they might also have added, electric ratepayers are paying through the nose for this carnival of foolish subsidies. Why do we keep electing people who support it?

From: Rob Pforzheimer
Sent: Thursday, February 14, 2013 5:59 PM

Subject: Wisconsin Wind farm proposal rejected citing concerns about turbine noise

http://www.jsonline.com/blogs/business/191236721.html

Wind farm proposal rejected, developer plans another try

By Thomas Content of the Journal Sentinel

Updated: 4:24 p.m.

State regulators on Thursday rejected an application to build a new wind farm in St. Croix County, citing concerns about turbine noise the project would generate for nearby homes.

The state Public Service Commission voted 2-to-1 to reject Emerging Energies' proposal to build the Highland wind farm, which was proposed to generate 102.5 megawatts of power from 41 turbines, or eough to supply about 30,000 homes.

Commissioners said that they were rejecting the proposal "without prejudice," in essence leaving the door open for the developer to file a new application for the project, after it conducts a new noise study using more conservative assumptions about the background noise in the area.

The $250 million Highland project is the first wind farm to be ruled on by the state commission since Republican Gov. Scott Walker appointed two commissioners, a majority of the three-member panel.

Emerging Energies representative Jay Mundinger said after the vote the developer plans to continue its pursuit of a permit for the project.

Commissioner Eric Callisto, the lone remaining appointee of former Democratic Gov. Jim Doyle, said he would have approved the project but would have attached conditions binding the developer to protect nearby landowners from excessive turbine noise.

Noise studies by the applicant found that 20 homes would experience noise levels above the 45 decibel standard at night, but the commission could work with the developer on "micro-siting" issues after new analysis was done, he said.

The Highland project is the only large wind energy project currently in active development in the state. The state's utilities have already built enough wind farms to comply with the Wisconsin renewable portfolio standard, which requires that 10% of the state's electricity come from renewable sources by 2015.

During the commission's meeting in Madison, commissioner Ellen Nowak said the applicant didn't prove that all the wind project would result in noise levels below 45 decibels at night, the standard that's in Wisconsin's wind siting rule.

As a result, she said she concluded the project was not in the public interest.

In their decision, the PSC commissioners decided not to attach special requirements concerning low-frequency noise, after wind consultants studied the impacts of low frequency noise from wind turbines the same developer built near Green Bay.

Reached after the meeting, Mundinger said Emerging Energies would take the commissioners' noise concerns into account but was not giving up on the project.

“We believe that sound, from what we’ve heard, is a big concern, and we believe we can address that and we believe we have a pathway to get the (project permit) in short form,” he said. "We want to make sure we address the sound and be able to move this project forward.”

The company has offered not to use the kind of turbine that it used when developing the Brown County wind farm -- the tallest towers built so far in Wisconsin. Instead, Emerging Emergies has agreed to use two other turbines that don’t generate as much sound, he said.

PSC commissioners said they would not approve the project if it used the loudest of the three turbines Emerging Energies had been considering.

“The turbines are better than ever before,” Mundinger said. “They’re quieter than the ones just 10 years ago.”

Peter McKeever, attorney for the Forest Voice, a group that mobilized in opposition to the wind farm,said he was pleased with the commission’s decision.

Wind farms are difficult to build in Wisconsin because the state’s dairy farming heritage and land use history resulted in smaller farms being closer together rather than large farms that are farther apart on the Great Plains, he said.

“If we want wind to be a really viable energy source we have to get smart about siting wind farms in Wisconsin,” he said.

The state should be leery of developing projects where homeowners could experience problems similar to those found in the Green Bay area project, McKeever said.

At issue in this case is one of the variables in that model – an estimate of how much sound would be absorbed by the ground when the wind turbines are spinning.

In this case, the commission essentially asked Emerging Energies to assume a worst-case scenario: That the 45-decibel standard will be met at all times, even when there is totally reflective ground – hard frozen ground with no snow or vegetation on it.

The commission adopted a more stringent noise requirement than it did when it approved its most recent wind farm, the We Energies Glacier Hills Wind Park, in 2010, said Katie Nekola, general counsel at the conservation group Clean Wisconsin. However, in that case, there was no challenge to the assumptions used by We Energies in its turbine noise modeling.

She expressed hope that the decision would be a temporary setback for the Highland project.

From: Annette Smith |
Sent: Friday, February 15, 2013 2:58 PM
Subject: Mack: Cell tower approval process undermines democracy : VTDigger

Same complaints with the PSB process as with electricity generation development. Corporations running the show, with the help of the PSB, towns have no say.

http://vtdigger.org/2013/02/14/mack-cell-tower-approval-process-undermines-democracy/

Mack: Cell tower approval process undermines democracy

by Opinion | February 14, 2013

Editor's note: This op-ed is by John Mack, Ph.D., who is chairman of the Newfane Selectboard. This piece is his personal observations and not an official communication of the selectboard.

Cell tower proposals have intensely occupied the the town of Newfane for the past four months. The process as it has unfolded provides a disturbing example of how corporate interests exercise undue control over public resources and democratic processes.

Whatever the intent of the state of Vermont's telecommunications statute (Act 248a), its practical effect is to dramatically overload the equation in favor of the telecommunications industry to the extent that any local democratic processes are almost entirely ceremonial.

In allowing telecommunications corporations the "option" to seek approval either through the municipality or the state authority (Public Service Board), duly enacted municipal ordinances are, for all intents and purposes, nullified. By asking that municipalities make recommendations to the PSB while preempting local ordinances, the legislation gives the appearance of local democratic input while undercutting the reality.

We are asked to give a "recommendation" to the PSB as part of the "process," with the town's own ordinance cited where it agrees with the telecommunications firm and dismissed as irrelevant where it does not.

The threat, expressed at Newfane Selectboard meetings by both public officials and corporate spokespersons, is that the telecommunications companies will simply walk away, leaving localities with gaps in cell coverage that are harmful to business, inconvenient to most people, and sometimes seriously dangerous in emergency conditions. Perhaps out of this fear — along with the difficulty of getting telecommunications companies to come to the table — current legislation all but completely deprives localities of meaningful input in these decisions.

This has put the Newfane Selectboard in an impossible position. The selectboard knows that our town needs cell coverage, but the town's duly enacted ordinance sets requirements for height, setback of towers and adverse aesthetic impact. AT&T presents a specific site already negotiated with and signed by the property owner. We are asked to give a "recommendation" to the PSB as part of the "process," with the town's own ordinance cited where it agrees with the telecommunications firm and dismissed as irrelevant where it does not. The local ordinance also considers the long-term issues in cell tower construction, most notably the requiring that towers be properly removed when no longer in use. The state's certificate of public good carries no such requirements.

Because the PSB must decide, up or down, to take the telecommunication firm's offer or leave it, there is no room to insist that the firm respond seriously to local concerns, particularly with regard to the choice of site to ensure that all alternatives are considered and the best site for all concerned is chosen. The PSB's standard of

“undue adverse aesthetic effects” does not allow for consideration of the relative aesthetic impact of one site versus another. (The state’s “independent evaluator” found that there were, in fact, adverse aesthetic effects, but not undue aesthetic effects.)

When representatives of the selectboard met via teleconference with the “hearing officer” of the PSB (the lawyer for AT&T was also invited on the call by the PSB as an active participant), it was made clear in no uncertain terms that the town’s concerns with the violations of its ordinance and the need to consider alternative sites outside the .5 mile radius set by AT&T were irrelevant and immaterial to the PSB’s decision-making process.

All the cards are in the telecommunications companies’ hands. Despite the fact that they are the beneficiaries of licenses that are a public asset, they essentially dictate the terms of proposed coverage. In this case, the ability of AT&T to insist that they would only consider sites within .5 miles of the site they’d chosen essentially closed off consideration of sites that might provide similar coverage without adversely affecting townsfolk.

In this way, the state of Vermont has essentially followed the pattern of the federal government, allowing corporate interests to dominate the conversation while giving lip service to the concerns of those most directly affected.

This is neither a partisan nor an “anti-telecommunications” position. We need cell coverage. AT&T will provide it, but if and only if they do it their way. The state of Vermont has made it easy for them to do so rather than finding ways of ensuring those most affected by the construction of facilities have a real say in their placement. Under these conditions, the hours and hours of the selectboard listening carefully to townspeople’s concerns and drafting its recommendations are a charade, not a legitimate exercise in democracy.

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Rob Pforzheimer
Sent: Friday, February 15, 2013 10:47 AM
Subject: Some lessons from New York

http://www.rutlandherald.com/article/20130214/OPINION04/702149967/1018/OPINION

Some lessons from New York
February 14,2013

As Vermonters grapple with the pros and cons of industrial wind power, many of their questions may be answered by studying the track record of northern New York wind projects.

This area has been host to hundreds of turbines for nearly five years. The wind resource of northern Vermont is very close to that of northern New York. We can certainly expect nearly the same performance from turbines in both locations. I have tracked four northern New York projects since their inception with a comprehensive study centered on the Noble Chateaugay project, which has 71 GE 1.5 SLE turbines and is capacity-rated at 106.5 megawatts. The capacity rating is the maximum sustained output of the project.

The actual annual output of the Chateaugay was only 23 megawatts, giving an efficiency (capacity factor) of 21.6 percent. The other northern New York projects had similar capacity factors. This is quite far removed from the 30 percent to 35 percent commonly predicted by wind developers.

All northern New York wind projects had more than 1,200 hours annually that they produced no electricity at all (that's the equivalent of 50 24-hour days) or 14 percent of the time with zero generation. It appears wind developers notoriously inflate expected capacity factors to entice investors and increase chances of permitting approvals.

Both Vesta and GE turbines have a manufacturer's life expectancy rating of 20 years, yet no northern New York wind project is on track to sell enough electricity in 20 years to pay for itself. There are few locations in the Northeast that have a sufficient wind resource to support a viable wind generating project; not only are area winds light compared to the Midwest, but they have a huge problem of being very intermittent.

Wind power can never supply a steady base-load power, nor can it supply reliable and predictable electricity in any amount. This is especially true in marginal wind areas like New York and Vermont. Large-scale power storage is only a future dream, so a huge influx of wind power only increases its inefficiency.

Vermonters must look carefully at the current rush to cover their ridgelines with giant industrial wind turbines. Wind advocates, including Gov. Peter Shumlin, claim Vermont must switch to wind power in order to avoid another Hurricane Irene.

If this wasn't so serious, it would be laughable. Irene originated in the Caribbean, so I find it hard to believe that a few wind turbines on Lowell Mountain can stop a major storm forming in the Caribbean. If storms of Irene's ilk are caused by climate change, then Vermont's electrical generation is a very minor concern, since 96 percent of its carbon dioxide is caused by heating and transportation. It might make more sense for Vermonters to concentrate on conservation and energy efficiency rather than destroy their ridgelines with inefficient wind turbines.

An in-depth study done by the prestigious Pacific Research Institute found that a wind project needed to have a capacity factor of 35 percent before it could erase its carbon footprint within its life expectancy. Manufacture, transport and construction of a wind project produces huge amounts of carbon dioxide emissions; for example, just moving a single turbine across northern New York produces nearly five tons of carbon dioxide.

Even if Vermont wind projects produced less emissions, little reduction would occur since most of Vermont's electricity comes from hydro and nuclear, both already emission free.

A driving force behind the Shumlin administration's strong support of wind power seems to be the desire to destroy Vermont Yankee. The fact of the matter is that it would take more than 1,000 3-megawatt wind turbines to produce the average output of Yankee, and that output would be erratic and unpredictable.

Since Vermont electrical generation produces an infinitesimal part of U.S. carbon dioxide emissions, there is no way they have any measurable effect on climate change.

The Lowell Mountain project is interesting in that Green Mountain Power claims its 21 three-megawatt turbines will produce an annual average of 20 megawatts. This would mean a capacity factor of approximately 32 percent, rather unbelievable for a Northeast installation. I fear the people of Vermont are being sold a bill of goods not unlike what happened in northern New York.

Other considerations in the northern New York wind projects were changes in the rural ambiance of the landscape, a major factor for Vermonters as ridgelines are scalped and bulldozed. Here in northern New York woodlot and meadow scenery gave way to an industrial array of 500-foot turbines. The landowners who were near turbine sites found their property values decreasing. Studies in New York, Texas, Wisconsin, the United Kingdom and Ontario all agree that sites in view of turbines less than a mile away lost 20 percent to 50 percent of their value once they were installed. Additionally, we have had cases of ill health caused by neighboring turbines, a condition known as wind turbine syndrome and verified by medical professionals worldwide. A further negative effect that wind developers in northern New York have generally denied is the death of birds and bats due to wind turbines. It has been alleged that some projects have employees who scour the areas around turbines and remove carcasses, thus literally "knowing where the bodies are buried."

Vermonters should remember that once their ridgelines are dynamited, bulldozed and covered with giant wind turbines they will never be reclaimed.

Jack Sullivan is a town councilor in Malone, N.Y. He is a retired teacher of mathematics and physics.

From: Annette Smith
Sent: Friday, February 15, 2013 12:14 PM

Subject: Wind Turbines can be Hazardous to Human Health

I was asked to put together information about wind turbine noise and health issues so thought I'd send it along.

There is a lot of information now, this is just a sampling. Right now, governments in the US (Wisconsin), Canada, and Australia are agreeing that infrasound is an issue that needs further study and they are conducting monitoring for it (something the Vermont PSB does not require and is not being done at any wind sites in Vermont. The PSB has required the Lowell site to be monitored for low frequency noise -- above 20 hz -- but not infrasound which is below 20 hz). The wind developers and their experts have consistently said that infrasound is not an issue, and they have persuaded regulators to use the dBA weighting which excludes infrasound, and regulators are establishing noise levels of 45 dBA which is at a level where human health is now known to be harmed. I have not included any of the most recent reports of the studies that are being undertaken now about the need to study infrasound. What is included here are published materials from the US, Canada, England, Australia and New Zealand all covering the same issue, that wind turbines are making people sick. Dr. Alec Salt is the researcher doing the work in the laboratory who is figuring out the mechanisms by which people are getting sick.

UNITED STATES
1. Dr. Alec Salt's website with write-up about his research on wind turbines and what happens in the human ear
http://oto2.wustl.edu/cochlea/wind.html

Perception-based protection from low-frequency sounds may not be enough, 2012
Alec N. Salt, Jeffery T. Lichtenhan
Department of Otolaryngology, Washington University School of Medicine, St. Louis, MO, 63110, USA.
http://oto2.wustl.edu/cochlea/saltlichtenhaninternoise2012.pdf
Dr. Salt offered to educate Dr. Harry Chen, and reached out to him in August 2012 but never had a response.

2. Wind Turbine Acoustic Investigation: Infrasound and Low-Frequency Noise—A Case Study

Stephen E.Ambrose, Robert W. Rand, and Carmen M. E. Krogh. 2012. Attached

3. Effects of industrial wind turbine noise on sleep and health
Michael A. Nissenbaum, Jeffery J. Aramini, Christopher D. Hanning
Northern Maine Medical Center, Fort Kent, Maine, USA, 1*Intelligent Health Solutions, Guelph, Ontario, Canada, University Hospitals of*
Leicester NHS Trust, Leicester, UK

NEW ZEALAND
4. A pragmatic view of a wind turbine noise standard, 2010
http://docs.wind-watch.org/A-pragmatic-view-of-a-wind-turbine-noise-standard.pdf
Phillip Dickinson, Professor of Acoustics, College of Sciences, Massey University Wellington, New Zealand

5. Evaluating the impact of wind turbine noise on health- related quality of life, 2011
http://docs.wind-watch.org/NAH_2011.pdf
Daniel Shepherd, David McBride1, David Welch2, Kim N. Dirks2, Erin M. Hill
Department of Psychology, School of Public Health, Auckland University of Technology, Auckland,
1Department of Preventive and Social Medicine, University of Otago, Dunedin, 2School of Population Health, The University of Auckland, Auckland, New Zealand
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AUSTRALIA

6. Wind Farm Generated Noise and Adverse Health Effects, 2012

http://docs.wind-watch.org/Thorne_Wind-farm-generated-noise-adverse-health-effects.pdf

Bob Thorne, PhD, Team Leader Noise Measurement Services Pty Ltd, Brisbane, Australia Submitted to the Senate Hearing on 'Excessive Noise from Wind Farms' Bill, 14 November 2012

7. Characterisation of noise in homes affected by wind turbine noise, 2012

Benjamin Nobbs, Con J. Doolan and Danielle J. Moreau

School of Mechanical Engineering, The University of Adelaide, Adelaide, Australia

http://docs.wind-watch.org/Nobbs-Doolan-Moreau-Nov-2012-Characterisation-of-noise.pdf

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CANADA

8. document attached contains summaries of numerous studies and published papers

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Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

Wind Turbine Acoustic Investigation: Infrasound and Low-Frequency Noise—A Case Study

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Stephen E. Ambrose[1], Robert W. Rand[2], and Carmen M. E. Krogh[3]

Abstract

Wind turbines produce sound that is capable of disturbing local residents and is reported to cause annoyance, sleep disturbance, and other health-related impacts. An acoustical study was conducted to investigate the presence of infrasonic and low-frequency noise emissions from wind turbines located in Falmouth, Massachusetts, USA. During the study, the investigating acousticians experienced adverse health effects consistent with those reported by some Falmouth residents. The authors conclude that wind turbine acoustic energy was found to be greater than or uniquely distinguishable from the ambient background levels and capable of exceeding human detection thresholds. The authors emphasize the need for epidemiological and laboratory research by health professionals and acousticians concerned with public health and well-being to develop effective and precautionary setback distances for industrial wind turbines that protect residents from wind turbine sound.

Keywords

wind turbines, infrasound, low-frequency noise, physiological symptoms, adverse health effects

Introduction

Industrial wind turbines (IWTs) are being situated near human habitation in increasing numbers. In some communities individuals who are exposed to wind turbines report experiencing negative impacts including adverse health effects. Falmouth Massachusetts, USA is a community located in a quiet rural environment where there were reports of negative health effects from locating IWTs too close to residences. Some Falmouth residents have identified wind turbine noise as a cause of negative effects.

During a noise study investigating acousticians experienced adverse health symptoms similar to those described by residents living at the study location and near other IWT sites. The onset of adverse health effects was unexpected and persisted for some time after leaving the study area.

This case study provides wind turbine noise measurements and other technical data and describes the symptoms experienced by the investigators and explores the plausibility that wind turbine low-frequency energy could contribute to reported adverse health effects.

Background

Falmouth, Massachusetts, U.S. Wind Turbines

Falmouth, Massachusetts recently installed three IWTs (Vestas, V82, 1.65 MW); two owned by the town located at the municipal wastewater treatment plant (WIND1 and WIND2) and one privately owned at a nearby industrial park (NOTUS). This area has a limited amount of daytime business activity and only a distant highway with low traffic volumes at night. The area is representative of a quiet rural environment with widely spaced houses. WIND1 and NOTUS are installed with the nearest residences approximately 400 m (1,300 feet) and 520 m (1,700 feet), respectively.

The WIND1 and NOTUS IWTs were installed over several months, with WIND1 being the first to come on line in March 2010. A short time later, neighbors began to complain about excessive noise coming from WIND1. Later that year, NOTUS began operation and similar complaints came in from other neighbors. Complaints continued for months and neighbors were reporting that they could not adjust to the fluctuating sound, the endless swish and thumps. They found the noise to be intrusive and disruptive to normal at home activities. WIND2 was not operating during this study.

These fluctuating audible sounds or amplitude modulations are the routine characteristic of IWTs and can be disturbing

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and stressful to exposed individuals (G. Leventhall, 2006). During moderate wind speeds the IWT noise was clearly audible outdoors and for some, indoors. At times the noise included an audible low-frequency tone that came and went. Neighbors commented that the wind turbine noise was more noticeable indoors and it interfered with their relaxation and sleep.

The town responded to the numerous and persistent complaints by requiring postoperational noise surveys to determine if there were justifications for complaints. Neighbors responded by hiring legal counsel and had independent noise measurements performed and evaluated for adverse impacts. Most measurements were conducted by experienced acousticians. The primary acoustic quantifier measured was the average A-weighted sound level (dBA). The sound levels generally ranged from the mid-30s to mid-40s dBA. Some noise-level variations were due to differences for time of day, wind speed, and wind direction (upwind or downwind). Measured sound levels were fairly consistent from each survey provider. However, the acoustic reports had little effect on complaint resolution.

Falmouth Health Complaints

After WIND1 and NOTUS IWT started up, neighbor complaints included adverse health symptoms. They had days where they were unable to enjoy the previous peace and tranquility while at home, unable to relax, felt tense, and felt a strong desire to be someplace else. They noticed some relief when outdoors. The lessening of adverse effects when outdoors and the indoor worsening are consistent with the findings of low-frequency noise (LFN) effects exposure (Burt, 1996). Typically, the indoor A-weighted sound level is lower than the outdoor, especially when indoor human activity is at a minimum. The house exterior walls provide more middle- to high-frequency band attenuation than for the low and very low bands. Therefore, the average A-weighted sound level by itself may not be a useful measurement indicator for determining the potential for IWT complaints.

Some complainants described having significant difficulties living in their home with reports of experiencing headaches, ear pressure, dizziness, nausea, apprehension, confusion, mental fatigue, lassitude (inability to concentrate, lethargy). These were worse when IWTs were operating during moderate to strong winds. A few neighbors moved their bedrooms into the basement in an attempt to get a good night's sleep. Others were forced to leave their home to sleep farther away at a family or friend's house or even in a motel. These symptoms (DeGagne & Lapka, 2008; Schust, 2004) and behavior patterns (H. G. Leventhall, 2004) are consistent with LFN exposure suggesting that IWT low-frequency energy may be a factor.

Study Objectives

The purpose of the study was to confirm or deny the presence of infrasound (very-low-frequency noise, acoustic waves, or pressure pulsations less than 20 Hz) and LFN emissions (20-200 Hz) created by an IWT. The combination of infrasound and low-frequency noise is defined as ILFN. If ILFN was present the study was to determine: (a) if it was greater than or uniquely distinguishable from the ambient background levels and (b) if it exceeded human detection thresholds. It was not the intention of this study to determine the precise mechanism that linked the IWT to the physiological or psychological symptoms being reported by residents.

The scope of this study was conducted at one home that is representative of many other households that have complained about noise and adverse health effects. The investigators assessed differences between outdoor and indoor measurements.

Acoustic Measurements and Methodology

Acoustic measurements were made with precision sound measurement instruments and dual-channel computer-based signal analyzer software. These instruments were capable of measuring very-low-frequency energy, as low as 1 Hz. Frequency response was flat (within 1 dB) to 2 Hz and 6 Hz for the two primary measurement channels. Prior to computer analysis, the microphone and preamplifier frequency response were corrected to flat (1-6 Hz) using manufacturer data sheets. Instruments are itemized in Table 1.

Each sound-level measurement system was independently field-calibrated (end-to-end) prior to and verified after the survey measurements with an acoustic sound-level calibrator (Brüel & Kjær, Type 4230 or Larson Davis CAL200), generating a 1,000 Hz tone with 94 dB sound pressure level (SPL) reference 20 μPa root mean square (RMS). Sound-level meters and acoustic calibrators had current laboratory calibration certificates traceable to National Institute of Standards and Technology.

The ANSI (American National Standards Institute) filter characteristics of Type 1 instrumentation have a long impulse response time at low frequencies. At 1 Hz, the ANSI 1/3 octave band impulse response is close to 5 seconds. Thus, ANSI filters do not capture the fast peak pressure changes occurring in the low and infrasonic frequencies (Bray & James, 2011).

To observe fast peak pressure changes, signal analysis was improved by using an external digital filter in series with the digital recording playback output, and then analyzing the digital data with a fast Fourier transform (FFT) signal analyzer with short time length (<128 milliseconds).

Field testing was conducted in general accordance with applicable ANSI Standards, ANSI S12.18-1994 ("Procedures for Outdoor Measurement of Sound Pressure Level," Method 1) and S12.9-1993/Part 3 ("Procedures for Short-Term Measurements with an Observer Present"). Indoor-outdoor simultaneous measurements were made using two microphones to determine the outside-to-inside level reduction (OILR) for the exterior walls and roof. The OILR

Table 1. Instrument List

Instrument	Manufacturer	Model
Microphone	Brüel & Kjær	4165
Preamplifier	Larson Davis	2221
Microphone	GRAS	40AN
Preamplifier	Larson Davis	902
Sound level meter	Larson Davis	824
Calibrator	Brüel & Kjær	4230
Audio interface	Sound Devices	USBPre2
Recorder	M-Audio	Microtrack II
Software	Pioneer Hill	SpectraPLUS 5.0
Microphone	Svantek	SV22
Preamplifier	Svantek	SV12L
Sound level meter	Svantek	949
Calibrator	Larson Davis	CAL200
Audio interface	ROGA	DAQ2
Recorder	TEAC	DR100

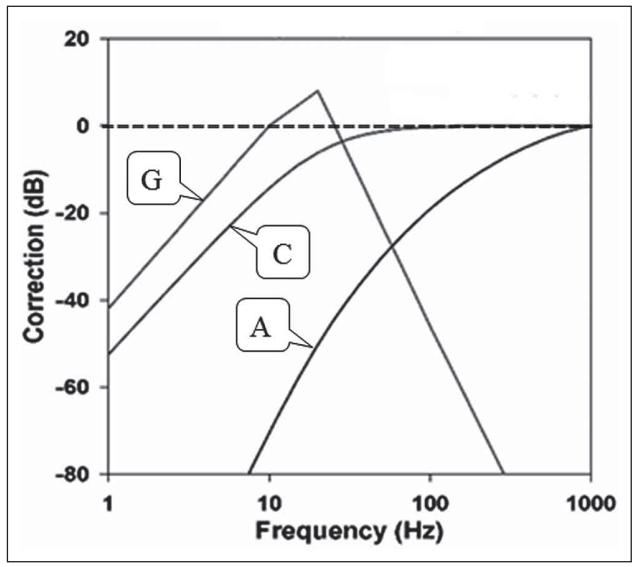

Figure 1. Weighting functions
Source. Adapted with permission from figure located at http://oto2.wustl.edu/cochlea/wt4.html

measurements were performed in accordance with ASTM E966-02 (ASTM, 2010). The indoor microphone was fitted with a 4-inch windscreen and mounted on a microphone stand in the master bedroom at a location where the reported adverse symptoms were more pronounced. The outdoor microphone was fitted with a 4-inch windscreen and placed inside a RODE Blimp for improved wind and shock mount protection. The entire outdoor system was mounted on a tripod, positioned 5 feet above the ground, and located away from house and trees. Wind speeds were light at the outdoor microphone position. In addition to noise measurements, weather, temperature, and wind speed data were collected.

The A- and C-weighting, octave band, and FFT analysis were performed with SpectraPLUS software in real time and recording mode on-site. The recorded data were analyzed off-site using the postprocessing features. G-weighted sound levels were computed using FFT settings for octave band analysis of the G-filtered 4, 8, 16, and 31.5 Hz octave bands using the G-weighting corrections which are the average value for the one-third octave bands comprising each full octave band (ISO 7196:1995, "Acoustics–Frequency Weighting"). While coarse in approach, the method was determined to be a usable trade-off between analysis time, accuracy, and computational requirements. It should be noted that the dBG levels obtained using the ANSI octave band filtering would not capture the highest peak pressure changes, so data reported are considered to understate the peak dBG levels.

Octave band (Hz)	4	8	16	31.5
dBG correction (dB)	−16	−4	+7.7	−4

The A-, C-, G-weighting and unweighted (dBL) filter functions are shown in Figure 1.

The A- and C-weighting filters discount frequency-level contributions below 1,000 Hz and 20 Hz, respectively. The G-weighting was created for evaluating infrasound, peaking at 20 Hz with rapid declines above and below which follow the recognized hearing response to pure sine waves, with a slope of 12 dB per octave. Unweighted (or dBL; dashed line) has flat frequency response over the entire bandwidth.

Weather Conditions

The survey was started in the late afternoon of April 17, 2011 (Day 1) and concluded in the morning of April 19, 2011 (Day 3). The weather conditions were representative of pleasant warm, windy spring days with cool, calmer nights.

Outdoor measurements were made when weather conditions were favorable for measurements (ground-level winds ≤ 9 mph [miles per hour] and no precipitation). Observed weather conditions and the nearest publicly accessible met tower are presented in the appendix.

Wind Turbine Operations

In the spring of 2011, Falmouth imposed a maximum wind speed restriction on their WIND1 in an effort to mitigate neighbors' complaints. WIND1 operation was modified to curtail power generation whenever the hub-height wind speeds exceeded 10 m/s. The town did not curtail NOTUS even though it was close to neighbors. The manufacturer has a setting to trip units off when the hub-height wind speed exceeds 32 m/s.

Results

Observations and Comments

Day 1: Hub-height wind speeds were from the west at 20 to 25 m/s, gusts exceeding 30 m/s (66 mph, gale force aloft). Surface winds were light from the southeast, contrary to upper level westerly winds. At night, the hub-height wind speed slowly decreased to light, whereas the surface wind speed decreased to nearly calm.

Outdoor noise measurements were first made on arrival at the study house. The NOTUS turbine was clearly audible (520 m distant) and WIND1 (1,220 m distant) was off.

Within 20 minutes of setting up work stations inside the study house, the investigators started to experience a loss of well-being and continued to worsen with time. They had difficulty performing routine survey and measurement tasks: connecting instruments, assessing for proper operation, and calibration. They experienced inability to stay focused using a computer or track survey scope of work.

After repeated efforts, it was determined that reliable indoor measurements were not possible because of debilitation. No meaningful measurements were acquired at ML-1 during the first evening when winds were strong.

Near midnight the wind speed started to decrease, prompting an effort to leave the house to attempt outdoor noise measurements nearer NOTUS. These measurements are discussed in more detail in the "Sound Level Versus Distance Measurement" section.

Day 2: Light pre-dawn hub-height wind speed slowly increased during the morning to above 18 m/s and continued throughout the day and decreased to light in the early evening. During the early night the wind speed remained light.

NOTUS noise was dominating with outdoor and indoor levels in the low 40s and 20s dBA, respectively. Spectral, one third, and full octave band sound levels were viewed with computer-based frequency analysis software for several hours during the day. Infrasound and low frequencies were of special interest and these had the highest unweighted SPLs. Outdoor–indoor (OILR) measurements were conducted. Digital recordings were made for a postprocessing at a later date.

Day 3: After midnight the wind speed increased to strong and decreased to light at sunrise.

Normal workday sounds from nearby commercial activity were intermittently audible. There were faint noises from diesel equipment operating at a nearby sandpit, light traffic on Rte. 28, 1,700 m (5,600 feet) away and an occasional vehicle on the nearest road, 300 m (1,000 feet) away). NOTUS was stopped and WIND1 was inaudible but operating in light winds as observed by ILFN modulations detectable on analyzer. This presented an opportunity to obtain digital recordings with WIND1 operating alone in light winds at ML-1. The wind died and the survey was concluded mid-morning.

Figure 2. NOTUS measurement locations

Sound Level Versus Distance Measurement

Sound-level measurements and recordings were made at four distances to show the noise level decrease with increasing distance and the distance for blending into the background acoustic environment. This technique can be called "level versus distance," "walk-away," or "stepped distance."

Measurements with digital recordings were made at three locations trending north-northeast away from NOTUS (MLA, B, and C at 80, 250, & 410 m (260, 830, 1,340 feet), respectively) in the Falmouth Technology Park, as shown in Figure 2. Measurements were ceased when it started to rain after 1:30 a.m. The fourth location (ML-1) was to the southeast at the survey residence (at 520 m or 1,700 feet). NOTUS noise was dominant at all measurement locations.

Investigator Assessment

IWT power outputs were obtained from the NOTUS and WIND1 websites. Figure 3 shows the power output and wind speed.

Table 2 was created to correlate the NOTUS IWT power output, measured dBA, dBG, and dBL data at ML-1 and adverse health effects experienced by the investigators at ML-1 during the operating conditions of the NOTUS wind turbine.

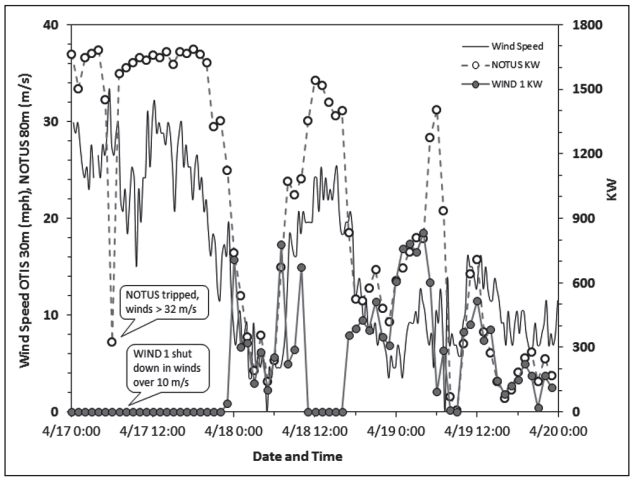

Figure 3. Wind turbine wind speed and power output

Figure 4 was created by combining Table 2 with Figure 3 to show the relationship of NOTUS power output, wind speed, and health states experienced by the investigators.

WIND1 was configured with an operational cap at 10 m/s and was off during the higher wind speeds. The investigators were most noticeably affected when the IWT power output was highest, with wind speeds more than 10 m/s at hub height for NOTUS while at the study location (at 520 m).

Figure 4 also shows the hours when the investigators were not as severely affected. Symptoms moderated during the first night when IWT power output dropped when nighttime noise measurements were made near NOTUS, and later while sleeping. When the power output increased (with wind speed greater than 10 m/s) during the following morning, symptoms returned, yet slowly went away (with increased distance from the IWT) after leaving the area for breakfast. On returning to the study house (at 520 m) the symptoms quickly set in again and remained strong until late afternoon when IWT power output dropped with lower wind speeds. The investigators left for an evening meal and symptoms moderated somewhat, yet, even with the increased distance from the IWT, the symptoms continued strongly enough to suppress appetite and affect thinking. When the investigators went to bed they had fitful sleep with numerous awakenings. Concurrently, IWT power output increased during the night, with average hub-height wind speeds fluctuating above and below 10 m/s during the early morning hours. In the morning, winds decreased to light, with NOTUS stopped and WIND1 turning in the distance (at 1,220 m).

Onsite Analysis Conducted on Day 2

A representative outdoor noise spectrum (RMS) was plotted with the outer hair cells (OHCs) and inner hair cells (IHCs) dBG thresholds, as shown in Figure 5A. The graph shows that the NOTUS 22.9-Hz tone exceeds the OHC threshold of 45 dB at 22.9 Hz. The 129-Hz tone exceeded the IHC threshold and was confirmed as audible outdoors (see, *OHC and IHC*) in the "Discussion" section).

The simultaneously measured indoor noise spectrum (RMS) is shown in Figure 5B. The graph shows that the NOTUS 22.9-Hz tone again exceeds the OHC threshold. The 129-Hz tone was less audible than outdoors. The spectrum was amplitude modulated and the averaged spectrum does not reveal the peak sound levels which may have exceeded the audibility threshold.

Time-History Tone Analysis

NOTUS noise levels and frequency content noticeably fluctuated with time. It would be appropriate to analyze these variations versus time focusing on the 22.9-Hz tone because it was shown to be detectable by the OHC. A 20 to 24 Hz 10th order digital bandpass filter was inserted between the digital recording output and the analysis input channel for SpectraPLUS software set to acquire FFT frames at 23-millisecond intervals using Hamming weighting. These furnished the band-limited tonal energy at 22.9 Hz free of ANSI filter response times.

Figure 6 shows the indoor time history of 22.9-Hertz amplitude variations above and below the OHC threshold of 45 dB. This graph shows amplitudes as high as 60 dB, which is 10 dB higher than the 50 dB average. The total fluctuation, maximum to minimum exceeds 50 dB.

This graph shows that the OHC is receiving pressure events nearly every 43 milliseconds at least 50% of the time during the measurement. The 22.9-Hz tone was not audible because it was not strong enough to exceed the IHC threshold (approximately 72 dB at 22.9 Hz).

Time-History dBG Analysis

Indoor and outdoor recordings with NOTUS operating were made on the afternoon of Day 2 and with NOTUS not operating due to very light wind on the morning of Day 3. This enabled time-history plots showing the dBG differences between NOTUS "ON" and NOTUS "OFF" for both indoors and outdoors as shown in Figure 7A and B. These data illustrate amplitude modulations exceeding 60 dBG. They were acquired through ANSI filter octave bands corrected to dBG. Because of ANSI filter impulse response times, they do not capture the highest peak pressure levels.

Indoors, the NOTUS "ON" dBG levels were about 20 dB higher than when "OFF." Outdoors, the NOTUS "ON" versus "OFF" dBG difference was about 10 dB.

Sound Level Versus Distance Measurement

Outdoor sound levels decrease at about 6 dB per doubling of distance (6 dB/dd) as depicted by the inverse square law for acoustic frequencies. Sound level versus distance measurements were plotted using a semilog scale for distance. This graphing method typically shows the drop of sound level as a straight line as the distance increases.

Table 2. NOTUS Operations, ML-1 Sound Levels, and Adverse Health Effects

Hub wind speed (m/s)	NOTUS output (kW)	Location	dBA	dBG	dBL	Symptoms experienced
Day 1: 25, gusts: 35	1,600-1,700	Indoors	n/a	n/a	n/a	Nausea, dizziness, irritability, headache, loss of appetite, inability to concentrate, need to leave, anxiety
		Outdoors	n/a	n/a	n/a	Felt miserable, performed tasks at a reduced pace
Night 1: 0-9	150-350	Indoors	18-20	n/a	n/a	Slept with little difficulty
Day 2: 20, gusts: 30	1,350-1,500	Indoors	18-24	51-64, pulsations	62-74, pulsations	Dizzy, no appetite, headache, felt miserable; performed tasks at a reduced pace. Desire to leave
		Outdoors	41-46	54-65, pulsations	60-69, pulsations	Dizzy, headache, no appetite. Slow. Preferred being outdoors or away
Night 2:	150-350	Indoors	18-20	n/a	n/a	Slept fitfully, woke up
Day 3: calm to 6	OFF	Indoors	18-20	39-44, random	50-61, random	Improvement in health. Fatigue and desire to leave
		Outdoors	32-38	49-54, random	57-61, random	Improvement in health. Fatigue and desire to leave

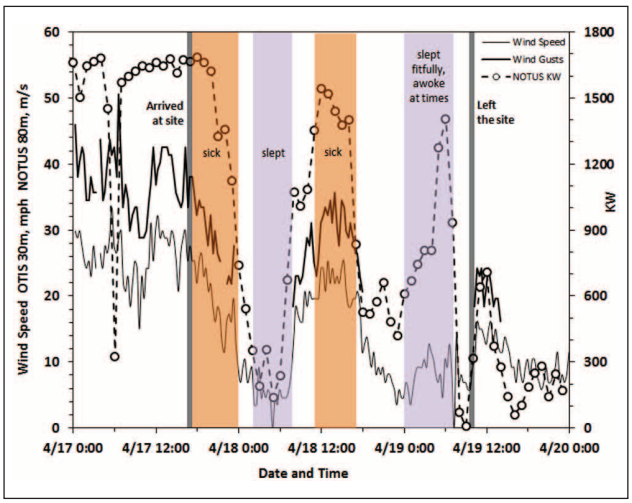

Figure 4. Survey operations at ML-1

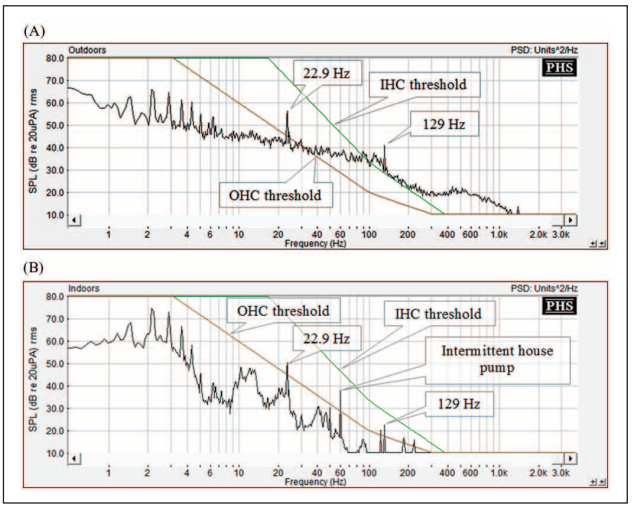

Figure 5. (A) Outdoor and (B) indoor NOTUS sound levels (averaged) versus outer hair cell (OHC) and inner hair cell (IHC) thresholds

The "stepped distance" data combined with the data at ML-1 show that the NOTUS noise level decreases with distance uniformly, as shown in Figure 8.

Two trend lines are included; the lower dashed line shows the dBA sound levels decreasing at a predictable 6 dB per distance doubling (6 dB/dd). The dBA trend line is faired through a wind speed of 8 m/s per the NOTUS specification wind speed. The upper dashed line is for unweighted sound levels, which was controlled by frequencies below 20 Hz. The unweighted sound levels decrease at about 3 dB/dd, which is representative of cylindrical spreading.

Noise levels at the study house showed that the indoor levels were more than 20 dBA quieter than outdoors. However, the unweighted dBL levels were several dB higher indoors than outdoors, indicating that the house was providing reinforcement (amplifying) of the very low frequencies.

House Noise Reduction

Measurements were made with the NOTUS "ON" with hub-height wind speeds averaging about 20 m/s. One-minute duration transfer function analysis measured the difference between outside and inside noise levels. The difference is shown by narrow band frequency (FFT) in Figure 9A, and by full-octave bands in Figure 9B.

The two graphs show the OILR by the two exterior master-bedroom walls and roof. Negative values indicate attenuation

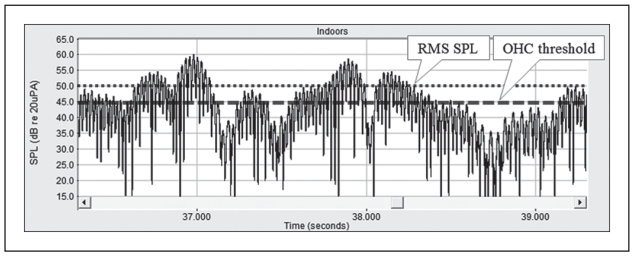

Figure 6. 22.9-Hz tone and OHC threshold
Note. OHC = outer hair cell; RMS = root mean square; SPL = sound pressure level.

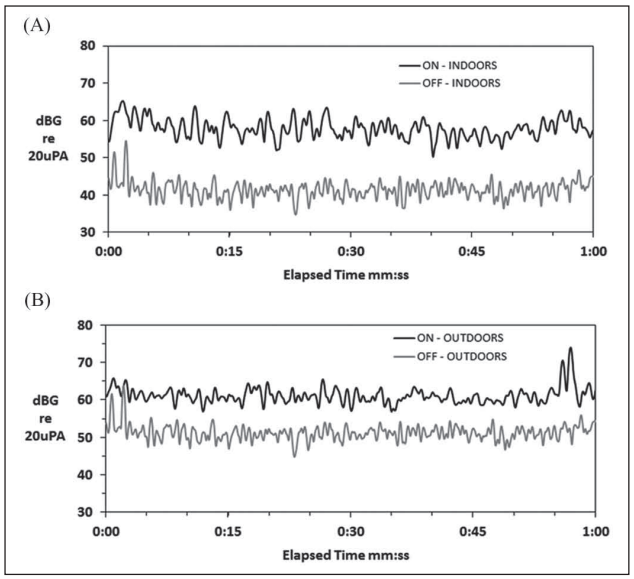

Figure 7. (A) Indoor and (B) outdoor dBG levels

and positive values show amplification. The graphs show high-frequency attenuation of 20 dB or more, about 15 dB in the 31.5-Hz octave band, and about 10 dB in the 8- and 16-Hz octave bands. The very low-frequency bands show amplification of about 3 and 8 dB in the 4- and 2-Hz bands, respectively.

Because of the house structure dramatically influencing interior very-low-frequency levels, the meter measurement units were changed from the log scale (dB) to a linear Pascal to expand the "*y*"-axis scale. The outdoor and indoor octave band Pascal levels are shown in Figure 10A and B, respectively. These are averaged levels and do not illustrate the dynamic amplitude modulation.

The difference between indoors and outdoors time history is shown in Figure 11. The outdoors graph shows the influence of higher frequencies that are not present indoors due to structure attenuation. Dynamic amplitude modulation is clearly visible.

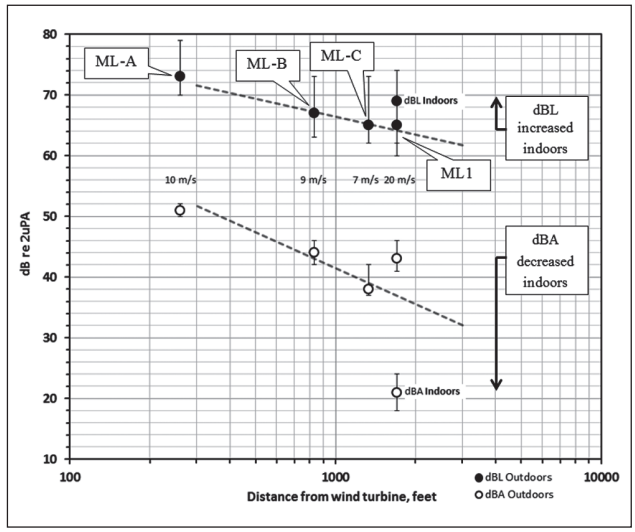

Figure 8. NOTUS root mean square (RMS) sound level versus distance

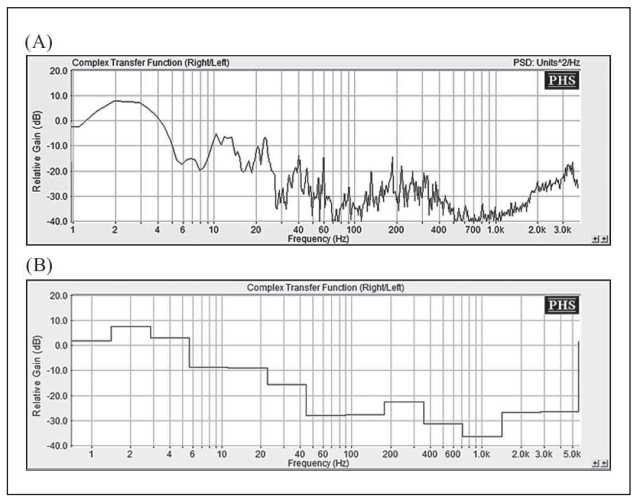

Figure 9. Outside-to-inside level reduction: (A) fast Fourier transform and (B) octave band

Acoustic Coupling

The comment "It's like living inside a drum" has been made by many neighbors living near IWT sites. These comments suggest that IWT low-frequency energy is being acoustically coupled into the interior space. Coherence analysis was used to determine the relationship between outdoor and indoor acoustic signals. Coherence values approaching 1.0 have a strong correlation and when less than 0.7 there is significantly less correlation. Figure 12 presents the coherence analysis results with the strong correlation, 0.7 to 1.0 highlighted.

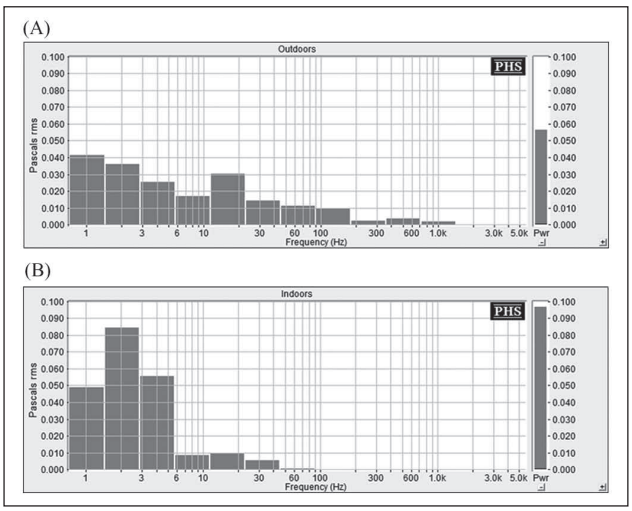

Figure 10. (A) Outdoor and (B) indoor sound pressure in Pascals

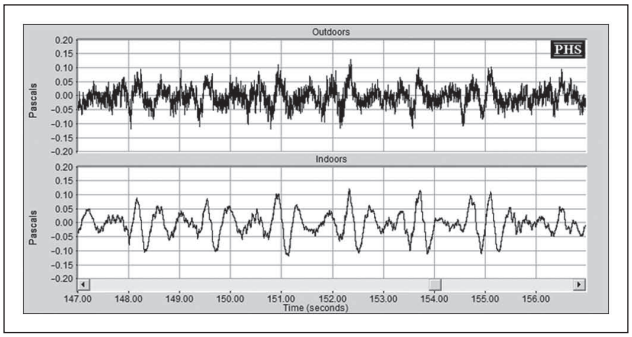

Figure 11. Pressure fluctuation time history in Pascal

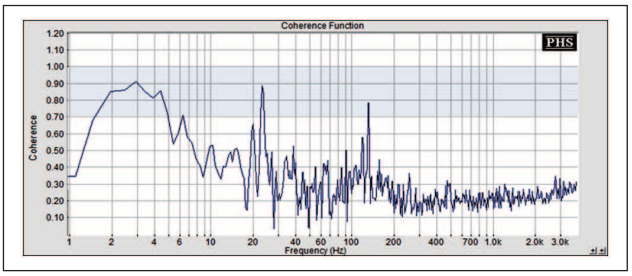

Figure 12. Coherence, outdoors to indoors

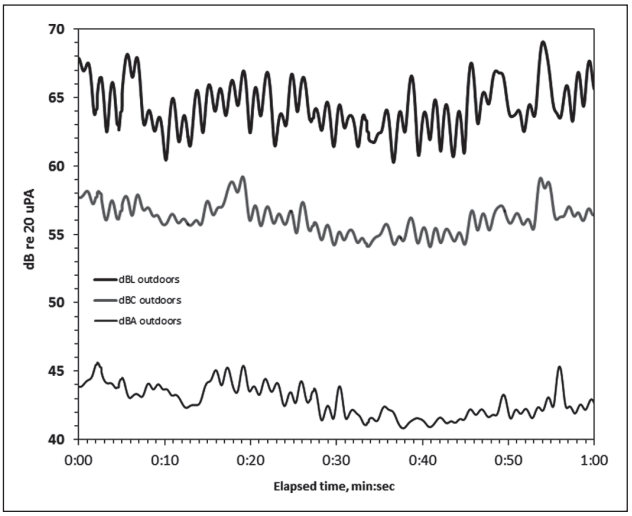

Figure 13. Outdoors sound levels: NOTUS "ON" (April 18, 2011)

The highlight banding shows which frequencies inside the house are judged to be directly coupled to the outside energy. High coherence was evident for the very low infrasonic frequencies and at 22.9 and 129 Hz.

Dynamic Amplitude Modulation Measurements

Wind turbine noise has a unique sound characteristic that distinguishes it from other man-made and environmental noise due to the strong dynamic amplitude modulation caused by the blades. Overall dBA, dBC, and dBL acoustic signatures were graphed as level versus time, as shown in Figure 13. The amplitude modulation was occasionally audible as indicated in the dBA time history. The dBL time history has higher amplitude modulations than dBA and dBC because there is no filter reduction for lower frequencies and, the strong amplitude modulations occurring at the blade pass frequency are revealed.

A comparison of the overall dBL indoors versus outdoors shows that the indoors levels are about 2 to 8 dB higher than outdoors, as shown in Figure 14. This graph also shows that the amplitude modulation increased in range indoors with rise and fall exceeding 10 dB per second.

The increase in the dBL levels and amplitude modulation indoors is consistent with and supports neighbors' comments that it is worse indoors than outdoors.

NOTUS "ON" and "OFF"

Outdoor measurements with NOTUS "ON" show stronger pulsation fluctuations than when NOTUS is "OFF," as shown in Figure 15.

Pressure Pulsation Exposure and Dose Response

It is generally accepted that human response and cumulative effect to intrusive noise exposure increases with number of peak noise events and peak level. This is consistent with the gradual onset over some 20 minutes of adverse health effects experienced by the investigators at ML-1 on the first day and the repeated onset of symptoms when returning to ML-1 during the survey.

For total unweighted sound exposure, the investigators were exposed to dynamically modulated pressure pulsations

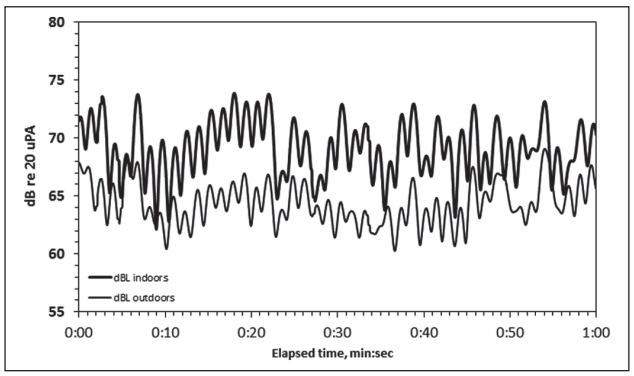

Figure 14. Acoustic pressure fluctuation time history (indoors versus outdoors; April 18, 2011, 3:22 p.m.)

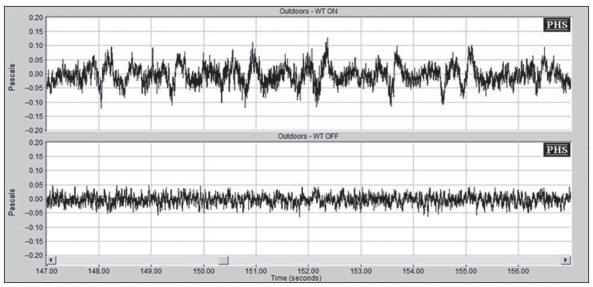

Figure 15. NOTUS "ON" and "OFF" sound pressure levels outdoors, ML-1

every 1.4 seconds (NOTUS blade pass rate) at the study house (Figure 15). After being indoors for 15 minutes, the pulsations totaled 642 peak pressure events. Every hour there were 2,570 pressure events. When the physiological effects were worst (at 5 hours exposure) the total exposure was 12,800 blade-pass peak pressure events. The time-history data suggest that over 50% of the peak pressure impacts exceeded the 60 dBG physiological OHC threshold (see *OHCs and IHCs* in the "Discussion" section).

The occurrence of pressure events at 22.9 Hz (Figure 6) is much higher. The acoustic pressure at 22.9 Hz dropped well below OHC threshold and then peaked over OHC threshold but not over the IHC threshold, at a rate of more than 82,000 per hour and more than 400,000 in 5 hours. If 50% of the 22.9-Hz pressure levels were detected by the OHC that would result in more than 200,000 stimulations to the OHCs in a 5-hour period.

Discussion

Human Detection Thresholds

Sound pressure is the small alternating deviation above and below atmospheric pressure due to the propagated wave of compression and rarefaction. The unit for sound

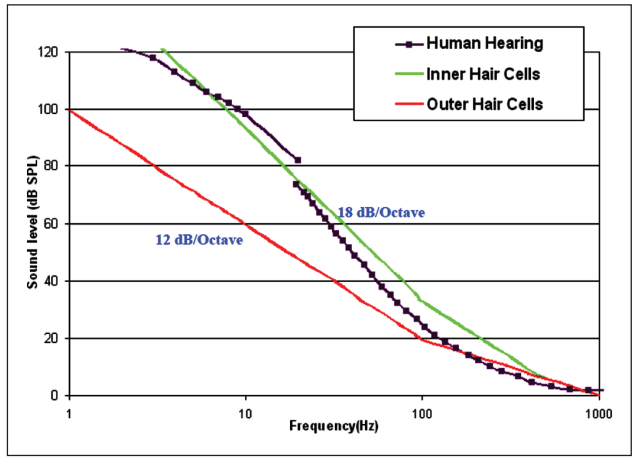

Figure 16. Human audibility curves

pressure is the Pascal (symbol: Pa). SPL or sound level is a logarithmic measure of the effective sound pressure of a sound relative to a reference value. It is measured in decibels (dB) above a standard reference level. The commonly used "zero" reference sound pressure in air is 20 μPa RMS, which is usually considered the median threshold of human hearing (at 1 kHz). Some 16% of the population is about 6 dB more sensitive than the median, and some 2% is 12 dB more sensitive. The percentage of people who are more sensitive who choose to live in quieter rural areas is unknown. That is, those living in quiet areas may have sensitivity shifted toward lower thresholds and self-select quieter areas.

Frequency is measured by the number of waves per second or Hertz (Hz). The average range of hearing is 20 to 20,000 Hz with the greatest sensitivity in 1,000 to 4,000 Hz range. At the most sensitive frequency around 4 kHz, the amplitude of motion of the eardrum is about 10 to 9 cm, which is only about 1/10 the diameter of a hydrogen atom. Thus, the ear is very sensitive, detecting signals in the range of atomic motion.

Outer Hair Cells and Inner Hair Cells

There are two types of hair cells in the cochlea where sound pressure is converted to nerve impulses; the IHCs and the OHCs. The IHCs are fluid connected and velocity sensitive, responding to minute changes in the acoustic pressure variations based on frequency, with sensitivity decreasing at a rate of −6 dB per downward octave. IHCs detect audible sounds and they are insensitive to low-frequency and infrasonic acoustic energy. In contrast, the OHCs are mechanically connected, or DC-coupled, to movements of the sensory structure and respond to infrasound stimuli at moderate levels, as much as 40 dB below IHC thresholds. The approximate threshold for physiological response by OHCs to infrasound is 60 dBG.

Figure 16 shows the IHC and OHC responses compared with ISO 2003 and Møller and Pedersen (2011) audibility measurements. Adapted with permission, from figure located at http://oto2.wustl.edu/cochlea/romesalt.pdf

OHC responses to infrasound are maximal when ambient sound levels are low. Furthermore, low-frequency sounds produce a biological amplitude modulation of nerve fiber responses to higher frequency stimuli. This is different from the amplitude modulation of sounds detected by a sound-level meter (Salt & Lichtenhan, 2011).

Adverse Health Effects

A 2011 Ontario Review Tribunal Decision found that wind turbines can harm humans if placed too close to residents stating,

> This case has successfully shown that the debate should not be simplified to one about whether wind turbines can cause harm to humans. The evidence presented to the Tribunal demonstrates that they can, if facilities are placed too close to residents. The debate has now evolved to one of degree. (*Erickson v. Director*, 2011)

Some individuals exposed to wind turbines report experiencing adverse health effects which include physiological and psychological symptoms as well as negative impacts on quality of life (Harry, 2007; Krogh, Gillis, Kouwen, & Aramini, 2011; Nissenbaum, Aramini, & Hanning, 2011; Phipps, Amati, McCoard, & Fisher, 2007; Shepherd, McBride, Welch, Dirks, & Hill, 2011; Thorne, 2011). In some cases the adverse effects are severe enough that some individuals have elected to abandon their homes. In other cases, homes of individuals reporting health effects have been purchased by the wind energy developer (Krogh, 2011). The World Health Organization's (1948) definition of health includes physical, mental, and social well-being. Adverse impacts associated with IWTs fall within the WHO definition of health.

Pierpont (2009) describes symptoms reported by individuals living near wind turbines. Symptoms include "sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, and panic episodes associated with sensations of internal pulsation or quivering when awake or asleep." G. Leventhall (2009) states,

> I am happy to accept these symptoms, as they have been known to me for many years as the symptoms of extreme psychological stress from environmental noise, particularly low frequency noise . . . what Pierpont describes is effects of annoyance by noise–a stress effect . . .

An expert panel review commissioned by the American Wind Energy Association and Canadian Wind Energy Association stated that these symptoms are not new and have been published previously in the context of "annoyance" to environmental sounds and are an example of the "well-known stress effects of exposure to noise" associated with noise annoyance (Colby et al., 2009).

Wind turbine sound is perceived to be more annoying than other equally loud sources of noise (Pedersen, Bakker, Bouma, & van den Berg, 2009). Higher levels of annoyance may be partly explained by wind turbine noise amplitude modulation, lack of night time abatement, and visual impacts. Wind turbine tonal and audible low-frequency sound are also plausible causes of wind turbine noise annoyance (Møller & Pedersen, 2011) and reported health effects (Minnesota Department of Health, 2009) and, may play an important part in the cause for adverse community reaction to large IWTs installed close to residences in quiet areas. Complaints associated with wind turbine low-frequency noise are often more prevalent indoors than outdoors. Recently there have been recommendations to address the impacts of wind turbine low-frequency noise (Howe Gastmeier Chapnik Limited, 2010; The Social and Economic Impact of Rural Wind Farms, 2011).

Wind turbine noise standards and most regulations are based on the averaged A-weighting metric which suppresses the amplitude of low-frequency noise predictions in modeling and application submittals. Averaged A-weighted sound-level measurements are unsatisfactory when individuals are annoyed by low-frequency sound and amplitude modulation (H. G. Leventhall, 2004; Richarz, Richarz, & Gambino, 2011). The A-weighting filter severely attenuates low-frequency signals (the primary frequency range of most community noise complaints) and essentially eliminates acoustic signals below 20 Hz where "infrasound" is located in the acoustic frequency spectrum.

Low-frequency vibration and its effects on humans are not well understood and sensitivity to such vibration resulting from wind turbine noise is highly variable among humans (National Research Council, 2007). Whether exposure to wind turbine infrasound can contribute to adverse effects in humans is a subject of considerable debate. There are aspects of infrasound from wind turbines that are not unanimously accepted by all technical and medical practitioners (Howe Gastmeier Chapnik Limited, 2010). Some discount wind turbine infrasound as a concern on the basis that levels are below the hearing threshold (Colby et al., 2009; G. Leventhall, 2006). It is noted that other noise sources can generate infrasonic energy, such as surf and thunderstorms. However, wind turbine low-frequency energy presents a recurring and/or unpredictable pressure signature, with audibility or delectability occurring over a much longer period of time than other environmental sources of low-frequency energy.

An audible or detectable acoustic or pressure signature is valuable for subsequent monitoring of system design and

correlating with complaints and exploring the plausibility that wind turbine low-level low-frequency energy could contribute to reported adverse health effects.

Infrasonic thresholds for human perception have been found to be lower than those previously estimated based on traditional sinusoidal hearing tests. There is evidence indicating that vestibular system does respond to sound we cannot hear (Salt & Hullar, 2010). Infrasound is understood by acousticians to refer inaudible acoustic energy for frequencies less than 20 Hz. There is increasing evidence that the OHC can detect nonsinusoidal pressure fluctuations at lower amplitudes than the IHC. Current research estimates that sound levels of 60 dBG for frequencies from 5 to 50 Hz can stimulate the OHC for the human ear (Salt & Kaltenbach, 2011).

Cochlear microphonic responses to infrasound recorded in endolymph of the third turn of the guinea pig cochlea are suppressed by the presence of higher frequency sounds. This suggests that the physiologic response to infrasound may be maximal when heard under quiet conditions, such as that may occur in a quiet bedroom in the vicinity of a wind turbine (Salt & Lichtenhan, 2011).

Sleep disturbance is one of the most common adverse health effects reported by neighbors living near IWTs (Hanning & Evans, 2012; Minnesota Department of Health, 2009). The investigators experienced sleep disturbance, especially during the second night when hub-height wind speeds were greater than 10 m/s. The indoor sound level was low at around 20 dBA and was below levels typically recommended to minimize sleep disturbance.

Sleep disturbance during this study was experienced by the investigators and reported by the home owners. A first assessment of the analyzed noise level data appears to show a stronger correlation with the 60-dBG threshold than it does with dBA-weighted sound levels. Recorded noise level analysis shows that NOTUS produces a strong 0.7-Hz blade-pass modulation and a strong 22.9-Hz tone sufficient to be detected by the OHC but remain inaudible.

Conclusions

Noise and Pressure Pulsations

This study revealed dynamically modulated low-frequency and infrasonic energy produced by NOTUS. The acoustic energy from NOTUS was found to be greater than and uniquely distinguishable from the ambient background levels without NOTUS operating. NOTUS produced dynamic infrasonic modulations that were not present when the wind turbine was off. NOTUS "ON" produced tonal energy at 22.9 and 129 Hz, which were found to be strongly coupled to the study house interior. Amplitude modulations below 10 Hz were amplified indoors, suggesting a whole house acoustic cavity response.

The dBG levels indoors were dynamically modulated at the blade-pass rate and tonal frequencies and exceeded the vestibular physiological threshold guideline of 60 dBG.

Adverse Health Effects

A dose-response relationship to peak pressure events detected by the OHC is supported by the gradual onset of adverse health symptoms while near the IWT. At SPLs associated with worsened health symptoms, NOTUS produced low-frequency pressure pulsations that could be detected by the ears' OHCs but not by the IHCs. Health effects moderated when dBG levels fell well below the 60-dBG guideline when the wind turbine was OFF, or when well away (several miles) from NOTUS.

The rapid onset of adverse health effects during the study confirms that wind turbines can harm humans if placed too close to residents. During the study, investigators without a preexisting sleep deprivation condition, not tied to the location nor invested in the property, experienced similar adverse health effects described and testified to by residents living near the wind turbines. Sound measurements acquired during the study indicate that A-weighted sound levels did not correlate to adverse health effects experienced. Adverse health effects experienced by investigators were more severe indoors where dBA levels were approximately 20 dBA lower than outdoors levels. The dBL (unweighted) and dBG (infrasonic-weighting) levels were higher and more strongly amplitude-modulated indoors compared to outdoors. The increase in amplitude modulation indoors was consistent with the stronger adverse health effects experienced indoors.

Wind turbine audible sound is perceived to be more annoying than equally loud transportation or other industrial noise and can be expected to contribute to stress-related health effects. Symptoms reported by some individuals exposed to IWTs can include sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, and panic episodes associated with sensations of internal pulsation or quivering when awake or asleep.

This acoustic study suggests that health effects reported by residents living near wind turbines may not be exclusively related to audible sounds. Inaudible amplitude modulated acoustic energy can be detected by the inner ear and can affect humans more at low ambient sound levels, consistent with complaints of worse conditions indoors than out near IWTs. The study results emphasize the need for epidemiological and laboratory research by health professionals and acousticians concerned with public health and well-being. These findings underscore the need for more effective and precautionary setback distances for IWTs. It appears prudent to include a margin of safety sufficient to prevent inaudible low-frequency wind turbine noise from adversely affecting humans.

Appendix

April 17, 2011

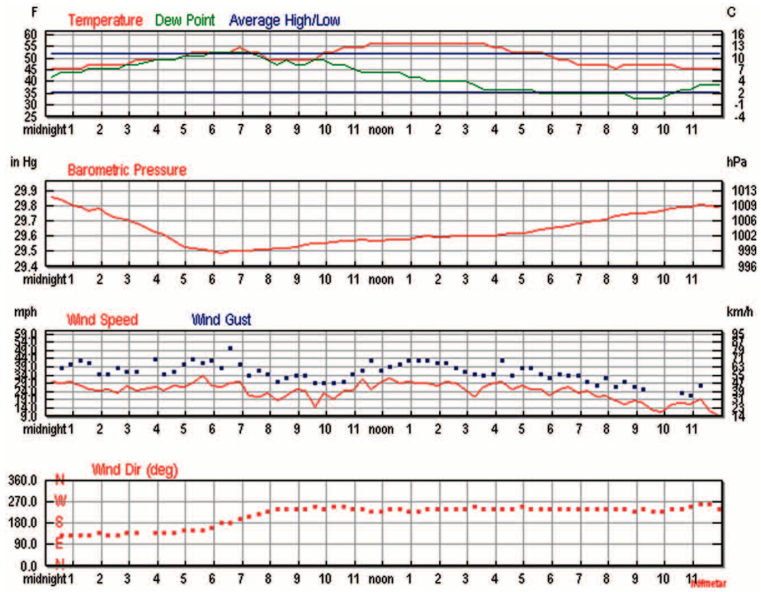

Figure 17. Day 1: Changeable weather with wind speeds 25 to 30 m/s at the hub, gusting to more than 35 m/s. Wind direction west–southwest. Barometer "low" and variable. Sunny and partly cloudy. Temperature 45°F to 50°F

April 18, 2011

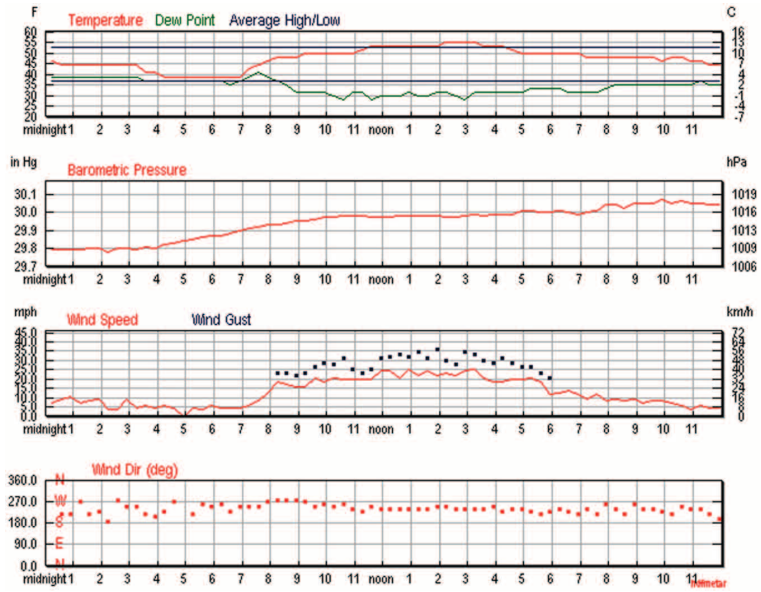

Figure 18. Day 2: Sunny with wind speeds 15 to 20 m/s at the hub, gusting to 25 to 30 m/s. Wind direction west–southwest. Barometer "low" and rising during the day. Temperature 45°F to 50°F

Appendix (continued)

April 19, 2011

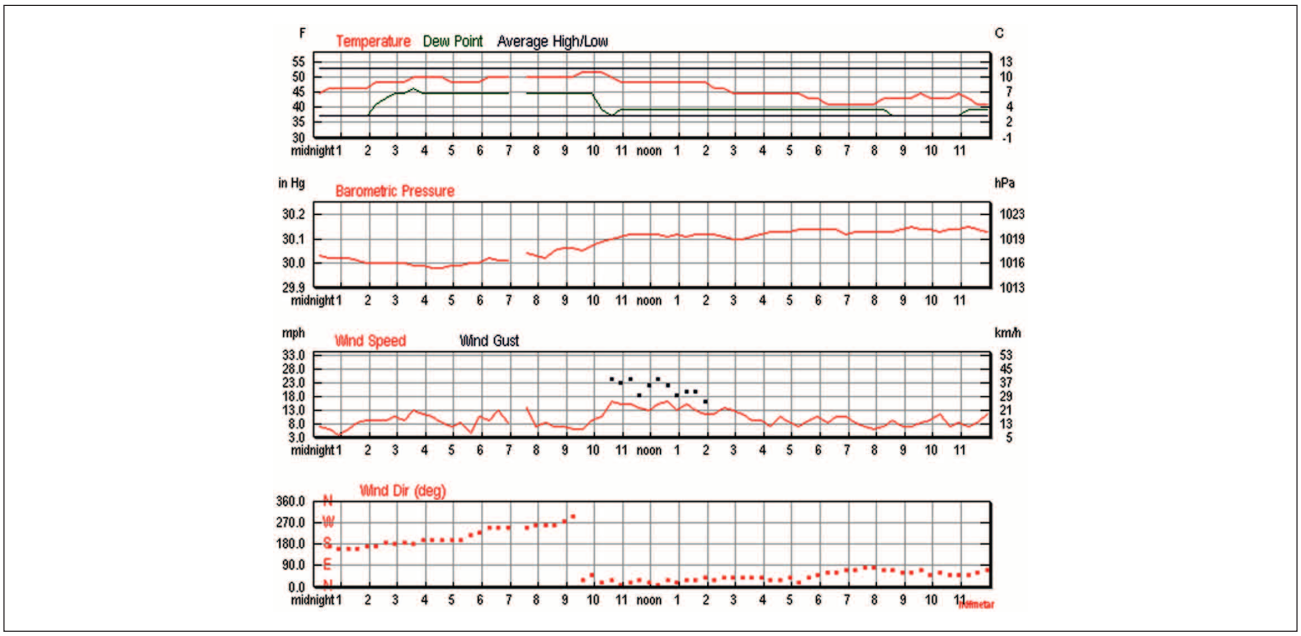

Figure 19. Day 3: Winds stopped in morning and the field study concluded at 9:30 a.m.

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Bios

Stephen E. Ambrose has more than 35 years of experience in industrial noise control. Board Certified and Member INCE since 1978, he runs a small business providing cost-effective environmental noise consulting services for industrial and commercial businesses, municipal and state governments, and private citizens.

Robert W. Rand has more than 30 years of experience in industrial noise control, environmental sound and general acoustics. A Member INCE since 1993, he runs a small business providing consulting, investigator, and design services in acoustics.

Carmen M. E. Krogh, BScPharm, provided research and reference support. She is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was former Director of Publications and Editor-in-Chief of the *Compendium of Pharmaceutical and Specialties (CPS)*, the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

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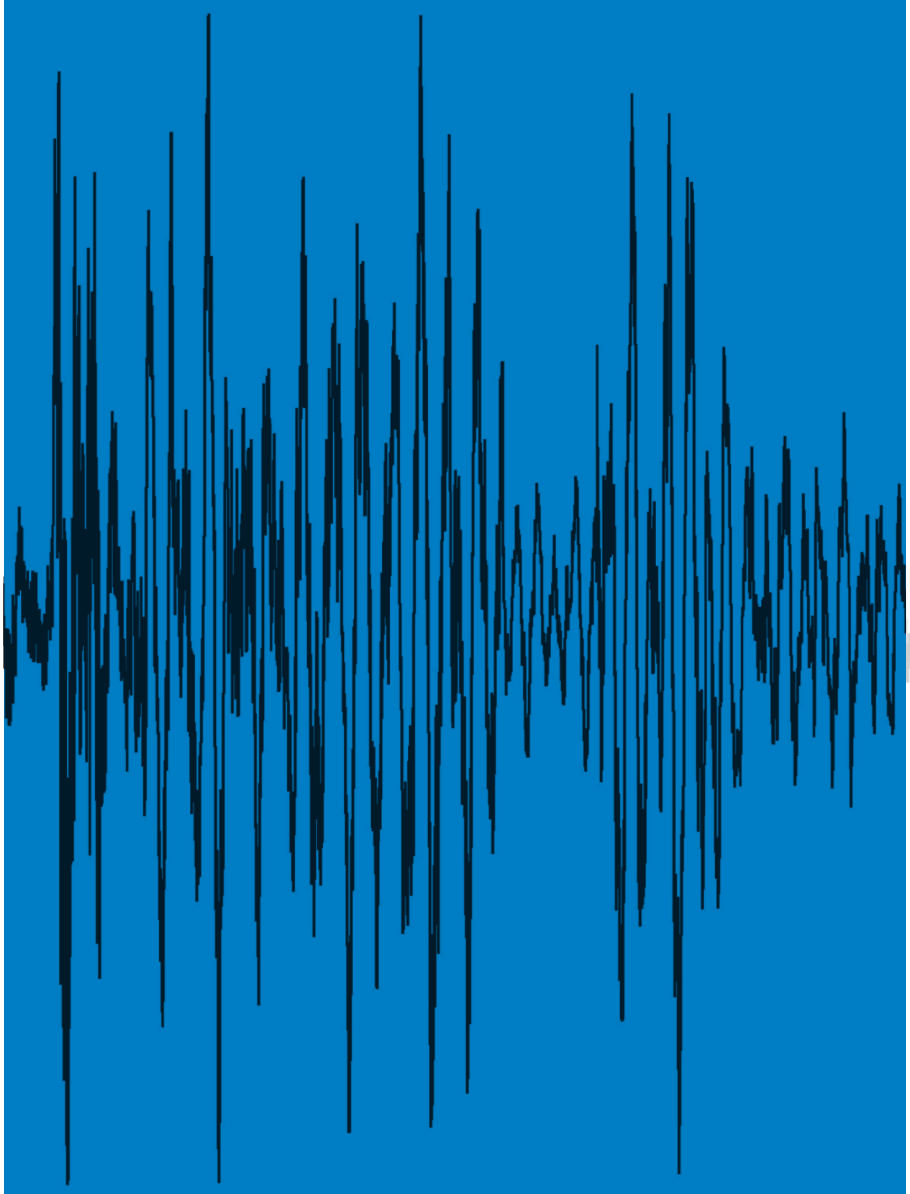

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Effects of industrial wind turbine noise on sleep and health

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Abstract

Industrial wind turbines (IWTs) are a new source of noise in previously quiet rural environments. Environmental noise is a public health concern, of which sleep disruption is a major factor. To compare sleep and general health outcomes between participants living close to IWTs and those living further away from them, participants living between 375 and 1400 m (n = 38) and 3.3 and 6.6 km (n = 41) from IWTs were enrolled in a stratified cross-sectional study involving two rural sites. Validated questionnaires were used to collect information on sleep quality (Pittsburgh Sleep Quality Index — PSQI), daytime sleepiness (Epworth Sleepiness Score — ESS), and general health (SF36v2), together with psychiatric disorders, attitude, and demographics. Descriptive and multivariate analyses were performed to investigate the effect of the main exposure variable of interest (distance to the nearest IWT) on various health outcome measures. Participants living within 1.4 km of an IWT had worse sleep, were sleepier during the day, and had worse SF36 Mental Component Scores compared to those living further than 1.4 km away. Significant dose-response relationships between PSQI, ESS, SF36 Mental Component Score, and log-distance to the nearest IWT were identified after controlling for gender, age, and household clustering. The adverse event reports of sleep disturbance and ill health by those living close to IWTs are supported.

Keywords: Health, industrial wind turbines, noise, sleep

Introduction

Environmental noise is emerging as one of the major public health concerns of the twenty-first century.[1] The drive to 'renewable', low-carbon energy sources, has resulted in Industrial Wind Turbines (IWTs) being sited closer to homes in traditionally quiet rural areas to reduce transmission losses and costs. Increasing numbers of complaints about sleep disturbance and adverse health effects have been documented,[2-4] while industry and government reviews have argued that the effects are trivial and that current guidance is adequate to protect the residents.[5,6] We undertook an epidemiological study to investigate the relationship between the reported adverse health effects and IWTs among residents of two rural communities.

Methods

General study design

This investigation is a stratified cross-sectional study involving two sites: Mars Hill and Vinalhaven, Maine, USA. A questionnaire was offered to all residents meeting the participant-inclusion criteria and living within 1.5 km of an industrial wind turbine (IWT) and to a random sample of residents, meeting participant inclusion criteria, living 3 to 7 km from an IWT between March and July of 2010. The protocol was reviewed and approved by Institutional Review Board Services, of Aurora, Ontario, Canada.

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	DOI: 10.4103/1463-1741.102961
	PubMed ID: ***

Questionnaire development

Adverse event reports were reviewed, together with the results of a smaller pilot survey of Mars Hill residents. A questionnaire was developed, which comprised of validated instruments relating to mental and physical health (SF-36v2)[7] and sleep disturbance ((Pittsburgh Sleep Quality Index (PSQI)[8] and the Epworth Sleepiness Scale (ESS)[9]). In addition, participants were asked before-and-after IWT questions about sleep quality and insomnia, attitude toward IWTs, and psychiatric disorders. A PSQI score > 5 was taken to indicate poor sleep and an ESS score > 10 was taken to indicate clinically relevant daytime sleepiness.[1-4] Responses to functional and attitudinal questions were graded on a five-point Likert scale with 1 representing the least effect and 5 the greatest. The questionnaire is available on request.

Study sites and participant selection

The Mars Hill site is a linear arrangement of 28 General Electric 1.5 megawatt turbines, sited on a ridgeline. The Vinalhaven site is a cluster of three similar turbines sited on

a low-lying, tree-covered island. All residents living within 1.5 km of an IWT, at each site, were identified via tax maps, and approached either door-to-door or via telephone and asked to participate in the study (near group). Homes were visited thrice or until contact was made. Those below the age of 18 or with a diagnosed cognitive disorder were excluded. A random sample of households in similar socioeconomic areas, 3 to 7 km away from IWTs at each site, were chosen to participate in the study to allow for comparison (far group). The households were approached sequentially until a similar number of participants were enrolled. A nurse practitioner supervised the distribution and ensured completion of the questionnaires.

Simultaneous collection of sound levels during data collection at the participants' residences was not possible, but measured IWT sound levels at various distances, at both sites, were obtained from publically available sources. At the Mars Hill site, a four quarter study was conducted and data from all four seasons were reported by power outputs at several key measurement points. The measurement points were located on or near residential parcels. The predicted and measured levels at full power were derived from figures in the Sound Level Study, Compilation of Ambient and Quarterly Operations Sound Testing, and the Maine Department of Environmental Protection Order No. L-21635-26-A-N. Measured noise levels versus distance at Vinalhaven were taken over a single day in February 2010, with the turbines operating at less than full power in moderate-to-variable northwest winds aloft (R and R, personal communication, 2011). Table 1 shows the estimated and measured noise levels at locations of varying distances and directions from the turbines at Mars Hill and Vinalhaven.

Table 1: Measured and predicted noise levels at Mars Hill and Vinalhaven

Mars hill			
Distance to nearestturbine (m)[1]	Predicted max. LAeq 1 hr[1]	Measured noise LAeq 1 hr[1]	
		Average	Range
244	51	52	50 – 57
320	48	50	48 – 53
366	47	49	47 – 52
640	42	44	40 – 47
762	41	43	41 – 46
1037	39	41	39 – 45
1799	35	37	32 – 43
Vinalhaven			
Distance to nearest turbine (m)[2]	Measured Noise LAeq[2]		
	Trend Average	Range	
152	53	51 – 61	
366	46	38 – 49	
595	41	39 – 49	
869	38	32 – 41	
1082	36	34 – 43	

[1] Values read or derived from report figures; accuracy + /- 50 m and + /- 1 Db [2] Values obtained with wind turbine noise dominating the acoustical environment, two-minute measurements during moderate-to-variable northwest winds aloft (less than full power)

Data handling and validation

The Principal Investigator (Michael Nissenbaum, MD) did not handle data at any point in the collection or analysis phase. Questionnaire results were coded and entered into a spreadsheet (Microsoft Excel 2007). Each questionnaire generated over 200 data elements. The distance from each participant's residence to the nearest IWT was measured using satellite maps. The SF36-V2 responses were processed using Quality Metric Health Outcomes™ Scoring Software 3.0 to generate Mental (MCS) and Physical (PCS) Component Scores.

Data quality of the SF36-V2 responses was determined using QualityMetric Health Outcomes™ Scoring Software 3.0. All SF36-V2 data quality indicators (completeness, response range, consistency, estimable scale scores, internal consistency, discriminant validity, and reliable scales) exceeded the parameter norms. SF 36-V2 missing values were automatically accommodated by the scoring systems (99.9% questions were completed). No missing values were present for other parameters (ESS, PSQI, psychiatric and attitudinal observations, and demographics).

Statistical analysis

All analyses were performed using SAS 9.22.[10] Descriptive and multivariate analyses were performed to investigate the effect of the main exposure variable of interest (distance to the nearest IWT) on the various outcome measures. Independent variables assessed included the following: Site (Mars Hill, Vinalhaven); Distance to IWT (both as a categorical and continuous variable); Age (continuous variable); Gender (categorical variable). The dependent variables assessed included the following: Summary variables — Epworth Sleepiness Scale (ESS), Pittsburgh Sleep Quality Index (PSQI), SF36-V2 Mental Component Score (MCS), SF36-V2 Physical Component Score (PCS); Before and after parameters — sleep, psychiatric disorders (both self-assessed and diagnosed by a physician), attitude toward IWTs; and Medication use (both over-the-counter and prescription drugs). A P value of < 0.05 was regarded as being statistically significant.

Results

Study participants

Thirty-three and 32 adults were identified as living within 1500 m of the nearest IWT at the Mars Hill (mean 805 m, range 390 – 1400) and Vinalhaven sites (mean 771 m range 375 – 1000), respectively. Twenty-three and 15 adults at the Mars Hill and Vinalhaven sites respectively, completed the questionnaires. Recruitment of participants into the far group continued until there were similar numbers as in the near group, 25 and 16 for Mars Hill and Vinalhaven, respectively [Table 2].

Statistical results

The binomial outcomes were assessed using either the GENMOD procedure with binomial distribution and a logit link; or when cell frequencies were small (< 5), Fisher's Exact Test. When assessing the significance between variables with a simple score outcome (e.g., 1 – 5), the exact Wilcoxon Score (Rank Sums) test was employed using the NPAR1WAY procedure. Continuous outcome variables were assessed using the GENMOD procedure with normal distribution. When using the GENMOD procedure, age, gender, and site were forced into the model as fixed effects. The potential effect of household clustering on statistical significance was accommodated by using the REPEATED statement. Effect of site as an effect modifier was assessed by evaluating the interaction term (Site*Distance).

Participants living near IWTs had worse sleep, as evidenced by significantly greater mean PSQI and ESS scores [Table 3]. More participants in the near group had PSQI > 5 (P = 0.0745) and ESS scores > 10 (P = 0.1313), but the differences did not reach statistical significance. Participants living near IWTs were significantly more likely to report an improvement in sleep quality when sleeping away from home.

Table 2: Demographic data of Mars Hill and Vinalhaven study participants

	Distance (m) from residence to nearest IWT (mean)			
Parameter	375 – 750 (601)	751 – 1400 (964)	3300 – 5000 (4181)	5300 – 6600 (5800)
Sample size	18	20	14	27
Household clusters	11	12	10	23
Mean age	50	57	65	58
Male / Female	10 / 8	12 / 8	7 / 7	11 / 16
Mean time in home[1]	14	21	30	24

[1] Years that study participants lived in the home

The near group had worse mental health as evidenced by significantly higher mean SF36 MCS (P = 0.0021) [Table 3]. There was no statistically significant difference in PCS (P = 0.9881). Nine participants in the near group reported that they had been diagnosed with either depression or anxiety since the start of turbine operations, compared to none in the far group. Nine of the 38 participants in the near group reported that they had been prescribed new psychotropic medications since the start of turbine operations compared with three of 41 in the far group (P = 0.06).

The ESS, PSQI, and SF36 scores were modeled against distance from the nearest IWT (Score = ln (distance) + gender + age + site [controlled for household clustering]), and the results are shown in Figures 1–3. In all cases, there were clear and significant dose-response relationships (P < 0.05), with the effect diminishing with increasing log-distance from IWTs. Log-distance fit the health outcomes better than distance. This was expected given that noise drops off as the log of distance. Measured sound levels were plotted against distance at the two sites on Figures 1-3.

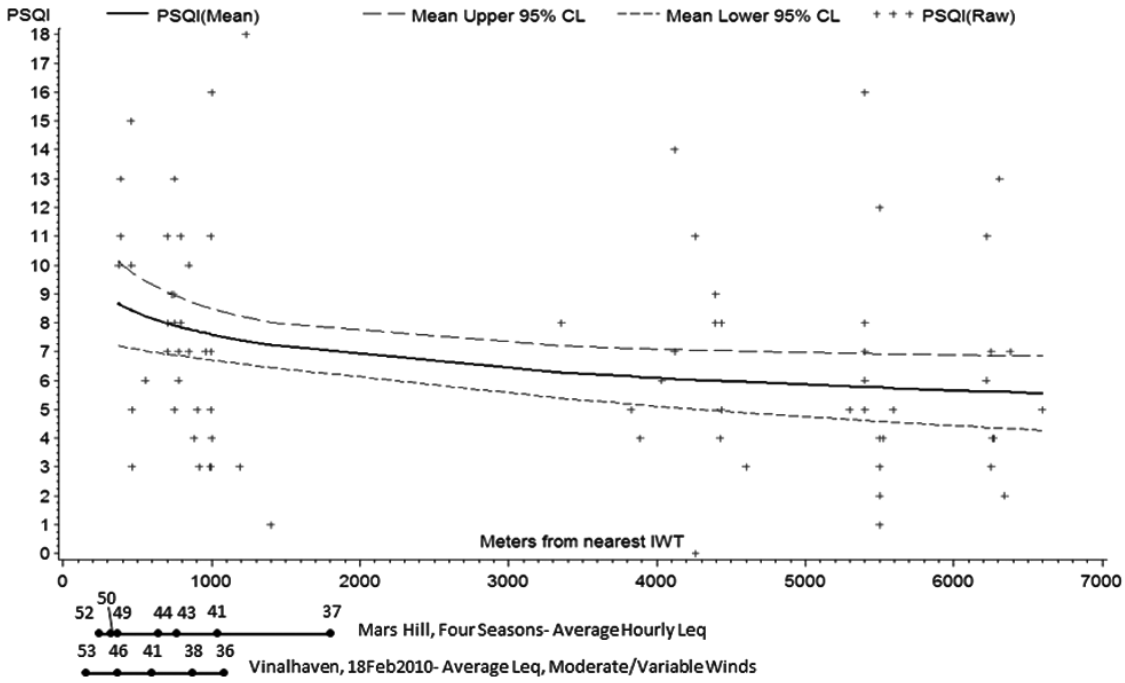

Figure 1: Modeled Pittsburgh Sleep Quality Index (PSQI) versus distance to nearest IWT (mean and 95% confidence limits) Regression equation: PSQI = ln (distance) + sex + age + site [controlled for household clustering]. Ln (distance) *p*-value = 0.0198

Table 3: Sleep and mental health outcomes of the study participants grouped by distance from the nearest IWT

	Distance (m) from residence to nearest IWT (mean)						
Parameter	375-750 (601)	751-1400 (964)	375-1400 (792)	3300-5000 (4181)	5300-6600 (5800)	3000-6600 (5248)	P-Value[1]
Mean PSQI[2]	8.7	7.0	7.8	6.6	5.6	6.0)	0.0461
% PSQI score > 5[3]	77.8	55.0	65.8	57.1	37.0	43.9	0.0745
Mean ESS[4]	7.2	8.4	7.8	6.4	5.3	5.7	0.0322
% with ESS score > 10[5]	16.7	30.0	23.7	14.3	7.4	9.8	0.1313
Mean worsening sleep score post IWTs[6]	3.2	3.1	3.1	1.2	1.4	1.3	< .0001
Improved sleep when away from IWTs	9 / 14	5 / 14	14 / 28	1 / 11	1 / 23	2 / 34	< .0001
% New sleep medications post IWTs	11.1	15.0	13.2	7.1	7.4	7.3	0.4711
New diagnoses of insomnia			2			0	
Mean SF36 MCS	40.7	43.1	42.0	50.7	54.1	52.9	0.0021
% Wishing to move away post IWTs	77.8	70.0	73.7	0.0	0.0	0.0	< .0001

[1] Testing difference of 375 – 1400 m group with 3000 – 6600 m group [2] Pittsburgh Sleep Quality Index [3] PSQI > 5 is considered a 'poor sleeper' [4] Epworth Sleepiness Scale [5] About 10 – 20 percent of the general population has ESS scores > 10 [6] (New sleep problems + Worsening sleep problem)/2; Strongly Agree (5) - Strongly disagree (1)

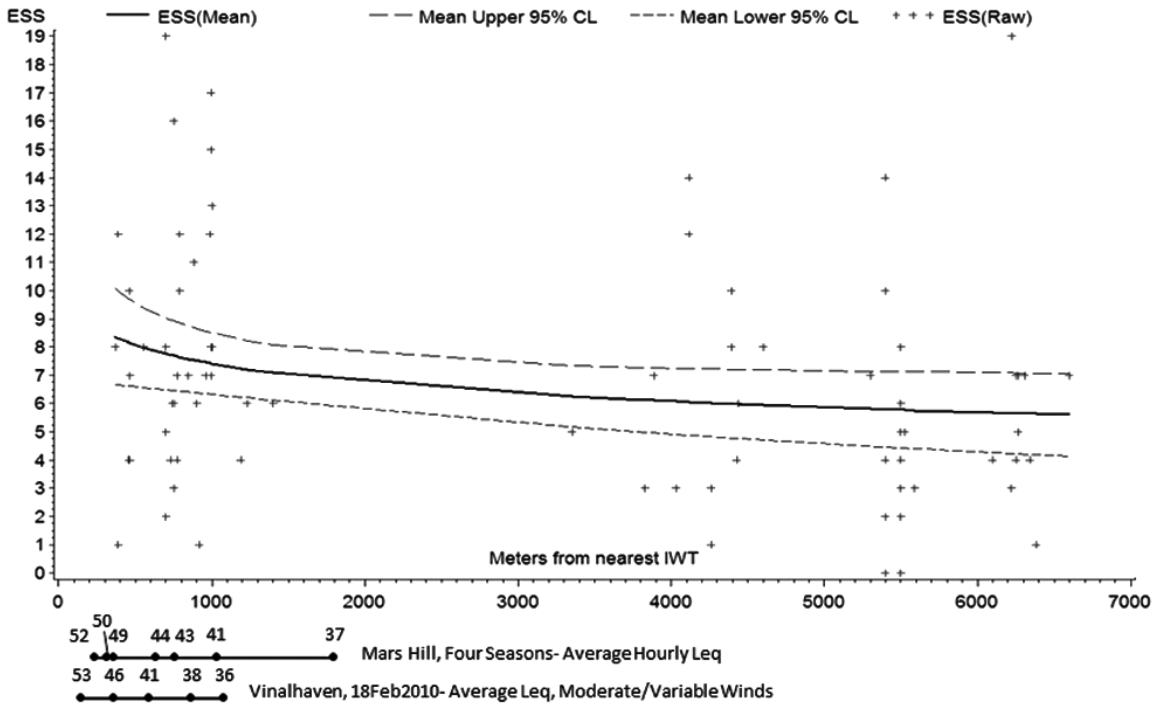

Figure 2: Modeled Epworth Sleepiness Scale (ESS) versus Distance to nearest IWT (mean and 95% confidence limits) Regression equation: ESS = ln (distance) + sex + age + site [controlled for household clustering)]. ln (distance) p-value = 0.0331

There were no statistically significant differences between the near and far groups with respect to age, gender, or duration of occupation. In addition, Site, and Site*Distance were not significant, indicating that the modeled exposure-outcome relationships were similar across both sites.

Discussion

This study supports the conclusions of previous studies, which demonstrate a relationship between proximity to IWTs and the general adverse effect of 'annoyance',[11-13] but differs in demonstrating clear dose-response relationships in important clinical indicators of health including sleep quality, daytime sleepiness, and mental health. The levels of sleep disruption and the daytime consequences of increased sleepiness, together with the impairment of mental health and the dose-response relationships observed in this study (distance from IWT vs. effect) strongly suggest that the noise from IWTs results in similar health impacts as other causes of excessive environmental noise[1].

The degree of effect on sleep and health from IWT noise seems to be greater than that of other sources of

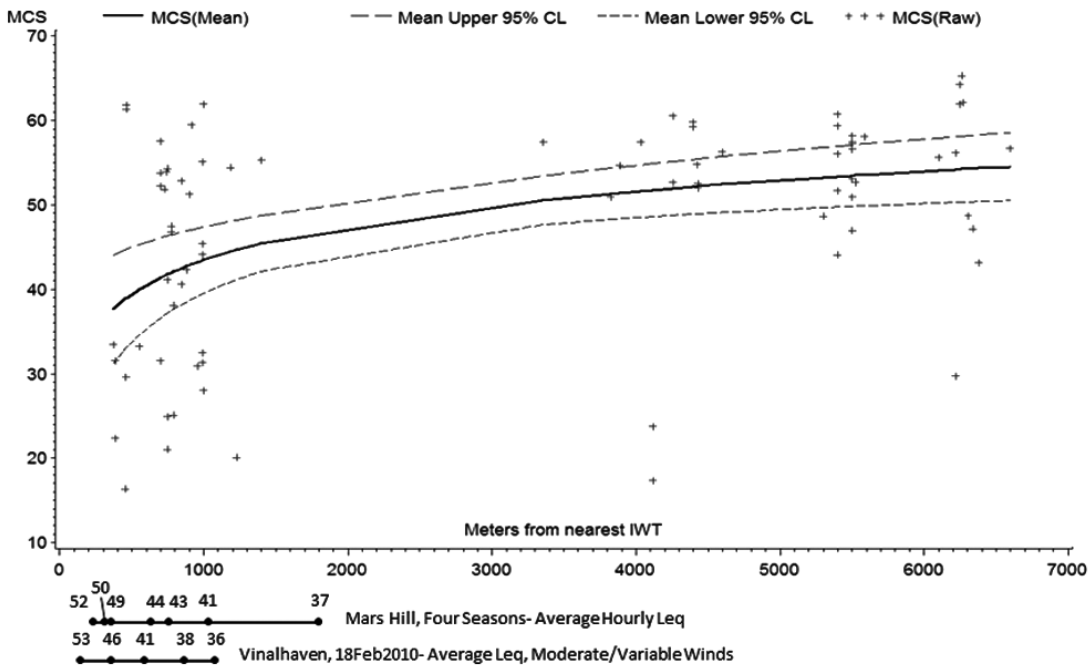

Figure 3: Modeled SF36 Mental Component Score (MCS) versus Distance to nearest IWT (mean and 95% confidence limits) Regression equation: MCS = ln (distance) + sex + age + site [controlled for household clustering]. ln (distance) p-value = 0.0014

environmental noise, such as, road, rail, and aircraft noise. Bray and James have argued that the commonly used noise metric of LAeq (averaged noise level adjusted to human hearing) is not appropriate for IWT noise, which contains relatively high levels of low frequency sound (LFN) and infrasound with impulsive characteristics.[14] This has led to an underestimation of the potential for adverse health effects of IWTs.

Potential biases

Reporting and selection biases in this study, if they existed, may have underestimated the strength of the association between distance to IWTs and health outcomes. Both Mars Hill and Vinalhaven residents gain financially from the wind projects, either through reduced electricity costs and / or increased tax revenues. The fear of reducing property values was also cited as a reason for downplaying the adverse health effects. Conversely, the possibility of legal action could result in symptoms being over stated. It was clear to the respondents that the questionnaire was directed at investigating adverse health effects potentially associated with IWT noise and no distractor questions were included. Nevertheless, given the large differences in reported adverse health effects between participants living within 1400 m and those living beyond 3300 m of an IWT, we do not believe that bias alone could have resulted in the differences demonstrated between the groups. In addition, the finding of strong dose-response relationships with log-distance, together with extensive sub-analyses using survey questions more and less likely to be influenced by bias demonstrating similar results, further support the existence of causative associations.

Visual impact and attitude are known to affect the psychological response to environmental noise.[11,15,16] At both sites, turbines are prominent features of the landscape and were visible to a majority of respondents; at Mars Hill, IWTs are sited along a 200 m high ridge, and Vinalhaven is a flat island. The visual impact on those living closest to turbines was arguably greater than on those living some distance away. Most residents welcomed the installation of IWTs for their proposed financial benefits and their attitudes only changed once they began to operate and the noise and health effects became apparent. Pedersen estimates that, with respect to annoyance, 41% of the observed effects of IWT noise could be attributed to attitude and visual impact.[11] The influence of these factors on other consequences, such as the health effects investigated in this study, remains to be determined. Even as these factors may have contributed to the reported effects, they are clearly not the sole mechanism and health effects are certain.

Mechanisms

A possible mechanism for the observed health effects is an effect on sleep from the noise emitted by IWTs. Industrial wind turbines emit high levels of noise with a major low frequency component. The noise is impulsive in nature and variously described as 'swooshing' or 'thumping'.[12] The character, volume, and frequency of the noise vary

with changes in wind speed and direction. Industrial wind turbine noise is more annoying than road, rail, and aircraft noise, for the same sound pressure, presumably due to its impulsive character.[12,15] Pedersen concludes that it is noise that prevents restoration, that those subjected to it are unable to find psychological recovery in their homes because of its intrusive nature.[16] Noise can affect sleep by preventing sleep onset or return to sleep following spontaneous or induced awakening. Clearly, attitude and psychological factors such as noise sensitivity may be important in influencing the ability to fall asleep, but it should be noted that noise sensitivity is, in part, heritable.[17] Noise also affects sleep by inducing arousals, which fragment sleep, reducing its quality and leading to the same consequences as sleep deprivation.[18] There is good evidence that road, rail, and aircraft noise induce arousals and lead to daytime consequences and there is no reason to suppose that IWT noise will not have a similar effect.[19-23] A recent study on the likelihood of different hospital noises that induce an arousal shows a considerable effect of sound character, with impulsive noises being more likely to induce an arousal.[24] It has also been shown that there is individual variability in the likelihood of an arousal in response to noise, which may be predicted from a spindle index, a measure of sleep quality.[25]

ESS assesses daytime sleepiness from the self-assessed propensity to fall asleep in different situations averaged over several weeks.[9] It is widely used in sleep medicine to assess daytime sleepiness, and scores in excess of 10 are deemed to represent clinically relevant excessive daytime sleepiness. If sleep is only disrupted occasionally, the ESS will not be affected, as the sleep deficit can be compensated on other nights. Changes in the ESS score observed in this study imply that sleep has been disrupted to a degree where compensation is not possible in at least some participants. PSQI also examines the sleep quality averaged over a period of weeks, scores in excess of 5 are deemed to represent poor quality sleep.[8] An individual's score will not be significantly affected by occasional disrupted nights, thus confirming the conclusions drawn from the ESS data. It is noteworthy also that significant changes in ESS and PSQI have been observed, despite the scatter in values indicative of the typical levels of impaired sleep found in the general population.[8,9]

Other mechanisms than sleep disruption cannot be excluded as an explanation for the psychological and other changes observed. Low frequency noise, and in particular, impulsive LFN, has been shown to be contributory to the symptoms of 'Sick Building Syndrome,' which has similarities with those reported here.[26,27] Salt has recently proposed a mechanism, whereby, infrasound from IWTs could affect the cochlear and cause many of the symptoms described.[28]

We assessed causality using a well-accepted framework.[29] Although the measured parameters (ESS, PSQI, and SF36) assess the current status, the evidence of the respondents is that the reported changes have followed the commencement of IWT operation. This is supported by the reported preferences of the residents; the great majority of those living within 1.4 km expressed their desire to move away as a result of the start of turbine operations. However, a study of the same population before and after turbine operation will be necessary to confirm our supposition. We believe that there is good evidence that a time sequence has been established. The association between distance to IWT and health outcome is both statistically significant and clinically relevant for the health outcomes assessed, suggesting a specific association between the factors. Given that this is the first study investigating the association between IWTs and a range of health outcomes, the consistency and replication to prove causation is limited. However, this study includes two different study populations living next to two different IWT projects. Despite these differences, the study site was not a significant effect modifier among any of the measured outcomes. In addition, adverse health effects similar to those identified in this study among those living near IWTs, have been documented in a number of case-series studies and surveys.[2-4,30] Finally, causal association can be judged by its coherence with other known facts about the health outcomes and the causal factor under study. The results of this study are consistent with the known effects of other sources of environmental noise on sleep.

The data on measured and estimated noise levels were not adequate to construct a dose-response curve and to determine an external noise level below which sleep disturbance will not occur. However, it is apparent that this value will be less than an average hourly LAeq of 40 dBA, which is the typical night time value permitted under the current guidance in most jurisdictions.

Conclusions

We conclude that the noise emissions of IWTs disturbed the sleep and caused daytime sleepiness and impaired mental health in residents living within 1.4 km of the two IWT installations studied. Industrial wind turbine noise is a further source of environmental noise, with the potential to harm human health. Current regulations seem to be insufficient to adequately protect the human population living close to IWTs. Our research suggests that adverse effects are observed at distances even beyond 1 km. Further research is needed to determine at what distances risks become negligable, as well as to better estimate the portion of the population suffering from adverse effects at a given distance.

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Announcement

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The journal issue has a unique new feature for reaching to the journal's website without typing a single letter. Each article on its first page has a "Quick Response Code". Using any mobile or other hand-held device with camera and GPRS/other internet source, one can reach to the full text of that particular article on the journal's website. Start a QR-code reading software (see list of free applications from http://tinyurl.com/yzlh2tc) and point the camera to the QR-code printed in the journal. It will automatically take you to the HTML full text of that article. One can also use a desktop or laptop with web camera for similar functionality. See http://tinyurl.com/2bw7fn3 or http://tinyurl.com/3ysr3me for the free applications.

Industrial Wind Turbines and Health:
Wind Turbines Can Harm Humans if too close to Residents [1]

A summary of some peer reviewed and conference articles, their abstracts and citations, regarding adverse health effects and wind turbines [2]

Compiled November 1, 2012

Wind Turbine Acoustic Investigation: Infrasound and Low-Frequency Noise--A Case Study

Stephen E. Ambrose, Robert W. Rand and Carmen M. E. Krogh

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http://bst.sagepub.com/content/early/2012/07/30/0270467612455734

Bio: Stephen E. Ambrose has more than 35 years of experience in industrial noise control. Board Certified and Member INCE since 1978, he runs a small business providing cost-effective environmental noise consulting services for industrial and commercial businesses, municipal and state governments, and private citizens.

Bio: Robert W. Rand has more than 30 years of experience in industrial noise control, environmental sound and general acoustics. A Member INCE since 1993, he runs a small business providing consulting, investigator, and design services in acoustics.

Bio: Carmen M. E. Krogh, BScPharm, provided research and reference support. She is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was former Director of Publications and Editor-in-Chief of the Compendium of Pharmaceutical and Specialties (CPS), the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

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[1] Excerpted from Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Environmental Review Tribunal, Decision, p 207 "This case has successfully shown that the debate should not be simplified to one about whether wind turbines can cause harm to humans. The evidence presented to the Tribunal demonstrates that they can, if facilities are placed too close to residents. The debate has now evolved to one of degree."

[2] This summary focuses on published literature 2010 to March 2012 associated with risks to health. References are not intended to be exhaustive.

Abstract
Wind turbines produce sound that is capable of disturbing local residents and is reported to cause annoyance, sleep disturbance, and other health-related impacts. An acoustical study was conducted to investigate the presence of infrasonic and low-frequency noise emissions from wind turbines located in Falmouth, Massachusetts, USA. During the study, the investigating acousticians experienced adverse health effects consistent with those reported by some Falmouth residents. The authors conclude that wind turbine acoustic energy was found to be greater than or uniquely distinguishable from the ambient background levels and capable of exceeding human detection thresholds. The authors emphasize the need for epidemiological and laboratory research by health professionals and acousticians concerned with public health and well-being to develop effective and precautionary setback distances for industrial wind turbines that protect residents from wind turbine sound.

Falmouth, Massachusetts wind turbine infrasound and low frequency noise measurements

Stephen E. Ambrose, Robert W. Rand and Carmen M. E. Krogh

Invited paper presented at Inter-noise 2012m New York City, NY

Bio: Stephen E. Ambrose has more than 35 years of experience in industrial noise control. Board Certified and Member INCE since 1978, he runs a small business providing cost-effective environmental noise consulting services for industrial and commercial businesses, municipal and state governments, and private citizens.

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Bio: Carmen M. E. Krogh, BScPharm, provided research and reference support. She is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was former Director of Publications and Editor-in-Chief of the Compendium of Pharmaceutical and Specialties (CPS), the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

Abstract
Falmouth, Massachusetts has experienced non-predicted adverse acoustic and health impacts from an industrial wind turbine (IWT) sited close to neighbors. The public response from this quiet rural area has been very vocal for a majority of homeowners living within 3000-ft. Complaints have ranged from the unexpectedly loud with constant fluctuations and the non-audible pressure fluctuations causing a real loss of public health and well-being. Early research indicates that both the IHC and OHC functions of the ear receive stimulation during

moderate to strong wind speeds. This research presents a challenge to noise control and health professionals to determine the causal factors for the adverse public health impacts. This case study will present sound level and analyzed measurement data obtained while living in a house 1700-ft from an operating IWT during moderate to strong hub height wind speeds. There was a strong correlation with wind speed, power output and health symptoms.

Relevance and applicability of the Soundscape concept to physiological or behavioural effects caused by noise at very low frequencies which may not be audible

Bray, Wade,

Acoustical Society of America 164th Meeting, Kansas City, MO 22－26 October, 2012, 2aNS6

Abstract:
A central tenet of the Soundscape concept is that humans immersed in sonic environments are objective measuring instruments (New Experts), whose reports and descriptions must be taken seriously and quantified by technical measurements. A topic category in acoustics meetings of recent years is "Perception and Effects of Noise." There is growing evidence from the field, and from medical research, that the ear's two－part transducer activity involving inner hair cells (IHC, hearing, velocity sensitive) and outer hair cells (OHC, displacement－sensitive) may, through demonstrated OHC activation and neural signals at up to 40 dB below the audibility threshold, produce behavioral and physiological effects as reported by a growing number of people. The Soundscape concept centering on human responses, New Experts, is as important and applicable to responses to effects from sound as it is to responses to directly audible sound. In a wider sense, this is a new sound quality and psychoacoustic issue.

The Noise from Wind Turbines: Potential Adverse Impacts on Children's Well-Being

Arline L. Bronzaft

Bulletin of Science Technology & Society 2011 31: 256, DOI: 10.1177/0270467611412548.

http://bst.sagepub.com/content/31/4/291

Bio: Dr. Arline L. Bronzaft is a Professor Emerita of Lehman College, City University of New York. She serves on the Mayor's GrowNYC, having been named to this organization by three previous Mayors as well. Dr. Bronzaft is the author of landmark research on the effects of elevated train noise on children's classroom learning; has examined the impacts of airport-related noise on quality of life; and has published articles on noise in environmental books, academic journals and the more popular press. In 2007, she assisted in the updating of the New York City Noise Code.

Abstract
Research linking loud sounds to hearing loss in youngsters is now widespread, resulting in the issuance of warnings to protect children's hearing. However, studies attesting to the adverse effects of intrusive sounds and noise on children's overall mental and physical health and well-being have not received similar attention. This, despite the fact that many studies have demonstrated that intrusive noises such as those from passing road traffic, nearby rail systems, and overhead aircraft can adversely affect children's cardiovascular system, memory, language development, and learning acquisition. While some schools in the United States have received funds to abate intrusive aircraft noise, for example, many schools still expose children to noises from passing traffic and overhead aircraft. Discussion focuses on the harmful effects of noise on children, what has to be done to remedy the situation, and the need for action to lessen the impacts of noise from all sources. Furthermore, based on our knowledge of the harmful effects of noise on children's health and the growing body of evidence to suggest the potential harmful effects of industrial wind turbine noise, it is strongly urged that further studies be conducted on the impacts of industrial wind turbines on their health, as well as the health of their parents, before forging ahead in siting industrial wind turbines.

Wind Turbine Noise
John P. Harrison
Bulletin of Science Technology & Society 2011 31: 256, DOI: 10.1177/0270467611412549
http://bst.sagepub.com/content/31/4/256

Bio: Dr. John P. Harrison has expertise in the properties of matter at low temperatures with emphasis on high frequency sound waves (phonons). For the past 5 years he has studied wind turbine noise and its regulation. He has presented invited talks on the subject at 3 conferences, including the 2008 World Wind Energy Conference.

Abstract
Following an introduction to noise and noise regulation of wind turbines, the problem of adverse health effects of turbine noise is discussed. This is attributed to the characteristics of turbine noise and deficiencies in the regulation of this noise. Both onshore and offshore wind farms are discussed.

Editorial: Wind turbine noise
Christopher D Hanning and Alun Evans
British Medical Journal, BM J2 012;344 doi: 10.1136/ bmj.e1527 (8 March 2012)
www.bmj.com

BMJ

Bio: Christopher Hanning, BSc, MB, BS, MRCS, LRCP, FRCA, MD is an honorary consultant in sleep medicine Sleep Disorders Service, University Hospitals of Leicester, Leicester General Hospital, Leicester, UK
Dr Chris Hanning is Honorary Consultant in Sleep Disorders Medicine to the University Hospitals of Leicester NHS Trust, UK. He retired in September 2007 as Consultant in Sleep Disorders Medicine.

After initial training in anaesthesia, he developed an interest in Sleep Medicine. He founded and ran the Leicester Sleep Disorders Service, one of the longest standing and largest services in the UK. He was a founder member and President of the British Sleep Society

His expertise in this field has been accepted by the civil, criminal and family courts. He chairs the Advisory panel of the SOMNIA study, a major project investigating sleep quality in the elderly, and sits on Advisory panels for several companies with interests in sleep medicine.

Bio: Alun Evans, is an epidemiologist, Centre for Public Health, Queen's University of Belfast, Institute of Clinical Science B, Belfast, UK

Except from BMJ web site:

Seems to affect health adversely and an independent review of evidence is needed.

The evidence for adequate sleep as a prerequisite for human health, particularly child health, is overwhelming. Governments have recently paid much attention to the effects of environmental noise on sleep duration and quality, and to how to reduce such noise. However, governments have also imposed noise from industrial wind turbines on large swathes of peaceful countryside.

The impact of road, rail, and aircraft noise on sleep and daytime functioning (sleepiness and cognitive function) is well established. Shortly after wind turbines began to be erected close to housing, complaints emerged of adverse effects on health. Sleep disturbance was the main complaint. Such reports have been dismissed as being subjective and anecdotal, but

experts contend that the quantity, consistency, and ubiquity of the complaints constitute epidemiological evidence of a strong link between wind turbine noise, ill health, and disruption of sleep.

The noise emitted by a typical onshore 2.5 MW wind turbine has two main components. A dynamo mounted on an 80 m tower is driven through a gear train by …

Literature Reviews on Wind Turbines and Health : Are They Enough?
Brett Horner, Roy D. Jeffery and Carmen M. E. Krogh
Bulletin of Science Technology & Society 2011 31: 399.
DOI: 10.1177/0270467611421849
http://bst.sagepub.com/content/31/5/399

Bio: Brett Horner, BA, is a certified management accountant and has held senior manager positions in international business consulting groups. He has provided information technology consulting and accounting/auditing services to a wide variety of clientele. He has dedicated over 2 years reviewing and analyzing references on the subject of industrial wind turbines and reported health effects.

Bio: Roy D. Jeffery, MD, is a rural family physician and a clinical preceptor for the University of Ottawa and the Northern Ontario Medical Schools. He practices rural medicine with special interests regarding geriatric home care and rural health. He has the distinction of being awarded the Ontario Family Physician of the Year–Northern Division in 2008.

Bio: Carmen M. E. Krogh, BSc Pharm, is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was a former director of Publications and editor-in-chief of the Compendium of Pharmaceutical and Specialties, the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

Abstract
Industrial wind turbines (IWTs) are a new source of community noise to which relatively few people have yet been exposed. IWTs are being erected at a rapid pace in proximity to human habitation. Some people report experiencing adverse health effects as a result of living in the environs of IWTs. In order to address public concerns and assess the plausibility of reported adverse health effects, a number of literature reviews have been commissioned by various organizations. This article explores some of the recent literature reviews on IWTs and adverse health effects. It considers the completeness, accuracy, and objectivity of their contents and conclusions. While some of the literature reviews provide a balanced assessment and draw reasonable scientific conclusions, others should not be relied on to

make informed decisions. The article concludes that human health research is required to develop authoritative guidelines for the siting of IWTs in order to protect the health and welfare of exposed individuals.

Wind Turbine Infra and Low-Frequency Sound: Warnings Signs That Were Not Heard
Richard R James
DOI: 10.1177/0270467611421845
Bulletin of Science Technology & Society published online 15 December 2011
http://bst.sagepub.com/content/early/2011/11/07/0270467611421845

Bio: Richard R. James, Institute of Noise Control Engineering, has been actively involved in the field of noise control since 1969, participating in and supervising research and engineering projects related to control of occupational and community noise. He has performed extensive acoustical testing and development work for a variety of complex environmental noise problems using both classical and computer simulation techniques. Since 2006, he has been involved with noise and health issues related to industrial wind turbines.

Abstract
Industrial wind turbines are frequently thought of as benign. However, the literature is reporting adverse health effects associated with the implementation of industrial-scale wind developments. This article explores the historical evidence about what was known regarding infra and low-frequency sound from wind turbines and other noise sources during the period from the 1970s through the end of the 1990s. This exploration has been accomplished through references, personal interviews and communications, and other available documentation. The application of past knowledge could improve the current siting of industrial wind turbines and avoid potential risks to health.

Wind Turbines Make Waves:
Why Some Residents Near Wind Turbines Become Ill
Magda Havas and David Colling
Bulletin of Science Technology & Society 2011 31: 414. DOI: 0.1177/0270467611417852
http://bst.sagepub.com/content/31/5/369

Bio: Magda Havas, PhD, is an associate professor at Trent University where she teaches and conducts research on the biological and health effects of electromagnetic and chemical

pollutants. She received her BSc and PhD at the University of Toronto and did postdoctoral research at Cornell University on acid rain and aluminum toxicity.

Bio: David Colling has applied his electrical engineering studies at Ryerson Polytechnical Institute and his specialized training in electrical pollution to conduct electrical pollution testing for Bio-Ag on farms, homes, and office buildings. Some of the homes tested are located in the environs of industrial wind turbines.

Abstract
People who live near wind turbines complain of symptoms that include some combination of the following: difficulty sleeping, fatigue, depression, irritability, aggressiveness, cognitive dysfunction, chest pain/pressure, headaches, joint pain, skin irritations, nausea, dizziness, tinnitus, and stress. These symptoms have been attributed to the pressure (sound) waves that wind turbines generate in the form of noise and infrasound. However, wind turbines also generate electromagnetic waves in the form of poor power quality (dirty electricity) and ground current, and these can adversely affect those who are electrically hypersensitive. Indeed, the symptoms mentioned above are consistent with electrohypersensitivity. Sensitivity to both sound and electromagnetic waves differs among individuals and may explain why not everyone in the same home experiences similar effects. Ways to mitigate the adverse health effects of wind turbines are presented.

Industrial Wind Turbine Development and Loss of Social Justice?
Carmen M.E. Krogh
Bulletin of Science Technology & Society 2011 31: 321, DOI: 10.1177/0270467611412550,
http://bst.sagepub.com/content/31/4/321

Bio: Carmen M. E. Krogh, BScPharm is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association and Health Canada. She was a former Director of Publications and Editor-in-chief of *the Compendium of Pharmaceutical and Specialties (CPS)*, the book used in Canada by physicians, nurses and other health professions for prescribing information on medication.

Abstract
This article explores the loss of social justice reported by individuals living in the environs of industrial wind turbines (IWTs). References indicate that some individuals residing in proximity to IWT facilities experience adverse health effects. These adverse health effects are severe enough that some families have abandoned their homes. Individuals report they welcomed IWTs into their community and the negative consequences were unexpected.

Expressions of grief are exacerbated by the emotional and physical toll of individuals' symptoms, loss of enjoyment of homes and property, disturbed living conditions, financial loss, and the lack of society's recognition of their situation. The author has investigated the reported loss of social justice through a review of literature, personal interviews with, and communications from, those reporting adverse health effects. The author's intention is to create awareness that loss of social justice is being associated with IWT development. This loss of justice arises from a number of factors, including the lack of fair process, the loss of rights, and associated disempowerment. These societal themes require further investigation. Research by health professionals and social scientists is urgently needed to address the health and social impacts of IWTs operating near family homes.

WindVOiCe, a Self-Reporting Survey: Adverse Health Effects, Industrial Wind Turbines, and the Need for Vigilance Monitoring

Carmen M.E. Krogh, Lorrie Gillis, Nicholas Kouwen, and Jeffery Aramini

Bulletin of Science Technology & Society 2011 31: 334,
DOI: 10.1177/0270467611412551,
http://bst.sagepub.com/content/31/4/334

Bio: Carmen M. E. Krogh, BScPharm is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association and Health Canada. She was a former Director of Publications and Editor-in-chief of the *Compendium of Pharmaceutical and Specialties (CPS)*, the book used in Canada by physicians, nurses and other health professions for prescribing information on medication.

Bio: Ms Lorrie Gillis is the process administrator for the WindVOiCe health survey. Ms Gillis volunteers her time and ensures the processes for administering the protocols are maintained.

Bio: Dr. Nicholas Kouwen is a Distinguished Professor Emeritus in the Department of Civil and Environmental Engineering of the University of Waterloo, Waterloo, Ontario, Canada. He is a registered Professional Engineer (Ontario) and a Fellow of the American Society of Civil Engineers. His field of expertise is in hydraulic and hydrological modelling and is currently involved in studies dealing with the impact of climate change on water availability.

Bio: Dr. Jeff Aramini is a public health epidemiologist with expertise in the investigation of health concerns using epidemiological principles. DVM and M.Sc. from the University of Saskatchewan; Ph.D. from the University of Guelph. Former senior epidemiologist with Health Canada/Public Health Agency of Canada. Currently, President and CEO of an organization that addresses public health, patient care, public safety and information management for clients in government, industry and academia.

Abstract
Industrial wind turbines have been operating in many parts of the globe. Anecdotal reports of perceived adverse health effects relating to industrial wind turbines have been published in the media and on the Internet. Based on these reports, indications were that some residents perceived they were experiencing adverse health effects. The purpose of the WindVOiCe health survey was to provide vigilance monitoring for those wishing to report their perceived adverse health effects. This article discusses the results of a self reporting health survey regarding perceived adverse health effects associated with industrial wind turbines.

Wind turbines can harm humans: a case study
Carmen ME Krogh, Roy D Jeffery, Jeff Aramini, Brett Horner
Paper presented at Inter-noise 2012, New York City, NY

Bio: Carmen M. E. Krogh, BSc Pharm, is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was a former director of Publications and editor-in-chief of the Compendium of Pharmaceutical and Specialties, the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

Bio: Roy D. Jeffery, MD, is a rural family physician and a clinical preceptor for the University of Ottawa and the Northern Ontario Medical Schools. He practices rural medicine with special interests regarding geriatric home care and rural health. He has the distinction of being awarded the Ontario Family Physician of the Year–Northern Division in 2008.

Bio: Dr. Jeff Aramini is a public health epidemiologist with expertise in the investigation of health concerns using epidemiological principles. DVM and M.Sc. from the University of Saskatchewan; Ph.D. from the University of Guelph. Former senior epidemiologist with Health Canada/Public Health Agency of Canada. Currently, President and CEO of an organization that addresses public health, patient care, public safety and information management for clients in government, industry and academia.

Bio: Brett Horner, BA, is a certified management accountant and has held senior manager positions in international business consulting groups. He has provided information technology consulting and accounting/auditing services to a wide variety of clientele. He has dedicated over 2 years reviewing and analyzing references on the subject of industrial wind turbines and reported health effects.

Abstract
In Canada the Ontario Government has adopted wind energy as a renewable energy

source. Our research in Ontario documents some individuals living in the environs of wind turbines report experiencing physiological and psychological symptoms, reduced quality of life, degraded living conditions, and adverse social economic impacts. Some families have abandoned their homes or negotiated financial agreements with wind energy developers. Wind turbine noise is a reported cause of these effects; however, some commentators suggest sound from wind turbines does not pose a risk of any adverse health effect in humans. These competing claims can confuse authorities responsible for establishing noise guidelines. An Ontario Environmental Review Tribunal considered a wide body of evidence including expert testimony and found wind turbines can harm humans if placed too close to residents. Risks must be understood to ensure guidelines protect human health. Evidence including peer reviewed literature, case reports, freedom of information documents and expert testimony will be presented which support the conclusion that wind turbines, if placed too close to residents, can harm human health.

Wind turbine noise perception, pathways and effects: a case study
Carmen ME Krogh, Roy D Jeffery, Jeff Aramini, Brett Horner
Paper presented at Inter-noise 2012, New York City, NY

Bio: Carmen M. E. Krogh, BSc Pharm, is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was a former director of Publications and editor-in-chief of the Compendium of Pharmaceutical and Specialties, the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

Bio: Roy D. Jeffery, MD, is a rural family physician and a clinical preceptor for the University of Ottawa and the Northern Ontario Medical Schools. He practices rural medicine with special interests regarding geriatric home care and rural health. He has the distinction of being awarded the Ontario Family Physician of the Year–Northern Division in 2008.

Bio: Dr. Jeff Aramini is a public health epidemiologist with expertise in the investigation of health concerns using epidemiological principles. DVM and M.Sc. from the University of Saskatchewan; Ph.D. from the University of Guelph. Former senior epidemiologist with Health Canada/Public Health Agency of Canada. Currently, President and CEO of an organization that addresses public health, patient care, public safety and information management for clients in government, industry and academia.

Bio: Brett Horner, BA, is a certified management accountant and has held senior manager positions in international business consulting groups. He has provided information technology consulting and accounting/auditing services to a wide variety of clientele. He has dedicated over 2 years reviewing and analyzing references on the subject of industrial wind turbines and reported health effects.

Abstract
In Ontario Canada wind turbines are being sited close to humans. Wind turbine noise is perceived to be more annoying than other equally loud sources of sound. This annoyance can contribute to stress related health impacts. An Ontario government commissioned report concludes a nontrivial percentage of exposed persons will be impacted. Our research documents some Ontarians living in the environs of wind turbines report experiencing physiological and psychological symptoms, reduced quality of life, degraded living conditions, and adverse social economic impacts including a loss of social justice. In some cases the effects resulted in families abandoning their homes. Others have negotiated financial agreements with wind energy developers. An Ontario Environmental Tribunal considered a wide body of evidence including expert witness testimony and found that wind turbines can harm humans if placed too close to residents. Peer reviewed literature, case reports, freedom of information documents and expert testimony will be presented which support the conclusion that noise perception via the indirect pathway can result in serious negative effects.

Annoyance can represent a serious degradation of health: wind turbine noise a case study

Carmen ME Krogh, Roy D Jeffery, Jeff Aramini, Brett Horner

Paper presented at Inter-noise 2012, New York City, NY

Bio: Carmen M. E. Krogh, BSc Pharm, is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was a former director of Publications and editor-in-chief of the Compendium of Pharmaceutical and Specialties, the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

Bio: Roy D. Jeffery, MD, is a rural family physician and a clinical preceptor for the University of Ottawa and the Northern Ontario Medical Schools. He practices rural medicine with special interests regarding geriatric home care and rural health. He has the distinction of being awarded the Ontario Family Physician of the Year–Northern Division in 2008.

Bio: Dr. Jeff Aramini is a public health epidemiologist with expertise in the investigation of health concerns using epidemiological principles. DVM and M.Sc. from the University of Saskatchewan; Ph.D. from the University of Guelph. Former senior epidemiologist with Health Canada/Public Health Agency of Canada. Currently, President and CEO of an organization that addresses public health, patient care, public safety and information management for clients in government, industry and academia.

Bio: Brett Horner, BA, is a certified management accountant and has held senior manager positions in international business consulting groups. He has provided information technology consulting and accounting/auditing services to a wide variety of clientele. He has dedicated over 2 years reviewing and analyzing references on the subject of industrial wind turbines and reported health effects.

Abstract
Annoyance is often discounted as a health concern. Wind turbine noise is perceived to be more annoying than other equally loud sources of sound. The Ontario government commissioned a report which concludes a non-trivial percentage those exposed to wind turbine sound will be highly annoyed which can be expected to contribute to stress related health impacts. Our research in Ontario, Canada documents some individuals living in the environs of wind turbines report experiencing physiological and psychological symptoms, reduced quality of life, degraded living conditions, and adverse social and economic impacts. Some families have abandoned their homes or negotiated financial agreements with wind energy developers. An Ontario Environmental Review Tribunal considered a wide body of evidence including expert testimony and found wind turbines can harm humans if placed too close to residents. Evidence including peer reviewed literature, case reports, freedom of information documents and expert testimony are presented which support the conclusion that annoyance can represent a serious degradation of health.

Low-frequency noise from large wind turbines

Henrik Møller and Christian Sejer Pedersen
Section of Acoustics, Aalborg University,
Fredrik Bajers Vej 7-B5, DK-9220 Aalborg Ø, Denmark, Acoustical Society of America
[DOI: 10.1121/1.3543957] J. Acoust. Soc. Am. 129 (6), June 2011 PACS number(s): 43.50.Rq, 43.28.Hr, 43.50.Cb, 43.50.Sr [ADP] Pages: 3727–3744

Abstract
As wind turbines get larger, worries have emerged that the turbine noise would move down in frequency and that the low-frequency noise would cause annoyance for the neighbors. The noise emission from 48 wind turbines with nominal electric power up to 3.6 MW is analyzed and discussed. The relative amount of low-frequency noise is higher for large turbines (2.3–3.6 MW) than for small turbines (□2 MW), and the difference is statistically significant. The difference can also be expressed as a downward shift of the spectrum of approximately one-third of an octave. A further shift of similar size is suggested for future turbines in the 10-MW range. Due to the air absorption, the higher low-frequency content becomes even more pronounced, when sound pressure levels in relevant neighbor distances are considered. Even when A-weighted levels are considered, a substantial part of the noise is at low frequencies, and for several of the investigated large turbines, the one-third-octave band with the highest

level is at or below 250 Hz. It is thus beyond any doubt that the low-frequency part of the spectrum plays an important role in the noise at the neighbors.

Toward a Case Definition of Adverse Health Effects in the Environs of Industrial Wind Turbines: Facilitating a Clinical Diagnosis

Robert Y. McMurtry

Bulletin of Science Technology & Society 2011 31: 316, DOI: 10.1177/0270467611415075,
http://bst.sagepub.com/content/31/4/316

Bio: Dr. Robert Y. McMurtry is the former Dean of Medicine for the University of Western Ontario. He was a member of the Health Council of Canada for 3½ years and a member and special advisor to the Royal Commission under Roy Romanow on the future of health care in Canada. Dr. McMurtry was a visiting Cameron Chair to Health Canada for providing policy advice to the Minister and Deputy Minister of Health. He was the Founding and Associate Deputy Minister of Population & Public Health, Canada. Dr. McMurtry also sat on the National Steering Committee on Climate Change and Health Assessment. Presently Dr. McMurtry is Professor (Emeritus) of Surgery, University of Western Ontario.

Abstract
Internationally, there are reports of adverse health effects (AHE) in the environs of industrial wind turbines (IWT). There was multidisciplinary confirmation of the key characteristics of the AHE at the first international symposium on AHE/IWT. The symptoms being reported are consistent internationally and are characterized by crossover findings or a predictable appearance of signs and symptoms present with exposure to IWT sound energy and amelioration when the exposure ceases. There is also a revealed preference of victims to seek restoration away from their homes. This article identifies the need to create a case definition to establish a clinical diagnosis. A case definition is proposed that identifies the sine qua non diagnostic criteria for a diagnosis of adverse health effects in the environs of industrial wind turbines. Possible, probable, and confirmed diagnoses are detailed. The goal is to foster the adoption of a common case definition that will facilitate future research efforts.

Effects of industrial wind turbine noise on sleep and health
Nissenbaum, Michael A., Aramini, Jeffery J., Hanning, Christopher D.
Noise & Health, September-October 2012, Volume 14, p243
www.noiseandhealth.org

Bio: Dr. Michael A. Nissenbaum received his undergraduate education at McGill University in Montreal and completed medical school at the University of Toronto. He specialized in diagnostic imaging and completed his residency at McGill University. He received a Fellowship from the University of California. Currently, Dr. Nissenbaum is certified by the Royal College of Physicians of Canada, and American Board of Radiology. He is a radiologist at the Northern Maine Medical Center, Fort Kent, Maine. Previous positions include Junior Faculty at Harvard University and Associate Director of MRI at a major Harvard teaching hospital.

Bio: Dr. Jeff Aramini is a public health epidemiologist with expertise in the investigation of health concerns using epidemiological principles. DVM and M.Sc. from the University of Saskatchewan; Ph.D. from the University of Guelph. Former senior epidemiologist with Health Canada/Public Health Agency of Canada. Currently, President and CEO of an organization that addresses public health, patient care, public safety and information management for clients in government, industry and academia.

Bio: Dr Chris Hanning is Honorary Consultant in Sleep Disorders Medicine to the University Hospitals of Leicester NHS Trust, UK. He retired in September 2007 as Consultant in Sleep Disorders Medicine. After initial training in anaesthesia, he developed an interest in Sleep Medicine. He founded and ran the Leicester Sleep Disorders Service, one of the longest standing and largest services in the UK. He was a founder member and President of the British Sleep Society. His expertise in this field has been accepted by the civil, criminal and family courts. He chairs the Advisory panel of the SOMNIA study, a major project investigating sleep quality in the elderly, and sits on Advisory panels for several companies with interests in sleep medicine.

Abstract
Industrial wind turbines (IWTs) are a new source of noise in previously quiet rural environments. Environmental noise is a public health concern, of which sleep disruption is a major factor. To compare sleep and general health outcomes between participants living close to IWTs and those living further away from them, participants living between 375 and 1400 m (n= 38) and 3.3 and 6.6 km (n = 41) from IWTs were enrolled in a stratified cross-sectional study involving two rural sites. Validated questionnaires were used to collect information on sleep quality (Pittsburgh Sleep Quality Index — PSQI), daytime sleepiness

(Epworth Sleepiness Score — ESS), and general health (SF36v2), together with psychiatric disorders, attitude, and demographics. Descriptive and multivariate analyses were performed to investigate the effect of the main exposure variable of interest (distance to the nearest IWT) on various health outcome measures. Participants living within 1.4 km of an IWT had worse sleep, were sleepier during the day, and had worse SF36 Mental Component Scores compared to those living further than 1.4 km away. Significant dose-response relationships between PSQI, ESS, SF36 Mental Component Score, and log-distance to the nearest IWT were identified after controlling for gender, age, and household clustering. The adverse event reports of sleep disturbance and ill health by those living close to IWTs are supported.

Properly Interpreting the Epidemiologic Evidence About the Health Effects of Industrial Wind Turbines on Nearby Residents

Carl V. Phillips

Bulletin of Science Technology & Society 2011 31: 303, DOI: 10.1177/0270467611412554,
http://bst.sagepub.com/content/31/4/303

Bio: Dr. Carl V. Phillips is a consultant and author specializing in epidemiology, science-based policy making, and communicating scientific concepts to the public. He spent most of his career as a professor of public health and now works in litigation support, scientific advising, and grant-supported research. He blogs at ep-ology.blogspot.com, which provides links to his other writings.

Abstract

There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-disorder type diseases, at a nontrivial rate. The bulk of the evidence takes the form of thousands of adverse event reports. There is also a small amount of systematically gathered data. The adverse event reports provide compelling evidence of the seriousness of the problems and of causation in this case because of their volume, the ease of observing exposure and outcome incidence, and case-crossover data. Proponents of turbines have sought to deny these problems by making a collection of contradictory claims including that the evidence does not "count," the outcomes are not "real" diseases, the outcomes are the victims' own fault, and that acoustical models cannot explain why there are health problems so the problems must not exist. These claims appeared to have swayed many nonexpert observers, though they are easily debunked. Moreover, though the failure of models to explain the observed problems does not deny the problems, it does mean that we do not know what, other than kilometers of distance, could sufficiently mitigate the effects. There has been no policy analysis that justifies imposing these effects on local residents. The attempts to deny the evidence cannot be seen as honest scientific disagreement and represent either gross incompetence or intentional bias.

Occupational Health and Industrial Wind Turbines: A Case Study

Robert W. Rand, Stephen E. Ambrose, and Carmen M. E. Krogh

Bulletin of Science Technology & Society 2011 31: 359DOI: 10.1177/0270467611417849
http://bst.sagepub.com/content/31/5/359

Bio: Robert W. Rand is a principal author with over 30 years of experience in industrial noise control, environmental sound, and general acoustics. A member of the Institute of Noise Control Engineering since 1993, he runs a small business providing consulting, investigator, and design services in acoustics.

Bio: Stephen E. Ambrose is a principal author with over 35 years of experience in industrial noise control. A member of the Institute of Noise Control Engineering since 1978, he runs a small business providing cost-effective environmental noise consulting services for industrial and commercial businesses, municipal and state governments, and private citizens.

Bio: Carmen M. E. Krogh, BScPharm, who provided health-related research and reference support, is a retired pharmacist with more than 40 years of experience in health. She has held senior executive positions at a major teaching hospital, a professional association, and Health Canada. She was a former Director of Publications and Editor in Chief of the *Compendium of Pharmaceutical and Specialties (CPS)*, the book used in Canada by physicians, nurses, and other health professions for prescribing information on medication.

Abstract
Industrial wind turbines (IWTs) are being installed at a fast pace globally. Researchers, medical practitioners, and media have reported adverse health effects resulting from living in the environs of IWTs. While there have been some anecdotal reports from technicians and other workers who work in the environs of IWTs, little is known about the occupational health sector. The purpose of this case study is to raise awareness about the potential for adverse health effects occurring among workers. The authors propose that there is a need for research regarding occupational worker exposure relating to IWTs.

Responses of the ear to low frequency sounds, infrasound and wind turbines.

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Hearing Research 2010 Sep 1; 268(1-2):12-21. Epub 2010 Jun 16

Abstract

Infrasonic sounds are generated internally in the body (by respiration, heartbeat, coughing, etc) and by external sources, such as air conditioning systems, inside vehicles, some industrial processes and, now becoming increasingly prevalent, wind turbines. It is widely assumed that infrasound presented at an amplitude below what is audible has no influence on the ear. In this review, we consider possible ways that low frequency sounds, at levels that may or may not be heard, could influence the function of the ear. The inner ear has elaborate mechanisms to attenuate low frequency sound components before they are transmitted to the brain. The auditory portion of the ear, the cochlea, has two types of sensory cells, inner hair cells (IHC) and outer hair cells (OHC), of which the IHC are coupled to the afferent fibers that transmit "hearing" to the brain. The sensory stereocilia ("hairs") on the IHC are "fluid coupled" to mechanical stimuli, so their responses depend on stimulus velocity and their sensitivity decreases as sound frequency is lowered. In contrast, the OHC are directly coupled to mechanical stimuli, so their input remains greater than for IHC at low frequencies. At very low frequencies the OHC are stimulated by sounds at levels below those that are heard. Although the hair cells in other sensory structures such as the saccule may be tuned to infrasonic frequencies, auditory stimulus coupling to these structures is inefficient so that they are unlikely to be influenced by airborne infrasound. Structures that are involved in endolymph volume regulation are also known to be influenced by infrasound, but their sensitivity is also thought to be low. There are, however, abnormal states in which the ear becomes hypersensitive to infrasound. In most cases, the inner ear's responses to infrasound can be considered normal, but they could be associated with unfamiliar sensations or subtle changes in physiology. This raises the possibility that exposure to the infrasound component of wind turbine noise could influence the physiology of the ear.

Responses of the Inner Ear to Infrasound
Alec N. Salt and Jeffery T. Lichtenhan
Fourth International Meeting on Wind Turbine Noise
Rome, Italy, 12-14 April 2011

Bio: Alec N. Salt received his PhD from the University of Birmingham, UK, in 1977 and has been actively involved in research into the physiology of the ear for over 35 years.

Bio: Dr. Lichtenhan is from the Eaton-Peabody Laboratory, Massachusetts Eye & Ear Infirmary, Boston Massachusetts and the Department of Otology & Laryngology, Harvard Medical School, Boston, Massachusetts.

Abstract:
Unweighted sound measurements show that wind turbines generate high levels of infrasound. It has been wrongly assumed that if subjects cannot hear the infrasound component of the noise then they cannot be affected by it. On the contrary, the mammalian ear is highly sensitive to infrasound stimulation at levels below those that are heard. Most aspects of responses to infrasound are far from well established. Measurements made within the endolymphatic system of the cochlea show responses that become larger, relative to measurements made in perilymph, as frequency is lowered. This suggests that endolymphatic responses to infrasound are enhances in some manner. For high-frequency sound, acoustic stimuli in the ear are summed. In contrast, the inner ear's responses to infrasound are suppressed by the presence of higher frequency stimuli. The complexity of the ear's response to infrasound leads us to the conclusion that there are many aspects that need to be better understood before the influence of wind turbine noise on the ear can be dismissed as insignificant.

Infrasound From Wind Turbines Could Affect Humans
Alec N. Salt and James A. Kaltenbach
Bulletin of Science Technology & Society 2011 31: 296,
DOI: 10.1177/0270467611412555
http://bst.sagepub.com/content/31/4/296

Bio: Alec N. Salt received his PhD from the University of Birmingham, UK, in 1977 and has been actively involved in research into the physiology of the ear for over 35 years.

Bio: James A. Kaltenbach received his PhD from the University of Pennsylvania in 1984. He specializes in the neurobiology of hearing disorders and is currently the Director of Otology Research at the Cleveland Clinic.

Abstract
Wind turbines generate low-frequency sounds that affect the ear. The ear is superficially similar to a microphone, converting mechanical sound waves into electrical signals, but does this by complex physiologic processes. Serious misconceptions about low-frequency sound and the ear have resulted from a failure to consider in detail how the ear works. Although the cells that provide hearing are insensitive to infrasound, other sensory cells in the ear are much more sensitive, which can be demonstrated by electrical recordings. Responses to infrasound reach the brain through pathways that do not involve conscious hearing but instead may produce sensations of fullness, pressure or tinnitus, or have no sensation. Activation of subconscious pathways by infrasound could disturb sleep. Based on our current knowledge of how the ear works, it is quite possible that low-frequency sounds at the levels generated by wind turbines could affect those living nearby.

Perception-based protection from low-frequency sounds may not be enough

Alec N. Salt and Jeffery T. Lichtenhan

Invited paper presented at Inter-noise 2012, New York City, NY

Bio: Alec N. Salt, Department of Otolaryngology, Washington University School of Medicine, St. Louis, MO,received his PhD from the University of Birmingham, UK, in 1977 and has been actively involved in research into the physiology of the ear for over 35 years.

ACKNOWLEDGEMENTS
This work was supported by grant R01 DC001368 from the NIDCD, National Institutes of Health. We thank Jared Hartsock and Ruth Gill for their assistance with the experiments.

Abstract
Hearing and perception in the mammalian ear are mediated by the inner hair cells (IHC). IHCs are fluid-coupled to mechanical vibrations and have been characterized as velocity sensitive, making them quite insensitive to low-frequency sounds. But the ear also contains more numerous outer hair cells (OHC), which are not fluid coupled and are characterized as displacement sensitive. The OHCs are more sensitive than IHCs to low frequencies and respond to very low-frequency sounds at levels below those that are perceived. OHC are connected to the brain by type II afferent fibers to networks that may further attenuate perception of low frequencies. These same pathways are also involved in alerting and phantom sounds (tinnitus). Because of these anatomic configurations, low-frequency sounds that are not perceived may cause influence in ways that have not yet been adequately studied. We present data showing that the ear's response to low-frequency sounds is influenced by the presence of higher-frequency sounds such as those in the speech frequency range, with substantially larger responses generated when higher-frequency components are absent. We conclude that the physiological effects of low-frequency sounds are more complex than is widely appreciated. Based on this knowledge, we have to be

concerned that sounds that are not perceived are clearly transduced by the ear and may still affect people in ways that have yet to be fully understood.

Public Health Ethics, Legitimacy, and the Challenges of Industrial Wind Turbines: The Case of Ontario, Canada

Martin Shain

Bulletin of Science Technology & Society, 2011 31: 256
DOI: 10.1177/0270467611412552,
http://bst.sagepub.com/content/31/4/346

Bio: Martin Shain S.J.D. is trained in law and social sciences. He is principal and founder of the Neighbour at Work Centre® and assistant professor at the Dalla Lana School of Public Health, Occupational and Environmental Health Division, University of Toronto.

Abstract
While industrial wind turbines (IWTs) clearly raise issues concerning threats to the health of a few in contrast to claimed health benefits to many, the trade-off has not been fully considered in a public health framework. This article reviews public health ethics justifications for the licensing and installation of IWTs. It concludes that the current methods used by government to evaluate licensing applications for IWTs do not meet most public health ethical criteria. Furthermore, these methods are contrary to widely held fundamental principles of administrative law and governmental legitimacy. A set of decision-making principles are suggested to address this situation that are derived from existing and emerging legal principles in Canada and elsewhere. These include the Precautionary Principle, the Least Impactful Means (Proportionality) Test, and the Neighbor Principle.

Mitigating the Acoustic Impacts of Modern Technologies: Acoustic, Health, and Psychosocial Factors Informing Wind Farm Placement

Daniel Shepherd and Rex Billington

Bulletin of Science Technology & Society 2011 31: 389
DOI: 10.1177/0270467611417841
http://bst.sagepub.com/content/31/5/389

Bio: Daniel Shepherd has a PhD in psychoacoustics and holds a lectureship at the Faculty of Health, AUT University. As an environmental psychologist, he researches the psychological response to noise from both individual and social perspectives.

Bio: Dr. Rex Billington is a research health psychologist at AUT University after 18 years with the World Health Organization including directorships in Mental Health and the Global Program on AIDS.

Abstract
Wind turbine noise is annoying and has been linked to increased levels of psychological distress, stress, difficulty falling asleep and sleep interruption. For these reasons, there is a need for competently designed noise standards to safeguard community health and well-being. The authors identify key considerations for the development of wind turbine noise standards, which emphasize a more social and humanistic approach to the assessment of new energy technologies in society.

Evaluating the impact of wind turbine noise on health related quality of life
by Daniel Shepherd, David McBride, David Welch, Kim N. Dirks, Erin M. Hill
Noise & Health, September-October 2011, 13:54,333-9
DOI: 10.4103/1463-1741.85502
www.noiseandhealth.org

Abstract
We report a cross-sectional study comparing the health-related quality of life (HRQOL) of individuals residing in the proximity of a wind farm to those residing in a demographically matched area sufficiently displaced from wind turbines. The study employed a nonequivalent comparison group posttest-only design. Self-administered questionnaires, which included the brief version of the World Health Organization quality of life scale, were delivered to residents in two adjacent areas in semirural New Zealand. Participants were also asked to identify annoying noises, indicate their degree of noise sensitivity, and rate amenity. Statistically significant differences were noted in some HRQOL domain scores, with residents living within 2 km of a turbine installation reporting lower overall quality of life, physical quality of life, and environmental quality of life. Those exposed to turbine noise also reported significantly lower sleep quality, and rated their environment as less restful. Our data suggest that wind farm noise can negatively impact facets of HRQOL.

Acknowledgements: We are grateful to our colleagues and others whose reviews substantially improved the manuscript. We are especially grateful for the thorough review undertaken by Professor Rex Billington, who as the WHO Director of Mental Health in the 1990s oversaw the development of the WHO's program into quality of life, health and the environment.

The Problems With "Noise Numbers" for Wind Farm Noise Assessment

Bob Thorne

Bulletin of Science Technology & Society 2011 31: 262
DOI: 10.1177/0270467611412557,
http://bst.sagepub.com/content/31/4/262

Bio: Bob Thorne, MSc, PhD, is the principal consultant of Noise Measurement Services Pty Ltd, Brisbane, Australia. He holds a PhD from Massey University, New Zealand, in health science and is an environmental health research associate in the Institute of Food, Nutrition and Human Health at Massey University. His research work involves using advanced specialized technology for intrusive noise assessment, and a specific application is personalized sound reinforcement for hearing assistive devices.

Abstract
Human perception responds primarily to sound character rather than sound level. Wind farms are unique sound sources and exhibit special audible and inaudible characteristics that can be described as modulating sound or as a tonal complex. Wind farm compliance measures based on a specified noise number alone will fail to address problems with noise nuisance. The character of wind farm sound, noise emissions from wind farms, noise prediction at residences, and systemic failures in assessment processes are examined. Human perception of wind farm sound is compared with noise assessment measures and complaint histories. The adverse effects on health of persons susceptible to noise from wind farms are examined and a hypothesis, the concept of heightened noise zones (pressure variations), as a marker for cause and effect is advanced. A sound level of LAeq 32 dB outside a residence and above an individual's threshold of hearing inside the home are identified as markers for serious adverse health effects affecting susceptible individuals. The article is referenced to the author's research, measurements, and observations at different wind farms in New Zealand and Victoria, Australia.

From: Annette Smith
Sent: Friday, February 15, 2013 10:45 AM

Subject: watching the wind site visit videos

Robert Dostis said that they visited every home in Lowell. Residents on the east side of the mountain in Lowell (accessed by Albany or Eden) were never visited by GMP.

GMP did not simply provide facts. They used scare tactics and told residents in Lowell (on the western side of the mountain) that if Vermont Yankee shuts down, the lights would go out if they did not get the wind project through.

The 3 MW turbines are actually rated higher than 3 MW and its nameplate capacity is more than 63 MW because post-CPG, GMP came into the PSB with bigger turbines with longer blades (which increases the visiblity and the noise). The Towns asked the PSB to reopen the hearings to look at aesthetic issues and also economics because the bigger turbines cost $20 million more, and also there was the need for a $10 million voltage regulator. GMP said that the cost differences would be made up for by the increased capacity factor of 32%, which most everyone who is educated about capacity factors knows is not likely. With the ISO-NE curtailment, it is likely that the Lowell GMP capacity factor is in the low 20's, as it is with Sheffield.

Robert Dostis said there was nothing they could do to avoid wetlands and waters, but in one area between T9 and T10 where the road was built on top of a headwater stream, experts hired by citizens noted that there was room and they could have simply moved the road and it would not have had to fill in the stream.

As for the mitigation parcels, one of the biggest jokes is that the are around the ridgeline road is being called a mitigation parcel, so the very areas that are the most impacted have been allowed to be considered as part of the mitigation. Dig into the details of how the wildlife and water issues were mitigated and it is not even funny. They allowed a mid-level beaver pond to serve as mitigation for high elevation wetlands destruction, they allowed connectivity parcels for mitigation but there is a one mile gap between the conserved lands and the wind project site.

But why do I bother, nobody cares. I have lost my compass where environmental laws in Vermont are concerned. Nothing matters anymore. What GMP wanted, GMP got. ANR turned the stormwater permitting over to VHB, using technology that is absolutely not advised for steep slopes. Didn't matter. Whatever GMP wanted, GMP got.

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Kathleen J. Nelson [mailto
Sent: Wednesday, February 20, 2013 1:11 PM

Subject: Guest Column: Boone County citizens want responsible wind turbine siting, clarity | The Rock River Times

Siting Commission Members,

Please overlook this article from Boone County, Illinois. It concerns wind tower siting and setbacks and includes some comments on tar sands oil as well, which is an issue in that area as well.
http://rockrivertimes.com/2013/02/20/guest-column-boone-county-citizens-want-responsible-wind-turbine-siting-clarity/

Kathleen J. Nelson
Brighton/Island Pond

From:
Sent: Wednesday, February 20, 2013 12:01 PM
Subject: Greenfellas: The Italian Mafia Muscles In On Green Energy Racket

First Wind mafia connections

Note this article below identifies Oreste Vigorito of IVPC, Italian Vento Power Corporation,

http://mafiatoday.com/general-breaking-news/greenfellas-the-italian-mafia-muscles-in-on-green-energy-racket/

IVPC is a subsidiary of UPC founded by Brian Caffyn that is now called First Wind...evidenced by UPC testimony attached--(because it was downloaded, as it is it no longer accessible on the Web--since the arrest of the indicted Vigorito.

Greenfellas: The Italian Mafia Muscles In On Green Energy Racket
Capo | January 29, 2013 | 0 Comments

Big Government: For an industry all puffed up about its supposed environmental virtue, green energy sure is attracting a dirty crowd. Witness its latest entrant, Italy's Mafia. The mob knows a good fraud when it sees one.

Alongside strip joints, drug smuggling, human trafficking, leg-breaking and political shakedowns, Mafia soldiers have moved in on the something-for-nothing world of green energy.

The Washington Post, in a page-one story, reported last week that a major sting operation by Italian authorities yielded a swarm of corrupt front groups run not by green hipsters, but by the Cosa Nostra of Sicily and the Calabrian syndicate known as 'Ndrangheta.

The plot was "part 'Sopranos,' part 'An Inconvenient Truth,'" the Post noted, with the mob shaking down legitimate farmers for title to their land, and then accepting EU subsidies for windmill construction, paying off political players to ensure the subsidies came.

It's the latest chapter in an ongoing story of corruption continuously surrounding green energy. In 2009, Italy's National Association of Wind Energy boss Oreste Vigorito was busted for building wind farms on public subsidies that sopped up state cash and delivered nothing. In 2010, cops seized $2 billion in 43 solar and wind fronts from "businessman" Vito Nicastri, known as "Lord of the Winds."

Can't happen here? Along with pay-for-play subsidies that have rolled into politically tied companies like Solyndra, green Mafia scams have reached the Netherlands, Britain, Ireland and Spain. Meanwhile, in Germany, carbon trading has drawn corruption of its own.

Italian blogger Pasquale Trivisonne denounced the waste of these scams in Italy — with wasted farmland and noisy windmills, but zero jobs and no energy.

It's money in the pockets of criminals. Green millionaires such as Vigorito got their seed capital from U.S. sources, Trivisonne noted. Vigorito, for one, had ties to Bryan Caffyn, founder of the "Cape Wind Project" in Massachusetts *and UPC/First Wind*, which has been criticized for giving taxpayers little value for their money. The Mafia only moves in on industries that have no need to create anything of value. The green energy industry is shot through with government cash and "direction" because it can't stand on its own. Its inability to turn a profit legitimately leaves it one of the least-free markets.

A nonfree market is like a dung heap for creepy crawlies. No wonder the face of green is increasingly a mob face. It's an offer the Mafia can't refuse.

Source: news.investors.com

From: Rob Pforzheimer
Sent: Wednesday, February 20, 2013 9:31 AM

Subject: Wind Project Kills Eagle One Month After Startup

The corrupt wind industry is literally getting away with murder.

Note:The CEO of NextEra, Hay, is an Obama jobs council advisor, along with Imelt (GE), and DE Shaw (First Wind/Deepwater).
NextEra also cut down a 100 year old cottonwood tree with an active eagles nest in Ontario, CA in January.
Does anyone believe they really care about the environment?

WIND
Wind Project Kills Eagle One Month After Startup
*by **Chris Clarke*** *http://www.kcet.org/news/rewire/wind/wind-project-kills-eagle-one-month-after-startup.html*

on February 19, 2013 3:24 PM

Photo: Michael Privorotsky/Flickr/Creative Commons License

ReWire has learned that the North Sky River Wind project, which attracted fierce opposition from environmental groups concerned about potential threat to eagles and California condors, was the site of a golden eagle death in January.

Ileene Anderson, who let ReWire know about the kill and is the Biologist and Wildlands Deserts Director for the Center for Biological Diversity, says that North Sky River's developer NextEra and government agencies pushed forward with the project despite high wildlife mortality and the nearby Pine Tree wind project. The aim was to get North Sky River producing power by December 31 so that it could qualify for the federal Wind Production Tax Credit, which wind proponents feared would expire at the end of the year.

The eagle kill apparently occurred on January 29, just a month after North Sky River started generating power.

The Center for Biological Diversity is one of several groups that sued to stop the 100-turbine, 12,781-acre project last year, charging that North Sky River -- a subsidiary of NextEra Energy -- posed unacceptable risk not only to eagles, but to California condors and southwestern willow flycatchers, both on the Endangered Species list. The plaintiffs in that suit pointed out that Los Angeles Department of Water and Power's Pine Tree wind facility, North Sky River's neighbor in the rugged hills northwest of Mojave, had killed at least eight golden eagles in a two-year span.

As quoted in a CBD press release announcing the suit, the U.S. Fish and Wildlife Service (FWS) wasn't optimistic about North Sky river's impact on birds, given its neighbor's poor record:

In August 2011, the Fish and Wildlife Service wrote: "The first full year of fatality monitoring [for the Pine Tree wind project] resulted in an estimated 1,595 fatalities per year, which -- per megawatt (11.8 fatalities/megawatt) -- is among the highest fatality rates being recorded in the nation . . . It's reasonable to estimate that the proposed [North Sky River] project would have avian fatality rates equal to or greater than those observed at the adjacent Pine Tree wind facility."

When completed, North Sky River will have the capacity of 297 megawatts, one-tenth the output of the San Onofre nuclear power plant in Southern California.

As we reported in August, the green groups failed to win an injunction halting construction.
Neither the FWS nor North Sky River's owner NextEra offered comment to ReWire by press time. We'll keep you posted if they do respond, though the CBD's Anderson did note to us that FWS has started to keep relevant data close to its vest of late, citing "ongoing investigations."

ReWire is dedicated to covering renewable energy in California. Keep in touch by liking us on Facebook, and help shape our editorial direction by taking this quick survey here.

From: Rob Pforzheimer
Sent: Wednesday, February 20, 2013 1:14 AM
Subject: NH - Several hundred attend wind farm moratorium hearing

"The legislation scheduled for a hearing Thursday would require a vote in communities where any structure of 50 feet or higher would be visible. The Site Evaluation Committee could not issue a permit if voters reject the projec"

February 19. 2013
10:06PM http://www.unionleader.com/article/20130219/NEWS06/130219039&source=RSS
Updated: Several hundred attend wind farm moratorium hearing

By MARK HAYWARD
New Hampshire Union Leader
CONCORD — Move over Northern Pass; there's a new environmental issue in town.

Opponents of ridge-line wind farms packed Representatives Hall in Concord Tuesday, outnumbering a smattering of people clad in orange vests, the trademark gear of opponents to the Northern Pass transmission line.

Both spoke in favor of House Bill 580, which would place a moratorium on wind turbine plants and electric transmission line projects until the state issues a comprehensive energy plan.

"We have to hit the pause button; we have to put the brakes on," said state Rep. Rick Ladd, R-Haverhill, one of eight sponsors listed on the legislation.

At least three-quarters of the 400 seats in Representatives Hall were filled with people interested in the legislation.

The turnout prompted the House Science, Technology and Energy Committee to postpone a hearing on another wind-related bill until Thursday.

That legislation, House Bill 484, would require an affirmative public vote before controversial energy projects could be permitted.

Many speakers were from the Plymouth area, where the 48-megawatt Groton wind farm is in operation, or the Newfound Lake area, where developers want to erect 37 turbines.

Complaints included noise from the 500-foot towers, the effects on wildlife, even the shadow the towers and blades will throw on home solar panels.

But most worried about visual impacts, home values and tourism.

"This could be the death of our mountaintops and our tourism," warned Plymouth resident Pamela Charron.

Opposing the legislation were business groups, labor groups and city officials from Franklin, where a converter station would be built for the Northern Pass.

"We keep coming back here. Set the rules and leave the rules in place. Don't mess with the process," said Franklin City Manager Elizabeth Dragon, who was rebuked by a Northern Pass opponent as she spoke.

The bill drew tepid support from environmental groups.

New Hampshire Sierra Club opposed it outright.

"It is a fire hose putting out a match," said Sierra Club's Catherine Corkey.

The Society for the Protection of New Hampshire Forests, the main opponent of Northern Pass, said wind turbines may be a part of renewable energy in New Hampshire. But it favored a moratorium to write wind farm siting criteria, not an energy plan.

Critics of the bill noted that it gives no details on who would write the energy plan, what it would include and any timetable or deadlines.

Gov. Maggie Hassan has not taken a position on the legislation.

"We will closely review the bills as they move forward," wrote her spokesman, Marc Goldberg, in an email.

The legislation scheduled for a hearing Thursday would require a vote in communities where any structure of 50 feet or higher would be visible. The Site Evaluation Committee could not issue a permit if voters reject the project

From: Kathleen J. Nelson
Sent: Tuesday, February 19, 2013 2:29 PM
Subject: Fw: Request for assistance

To the Vermont Energy Siting Commission,

I forward you a letter I have sent today to Public Advocate Geoff Commons over at the VT Dept. of Public Service. I am requesting that DPS intervene to halt the installation of a synchronus condenser requested by Green Mountain Power to allow Kingdom Community wind to boost it's power output without destabilizing the grid. I request this intervention on behalf of the ratepayers of the Vermont Electric Cooperative of which I am a member.

I ask the Siting Commission to review my letter and to overlook the link to the Mankouski Testimony that is provided in that letter. GMP was aware that they would have grid access problems well before the construction at the Lowell wind project was completed. In GMP's rush to collect federal subsidies time was not properly taken to ensure unrestrained grid access and the issues of public safety surrounding the transport of turbine components to the site was disregarded. GMP received a $30,000 fine for this and the residents from Island Pond all the way to Lowell also had to tolerate obstructive and often dangerous issues surrounding the transport of those components

GMP has been blatant in its failure to properly site and manage the wind project at Lowell and is a prime example of how not to site a wind generation facility. The damage done there, and at other wind turbine sites, will be a subject of controversy in this state for decades. I hope the Siting Commission will take my concerns into account and help to promote the stricter regulation and pre and post construction oversight of any future projects.

Thank You,

Kathleen J. Nelson

----- Original Message -----
Fr
To
Sent: Tuesday, February 19, 2013 2:30 AM
Subject: Request for assistance

Director Commons,

Please read my attached letter. Your assistance is requested on behalf of the the Vermont Electric Cooperative ratepayers.

Thank You,

Kathleen J. Nelson
Brighton/Island Pond

Kathleen J. Nelson

Mr. Geoff Commons, Director
Dept. of Public Service
Public Advocacy Division
112 State Street
Montpelier, VT 05620-2601

Dear Director Commons,

I seek your assistance to intervene in behalf of the Vermont Electric Cooperative ratepayers in PSB Docket #7987. This docket relates to an application by Green Mountain Power to install a $10.5 million synchronous condenser device at the Kingdom Community Wind plant in Lowell, VT. The purpose of this device has been reported as being necessary to comply with a directive from ISO New England to ensure intermittent power from the wind turbines will not destabilize the grid.

I do not believe it is in the best interest of the ratepayers of Vermont Electric Cooperative, of which I am a member, to allow the installation of this expensive device at this time. I have taken the time to understand some of the concerns of ISO New England in this matter but I am not an electrical engineer and cannot speak to those issues. However, as a ratepayer, I must protest the placing of a $10.5 million burden on the ratepayers for an upgrade to a new facility that knew it would have grid access problems before it went online.

Let me address some issues of concern:

*It is well known that when GMP merged with CVPS, with the state's blessing, that the ratepayers of CVPS were deprived of their due return of $21 million that was given to CVPS to bail them out of difficulties. GMP has made no effort to reimburse this loss.

*In what amounted to a panic rush to secure US government subsidies GMP incurred a $30,000 fine for failing to properly advise several Vermont towns of the transport of large turbine components through those towns.

*Since the KCW project came online GMP has announced two rate increases.

*GMP has claimed the right to collect US government subsidies by claiming it was "in service" as of 31 Dec 2013 when in fact it did not have unrestrained access to the grid due to its failure to comply with ISO New England's directives. The amount of this subsidy is reported as between $40-48 million in taxpayer money.

*Without installing any new devices GMP has claimed that KCW has been pumping

limited power into the grid. This power has been subject to curtailment by ISO-NE even without the synchronous condenser. The same is true for the Sheffield wind project (owned by First Wind/Emera). It makes no sense to allow an upgrade to a facility when there is no demand for an increase in power.

*On 12 Feb 2013 GMP's Robert Dostis made it clear to the VT Energy Siting Committee that the $10.5 million for this synchronous condenser would be passed on to the ratepayers.

*On 14 Sep 2009 GMP made its first grid interconnection request to ISO-NE. GMP then decided to change their turbine type from the Vestas V90 to the larger Vestas V112 and filed a revised grid interconnection request with ISO on 18 Apr 2011. GMP made yet another change to their grid access request on 11 May 2011. It was about mid-2011 (or earlier) that GMP was made aware that ISO was going to demand a voltage regulation device, called a dynamic reactive device (DRD) before unrestrained grid access would be allowed. GMP decided to file a formal complaint with the Federal Energy Regulatory Commission (FERC).

I provide you with a link to the documents concerning GMP's complaint to FERC and the testimony of Kevin Mankouski (Manager of Transmission Service Studies for ISO-NE):
http://www.iso.ne.com/regulatory/ferc/filings/2012/jul/er12-2214-000_6-6-12_kingdow_wind_lgia.pdf

I am convinced GMP was well aware of grid access problems before the wind turbines were constructed and were hoping to skirt ISO's restrictions. They failed to do so. Now they are required to construct a $10.5 million device to correct this misjudgement, at the ratepayers expense, to allow for a potential boosting of power to the grid, power which is not needed by the grid or the ratepayers. Regardless of whether this device is put into place or not ISO will continue curtailments of intermittent wind turbine generation. If GMP still wants this device then it should be at the company's expense and not the ratepayers.

I ask that the DPS please advocate on the behalf of the ratepayers of the Vermont Electric Cooperative and intervene in PSB docket #7987 to deny the application of Green Mountain Power to construct a $10.5 million synchronous condenser.

Thank you for your assistance,

Kathleen J. Nelson
VEC Member
Brighton/Island Pond

From: Annette Smith
Sent: Tuesday, February 19, 2013 11:52 AM

Subject: comments on deliberative session and site visits

I sat through the full day deliberative session at the Agency of Commerce conference room. Watching the regulators, developers, utilities and attorneys sitting together going through the options paper with no representatives of towns or the public was most disturbing.

Perhaps more disturbing was the cursory discussion about substantive suggestions such as moving the process from the PSB to Act 250, and giving town plans more weight. Dismissing both by saying that the public good must rule, and that you can't have 9 different decision-making bodies ignores the substance of those points. I encourage you to delve more deeply into the merits of both proposals, and include consideration of the people and towns who are being hit with these big corporate renewable projects, with zero resources to defend their interests, except by draining their own bank accounts.

Act 250 has some standards in place that the PSB has chosen either to ignore or not incorporate into their decisions. One standard is to protect lands above 2500 feet in elevation, which it turns out is where wind developers target areas for development. Another standard is to give deference to town plans. Act 250 has criteria for protecting headwaters. Your deliberations should not simply discard the idea of using Act 250, but should involve taking at a look at how the PSB has been incorporating Act 250 into its decision-making, and since you seem to be focusing on tweaking the PSB process, then you need to look at whether the PSB needs different directions on how they review Act 250 criteria.

Tweaking the PSB process, even if you recommend intervenor funding or some sort of better public process, does nothing to address the failure of the PSB to listen to anyone other than the developers' experts. As difficult and expensive as the process is, in several big wind cases, citizens and towns have stepped up and raised the hundreds of thousands of dollars required to participate in the PSB process, only to find their experts were totally ignored. I sense a desire to give deference to the PSB, but have they earned it? Until you start talking about what is really happening with the Board's decisions, rather than tinkering around the edges of what it takes to participate in the PSB process, you are not going to solve the very real problems that people and towns are experiencing.

I encourage you to have a discussion about the merits of recommending to the Governor and the legislature that applications for new big corporate renewable projects be suspended until the issues are better understood. The PSB is allowing
--development above 2500 feet
--filling Class A1 headwater streams
--reckless blasting with none of the safeguards provided by Act 250
--construction and operation of projects with inadequate grid connections
--approval of projects with conditions that have allowed developers to drastically increase the cost of the projects post-CPG, and then denying requests for reopening hearings to consider the changes
--noise standards dictated by the wind industry, which are now widely known to be 1) at a level where human health is known to be harmed and 2) do not include infrasound which the towns' experts told the PSB was an issue and which the PSB said the developer's expert persuaded them was not an issue
--setbacks of less than 200 feet from neighboring property lines for 450+ foot tall structures that are known to collapse, catch fire, throw ice, and throw blades
--developers suing neighbors in Superior Court for blasting zones that should have been secured using the PSB's condemnation process
--wind developer's experts to be the primary post-construction monitors of noise, birds, bats, and water. There is practically no independent monitoring taking place on the wind sites, which are carefully controlled by the wind companies and exclude qualified experts from evaluating conditions post-construction.

Annette

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Noreen
Sent: Tuesday, February 19, 2013 11:35 AM
Subject: Public Participation in EnergySiting Commission : an equal number of seats at the table

I am following up on my suggestion made last week at the Lowell public hearing. This suggestion is not about energy generation siting, but rather about the process - the process of the energy siting committee and our process in Vermont - for making decisions about who matters in this conversation. In your posted transcript of the last deliberative session we see that sitting around the table with the siting commission were:

- Kimberly Hayden - an attorney who represents developers,
- Geoff Hand - an attorney who represents wind companies & is currently in contested case against the Town of Newark,
- Dottie Schnure of GMP
- Randy Pratt of VEC
- Avram Patt of WEC
- John Zimmerman of Northeast Wind (a developer!)
- John David Mullett, an attorney representing VPPSA (developers)
- Geoff Commons and Asa Hopkins of PSD
- Deb Markowitz and Billy Coster of ANR.

I haven't seen evidence that any of the people on the above list represent the interests of small towns, communities, the environment, our wildlife, our near endangered species, our mountains, our ridgelines. Developers are in business to make money. Other state agencies (PSD and ANR) have not stepped up to represent our interests. The only possible "friend" we had at the table was attorney Dan Hershenson - and I did not see anyplace where he made the case for moving Industrial Wind generation under Act 250, which is the absolute bottom line minimum step that can be taken to get things on track to protect Vermont's environment and to empower Vermont towns and small communities.

The issue is not only that those who were invited to sit at the table with the siting commission while deliberating representened a bias against towns, but those sitting at the table represented the players who are actively working against the public interest in so many ways.

Why would developers have a place at the table? It's like inviting BP to the table to tell us that oil spills are good for the oceans, or inviting Wall Mart to the table so they can tell us why we don't need country stores in Vermont.

The person who can best represent the protection of our public interest is Annette Smith. Why isn't there a seat at your table for the general public? Why hasn't Annette Smith (executive director, VCE) been invited to sit at the table with you? I don't know anyone who's better versed in the issues or has more support from towns under attack. Why is it that Luke Snelling (Energize Vermont, author of a Sane Energy Plan) and Steve Wright (Former Wildlife Commissioner) are not invited to sit at the table? Why is that Kim Fried (Head of the Newark Planning Commission) is not given a seat at the table? If you're going to invite Geoff Hand then why aren't Gerry Tarrant and Brook Dingledine sitting at the table?

What I'd like to see is, for every seat occupied by an someone who represents developers we have an equal number of people who represent the general public. For every seat occupied by someone who represents the state wide notion of public good we have an equal number of participants who represent small towns.
We know the process, as it exists now, is not working. Giving this weight to the concerns of developers reinforces the current paradigm.
And it's not working for Vermonters. It's simply not fair. Please ensure there's fairness and give the small towns an equal say.

thank you for your consideration.

Noreen Hession

From: Joe Arborio
Date: February 17, 2013, 9:15:55 PM EST

Subject: Lowell Visit by Joe Arborio
Lowell Visit by Joe Arborio

On Tues. , Feb. 12th I toured the Lowell Mountain Wind project with the Govenor appointed Siting Commission, Green Mountain Power officials and the press. Our GMP guides were cordial and forthright. They answered every question asked and did not appear to dodge, evade or mislead. For instance, they admitted using carbon base power (when the turbines are not producing they use a parasitic load, drawing electricity into the turbines from the grid). GMP admit they won't know if the efforts to reduce runoff and rebuild the environmental destruction will work for a few years. We saw the entire project and they even gave us the formula to figure out how much dynamite was used in blasting for pads and roads.

The tour to look at the Industrial Wind Turbine's (IWT's) and their pads took us to the top of the Lowell Mountain Range on 16' wide roads and, at one point, we were able to see down both sides of the mountain, a 100' drop. Reaching a height of 2,600 feet above sea level I was devastated to realize both headwaters and Class A streams were buried under roads and construction pads. I found the use of Level Spreaders in controlling runoff to be no more than the placement of glorified water bars. This doesn't appear to be the solution needed to replenish aquifers that should ultimately distribute water through underground channels, creating small bogs and pools to support the ecosystem and wildlife. The PSB has decided 30 Db. is an acceptable sound level for the inside of homes with proximity to IWT projects. To me any sound, thing or person that comes into my home day and night uninvited is unacceptable. Vermonters have a right to protect our homes and sound is as much of an intruder as someone walking through your front door at 3am.

The Lowell project is a done deal. We should not be naive enough to think they're going to tear them down. The result is a project with huge impacts on headwaters, aquifers, bear habitat, the tops of Lowell ridgelines being leveled, cuts that blasted through ledge to make roads and all for the sake of producing more electricity than can be used. It just doesn't make sense. In my opinion the PSB should have thoroughly investigated Lowell as a proposed project. It should have included financial background checks, the true ecological impacts (not allowing nearby conserved land as a trade off for the destruction of rare ecosystems and bear scarred beech groves and the destruction/covering of headwaters) and, most important, an approved application to ISO New England acknowledging power from the proposed site would be accepted on the grid. Lowell/GMP is now faced with a 10.5 million dollar upgrade being added in the hopes it will help stabilize the unreliable power inherent in Industrial Wind turbines. Of course the 10.5 million and an additional 20 million spent on larger turbines and blades will be passed on to ratepayers.

A moratorium on IWT's is needed not for 2 or 3 years but 10 years to learn from projects like Lowell. Vermont's ridgelines are one of our most precious assets. Please don't build new wind projects because you think they're "green". They destroy bear habitat, disrupt wetlands, headwaters, violate The Clean Water Act, disrupt bat and avian migration and violate the rights of abuttors. They affect area homes and neighboring towns with unwanted sound, blinking lights and lose of property values. What, for hundreds of years, was a peaceful hike to the top of a beautiful mountain is now surrounded by
NO TRESPASSING, KEEP OUTand DANGER signs. Is this how Vermont wants to be viewed?

Joe Arborio, Brighton, Vt.

From: Rob Pforzheimer
Sent: Tuesday, February 19, 2013 8:33 AM
Subject: Germany And Spain Throw Green Energy Under the Bus

"What both countries are experiencing is the pain of trying to subsidize an industry that's not ready for prime time. If renewable energy eventually becomes viable, it won't need subsidies; capital owners who can make money off of it will ensure it's put to use. But until then, these attempts to prop up struggling industries are foolish and painful to consumers."
February 17, 2013

Germany And Spain Throw Green Energy Under the Bus

Consumers in Europe are revolting against their countries' green energy policies. For over a decade, the governments of Germany and Spain have been funding their subsidies for solar and wind energy by passing on large costs to the consumer. In Germany, an extra charge is added to household electricity bils, and that charge nearly doubled in January. Worried about the consumer reaction, Merkel's government is now furiously backpedaling, according to the *WSJ*:

Fearing a voter backlash from anger over the lopsided financing of green energy, Ms. Merkel's government on Thursday proposed putting a cap on the green-energy surcharge until the end of 2014 and then restricting any rise in the surcharge after that to no more than 2.5% a year. The government also plans to tighten exemptions, which would force more companies to pay, and achieve a cut in green subsidies of €1.8 billion ($2.42 billion). The plan is a quick fix pending comprehensive reform after the election, government officials said.

Merkel hopes to gain votes by taking these measures to cap green energy subsidies. Meanwhile, Spain is following suit, cutting renewable energy subsidies in an attempt to push down energy costs. The logic is clear:

Renewable-energy producers “are going to receive less revenue, but these measures are better for consumers” said Energy Minister José Manuel Soria.

What both countries are experiencing is the pain of trying to subsidize an industry that’s not ready for prime time. If renewable energy eventually becomes viable, it won’t need subsidies; capital owners who can make money off of it will ensure it’s put to use. But until then, these attempts to prop up struggling industries are foolish and painful to consumers.

From: Annette Smith
Sent: Monday, February 18, 2013 11:07 AM
Subject: the Lowell and Sheffield wind site visits

I am receiving feedback from people who have watched the videos of both the Sheffield and Lowell wind sites that you were told information from only one perspective, and there is a lot that is not accurate about what you were told. Given that you chose not to meet with any of the people who live around the mountain, it seems very one-sided. Experts are watching the videos and are quite disturbed by the water and noise and wildlife claims. But you have not provided an opportunity for anyone to provide another perspective on those issues. This has played out exactly as people were worried it was, where you made yourselves available only to the wind developers, who carefully controlled the information you received. That is the fundamental problem with these processes, where it is all dominated by the developers and anyone else has to fight to even get some truth into the mix. There is zero independent water quality, wildlife, or noise monitoring taking place, except for part of the bat work being done on Sheffield.

Right now I am trying to get to the bottom of VHB's claims that ANR chose the sampling sites for the water quality monitoring. ANR says they chose the 2010/2011/20112 sites. But they appear to be exactly the same sites that VHB chose in 2006 and 2009 (and those sites are way downstream, not headwaters or anything on the mountain itself anyway). It's this kind of spin that is wasting a lot of people's time, when the facts are being obscured. The fact is there is no water quality monitoring taking place in the streams up on the mountain, those headwaters have been sacrificed. The only water quality monitoring being done on the mountain is in the sediment basins.

We need a requirement immediately that gives access to experts not chosen by the developer to evaluate the noise, water quality, and wildlife issues. What you heard is spin on your site visits on the mountain.

Annette Smith
Executive Director
Vermonters for a Clean Environment, Inc.

From: Rob Pforzheimer
Sent: Monday, February 18, 2013 9:41 AM
Subject: Ice Throw is REAL

Ice Throw is REAL ***February 18, 2013*** **http://www.windaction.org/pictures/37420**
Credits: Doreen Conner Reilly
Description:
Wind developers play down the issue of ice throw until the plant is operating. After that, even hardhats are not enough to protect persons or property from flying chunks.

Click to download full sized image

File name:	IceThrowImage.jpg
File size:	90.95 kB
Width x Height:	480 x 640 pixels

From: Rob Pforzheimer
Sent: Monday, February 18, 2013 9:10 AM
Subject: FW: Friends of Maine's Mountains Update

Having trouble viewing this email? Click here

Augusta Update

February 18, 2013

29 Cents for a 5 Cent Product

This winter we are asking the Legislature to reinstate public hearings for wind projects because we need to challenge the assertions made by wind developers in their permit applications. Sworn testimony with expert witnesses, subject to cross examination, is the best way to distinguish the truth from what an applicant wants us to believe. Our legislation is likely to be published soon.
Speaking of truth, remember when a price tag was a pretty clear indication of how much something would cost? This week's update is an illustration that might shock you. Below we will explain how a wind power developer can look at us with a straight face and tell us that the cost of wind energy is "competitive," even though it is not even close.

Last month our regional grid operator, ISO-New England, **reported** that the average wholesale price for power in 2012 was **$36.09** per megawatt hour (MWH). That was a 26% decrease from 2011, when the average wholesale price had been **$48.49** per MWH.

Construction of First Wind's Bull Hill wind project, in the dooryard of Acadia National Park, was completed in 2012. When the wind is right, this new wind facility can effectively provide about 1/20th of one percent additional electricity to the New England grid. Truly a drop in the bucket. Bull Hill commenced commercial sale of its occasional electricity in October. Recently the Federal Energy Regulatory Commission (FERC) **reported** that Bull Hill's 2012 fourth quarter energy sales were 4,372 MWH, which resulted in energy revenues of $164,414. An average of **$37.60** per MWH.

So First Wind can churn out the press releases asserting how "competitive" their 3.76 cent electricity is, right?

Well, not so fast. They can, but they shouldn't, any more than the auto dealer should advertise the price of a car with no wheels, seats, or motor.

FERC also reported "FP" revenues for the fourth quarter. These are *additional* revenues that go to generation facilities, including capacity payments and renewable energy credits. FP revenues for Bull Hill amounted to almost ten times as much as energy revenues: $1,013,045. So for FP revenues, First Wind yielded an average of **$231.70** per MWH of generated electricity. Every penny came out of our light bills.
But it actually gets worse.

It is nearly impossible to accurately calculate the additional transmission & distribution costs that ratepayers must bear for remote wind projects, so we will not add those dollars for this exercise. But we can assume that Bull Hill qualified for the Production Tax Credit (PTC), so let's add **$22.00** per MWH to First Wind's till. (Of course the PTC is borne by taxpayers - not ratepayers.) Without even counting government-imposed mandates to buy their power or the favorable regulatory treatment, First Wind yielded over **$290.00** per MWH from Bull Hill. That's 29 cents for a five cent product.
And the Maine law says we should build thousands more windmills!

Capacity payments are intended to incentivize and obligate dispatchable generators to remain at the ready. The grid grants capacity payments so that generators can readily satisfy demand spikes with additional power. Yet non-dispatchable intermittent generators like Bull Hill have been granted capacity payments despite their physical inability to supply power on demand.

As the numbers above show, ratepayers (and taxpayers) are making First Wind very rich. Meanwhile the public generally believes:

- that wind projects provide substantial amounts of "competitive" electricity,
- that dirty coal and oil plants somewhere are being closed as a result,
- and that C02 emissions are materially reduced because of wind power.

In exchange for all that *perceived* benefit, most people would be willing to ruin the mountains and pay a little bit more for wind power. However none of that benefit is real, and the cost - as you can see - is not just "a little bit more."

Contrast Bull Hill Wind with the ten year old "Casco Bay Energy" natural gas plant in Veazie. We do not yet have 2012 statistics for Veazie, but in 2011 when wholesale electricity averaged **$48.49** per MWH, Veazie produced almost 2 million MWH at an average price of **$41.00** per MWH. In part because the ISO-NE is not desperate for more power, Veazie operated in 2011 at only 40% of its generating capacity, yet it was granted zero capacity payments.

In a full year of operation, Bull Hill will be lucky to generate 20,000 MWH (one percent of the power that Veazie generated in 2011), with much of its wind generation happening at times when the grid does not need it. Dozens of Bull Hill projects could not replace the power of one dispatchable Veazie plant, yet we are throwing stacks of our money at the 40-story twirling blinking towers of Bull Hill, which diminish Acadia's Quality of Place.

These policies are misguided and egregiously abusive of ratepayers, taxpayers, and Maine's natural environment. Examples like this one help us to convince policymakers that wind power is high impact and low benefit, and simply not worth all the favor it is granted.

Which brings us back to public hearings. Soon we will be testifying to the Legislature about why we need public hearings to challenge the assertions of the applicant in a wind project permitting process. Please let us know your story. Have you participated in a wind permitting process? Was there a public hearing? What is

your experience being able - or unable - to force the truth onto the record? Your real-life stories are critical to our efforts to change the policy that is now so favorable to the wind developer. Please get in touch with us by **clicking here**.

Once policymakers realize the facts about how unnecessary, useless, and unaffordable is grid scale wind power, they will be less inclined to give it statutory and regulatory favor. Contact a legislator or two today. Let them know the facts.

Links for **Senators and Representatives**.

Please email or call them today. **Click here** if you need facts.

More legislation will be emerging in the coming weeks and we will keep you informed. Also, please **let us know** if you have any noteworthy feedback from legislators.

Thank you.

PLEASE DONATE TO FMM TODAY: **Click Here**

Friends of Maine's Mountains
PO Box 60
Weld, Maine 04285

From: Rob Pforzheimer
Sent: Sunday, February 17, 2013 11:52 AM
Subject: Wind turbine complaints foreboding - Berkshires

http://www.berkshireeagle.com/ci_22607971/clarence-fanto-wind-turbine-complaints-foreboding?source=most_viewed

Clarence Fanto: Wind turbine complaints foreboding

By Clarence Fanto, Berkshire Eagle Staff,

Posted: 02/16/2013 11:56:56 PM EST
Updated: 02/17/2013 12:07:36 AM EST

Sunday February 17, 2013LENOX

Alternative-energy advocates need to heed ill winds blowing from residents living near several high-profile turbine installations.

Some Floridians in North Berkshire are complaining of headaches and other adverse effects from the recently activated Hoosac Wind Project. On Cape Cod, the Selectmen in Falmouth are debating whether to remove a major turbine project that has aroused the ire of nearby residents because of reported health concerns.

At the same time, a Lenox solar-energy project is under a cloud.
As reported in The Eagle and the North Adams Transcript, town of Florida residents have formally complained to the state about noise levels they say exceed state legal limits as well as health problems they blame on the 19-turbine Hoosac project atop Bakke Mountain and Crum Hill in the adjacent Franklin County town of Monroe.

Several longtime residents complain of headaches and dramatic reductions in quality of life.
"My quiet, peaceful, serene world and home has been turned into a reality of grief, unending noise, annoyance and constant dealing with those in charge to help us," said Michael Fairneny of Florida.
On Cape Cod, the Falmouth Select Board has voted to send a posse to Beacon Hill to seek financial help from the state if the town's two municipal turbines are removed.

Wind-energy advocates and opponents believe that if Falmouth Town Meeting approves the dismantling, wind projects

across the nation could suffer setbacks.Resident Malcolm Donald told the local Enterprise weekly that "it's going to be precedent-setting. The Falmouth experience is known worldwide and it's unfortunate for the wind turbine industry, but Falmouth has become a martyr. It's an embarrassment to the industry."
The estimated cost of removal ranges from $9 million to nearly $12 million. It would likely be the first commercial-sized turbine installation in the country to come down within three years of installation because of noise and health complaints, the Enterprise reported.

At least four other towns in Massachusetts -- Scituate, Plymouth, Kingston and Fairhaven -- are watching closely, since their wind farms have aroused similar complaints.

Although the 10-turbine Berkshire Wind Project along the Brodie Mountain ridge line in Hancock and New Ashford has not triggered citizen complaints in the sparsely populated area -- nor have the nearby Jiminy Peak units -- the town government in Lenox blew away a proposed municipal installation after an appointed citizens' research group produced a critical study citing the potential impact on nearby homeowners.

Lenox Town Meeting voters approved a modest municipal solar panel project last May that has yet to be built because of stalled contract talks between the Boston developer and electric utility companies that would

distribute the power to local schools and town-owned buildings.

On a more positive note, the Solarize Mass project enabling property owners to install panels on homes or businesses has produced energy-cost savings in Pittsfield, Lenox and 19 towns statewide. Other cities and towns can apply to the state for participation by next Wednesday.

Wind energy is still expanding nationally, according to the industry's trade group, which lists 45,100 turbines in the U.S., with Texas, California and Iowa as the leading producers, while Massachusetts is 35th in the nation.

But the recent pushback from residents in Florida, Monroe and Falmouth demonstrates that unless the complaints turn out to be a lot of hot air -- an unlikely outcome -- each project has to spin or sputter on its own carefully scrutinized merits.

Clarence Fanto, a regular Eagle contributor, can be reached at cfanto@yahoo.com.

From: Pam Arborio
Sent: Sunday, February 17, 2013 11:47 AM
Subject: Ontario wind power bringing down property values - Canada - CBC News

http://www.cbc.ca/news/canada/story/2011/09/30/ontario-wind-power-property-values.html

Sent from my iPad

Although the "experts" at Sheffield and Lowell discounted loss of property values around wind projects as you'll read the truth is apparent.
Pam

From: Rob Pforzheimer
Sent: Sunday, February 17, 2013 10:26 AM
Subject: wind power bringing down property values-CBC news

Saw this on the Ontario news
http://www.cbc.ca/news/canada/story/2011/09/30/ontario-wind-power-property-values.html

Ontario wind power bringing down property values
By John Nicol and Dave Seglins, CBC News
Posted: Oct 1, 2011 6:56 AM ET
Last Updated: Oct 2, 2011 3:56 PM ET

Read 1260comments1260

Wind turbines are shown near Port Alma, Ont., near the shores of Lake Erie. CBC News has documented scores of families who've discovered their property values are going downward. (Dave Chidley/Canadian Press)

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Ontario's rapid expansion in wind power projects has provoked a backlash from rural residents living near industrial wind turbines who say their property values are plummeting and they are unable to sell their homes, a CBC News investigation has found.
The government and the wind energy industry have long maintained turbines have no adverse effects on property values, health or the environment.

The CBC has documented scores of families who've discovered their property values are not only going downward, but also some who are unable to sell and have even abandoned their homes because of concerns nearby turbines are affecting their health.

News tips

For news tips on this and other stories, please contact the writers atjohn.nicol@cbc.ca anddave.seglins@cbc.ca.

"I have to tell you not a soul has come to look at it," says Stephana Johnston, 81, of Clear Creek, a hamlet in Haldimand County on the north shore of Lake Erie, about 60 kilometres southeast of London.
Johnston, a retired Toronto teacher, moved here six years ago to build what she thought would be her dream home. But in 2008, 18 industrial wind turbines sprung up near her property and she put the one-floor, wheelchair-accessible home up for sale.

"My hunch is that people look at them and say: 'As nice as the property is going south, looking at the lake, we don't want to be surrounded by those turbines.' Can't say that I blame them."
P.O.V.:

Would you live near wind turbines?

Johnston says she has suffered so many ill health effects, including an inability to sleep — which she believes stem from the noise and vibration of the turbines— that she now sleeps on a couch in her son's trailer, 12 kilometres away, and only returns to her house to eat breakfast and dinner and use the internet.

Industry rejects claims of lower land values
Meanwhile, the industry rejects claims of lower land values.

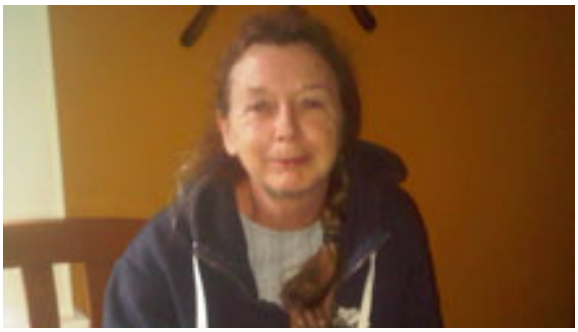
"Multiple studies, and particularly some very comprehensive ones from the United States have consistently shown the presence of wind turbines does not have any statistically significant impact on property values," says Robert Hornung of the Ottawa-based Canadian Wind Energy Association (CANWEA).

While acknowledging a lack of peer-reviewed studies in Ontario, Hornung says CANWEA commissioned a study of the Chatham-Kent area, where new wind turbines are appearing, and found no evidence of any impact on property values.

"In fact," says Hornung, "we've recently seen evidence coming from Re/Max indicating that we're seeing farm values throughout Ontario, including the Chatham-Kent area, increasing significantly this year as wind energy is being developed in the area at the same time."

However, Ron VandenBussche, a Re/Max agent along the Lake Erie shore, said the reality is that the wind turbines reduce the pool of interested buyers, and ultimately the price of properties.

"It's going to make my life more difficult," says VandenBussche, who has been a realtor for 38 years. "There's going to be people that would love to buy this particular place, but because the turbines are there, it's going to make it more difficult, no doubt."



Kay Armstrong says she felt fortunate to sell her two-acre property listed at $270,000 for $175,000. CBC
Kay Armstrong is one example. She put her two-acre, waterfront property up for sale before the turbines appeared in Clear Creek, for what three agents said was a reasonable price of $270,000.

Two years after the turbines appeared, she took $175,000, and she felt lucky to do that — the property went to someone who only wanted to grow marijuana there for legal uses.

"I had to get out," said Armstrong. "It was getting so, so bad. And I had to disclose the health issues I had. I was told by two prominent lawyers that I would be sued if the ensuing purchasers were to develop health problems."

Realtor association finds 20 to 40 per cent drops in value

Armstrong's experience is backed up in a study by Brampton-based realtor Chris Luxemburger. The president of the Brampton Real Estate Board examined real estate listings and sales figures for the Melancthon-Amaranth area, home to 133 turbines in what is Ontario's first and largest industrial wind farm.

"Homes inside the windmill zones were selling for less and taking longer to sell than the homes outside the windmill zones," said Luxemburger.

On average, from 2007 to 2010, he says properties adjacent to turbines sold for between 20 and 40 per cent less than comparable properties that were out of sight from the windmills.
Power company sells at a loss

Land registry documents obtained by CBC News show that some property owners who complained about noise and health issues and threatened legal action did well if they convinced the turbine companies to buy them out.

Canadian Hydro Developers bought out four different owners for $500,000, $350,000, $305,000 and $302,670. The company then resold each property, respectively, for $288,400, $175,000, $278,000 and $215,000.

In total, Canadian Hydro absorbed just over half a million dollars in losses on those four properties.
The new buyers were required to sign agreements acknowledging that the wind turbine facilities may affect the buyer's "living environment" and that the power company will not be responsible for or liable from any of the buyer's "complaints, claims, demands, suits, actions or causes of action of every kind known or unknown which may arise directly or indirectly from the Transferee's wind turbine facilities."
The energy company admits the impacts may include "heat, sound, vibration, shadow flickering of light, noise (including grey noise) or any other adverse effect or combination thereof resulting directly or indirectly from the operation."
TransAlta, the company that took over for Canadian Hydro, refused to discuss the specific properties it bought and then resold at a loss in Melancthon. But in an email to CBC, spokesman Glen Whelan cited the recession and other "business considerations" that "influence the cost at which we buy or sell properties, and to attribute purchase or sale prices to any one factor would be impossible."

Province says no change to tax base Ontario's ministers of Energy, Municipal Affairs and Finance, all in the midst of an election campaign, declined requests for an interview.

'That's what makes them sick is that, you know, they'll get less money for their properties, and that's what's causing all this annoyance and frustration.'—Environment Ministry lawyer Frederika Rotter
A spokesperson for Municipal Affairs says his ministry has no studies or information about the potential impact wind turbines are having on rural property values.

However, last February, before an environmental review tribunal in Chatham, Environment Ministry lawyer Frederika Rotter said: "We will see in the course of this hearing that lots of people are worried about windmills. They may not like the noise, they may think the noise makes them sick, but really what makes them sick is just the windmills being on the land because it does impact their property values.
"That's what makes them sick is that, you know, they'll get less money for their properties, and that's what's causing all this annoyance and frustration and all of that."

When Energy Minister Brad Duguid declined comment, his staff referred CBC News to the Ministry of Finance, which oversees MPAC (the Municipal Property Assessment Corporation), which sets values on land for taxation purposes. They indicated that MPAC has no evidence wind turbines are driving down assessed values.

However, CBC found one household in Melancthon was awarded a 50-per-cent reduction in property tax because the house sat next to a transformer station for the turbines.
Losing the rural life

Almost all the people interviewed by the CBC rue the division between neighbours for and against the turbines, and said what they have lost is a sense of home and the idyllic life of living in the countryside.

Tracy Whitworth refuses to sell her historic home in Clear Creek. CBC

Tracy Whitworth, who has a historic home in Clear Creek, refuses to sell it and instead has become a nomad, renting from place to place with her son, to avoid the ill effects of the turbines.

"My house sits empty — it's been vandalized," says Whitworth, a Clear Creek resident who teaches high school in Delhi. "I've had a couple of 'Stop the wind turbine' signs knocked down, mailbox broken off.
"I lived out there for a reason. It was out in the country. School's very busy. When I come home, I like peace and quiet. Now, we have the turbines and the noise. Absolutely no wildlife. I used to go out in the morning, tend to my dogs, let my dogs run, and I'd hear the geese go over.

"And ugh! Now there's no deer, no geese, no wild turkeys. Nothing."

For the octogenarian Johnston, the fight is all more than she bargained for. She sank all her life savings, about $500,000, into the house, and she says she does not have the money to be able to hire a lawyer to fight for a buyout. But she is coming to the conclusion she must get a mortgage to try the legal route.

"I love being near the water and I thought, what a way to spend the rest of my days — every view is precious," she said, as tears filled her eyes. "And I would not have that any more.

"And that is hard to reconcile and accept."
Getting a mortgage on her house might not be that easy. CBC News has learned that already one bank in the Melancthon area is not allowing lines of credit to be secured by houses situated near wind turbines. In a letter to one family situated close to the turbines, the bank wrote, "we find your property a high risk and its future marketability may be jeopardized."

From: Pam Arborio
Sent: Saturday, February 16, 2013 10:33 PM
Subject: Nulhegan Gateway Association - NEK community and economic development

http://nulhegan.info/nga/

Sent from my iPad

Both this site and Brighton State park capture the essence of our beautiful corner of the world. Please make sure the Siting Commission search both, this is what our visitors see when they search online for activities in Brighton. The photo's and video say it all, please don't allow the PSB to destroy our mountains.

Pam Aarborio

From: Pam Arborio
Sent: Saturday, February 16, 2013 10:17 PM
Subject: Brighton State Park | Oh, Ranger!

http://www.ohranger.com/vt/brighton

From: Rob Pforzheimer
Sent: Friday, February 15, 2013 6:40 PM
Subject: Get involved now or hold your peace on wind farms scarring N.H.

http://www.laconiadailysun.com/index.php/opinion/letters/65698-ray-cunningham-2-13-811
Get involved now or hold your peace on wind farms scarring N.H.

Published Date

To the editor,

Wind Farms promise more jobs in a cleaner environment here in New Hampshire. They promise a new economy driven by cleaner electricity, electric cars, electric lawnmowers, less pollution, and of course, the gratitude of generations to come. There's just one problem — the lack of credible evidence that any of that can actually occur.

Our neighboring state, Vermont, just stated on January 30, 2013 "that some big wind projects in the region are not performing as planned due to constraints on the transmission grid." The operator of the New England Electric Grid has told these wind projects that "they can't put electricity on to the network because it would de-stabilize the grid." The problem derives from the electrical grid getting out of sync when wind turbines produce more power than is being used at any given time.

This is a hugely important story — one that should shake New Hampshire politicians to their core. If Vermont is experiencing these issues so will New Hampshire, right?

Vermont is seeing additional issues with other wind projects as well. And it's rumored that the Groton, N.H. wind farm may be looking at the same situation. Groton residents should add another word to their vocabulary, a little device called the synchronous condenser (cost about $10.5 million) is needed and should help Vermont's transmission issues or not.

Across the pond in countries like Spain, Denmark and Germany, who are heavily invested in wind technology, they have seen their electricity rates soar. Here in the United States — all states with wind power have seen increases in their electrical rates. Another fair business question to ask is: "Will higher electrical rates push businesses out of the New Hampshire?"

As New Hampshire politicians discuss a new energy policy in dealing with Northern Pass, Wind Farms and other energy related issues, the first thing that comes to my mind when I hear the words "new energy policy" is: How much will our electrical rates increase to compensate for this so called "change"? A second question that comes to mind is: Why are we financially responsible for shipping electricity through our state to southern states. And if our politicians find a way to pass everything in return for additional revenues, my third question would be: what are our politicians going to do with all the new revenue?

As I continue my research on wind farms I have been searching for a few answers: First: "Has anyone seen a decrease in their electrical rates due to wind energy being added to the grid?" I have yet to find anyone that can say yes to that question. Second: "Why does New Hampshire have to revamp its entire electrical grid to pass electricity through to southern states?" Keep in mind we will pay higher electrical rates by passing that electricity on — not using it. Third: "Is it our obligation to sacrifice our mountain tops to feed southern states with electricity?" And fourth: "Why is Massachusetts subsidizing their renewable energy credits through New Hampshire land?"

How does anyone really know the true impact of these projects? It truly is a project divided up into many

individual parts. It's designed to be confusing and is great for finger pointing. I urge all of you to look at the Groton wind farm. How many individual parts were involved in that project? You had developers, transmission lines, substation, maintenance, town officials, state government, federal government, etc. It got confusing — didn't it? And the turbines still aren't spinning.

Get involved now or forever hold your peace. Or, take your hats off and bow your heads, for the death of another state treasure, here in New Hampshire, will be foretold.
There are many reasons why people have fought so hard against the concentration of wind farms around Newfound Lake. Here are just a few examples: 1. turbines should not be placed in the middle of a recreational area that depends on tourism; 2. we already have three renewable energy plants in the area; 3. it could jeopardize our watershed; 4. no sufficient funds set aside for dismantling them; 5. they are too tall, too close and too many of them near the shoreline; 6. many think the lake will have an airport setting with the red lights blinking at night. Residents, real estate agents, business owners and vacationers alike will add many concerns to this list. . . I'm sure.

A moratorium on Big Wind Farms in New Hampshire, makes absolute sense. I applaud Representative Harold "Skip" Reilly (R-Grafton) for his forward thinking on this matter. Reilly has proposed legislation calling for a moratorium on all wind power construction until the state updates its energy plan. (HB-580 and HB-484).

Get back to basics and start asking important questions. Questions that will define your future here in New Hampshire. Speak up at the State Legislative Bills Hearing on February 19 at 1 p.m. Location: NH Statehouse in Concord.

Ray Cunningham
Bridgewater

From: Susan Hoyt
Sent: Monday, February 11, 2013 1:13 PM
Subject: NOT BEING ABLE TO GET BANK CREDIT solely because of Industrial Scale Wind Complex!

Dear Sirs,

I am in favor of a Moratorium for INDUSTRIAL SCALE WIND DEVELOPMENT on Vermon't ridge lines for many substantial reasons, only some of them being numerous serious environmental concerns, health concerns, and financial concerns. If you would like me to send more specifics I will gladly do that.

Please see the below. This is something to very seriously consider.

Thank you,

Susan Hoyt
Waitsfield.

Property near wind project denied bank line of credit
August 18, 2011 by Belinda S. Reid
Summary:
This residential property located near the Melancthon I and II wind energy facilities (2 hours NW of Toronto) was denied a bank line of credit due to the health risks caused by proximity to the transformer substations.

Paul Thompson's front porch is located just 388.82 meters from the two Trans Alta transformer substations that service the Melancthon I and II wind energy facilities (133 industrial turbines). The constant hum emanating from the substations are audible from both outside and inside his dwelling even with the windows closed. The noise has required he move out of his house at night and rent other accommodations.

In 2011, Mr. Thompson contacted his bank about using his home as collateral for a line of credit to support the lawsuit against the siting of the Trans Alta substation. The bank denied his request based on the appraisal which found that his property was a high risk and its future marketability potentially jeopardized.

The letter accompanying the bank's appraisal report is provided below. Both the letter and the appraisal report can be accessed by clicking on the links at the bottom of this page.

Dear Paul:
It is with regret that I must advise that we are unable to put a second credit line on your property. The property was appraised and based on the report and the health concerns mentioned therein, the report is hypothetical in nature and the health risks caused by the hydro station located close to your home, we find your property a high risk and its future marketability may be jeopardized.
Please rest assured that you are a high value client with RBC and your credit with us has never been an issue, however, the property at this time has caused some concerns.
Please feel free to contact me at if you require further clarification.
Regards,

Ms. Belinda S. Reid
RBC Mortgage Specialist
Windaction.org wishes to thank Mr. Thompson for granting us permission to share these documents with our readers.

Download File(s):
Royal credit line declined letter.pdf (15.88 kB)
Paul D Thompson royal bank appraisal.pdf (1.42 MB)
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Please feel free to contact me at [redacted] if you require further clarification.
Regards,

Ms. Belinda S. Reid
RBC Mortgage Specialist
Windaction.org wishes to thank Mr. Thompson for granting us permission to share these documents with our readers.
Download File(s):
Royal credit line declined letter.pdf (15.88 kB)
Paul D Thompson royal bank appraisal.pdf (1.42 MB)

--
~ Susan~

From: Pam Arborio
Sent: Friday, February 22, 2013 12:13 PM
Subject: Fwd: Hey NH Sierra Club: Stop Sucking the Wind-Pipe!

Please don't discount this report because the beginning is slightly rude, the report content is very important especially since environmental groups have jumped on the pro wind bandwagon.

Sent from my iPad

Begin forwarded message:
From: Rob Pforzheimer <rpforz@hotmail.com>
Date: February 22, 2013 9:27:19 AM EST
To: siting commission <sitingcommission@state.vt.us>
Subject: Hey NH Sierra Club: Stop Sucking the Wind-Pipe!
"the turbines are not benign little "windmills" but large industrial wind turbines that make the areas around them inaccessible, uninhabitable regions devoid of life. With mountains blasted into ruins, trails rendered unusable, the state's entire western New Hampshire tourist industry would sit idle."

http://progressiveactionnh.wordpress.com/2013/02/20/hey-nh-sierra-club-stop-sucking-the-wind-pipe/
Hey NH Sierra Club: Stop Sucking the Wind-Pipe!
Posted on February 20, 2013 by Progressive Action NH

Ms. Corkery engaged in Sierra Club approved environmental actions; we assume pre wind industry days.
In a crowded Representative's Hall yesterday afternoon, Cathy Corkery, spokesperson for the NH Sierra Club shocked activist residents by coming out against NH 580, the bill demanding a moratorium on any further construction of wind turbines or power line infrastructure in the state. Presenting her case with such nervous confusion, even Representative Kahn had to ask Ms. Corkery where exactly she stood on HB 580; it was certainly hard to discern. Ms. Corkery presented a pitiable picture of someone torn between her own knowledge of what is right and her duty to follow the orders of her superiors. Listening to Ms. Corkery make reference of solidarity to the Northern Pass opponents in the room while attempting to justify opposition to HB 580 seemed to this writer much like putting a conch to one's ear; it all began to sound like the wind.

Those folks that Ms. Corkery supposedly were in solidarity with — or maybe not (who can tell really?) testified that the bill would put the brakes on industry pressure to move forward with the Northern Pass power line project and the wind-farm project. Both are claimed as renewable energy projects that will meet the requirements of the RPS – Renewable Portfolio Standard, put in place to increase power output from renewable energy resources. The goal of the RPS for New Hampshire is to have twenty-three percent of power output in New Hampshire from renewable energy by 2025.

Both Northern Pass and now the various wind turbine projects proposed from two international turbine companies have characterized their ventures as renewable energy. The people opposed to Northern Pass and the wind projects have come out with clear, cogent and disconcerting arguments as to why these two projects need further study. Northern Pass does not qualify as green, sustainable energy as it will mar key parts of New Hampshire's White Mountain forest, flood huge swaths of southern Quebec's Innuit homelands (causing possibly the first environmental refugees in North America in this century) and encroach on untold more miles of woodland in order to service power demand not for New Hampshire's use — but for southern New England. [*for more information and links on Northern Pass see Northern Pass - Not the Option for New Hampshire].*

Yesterday testimony was heard concerning the industrial wind turbines proposed for the western portion of New Hampshire. Dotted with many of its own small mountains, large lakes and expanse of forest land, western New

Hampshire has traditionally provided a huge portion of state revenue through tourism. The industrial level turbines as proposed would sit atop mountains across the western region of the state. As many among the near three hundred present testified, the turbines are not benign little "windmills" but large industrial wind turbines that make the areas around them inaccessible, uninhabitable regions devoid of life. With mountains blasted into ruins, trails rendered unusable, the state's entire western New Hampshire tourist industry would sit idle.

Worse, the turbines' placement in New Hampshire is inappropriate as our hilly terrain and low elevation to sea level make the wind output level surprisingly low. Even by the industry's own admission, nearly all the turbines proposed would produce only "fair" energy generation.

But we'd expect that Sierra Club New Hampshire would know this. We'd expect that Sierra Club New Hampshire had listened to its New Hampshire membership and decided to stand by its mission to be a steward of the environment and represent its local members' concerns. But instead, Sierra Club New Hampshire has apparently decided to take a national stance on green energy with little consideration of local concerns about making a fit appropriate to the region.

In addition, it would seem that Sierra Club would also understand that another larger issue of environmentalism consists of the practice of a sort of environmental imperialism — where large corporations that pollute will choose typically low profile, less organized, less populated and lower income areas to target. Many parts of western New Hampshire fit this profile with small towns of regular working folks, a high level of individualism and a tendency to distrust government regulation.

You'd think Sierra Club would know this considering its work around the world where lower income and less empowered states, nations and populations are most often targeted for environmental abuse. You'd think Sierra Club would know all too well that sustainable means more than just non-fossil fuels; it means workable, realistic and supporting local community over big global corporations. Apparently Sierra Club forgot about that part of the concept of renewable energy development; that sustainable means community supported and community supporting. But we all know that one can tend to get temporal paralysis when sucking wind just a little to much.

[Progressive Action NH calls and messages left for Ms. Corkery at her office and her cellphone were not returned.]
For more information on wind turbines and how they don't fit in New Hampshire see New Hampshire Wind Watch.
posted in NH Politics, Protecting our Environment and tagged cathy corkery, Environment, HB 580, Iberdrola, lakes region, moratorium, New Hampshire, NH House of Representatives, no northern pass, northern pass, Sierra Club, wind, wind mills,wind power, wind turbines. Bookmark the permalink.
Post navigatOne thought on "Hey NH Sierra Club: Stop Sucking the Wind-Pipe!"
1. Corry Hughes says:
February 21, 2013 at 12:54 am
Excellent response to Sierra Club's incomprehensible position at the HB580 hearing yesterday in Concord. It was disturbing indeed to hear Sierra Club side with the handful of corporate lobbyists for power companies instead of the hundreds of environmentally concerned citizens fighting to preserve the natural beautiy and health of New Hampshire.

Submitted on Wednesday, February 13, 2013 - 12:18 Submitted by anonymous user: [74.114.16.119] Submitted values are:

Name: Steven L Mason
Town: Lowell
Organization:
Title:

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Wind
3) Comment :
I was at the Siting Commission hearing on February 12, 2013, held at the Lowell Graded School. Initially, it was my intention to testify as to the sufficiency of the information I was provided prior to the town vote on the Kingdom Community Wind project here in Lowell.

Had I decided to testify, I would have said that of all the issues I have been asked to vote on in the last 40 years, none comes close to what I was provided with by Green Mountain Power. In addition, the number of opportunities that I had to participate in public meetings – as well as having GMP officials at my home on two occasions – was more than sufficient.

Along with the direct information provided, I was given contact information for additional, detailed information. I also did research on my own. I suppose that the fat that I was going to be able to see the entire project from my porch, and the fact that my family has bee in Lowell since 1845, had something to do with my diligence.

In short, I was satisfied with the information, given the projects size and scope, and the relative new and evolving technology.

I have spent a considerable amount of time in my adult years thinking our dependence on foreign oil – the political implications and the fact that we a so very reliant on the instability of its sourcing. I know that there are no simple or perfect options, but we do need options. As the saying goes, "every form of refuge has its price."

Now as to why I decided not to testify. It became obvious from the start of the meeting that most of the people lost their objectivity somewhere at sometime. But more disconcerting, many were rude, did not follow the "rules of engagement", and had for flung comments that were not germane to the issue. Additionally, the people sitting behind me made obnoxious comments when people not sharing their opinion spoke. Add to all of this a warning not to applaud that went unheeded and I chose not to subject my thoughts to the ridicule. I felt that the moderator let the meeting get out of hand and did not take the appropriate action when warnings went unheeded.

The democratic process does allow for all manner of speech, but it needs to include a modicum of civility. It was not present at this meeting.

Sincerely,

Steven L Mason
Lowell, Vermont

Submitted on Tuesday, February 19, 2013 - 11:45 Submitted by anonymous user: [72.171.24.125] Submitted values are:

Name: Noreen Hession
Town: Newark
Organization:
Title: Concerned Citizen

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon:
3) Comment :
Please give the "general public" a seat at the table during the deliberative sessions. To date those invited to sit at the table not only represent a bias against towns, but many sitting at the table represent the players who are actively working against the public interest. Why would developers have a place at the table? It's like inviting Walmart to the table
so they can convince us we don't need country stores in Vermont. Developers
are in business to make a profit. They aren't protecting the interests of the people who live in the targeted areas. No one is.
We need representatives at the table who, as Prof James Lovelock recently said, will not "cast aside our priceless ecological heritage because of a failure to understand that the needs of the Earth are not separable from human needs."
The person who can best represent the protection of our public interest is Annette Smith. She is exceptionally well versed in the issues and has state
wide support from towns under attack. Luke Snelling, Steve Wright and Kim
Fried should also be given a seat at the table. Right now the table is heavily weighted with lawyers who represent developers, developers who represent themselves, and state agencies that don't represent towns and communities under attack. For every seat occupied by someone who represents a developer we should have an equal number of people representing the general public. We know the process, as it exists now, is not working. Giving this kind of weight to the concerns of developers reinforces the current paradigm.
It's not working for Vermonters. It's simply not fair. Please ensure there's a modicum of fairness and give the small towns an equal say.

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/815

Submitted on Monday, February 18, 2013 - 03:38 Submitted by anonymous user: [68.114.49.228] Submitted values are:

Name: John Sales
Town: Barre Town
Organization:
Title: energy background - retired

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon:
- Biomass
- Oil
- Wind
- Other Energy Sources, Facilities or General Comment

3) Comment :
VERMONT'S WIND MORATORIUM IS ILL ADVISED

In the three years of Vermont's proposed wind moratorium, production in North Dakota's Bakken average fracked shale well will decline 80%. And new Bakken wells are producing less than the first-drilled just six years ago.

Huge rig numbers, little need for additional exploration, inherent fast decline in shale wells, strong demand, and artificially low pricing promote waste and argue for depletion within 20 Years. With the only energy source large enough to convert to renewables gone, energy will go critical. An all-out effort towards renewables and Liquid Fluoride Thorium Reactors is imperative.

Before fracked shale, U. S. conventional oil production was about half of demand and declining. With both fracked shale and conventional oil production declining, America will be almost without domestic production in 20 years.

Meanwhile, China is locking in Middle East conventional production, that will last decades longer than fracked shale's. The petroleum industry and government are telling us what we want to hear, not what we need to hear. We drilled 4,200 Bakken wells in six years - of course production increased a
100 fold - that's just hype. Peak oil is an 800 pound gorilla, about to get out of its cage - when lower 48 conventional oil peaked in 1970 there were options elsewhere, not now. Including Middle East wars and artificially low gas prices promoting waste, petroleum is subsidized millions to one over renewables.

Moratorium advocates don't grasp the alternative. With better alternatives, fracked shale's situation would shut rigs down, but alternatives are few. Escalating oil prices will keep them drilling and massive over-fracking can keep them producing dregs, ruining both surface and ground water supplies. Black market prices will sink the economy. Shift to Tar Sand Oil may tank the environment, and tar sand oil will remain economic only with rising prices. Escalating oil prices will denude our forests, coal will belch - massive global warming. Renewables are rosy by comparison - even now electric vehicles on renewable power, can drive for a fraction of gas guzzlers.

Converting to renewables with energy from renewables would force us to steal from gas tanks and furnaces. We have to convert before Oil's decline, and a wind moratorium isn't common sense, especially since we have had the conversation they suggest in the runup to each new wind development - Their energies would be much better focused on getting a thorium LFTR reactor paired with each of Vermont's thirty odd VELCO substations. These could replace ridgeline wind, behind-the-dam hydro, Vermont Yankee, and would be completely safe. Giving America's Greenest, most resilient and most load-responsive electric grid. Ridge lines, free flowing rivers would remain pristine and our uranium nuclear waste and risk miscarrage would finally terminate.

John Sales

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/807

Name: John Sales
Town: Barre Town
Organization:
Title: energy background - retired

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Other Energy Sources, Facilities or General Comment
3) Comment :
THORIUM(LFTR) REACTORS PAIRED WITH VERMONT'S SUBSTATIONS A SAFE, RELIABLE, CHEAP AND TRULY GREEN ELECTRIC GRID

We need an electric grid that is 24/365 reliable, robust enough to support a massive shift to non-carbon fuels, and flexible enough to handle both grid spikes and loss of part of the grid to natural disaster. It shouldn't generate plutonium or bad waste of high toxicity and duration. Renewables can contribute substantially but can't in time for petroleum shortfall and they are intermittant and can't handle daily grid spikes. Though technically renewable, biomass is dubious - generating no electricity, emitting significant CO2, while preventing the sequestering of even more.

Liquid Fluoride Thorium Reactors (LFTRs) could potentially out compete all other forms of generation. They are not a "tweak" of the same old uranium plutonium reactors, but a completely different material and concept. They are safe, clean, and can be refueled, ramped up, or damped down to match grid power requirements, while online. Thus generating 24/365. Unlike petroleum or uranium, with a thousand-years of thorium, there's no foreseeable LFTR energy cliff. In contrast, uranium reactors are inefficient, unsafe, generate bad waste, and are shut down for refueling and maintenance, averaging a quarter of the time. They can't adjust to fit the power curve, and uranium is in short supply.

Because of their safety and size adaptability, a LFTR can be matched with each of Vermont's 30 odd VELCO substations, resulting in ultimate grid reliability. They could replace biomass, ridge wind farms, and power dams, producing Vermont's total electric load at about 2000 MW, with thirty LFTRs averaging about 70 MW, (about the energy size of larger power dams or wind farms, but the actual size of a house). Compared with uranium plants, LFTRs are safer, cheaper, size-adaptable, and can't be used to make bombs. They generate meager waste volume and isolation requirements. There's a thousand year supply of thorium in the U. S., vs a supply shortfall for world uranium. LFTRs are so safe from radiation that the car version on the drawing boards can protect passengers with the equivalent of one layer of aluminum foil.

Thorium is hugely energy-dense and efficient, requiring vastly less fuel and generate vastly less waste. Most of that waste can be reused in industry and medicine, and the rest requires isolation for only 300 years, compared with say 300,000 years for uranium waste. Half the heat in u-plants doesn't generate electricity, but is lost to the atmosphere via cooling towers and heated rivers. In contrast, to fully utilize LFTR's unique features, a housing or office complex should be integrated with the LFTR for co-generation. Electricity goes to the grid, heat to this complex, which has the cheapest heating bills in Vermont. Thus, Vermont's global warming contribution would be reduced to near zero - Vermont's grid entirely secure. LFTRs are being stonewalled by politics and turf protection. Vermont could break this log jam for America, just as they did with Civil Unions.
Google U-tube, Richard Hargraves and Kirt Sorenson - LFTRs.

John Sales

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/808

Submitted on Monday, February 18, 2013 - 03:53 Submitted by anonymous user: [68.114.49.228] Submitted values are:

Name: John Sales
Town: Barre Town
Organization:
Title: energy background - retired

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Other Energy Sources, Facilities or General Comment
3) Comment :

THE FARM-WIND ALTERNATIVE

Gigantic turbines on ridge lines generate huge and enduring controversy - here's an alternative: Instead, have intermediate-sized turbines* in each of our several thousand farmer's fields. Rather than subsidizing multi-state conglomerates to build the big ones, give subsides directly to farmers to build the intermediate sized ones. Give them a second crop in every field that would both help keep them in business, and lower food prices. Wind may not be 24/7/365 on a single turbine but, compared with the fluctuations of weather, farm bills and energy prices farmers face, their own wind turbines would be very stabilizing - the wind wouldn't stop blowing when milk prices plummet.

With the exception of high ridges, Vermont's best farmland and wind resources coincide. Our best farms and winds are in the Champlain Valley lowlands. There's a reason - the rougher the topography, the higher you have to go to get adequate wind - the top of Pikes Peaks may have the strongest winds, but the Great Plains out east of it is one of the world's greatest wind resources. Compared with the Adirondacks and Greens, the Champlain Lowlands are a little like the Great Plains.

An entire wind farm takes up a lot of real estate, compared with the amount of power it generates. However a single wind turbine generates a lot of power compared with the small footprint of its base. In a farmer's field a turbine might displace a cow or one row of corn equivalent, but not much more. (I checked out a Northwind 100 - its pole base is less than 6 ft in diameter and its concrete pad less than a very small one-car garage.) As long as the turbines sit on poles without guy lines, they might fit in the waste space farmers leave anyway - at the ends of their rows to turn their tractors around.

We usually analyze economics just in terms of cost vs production. But this is more than dollar-cost economics - not just the power the turbines produce but the farms they help save, the disadvantaged kids that have less expensive milk to drink, a fuller Food Bank, a more-resilient distributive and home grown electric grid in an ice storm, paid employment in a new skill for farm kids to keep them on the land, and viewscapes that don't grow back to stubble. Far from degrading Vermont's tourist appeal, in balance, farm wind turbines might enhance both tourism and our total well being.

*Northern Power System's Northwind 100 nominally generates 100 KW. One in each of Vt's 5000 farmer's fields would generate 500 MW, about the size of Vt Yankee (600 MW). This works out to between one and two turbines per farmer, less than one per field. NPS turbines are produced in Barre, Vt. This is the turbine we all see as we drive through South Burlington Vt. on I-89. A test NW-100 in Nova Scotia produced 225,000 KW/year. Green Mountain Power pays 4.6 cents / KW. If I've done the math right each farmer would get a little over $ 9000/year/turbine. Turbines promoted by John Deere in the Mid West return 12-15% on investment, pay off in 8 years, 12 years of profit.

John Sales

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/810

Submitted on Monday, February 18, 2013 - 04:14 Submitted by anonymous user: [68.114.49.228] Submitted values are:

Name: john Sales
Town: Barre Town
Organization:
Title: energy background - retired

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Other Energy Sources, Facilities or General Comment
3) Comment :
THORIUM - A BRIEF HISTORY

Thorium can out compete every other energy source in terms of cost, safety, simplicity, versatility, environmental friendliness and resource availability. This means that every other energy form lobbies against it. Since energy is the biggest lobby, no other commodity has ever had such an uphill political battle, even though its science is sound and proven.

Alvin Weinberg engineered the first uranium reactor for Rickover's submarines. That design was borrowed for onshore reactors. Weinberg became uneasy and stated his case - submarines have unlimited access to infinite water for cooling and onshore reactors don't. They rely on pumping water uphill, and pumps can fail...as they later did at Three Mile Island, Chernobyl, and Fukushima. Never the less, it was before any of these accidents and President Nixon put it succinctly - this is the cold war, our main goal is atom bombs - we want this technology!" It was easy to siphon off as much plutonium as needed from uranium light water reactors without anybody noticing.

Weinberg then quietly invented the Liquid Fluoride, Thorium Reactor (LFTR) - melted fluoride salts in a tank, sprinkled in thorium, shot it with a plutonium gun (thorium is not a self-starter) and the results were amazing - got too hot, the salt expanded, less thorium was bombarded, and it cooled.
Got too cool, the fluoride contracted, more thorium was bombarded, and it heated back up - the thing was completely self regulating without pumps for cooling. If that wasn't safe enough, he put a drain pipe in the bottom down into a drain tank, and put a plain old fan on the pipe to freeze the fluoride as a plug - power went off, the plug melted, the reactor drained itself, and more reaction was impossible.

The President asked, "but can it make bombs?" Well, no - there's one particle in the decay chain that could - the particle from hell - working with it would be like trying to train a rattlesnake to be a lap pet - no it can't make bombs. The president said, "well then, shut it down."
Weinberg retired with an offer he couldn't refuse - after re in Oak ridge National Laboratory (ORNL) for about half a century. You could probably start it up tomorrow morning, but the uranium lobby would play hell with Congress.

Thorium, occurring with raunning flawlessly for 5 years, the first and only working LFTR has sat in storagre earths, has no market - stockpiled around rare earth mines - rare earths being our most strategic minerals, critical to high tech. There's an estimated 1000 years of thorium in Montana, lots elsewhere. China has a monopoly on rare earths we'd brake if we utilized thorium. China sent a delegation to ORNL to study Weinberg's LFTR, ostensibly to partner with the U. S. in developing it. The delegation was headed by the son of former Primer Deng Xiaoping - this translates to China's highest priority. That son made the comment that China might try to patent the LFTR??? Meanwhile Obama's science advisor is worried about corrosion in LFTRs. Engineers say otherwise, and if there is a problem you just drain it and fix it. This is pure stonewalling - it is hard to see how a country could better mismanage a critical resource.

John Sales

Submitted on Monday, February 18, 2013 - 04:23 Submitted by anonymous user: [68.114.49.228] Submitted values are:

Name: John Sales
Town: Barre Town
Organization:
Title: energy background - retired

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Other Energy Sources, Facilities or General Comment
3) Comment :
LFTR TOWN OF THE FUTURE
SAFE, SELF SUSTAINING AND SUPPLIES ALL ENERGY NEEDS

John Sales - draft

The purpose of this essay is to sketch out a completely self-contained and self-sustaining town that supplies all its resident's energy needs. Key is the Liquid Fluoride Thorium Reactor (LFTR, pronounced "lifter"). LFTRs are light years ahead of current uranium plants in efficiency, resource availability and safety, and can't be used to make bombs. LFTRs are hugely more efficient at utilizing their fuel, produce vastly less waste per unit of fuel, and that waste is vastly less threatening - 300 year isolation for thorium, several thousand to several hundreds of thousands of years of isolation for uranium. In contrast with the 600 people necessary to keep even a small uranium nuclear reactor in operation and safe through intense training and eternal vigilance, the few needed to run a lifter can pull the plug on it, and go fishing for the weekend.

Picture a purposefully jagged looking wheel visible on a satellite image, with a LFTR plant in its center. The spokes are buried radiant (water) heat pipes augmented as necessary with more radiant electric-resistance heat wires. These generally follow the radial streets and pedestrian walks which are ice free because of it. A pedestrian park surrounds the LFTR power plant.
Municipal and shopping complex buildings surrounding the park. Town parking surrounds that, residential areas still farther out, and then farmers fields.
The inner parts of farmer's fields are dominated by greenhouses that are heat-augmented from the radiant coils from the power plant, as are all buildings inbound from these.

In effect, we have turned an entire town, rather than the atmosphere via cooling towers, into the thermal sump for the power plant. Rather than loosing the heat to the atmosphere, we are heating a whole town. It contributes minimally to global warming, with almost no contribution via CO2.

Beyond that is ranch, range land, forest, free range and wildlife corridors.
The ranch area (fenced) and range land (unfenced) is dominated by grazing animals, un-guyed wind turbines, sun following solar, and wild life hedges and corridors. Feed lots are heavily taxed and frowned upon - almost all cattle are grass fed, not just grass-finished. Free range fenceless corridors snake through the most remote areas between towns. Fenced ranches gate into this fenceless corridor and cattle drives to railheads are a common occurrence, with trucking to railheads taxed. Shades of "City Slickers", dude ranches with real cattle drives to market are a big tourist attraction.

Since this is a "commons" it is minimally but effectively controlled with an "Allen Savory" philosophy - strong herd trampling and fertilization, interspersed with adequate rest - mimics the great buffalo migrations of the Great Plains and the Sarengetti and produces maximum grass.

In areas with fire potential there are mandatory grazing sequences (cattle - sheep - goats). Forests and wood lots

are managed for a combination of timber harvest, wildlife refuge, and fire suppression - wild fires kill endangered species, trees, and people. Thus both wood lots and range is managed to eliminate fire danger. Scientific management dominates - litigation to shut down ranching and logging is a thing of the past. There is no external input to this town - it is completely self sustaining.

Parking meters with electric vehicle recharging plugs line both the commercial - municipal inner, and the residential outer, side of the parking area. Electric vehicles park free, drive almost free, and pay for recharges at utility rates - roughly 1/3 of current gas rates. With an antique fossil fueler, you plunk in quarters traditionally, besides paying for gas (which is by now at least ten dollars /gallon). There is every indication that kwh costs will go down with LFTR, and that gas costs will continue to escalate with peak oil/ international strife.

Pedestrian walks and car parking areas are ice-free year around, without the use of salt. Everybody walks or rides horses or bicycles everywhere - outward to get fresh food from the farmers, inward to do other shopping. Out into the range land and forest for recreation. The inner park is landscaped with gigantic pines nearly masking the, by comparison, diminutive LFTR power plant. (LFTRs need neither giant containment buildings nor cooling towers - super cheap and reliable compared with uranium-plutonium reactors.) The outer part of the park is lined with bistros, etc., with a permanent glass shelter roof, keeping all pedestrians out of the weather when walking shop to shop.
This same glass roof-sheltered walk lines the parking side of the buildings, and maybe both sides of the residential area. (The St. Hubert Walking Street, in Montreal is an excellent template for this). Glass may be replaced by opaque in the southwest, to protect from the sun.

Within these broad parameters it would be business as usual. Both commercial and residential real estate owned, bought, and sold as usual. I would however hardily recommend return to the row-house model - An acquaintance lives in one in Montreal and, between its two heated walls and Hydro Quebec, their heating an utility bills are between a fifth and a tenth of comparable space in normal US suburbia. With the substantial fenced back yards and alley behind there is actually considerably more privacy and room for individuality in a row house than in “fish globe” suburbia (where covenants dictate the amount of lawn and what you can put on it). In row houses, one back yard can have wrecked cars, the next truck gardens, a third a pool with nothing but skinny dipping, and the forth a Zen Buddhist shrine. The point is no one knows or cares what is going on in other back yards as long as minimum smell and noise standards are maintained.

Here’s some crude math to think about: If only 1% of uranium but 99% of thorium is “burned up” in the nuclear reaction, the latter is roughly 100X as efficient. If half of uranium’s 1% of usable energy is lost as heat to the atmosphere via cooling towers, that brings uranium’s efficiently down to .5%. If a LFTR-centered town recaptures all that half of heat that uranium dissipates to the atmosphere, by heat pipes under walks and pavement, buildings, residences and greenhouses, there’s another huge energy leg up. Arguably, thorium LFTR in this town is X200 more thermally and electrically efficient, produces X200 less waste, and that waste is hazardous for only 1/200 as long.

It should be pointed out that almost everything in this “futuristic” town is based on existing technology: Both hot-water and electrical-resistance floor heating are old technology - because of Norway’s super good hydro electric system, all houses had heated floors, walk in refrigerators, and universal saunas when I worked there in the 80s. Plug-in charged electric vehicles? Electric forklifts have dominated for a hundred years. Batteries have gotten so good that by now the all-electric Nissan Lief and Chevy Volt are very viable options. If every town was a LFTR town, you could drive coast to coast almost free.

What America needs is to sit down by itself in a quiet room and completely rethink the concept of freedom: The basic concept is simplicity itself - you are free to do anything as long as you do not impinge on the right of others to do the same. Right now we are impinging big time on the rights of others - our own grand children. We do this with a faith-based conviction that technology can always get us out of the mess we have

made of things. I strongly resist this nieve assumption - we are overwhelming all our children's basic support systems with our "9 billion people - all wanting America's standard of living" freedom spree. The party has to wind down, we can't have our cake and eat it too. This LFTR town is a step toward sanity and deliverance. Uranium-plutonium was a gigantic step in the wrong direction that needs correcting. With Lifter towns there's even room for cowboys and cattle drives. Head em up and move em out - we're burnin daylight - make the world LFTR-centric!

John Sales

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/812

Submitted on Sunday, February 17, 2013 - 15:05 Submitted by anonymous user: [69.54.29.80] Submitted values are:

Name: James Tabor
Town: Waitsfield
Organization: Vermont taxpayer and voter
Title:

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon:
Wind
3) Comment :
I'm an advocate of all alternative energy forms, including industrial wind power, when appropriately used. Three years ago, an out of state industrial wind company, Citizens Wind, tried to force an industrial wind facility on the Northfield Ridge, overlooking the Mad River Valley--surely one of the most inappropriate applications ever proposed. This caused many of us to learn a lot, quickly, about industrial wind. I can boil the had lessons down to a few essential points:
1. Wind technology is already obsolescent 2. Industrial wind companies' primary concern is profit; all else, including environmental preservation, is irrelevant.
3. Without federal subsidies, these companies' project would not be profitable, and they would have no interest in Vermont 4. Vermont is one of the nation's most wind-poor states. Even the precious ridgelines don't provide sufficient windpower for industrial-scale facilities.
5. The Public Service Board was worse than useless in protecting our towns', and the public's interests and, in fact, gave the appearance of serving the wind companies, rather than the public. As a result, Waitsfield amended its Town Plan to specifically forbid ridgeline industrial wind facilities.
I urge the state to adopt a three year moratorium on wind development here.
AND to get rid of, or reform, the abominable PSB.

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/805

Submitted on Friday, February 22, 2013 - 11:33 Submitted by anonymous user: [74.114.16.207] Submitted values are:

Name: Joel Cope
Town: Brighton
Organization:
Title:

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Wind
3) Comment :
From: Joel Cope, Brighton
To: The Siting Commission:

The Lowell CPG decision shows that the 248 process has actually been thwarted, and used as a whitewash to implement a state goal for renewable energy. For example, in the Lowell decision, the board adopts the Quechee test to address esthetics (p 82), and acknowledges:

"No party disputes that the proposed project would have an adverse aesthetic impact." (p83)

The adverse impact is undue if you can answer Yes to the following question:

"Does the project offend the sensibilities of the average person? Is it offensive or shocking because it is out of character with its surroundings or significantly diminishes the scenic qualities of the area? "

Note they have already admitted that the turbines "due to their sheer size and industrial nature, are out of character with the predominately rural surrounding area." (p83)

On page 84, "The Department concludes that average persons within the area in and around Bayley Hazen Road heading west from Albany will be shocked or offended by this project, and therefore, the project has an undue adverse aesthetic impact on people in this area." (p84)

GMP argued that there are limited views of the project area, so the average person doesn't get to look at them that much and therefore they can't be offended. The corollary here would seem to be that if the average person did get to look at them, they would be offended. In other words, the project is only offensive if you look at it. Tell that to Vermont tourists.

By page 89, the board, apparently sensing an esthetic conundrum, is backing away from the Quechee test:

"Nothing in Section 248 requires the Board to utilize the Quechee test exactly as it was developed by the Environmental Board…."

Ergo:
"We further conclude adverse effects around Bayley Hazen Road are not undue, in light of the societal benefits of the proposed project." (p 90)

Two objections: 1) the concept of "societal benefits" as compared to 248's "Public Good" should be arguable, but is treated as fact. Its introduction into the quasi-judicial nature of the 248 process is really a bias, ex parte communication. 2) "Public good" and "societal benefit"
are essentially synonymous, and to use the conclusion as a premise to arrive at the conclusion is circular.

On the Lowell case, the PSB had its mind made up before taking any evidence.

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/826

From:
Sent: Friday, February 22, 2013 9:56 AM

Subject: Re: FW: Jenkins: A Spectator's Stake in the Tesla Test-Drive Spat - WSJ.com

Rob,

http://online.wsj.com/article/SB10001424127887324162304578306150070640438.html

See below articles that show, with numbers, plug-in hybrids and EVs are a hoax regarding CO2 emissions reduction.

Note: Regular hybrids, such as the Toyota Prius; 50 MPG EPA Combined, that do not use energy from the grid are great to reduce CO2 emissions.

http://theenergycollective.com/willem-post/171561/co2-emissions-and-chevy-volt-vs-honda-civic-ex-l
http://theenergycollective.com/willem-post/184756/plug-hybrid-mileage-overstated-epa

Willem

From: Rob Pforzheimer

Sent: Fri, Feb 22, 2013 9:08 am
Subject: FW: Jenkins: A Spectator's Stake in the Tesla Test-Drive Spat - WSJ.com

BUSINESS WORLD
February 15, 2013, 6:51 p.m. ET
A Spectator's Stake in the Tesla Test-Drive SpatOh, for the day when electric-car enthusiasts didn't expect the rest of us to subsidize their hobby.By HOLMAN W. JENKINS, JR.
LIKE THIS COLUMNIST

MORE IN OPINION »

Somebody once asked the late, great British motorcycle journalist Kevin Ash about the electric motorcycles then arriving on the market. After noting that most electricity comes from coal, casting doubt on any eco-benefit, he dug in: "The silly small range and long recharge times make them impractical. . . . An entirely new method of storing electricity is needed to transform practicality, and it must be invented (and then refined in labs) first. Developing electric road vehicles using existing technology is a waste and a deception."Related Video Columnist Holman Jenkins on the electric car maker Tesla's vendetta against the New York Times.
Photo: Getty Images

Ash, who was killed last month testing a new BMW bike in South Africa, naturally comes to mind amid this week's spat between the New York Times and Tesla over a road trip from Washington to Boston attempted by a Times reporter in one of the company's electric cars. The car ran out of juice. Recriminations flew.Ecumenically, let's dispense blame to all involved. Tesla certainly has a point that, on such an extended journey, Priorities A through F should be attending to the battery, not keeping up with traffic or enjoying the ride. The New York Times has a point if the purpose of the Tesla-designed exercise was to show the Tesla S can be a worry-free substitute for a gas-powered car on a long trip. It can't.The best point, though, is had by those green-car advocates who say Tesla was nuts to concoct such a PR stunt in the first place. "If an average driver needs such hand-holding from an automaker to make the trip, it's the wrong car for the trip," writes GM's former in-house electric-car enthusiast Chelsea Sexton at Wired.com.The ensuing furor undoubtedly owes much to the fact that Tesla and its affluent fans are heavily subsidized by the U.S.

taxpayer. More power to Tesla founder Elon Musk and his customers if, with entirely their own money, they wish to indulge an interest in electrical vehicles. But that's not the case here, and the delusions of U.S. government policy seem to have filtered into Tesla's public relations.Kevin Ash was right. To subsidize the take-up of immature technologies that can't meet ordinary expectations of the marketplace is a formula for embarrassment, scandal and discrediting the very technology being promoted. We like to imagine coherent government planning. We like to think policy actions are predicated on careful and intelligent anticipation of consequences. But the nature of the beast is otherwise. Any rational coordination of means and ends goes out the window as soon as the political scramble for subsidies begins.Tesla, let's recall, set out to market an electric car before Washington entered the business with its vast and distorting subsidies. Most troubling, to Tesla at least, ought to be the new Obama fuel-economy rules that virtually require the big auto makers to build electric cars and bribe consumers to drive them off the lot in order to create headroom for the cars that auto makers really want to sell. Hard to devise would be a better strategy for discouraging the profitable emergence of a niche maker of electric vehicles.The Ash rule applies not just to electric cars, but to wind farms, solar power and other renewable energy projects, all of which may have potential, all of which would be better served if government limited itself to funding basic research until a technology emerges that the marketplace can support on its merits.Consider the spectacle Germany has been making of itself in this regard. German politicians

decided it would be nice if 35% of the country's electricity came from renewables by 2020. German politicians, after Fukushima, decided it would be nice to phase out the country's nuclear plants. German politicians decided factories should be protected from any increase in electricity prices. In their home districts, politicians thought "factory" should be extended to cover any large and influential employer.Now the green future has arrived and German voters are in revolt over rising power prices. "Fuel poverty" has become a buzz term as thousands have been shut off for nonpayment of bills. Politicians have begun trying to claw back subsidies from companies that say the subsidies are the only reason they're in business. A scandal seems to emerge weekly over some big-name company illicitly benefiting from subsidized electricity rates.Though Germany is burning more coal than ever, though carbon-dioxide emissions are higher than ever, its fossil-fuel plants are going broke while waiting for the wind to die down or the sun to disappear behind a cloud.

Operators at one point were receiving negative prices (i.e., paying) to get customers to accept power created by coal- and gas-fired generators that must be kept spinning in order to support the heavily subsidized renewables.Yet somehow Germany continues to feature as a role model in the rhetoric of U.S. policy makers. One hopes the news will catch up with them before the U.S. economy is stuck on the roadside needing a tow.

From: Rob Pforzheimer
Sent: Thursday, February 21, 2013 1:54 AM
Subject: Excellent Reportage about political wind mess in RI

Interesting vdo from Rhode Island. http://www.hummelreport.org/2.21.2013.wind.html

From:
Date: Wed, 20 Feb 2013 23:05:55 -0500

http://www.hummelreport.org/2.21.2013.wind.html

This deserves widespread circulation, It's a great complement to the political wind mess along the coast of Massachusetts
Jon

From: Rob Pforzheimer
Sent: Wednesday, February 20, 2013 6:38 PM

Subject: FW: Shumlin & Quebec Premier discussion regarding transmission lines in VT

Caledonian Record 2/20/2013
Transmission Questions Arise Following Shumlin Visit To Quebec
James Jardine
Staff Writer
A visit by Vermont Gov. Peter Shumlin to Quebec for a meeting with Premier Pauline Marois on Monday has some people in the Northeast Kingdom wondering if Vermont could be considering ways to help Quebec deliver huge reserves of hydropower to U.S. markets through Vermont.
Following the meeting, Shumlin's office issued a press release detailing a cross-border agreement signed by the two leaders. Among the "areas of agreement" specifically detailed by Shumlin's office is "Strengthening energy cooperation, including continued access to Hydro Quebec power and addressing transmission challenges." Shumlin recently noted that Hydro Quebec has large supplies of hydropower it is eager to sell in the U.S. market. Meanwhile, the "Northern Pass" power transmission project in Northwestern New Hampshire is facing strong opposition in some New Hampshire communities.

Vermont, meanwhile, has a 30-year-old high voltage line delivering Canadian power along transmission lines running through remote areas of Essex County and connecting up with hydro dams along the Connecticut River. At least one map drawn up by VELCO in 2009 showed a possible route through Essex County for a new line parallelling the existing line, should Hydro Quebec wish to dispatch large quantities of power through Vermont and New Hampshire to the southern market. No such power line was ever formerly proposed, according to Kerrick Johnson, Vice President of External Affairs for VELCO. Velco is the transmission company for Vermont utilities.

One Kingdom Senator who would like to see Vermont take another look at moving hydropower from Quebec to Vermont is Sen. Joe Benning, R-Caledonia-Orange.

"I think the idea has merit and needs to be pursued," he said. Benning said for him to back a new line delivering power along a corridor through Vermont he "would have minimal environmental impact" by shadowing existing rights of way. For Benning, additional power generated by Quebec's vast hydroelectric sources could be a welcome alternative to blasting Vermont ridgelines for more industrial wind farms.

Sen. John Rodgers, D-Essex-Orleans is another Kingdom politician who is open to taking a look at more hydropower. He serves on the Senate Natural Resources Committee and said he is finding that the more his committee studies wind turbines as a source of renewable energy, the more he realizes that wind generated electricity is expensive and relatively ineffective at reducing carbon emissions, compared to alternative strategies such as thermal efficiency.

Johnson said no one is knocking on VELCO's door with a proposal to distribute more Canadian power through Vermont. He points out that since the last powerline was built, the Champion land sales created federal protected lands along the present route that could be a factor in building another line.
Further, he points out the present line delivers huge amounts of power to southern New England very efficiently, but there are "no off ramps" along the way, meaning at present the power is not distributed along the way through Vermont. Building a new high voltage power line with off ramps all along the route to serve Vermont communities is quite a different project.

Northern Pass Considered
The New Hampshire Forest Society, too, is unaware of a request or expression of interest by Hydro-Quebec to use the VELCO transmission line right-of-way as an alternative to Northern Pass.
"Any discussion of that for the project would be pretty big news and we haven't heard anything," Jack Savage, spokesman for the New Hampshire Forest Society, said Tuesday.

Savage feels Northeast Utilities (NU), partner with Hydro-Quebec in the Northern Pass proposal, would especially not want a portion of the Northern Pass line to go along the existing VELCO right-of-way in Vermont.

"The reason they don't want to look at it is because Northeast Utilities doesn't control it and their profit margin wouldn't be nearly as great," said Savage.
Northern Pass is working on an obvious route for the line and that route is in New Hampshire, he said.
The Forest Society is actively trying to block that route in Coos County by buying up parcels to put into permanent conservation easements, leaving open the question if Hydro-Quebec would consider taking all or a portion of a Northern Pass right-of-way into Vermont to get around the block and achieve its goal of importing power into New England.

Savage said the Forest Society blocking action is to compel Northern Pass to look at other alternatives to the proposed overhead line in New Hampshire, and the possibility of Hydro-Quebec using the existing VELCO right-of-way would be one of them.

"That corridor has been something any number of opponents who oppose the Northern Pass route have pointed to as a viable alternative," he said.

On Tuesday, NU/Northern Pass spokesman Martin Murray said he has no knowledge of any discussion between VELCO and Hydro-Quebec regarding the VELCO right-of-way.

Murray referenced a May 21, 2011 story in the New Hampshire Union-Leader in which VELCO's Johnson was quoted as saying the line through Vermont is fully used to its design capacity and cannot safely accommodate additional amounts of electricity.

Johnson did not say in the Union-Leader story if the VELCO right-of-way can accommodate additional lines, but did say any attempt by Northern Pass to piggyback on the VELCO route would be complicated by two wildlife refuges, one state and one federal.

When asked Tuesday if Hydro-Quebec is considering the VELCO right-of-way, Hydro-Quebec spokesman Gary Sutherland said, "Hydro-Quebec's partner, Northeast Utilities, is responsible for developing the American portion of the project."

Sutherland said, "This interconnection project was designed in collaboration with Hydro-Quebec's American partner to link the Quebec and New Hampshire power grids."
Robert Blechl contributed to this story.

Best Regards,
Glenda Nye

From: Rob Pforzheimer
Sent: Saturday, February 23, 2013 1:06 AM
Subject: ANCRAM Board votes to revoke wind turbines permits

http://www.registerstar.com/news/article_69385158-7cae-11e2-9cec-001a4bcf887a.html
ANCRAM Board votes to revoke wind turbines permits
Posted: Friday, February 22, 2013 12:30 am
By John Mason Hudson-Catskill Newspapers | 1 comment
Posted on February 22, 2013
.
by **John Mason**
The Ancram Town Board voted unanimously Thursday to begin the process of revoking the special use permits for wind turbines on the properties of Michael Gershon and Joseph Crocco on Carson Road.
Numerous noise complaints from abutting neighbors led to the action. Under the terms of the permits, they can be revoked if the applicant engages in any misrepresentation of fact, said Supervisor Art Bassin, "and that's the case here."

When the Zoning Board of Appeals granted special use permits for the turbines in 2010, the applicants said the turbines were "extremely quiet," "almost silent," according to the resolution.

In fact, the resolution goes on, "it has become apparent that during certain wind conditions, these turbines make groaning and/or hovering helicopter noises that disturb the neighbors' peace and quiet ..."
Bassin said this is the first time in his memory the town has ever moved to revoke a permit. But, he said, revocation is the last resort and he hopes to work this out by meeting with Gershon and Crocco and by their communicating with Mike Bergey, the manufacturer of the turbines.

Bassin also has to talk to the New York State Department of Agriculture and Markets to see whether Crocco's turbine is protected because he has an alpaca farm.

"We are a farm," Crocco said at the meeting. "We comply with everything else that's required. I figured I was safe ... Ag and Markets looks on a turbine as a piece of farm equipment."
He asked for a delay so he could get a determination from that department.

"If not, I can appeal to the Zoning Board; that would stay any action by the town. If not, I could file an Article 78," Crocco said. "I'd like to take the path of least resistance; I don't know how long the state will take to get back to us."

Bassin said he would talk to Bob Summers at Ag and Markets.

"Tonight, I'll ask the Town Board to pass a resolution including you," he said. "My intent is the same as yours: I want the noise to be abated, whatever we can do with Bergey, whenever."
"Any turbine that size is going to make 50 to 60 decibels," Crocco said.
Neighbor Joe Amato said 60 decibels is 100 times as loud as 50.
"Sound is an environmental issue," he said. "We are being exposed to sound waves that have high energies. That was not exposed at the time of permitting."

"The problem is when the wind comes up," said Amato's brother, Sebastian. "In the day you deal with it, but at nighttime, it can drive you crazy. I don't want to hear chuck-chuck all night — it's like a helicopter path."
"I know the sound levels are high when the windows are shaking," said another neighbor.

Amato called it a medical issue, as the noise is impacting people's health.
"A farm cannot dump manure in your house," he said.

The measure was adopted unanimously.
Councilman Hugh Clark said he appreciated the neighborly manner in which Crocco approached the issue.

***
To reach reporter John Mason, call

From: Rob Pforzheimer
Sent: Saturday, February 23, 2013 3:53 PM

Subject: FW: Barton Chronicle-Wind curtailed while power prices soar

"it's a crazy proposal"

VEC CEO, David Hallquist, quoted in the article (below) refers to the Seneca Mtn Wind project proposed by the Eolian wannabee wind developers,

"Asked about the big project proposed for Newark and towns in Essex county, Mr. Hallquist is characteristically emphatic.

"That can't happen. It requires so much transmission upgrade that the affordability is in question. From my utilities managers viewpoint, it's a crazy proposal. We certainly wouldn't support it."

Wind curtailed while power prices soar

by Chris Braithwaite

JOHNSON — If wind-generated electricity ever had a chance to prove itself, it was in the early days of this year. Wholesale electric prices in New England, which fell to very low levels last year thanks to the availability of cheap natural gas, spiked alarmingly in early January.

The problem was a surge in demand for gas by the people who use it to keep warm, and a gas shortage which, said David Hallquist, the chief executive officer of Vermont Electric Cooperative (VEC), was due less to the underlying supply than to bottlenecks in the pipelines that carry the gas to market.

Wholesale electric power costs, which averaged just 3.6 cents per kilowatt hour in 2012, shot up to more than $1 in early January, Mr. Hallquist said.

As the weather moderated, he

(Continued on page thirty.)

"It's a double whammy," says Hallquist

(Continued from page one.)

said Friday, "you expect it to go away. But it hovered at over 20 cents, and right now it's 5.6 cents."

Once the wholesale price of power goes over a dime, the power generated by the Lowell Wind project, in which VEC is a junior partner with Green Mountain Power (GMP), looks quite competitive. A dime per kilowatt hour is about what GMP said the power would cost.

The project met its federal deadline and started making power before the end of last year. How much power is the question.

"We're quite frustrated," Mr. Hallquist said in a February 15 interview.

"During the windy, cold days we're being constrained to ten megawatts, when the capacity is 60-plus megawatts."

He was talking about the power that the regulatory agency, ISO-New England, permitted the Lowell project to produce at any one time.

"It's a double whammy," Mr. Hallquist said. "We've got the investment up there. We spent a lot of money on it, and we're buying power — at a high price."

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SUMNER TIRE

The frustration for VEC is that any power it gets from Lowell Mountain has a marginal cost very close to zero. The utility has agreed to pay a 13 percent share of the project's total costs, but doesn't pay for its share of the power it draws from the wind turbines. Thus the utility's average cost per kilowatt hour depends on how much power the project yields.

Part of the curtailment problem is temporary, but Mr. Hallquist worries that part of it is not.

The solution to the temporary problem will be the subject of a state Public Service Board site visit to Jay on Wednesday, February 20, followed by a 7 p.m. hearing at the Jay Town Hall.

When it did a "system impact study" of the proposed Lowell Mountain project in 2011, ISO-NE called for a "synchronous condenser" to smooth the flow of power into the grid. GMP didn't see the need for such an expensive gadget, and appealed ISO-NE's ruling to the Federal Energy Regulatory Commission. GMP lost the argument, and now hopes to have the $10-million device installed in Jay by this fall.

In the meantime, ISO-NE is permitting the project to make power under constraints that it imposes as it deems fit.

"We believed it was not necessary, and we were wrong," Mr. Hallquist said of the synchronous condenser. He described it as a very large flywheel that is spun by the power coming in from the mountain on one side, and puts out a more regulated power on the other.

Dorothy Schnure, a spokesman for GMP, said Tuesday that once the project is complete and ISO-NE's technical constraints are lifted, the wind project should live up to its stated capacity of generating 32 percent of its nameplate capacity of 63 megawatts of power, after wind variations and other factors are taken into consideration.

Mr. Hallquist didn't sound so sure, on Friday.

He said the condenser would solve a "large percentage" of the Lowell project's production shortfall. But he noted that the Sheffield wind project, which sells power to VEC, has so far performed at 23 percent of capacity, well below its 32 percent target.

"Since we're plugging our project into the same grid," he said of Lowell, "it's not going to do better."

ISO-NE and the nation's six other regional grid authorities function on technical, operating rules, he said, "not market rules."

"Their object is stability, not running economically."

And, he added, "they don't like interruptible renewables" like wind and solar power.

Keeping supply and demand in balance over a large region, with no way to safely store excess energy for later use, requires a lot of what Mr. Hallquist calls "spinning reserve capacity." Most of that comes from gas-fired plants, which supply about half of New England's power.

And if that spinning reserve isn't available, he explained, ISO-NE won't allow wind projects to come on line.

Another problem for new wind projects, he added, is that when the power supply has to be cut back to meet demand, "the last generator that goes on gets the brunt of the curtailment."

(Continued on page thirty-one.)

VEC seeks state moratorium on all renewable energy

(Continued from page thirty.)

Lacey Ryan, an ISO-NE spokesman, discussed the regulator's approach in an e-mail Tuesday:

"ISO New England operates the regional power system to make sure that the amount of electricity produced is in balance with the consumer demand for electricity — and the ISO does this in the most economic manner possible while maintaining the reliability of the power system. The ISO is agnostic when it comes to resources — we don't advocate for one type over another. The ISO uses an economic dispatch approach when scheduling generators to run. This means that the ISO selects the least expensive, available generators first to maintain reliability and meet real-time consumer demand for power, regardless of the resource type."

"There is really not enough experience with this — integrating with the grid in New England," Mr. Hallquist said.

That may be among the reasons the VEC board voted on December 28 for a resolution asking the state Legislature "to impose a moratorium for a period of up to two years on further renewable power supply mandates."

Mr. Hallquist emphasized Friday that the resolution speaks to all renewable sources, not just wind.

"We do not support a wind moratorium by itself," he said. "It should be on all renewables, while we take a look at the entire issue. I can equally bash all power sources."

While he insists he's not opposed to renewable energy, Mr. Hallquist believes this region already has its fair share.

"The Northeast Kingdom is tapped out in terms of renewables," he said. "We've got twice the penetration of the rest of the state."

Asked about the big project proposed for Newark and towns in Essex County, Mr. Hallquist is characteristically emphatic.

"That can't happen. It requires so much transmission upgrade that the affordability is in question. From my utility manager's viewpoint, it's a crazy proposal. We certainly wouldn't support it."

Asked if he has any regrets about supporting VEC's 13 percent participation in the Lowell project, Mr. Hallquist takes a moment.

"It's funny," he said. "You never have regrets when you make a decision with the information you have at the time. If we're trying to attack climate change, you have to address all these issues, and you will have fits and starts.

"As a utility manager I can't help thinking about my first goal — to keep the rates low. To solve climate change is going to cost money. But how much can you put on the backs of people who can hardly pay the rent or buy groceries?"

contact Chris Braithwaite at chris@bartonchronicle.com

Border Truck Equipment

From: Joe Arborio
Sent: Saturday, February 23, 2013 5:33 PM
Subject: Fwd: Lowell Industrial Wind Turbine Visit by Joe Arborio, Brighton, Vt.

The following letter and another you will receive from my wife were written after we won two of the four lottery seats the Siting Commission held for visits to the Sheffield and Lowell Industrial Wind Turbine projects.
They tell us the "charge" of the Commission prevents them from visiting sites with ongoing applications. So, we have a Siting body not allowed to visit sites. And you wonder why the publics' faith in politics has eroded.
Placate, distract dissenters, keep the busybodies busy.
We do so hope we're wrong. Please prove us wrong.
Pam and Joe Arborio

Sent from my iPad

Begin forwarded message:
From: Joe Arborio
Date: February 23, 2013 11:21:21 AM EST
Subject: Lowell Industrial Wind Turbine Visit by Joe Arborio, Brighton, Vt.
Lowell Industrial Wind Turbine Visit by Joe Arborio, Brighton, Vt.

On Tues. , Feb. 12th I toured the Lowell Mountain Wind project with the Govenor appointed Siting Commission, Green Mountain Power officials and the press. Our GMP guides were cordial and forthright. They answered every question asked and did not appear to dodge, evade or mislead. For instance, they admitted using carbon base power (when the turbines are not producing they use a parasitic load, drawing electricity into the turbines from the grid). GMP admit they won't know if the efforts to reduce runoff and rebuild the environmental destruction will work for a few years. We saw the entire project and they even gave us the formula to figure out how much dynamite was used in blasting for pads and roads.

The tour to look at the Industrial Wind Turbine's (IWT's) and their pads took us to the top of the Lowell Mountain Range on 16' wide roads and, at one point, we were able to see down both sides of the mountain, a 100' drop. Reaching a height of 2,600 feet above sea level I was devastated to realize both headwaters and Class A streams were buried under roads and construction pads. I found the use of Level Spreaders in controlling runoff to be no more than the placement of glorified water bars. This doesn't appear to be the solution needed to replenish aquifers that should ultimately distribute water through underground channels, creating small bogs and pools to support the ecosystem and wildlife.

The PSB has decided 30 Db. is an acceptable sound level for the inside of homes with proximity to IWT projects. To me any sound, thing or person that comes into my home day and night uninvited is unacceptable. Vermonters have a right to protect our homes and sound is as much of an intruder as someone walking through your front door at 3am.

The Lowell project is a done deal. We should not be naive enough to think they're going to tear them down. The result is a project with huge impacts on headwaters, aquifers, bear habitat, the tops of Lowell ridgelines being leveled, cuts that blasted through ledge to make roads and all for the sake of producing more electricity than can be used. It just doesn't make sense.

In my opinion the PSB should have thoroughly investigated Lowell as a proposed project. It should have included financial background checks, the true ecological impacts (not allowing nearby conserved land as a trade off for the destruction of rare ecosystems and bear scarred beech groves and the destruction/covering of headwaters) and, most important, an approved application to ISO New England acknowledging power from the

proposed site would be accepted on the grid. Lowell/GMP is now faced with a 10.5 million dollar upgrade being added in the hopes it will help stabilize the unreliable power inherent in Industrial Wind turbines. Of course the 10.5 million and an additional 20 million spent on larger turbines and blades will be passed on to ratepayers.

A moratorium on IWT's is needed not for 2 or 3 years but 10 years to learn from projects like Lowell. Vermont's ridgelines are one of our most precious assets. Please don't build new wind projects because you think they're "green". They destroy bear habitat, disrupt wetlands, headwaters, violate The Clean Water Act, disrupt bat and avian migration and violate the rights of abuttors. They affect area homes and neighboring towns with unwanted sound, blinking lights and lose of property values. What, for hundreds of years, was a peaceful hike to the top of a beautiful mountain is now surrounded by

NO TRESPASSING, KEEP OUTand DANGER signs. Is this how Vermont wants to be viewed?

Joe Arborio, Brighton, Vt.

From: Pam Arborio
Sent: Tuesday, February 19, 2013 9:12 AM
Subject: Visit to Sheffield, Vt. Industrial Wind Turbines by Pam Arborio

Visit to Sheffield, Vt. Industrial Wind Turbines by Pam Arborio

The Governors Siting Commission held a lottery to choose four citizens to accompany them on visits to the Sheffield and Lowell Industrial Wind Turbine (IWT)projects on Feb. 12, 2013. As luck would have it both my husband Joe and I were chosen, his draw was to visit Lowell, mine was the Sheffield visit.

The opportunity to spend "quiet" time with Commission members and to view the turbines was an enormous responsibility. We carried the entire community fighting future IWT development on our shoulders. This responsibility was not taken lightly.

Before and after pictures were gathered and studied. Reports of the developers process, issues relating to water runoff, destruction of wildlife habitat, ecological damage and noise complaints were some of the issues studied. Lists of questions for the developers, both from ourselves and others involved in our battle, were drawn up. Finally the day arrived.

Joe has already written of his observations during his Lowell tour, the following comments will address my visit to Sheffield.

Never having visited Sheffield before and unsure of our downloaded directions we stopped at the Barton Municipal offices to ask directions. The first question they asked was"Do you have permission to visit the site?" This simple query was the first of a series of contradictions that would unfold this day.
As we drove the miles of dirt road leading to the turbines they were nowhere to be seen. Visibility was poor, the snow and wind masking the project.

We joined the Siting Commission, press and videographer in First Wind offices at the base of the mountain. A "canned" presentation followed, questions from the Commission answered politely but questions I poised were either brushed aside, given no weight or, as would continue throughout the visit, answered with an arrogant, snide remark. The answer to a direct question about issues with the Clipper rotors was total misinformation, the infrasound query discounted and when I asked about water monitoring on the mountain they laughed saying "what sense would that make, the issue was water quality at the base not on the mountain itself". I found most of the presentation and tour a lesson in frustration.

We all squeezed into a snowcat (picture 12people in a Volkswagen), windows fogged inside, low visibility outside. As we drove up the 14' wide road the few turbines we could see at the base of he mountain came into view. Their placement made them appear the the blades might hit the ground as they slowly turned. As we often hear, the ISO had again today curtailed the ability of the Sheffield turbines to produce at full capacity. How often did this happen? Often enough to make one wonder why no one had investigated this problem long before a project of this magnitude was built!

We continued on the roads blasted through rock to arrive at the only site we would be allowed to physically investigate. Standing on the largest pad of the project, wind whipping, snow swirling I saw the monstrosity of my nightmares for the first time. There are no pictures taken that show just how huge these turbines are. The thought of 35-40 even larger turbines and blades marching down the ridge lines above Newark, Brighton and Ferdinand is terrifying. The stories of there being no sound as you stand under the turbines is false. They are very loud and it was easy to imagine that noise projecting down the mountain and traveling out across the valley. This was the one fact First Wind admitted readily, turbines produce noise, close and at a distance.

The pad was surrounded by blasted rock and what appeared to be piles of rubble. I asked how much dynamite had been used in the building of the roads and pads. The answer to a frequently asked question:" we have no idea", this from the construction manager and developer.

Having studied a map of the Sheffield turbines and reading of other visitors experiences I asked why no one was taken to visit a group of turbines further up the mountain. I knew an important scarred beech feeding ground for bears had been destroyed in that unseen area. My understanding was ANR made First Wind conserve land in two other places to compensate for the destroyed feeding ground but the conservation lands were separated by a mile of roads and subsequently logged. Are there beech trees left in the area? We don't know. Again my question was ignored, what I believe to be the access road not even plowed.

Since our schedule for the day was tight, we spent no time on our return to the base discussing what we'd seen. Oh, and by the way, although the staff in Barton questioned us with suspicion, First Wind invited us back anytime to hike up the roads as long as we parked near the main road. Strange the people in Barton wouldn't know that!

Because of misleading answers, the attempt to evade important questions, the definite sense First Wind management were only concerned with a Dog and Pony Show for the Siting Commission I would be naive to believe the figures presented and discount their attempts at transparency.

Sadly, the destruction to the environment, wildlife (particularly the bear feeding areas), headwater damage, health issues and a major problem with grid instability were pushed aside by the PSB "to serve the greater good". Can this outcome be justified by our legislature as Vermont's path to independence from fossil fuel ? Will curtailing and low wind continue to increase the use of electricity from the grid to stay operating?

A moritorium may bring common sense back into the equation. Completed studies in Canada and Europe on infrasound and health issues should be part of an investigation into the question of IWT's being the solution in our state to lower CO2 emissions. Instead of millions in subsidies going to out of state, foreign developers reward smaller municipal and personal solar and wind efforts. Encourage weatherization programs providing grants or loans to those of our own citizens and small businesses unable to afford expensive renovations. Instead of allowing Big Wind to tear apart our communities and families encourage working together as we New Englanders always have to achieve our goals. But our mountains, the very heart of Vermont, should no longer suffer the destructive footprint we see in every IWT project built to date.

Pam Arborio, Brighton, Vt.

From: Pam Arborio
Sent: Saturday, February 23, 2013 5:43 PM
Subject: Fwd: Visit to Sheffield, Vt. Industrial Wind Turbines by Pam Arborio

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Pam Arborio, Brighton, Vt.

From: Lynn Barrett
Sent: Saturday, February 23, 2013 4:15 PM
Cc: PSB - Clerk; Governor Peter Shumlin
Subject: Wind Talk II in Grafton

Lynn Barrett
Publisher, SO Vermont Arts & Living
President, Primetime Concepts, Inc.
East Coast Rep, The Bohle Company

www.vermontartsliving.com

WIND TALK:

A Discussion with Legislators and Citizens

What Grafton/Windham Residents and All Vermonters Need to Know

Please join us for a panel discussion on industrial wind development in Vermont with special focus on the proposed facility in Grafton and Windham.
All are welcome and invited to ask questions.

Speakers:

Senator Peter Galbraith, D-Windham
Senator Joe Benning, R-Caledonia
Lisa Linowes, Industrial Wind Action
Noreen Hession, co-chair, Newark Neighbors United
Steve and Luann Therrien, Sheffield residents

Moderator:

Ken Dufort, former Grafton Town Moderator

Friday, March 1
6:30 p.m.

Grafton Elementary School
School Street

FREE Pizza and beverages will be served.

Organized by Friends of Grafton's Heritage

Friends of Grafton's Heritage
P.O. Box 52
Grafton, VT 05146

facebook.com/FriendsOfGraftonsHeritage
fgh@vermontel.net
802-843-2447

From: Suzanna Jones
Sent: Monday, February 25, 2013 12:00 PM
Subject: comment

To the Energy Siting Commission:

Commission member Scott Johnstone recently said: "The challenge for us is to find the Vermont way … to move to a renewable platform and do it in a way that is keeping with the splendor and beauty of the state we live in." Sadly, many Vermonters feel that the "Vermont way" has become a thing of the past, a notion that survives only in tourist magazines and the occasional bumper sticker. Why? Because massive corporate-driven development projects that split our communities and destroy the environment are being rammed through with no real public input.

Once, the Vermont way meant that people in their communities had a real say in decisions affecting their lives. It wasn't perfect, but people all knew each other and were aware of who might be exaggerating a benefit, downplaying a consequence, or standing to gain financially on any given issue.

Now we have the "Shumlin way", and it's what you'll find in any other state: lobbyists, lawyers, and bribes give corporations the right to exploit our landbase, with full support of the politicians.

Welcome to the era of industrial wind. Because of federal subsidies, state mandates to purchase "green" power, and Shumlin administration boosterism, wind developers have invaded Vermont in a 21st century version of the gold rush. For these developers, climate change is little more than a marketing tool. They have only one agenda: profit.

There *is* a Vermont way to deal with our carbon emissions. Since electricity use accounts for only 4% of our emissions, the main focus should be home heating, industry, and transportation, which account for most of the remaining 96%. And the most important thing we can do in *every* sector is to reduce consumption through both efficiency, conservation, and lifestyle changes.

We hear that no energy source is perfect and that we all need to make sacrifices. True enough. But the assumption is that we should continue to sacrifice nature in order to feed our sense of entitlement for things we don't need, like water parks. However, the reverse is true: it is time to sacrifice some luxuries for the benefit of a healthy planet.

The energy we really do need can be sourced from renewable projects that are small-scale, community-owned, localized and distributed. In urban areas, neighborhoods can join together to choose suitable sites for small-scale projects that directly serve that community's needs. Like a barn-raising, this would bring people together in a meaningful way.

In our rural villages, distributed solar works well, and small-scale hydro projects can be created or revived. Small, single-family biogas digesters are already commonplace in much of the Third World: maybe we can learn something from people whose energy needs are met by recycling wastes, rather than fracking for gas. Developers and utilities will dismiss these methods because they don't add to their profits, but keep in mind that the Vermont way has nothing to do with increasing corporate profits.

My family lives off the grid, using PV for power and wood for heating and wintertime cooking. Contrary to popular belief, this is not akin to cave-dwelling. I invite the members of the Siting Commission to come see for yourselves. We promise that no neighbors will testify (for their allotted two minutes) about how upset and sick they are. There won't be corporate lawyers and lobbyists breathing down your necks. We won't have to clean up bird and bat corpses before you arrive. We will provide you with a meal, all the food grown here.

Perhaps you'll realize that we don't need to sacrifice our beloved mountains on the altar of profit-driven economics. You'll discover that we really can take meaningful action on climate change – the Vermont way.

Suzanna Jones
Walden, Vermont

From: Nancy Fried

Date: Sat, 23 Feb 2013 20:06:36 -0500
Subject: Comments on this weeks meeting
Dear Jan and Siting Commission menbers,

I wanted to pass on this article that was in the Chronicle this week. We spent time talking about thresholds that Developers would have to meet before even putting in an application for a project. I think this article really touches on that. VEC, our largest utility in this area talks about how the Seneca Mountain Wind project is just crazy and that they can not support it because of the lack of need for the power and the lack of capacity. Yet, for over a year our town has been tortured and has spent sixty thousand dollars defending itself. Maybe a preapplication check list would keep things like this from happening. Thanks, Nancy Fried

VEC 2-20-13
photo

Wind curtailed while power prices soar

by Chris Braithwaite

JOHNSON — If wind-generated electricity ever had a chance to prove itself, it was in the early days of this year. Wholesale electric prices in New England, which fell to very low levels last year thanks to the availability of cheap natural gas, spiked alarmingly in early January.

The problem was a surge in demand for gas by the people who use it to keep warm, and a gas shortage which, said David Hallquist, the chief executive officer of Vermont Electric Cooperative (VEC), was due less to the underlying supply than to bottlenecks in the pipelines that carry the gas to market.

Wholesale electric power costs, which averaged just 3.6 cents per kilowatt hour in 2012, shot up to more than $1 in early January, Mr. Hallquist said.

As the weather moderated, he said Friday, "you expect it to go away. But it hovered at over 20 cents, and right now it's 5.6 cents."

Once the wholesale price of power goes over a dime, the power generated by the Lowell Wind project, in which VEC is a junior partner with Green Mountain Power (GMP), looks quite competitive. A dime per kilowatt hour is about what GMP said the power would cost.

The project met its federal deadline and started making power before the end of last year. How much power is the question.

"We're quite frustrated," Mr. Hallquist said in a February 15 interview.

"During the windy, cold days we're being constrained to ten megawatts, when the capacity is 60-plus megawatts."

He was talking about the power that the regulatory agency, ISO-New England, permitted the Lowell project to produce at any one time.

"It's a double whammy," Mr. Hallquist said. "We've got the investment up there. We spent a lot of money on it, and we're buying power — at a high price."

The frustration for VEC is that any power it gets from Lowell Mountain has a marginal cost very close to zero. The utility has agreed to pay a 13 percent share of the projects' total costs, but doesn't pay for its share of the power it draws from the wind turbines. Thus the utility's average cost per kilowatt hour depends on how much power the project yields.

Part of the curtailment problem is temporary, but Mr. Hallquist worries that part of it is not.

The solution to the temporary problem will be the subject of a state Public Service Board site visit to Jay on Wednesday, February 20, followed by a 7 p.m. hearing at the Jay Town Hall.

When it did a "system impact study" of the proposed Lowell Mountain project in 2011, ISO-NE called for a "synchronous condenser" to smooth the flow of power into the grid. GMP didn't see the need for such an expensive gadget, and appealed ISO-NE's ruling to the Federal Energy Regulatory Commission. GMP lost the argument, and now hopes to have the $10-million device installed in Jay by this fall.

In the meantime, ISO-NE is permitting the project to make power under constraints that it imposes as it deems fit.

"We believed it was not necessary, and we were wrong," Mr. Hallquist said of the synchronous condenser. He described it as a very large flywheel that is spun by the power coming in from the mountain on one side, and puts out a more regulated power on the other.

Dorothy Schnure, a spokesman for GMP, said Tuesday that once the project is complete and ISO-NE's technical constraints are lifted, the wind project should live up to its stated capacity of generating 32 percent of its nameplate capacity of 63 megawatts of power, after wind variations and other factors are taken into consideration.

Mr. Hallquist didn't sound so sure, on Friday.

He said the condenser would solve a "large percentage" of the Lowell project's production shortfall. But he noted that the Sheffield wind project, which sells power to VEC, has so far performed at 23 percent of capacity, well below its 32 percent target.

"Since we're plugging our project into the same grid," he said of Lowell, "it's not going to do better."

ISO-NE and the nation's six other regional grid authorities function on technical, operating rules, he said, "not market rules."

"Their object is stability, not running economically."

And, he added, "they don't like interruptible renewables" like wind and solar power.

Keeping supply and demand in balance over a large region, with no way to safely store excess energy for later use, requires a lot of what Mr. Hallquist calls "spinning reserve capacity." Most of that comes from gas-fired plants, which supply about half of New England's power.

And if that spinning reserve isn't available, he explained, ISO-NE won't allow wind projects to come on line.

Another problem for new wind projects, he added, is that when the power supply has to be cut back to meet demand, "the last generator that goes on gets the brunt of the curtailment."

Lacey Ryan, an ISO-NE spokesman, discussed the regulator's approach in an e-mail Tuesday:

"ISO New England operates the regional power system to make sure that the amount of electricity produced is in balance with the consumer demand for electricity — and the ISO does this in the most economic manner possible while maintaining the reliability of the power system. The ISO is agnostic when it comes to resources — we don't advocate for one type over another. The ISO uses an economic dispatch approach when scheduling

generators to run. This means that the ISO selects the least expensive, available generators first to maintain reliability and meet real-time consumer demand for power, regardless of the resource type."

"There is really not enough experience with this — integrating with the grid in New England," Mr. Hallquist said.

That may be among the reasons the VEC board voted on December 28 for a resolution asking the state Legislature "to impose a moratorium for a period of up to two years on further renewable power supply mandates."

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While he insists he's not opposed to renewable energy, Mr. Hallquist believes this region already has its fair share.

"The Northeast Kingdom is tapped out in terms of renewables," he said. "We've got twice the penetration of the rest of the state."

Asked about the big project proposed for Newark and towns in Essex County, Mr. Hallquist is characteristically emphatic.

"That can't happen. It requires so much transmission upgrade that the affordability is in question. From my utility manager's viewpoint, it's a crazy proposal. We certainly wouldn't support it."

Asked if he has any regrets about supporting VEC's 13 percent participation in the Lowell project, Mr. Hallquist takes a moment.

"It's funny," he said. "You never have regrets when you make a decision with the information you have at the time. If we're trying to attack climate change, you have to address all these issues, and you will have fits and starts.

"As a utility manager I can't help thinking about my first goal — to keep the rates low. To solve climate change is going to cost money. But how much can you put on the backs of people who can hardly pay the rent or buy groceries?"

contact Chris Braithwaite at chris@bartonchronicle.com

cap

In Vermont Electric Co-op's control center in Johnson, David Hallquist stands under a screen that's lately been the source of a lot of bad news. It tracks the wholesale price of power in New England. Photo by Chris Braithwaite

From: Kim
Sent: Monday, February 25, 2013 8:22 AM
Subject: Will Staats Testimony

Dear Chairperson Eastman and Sitting Commission members,

Please read the attached very informative document which deals directly with many of the Commission's objectives and goals.

Mr. Staats is a resident wildlife biologist who has been very involved in ridge line industrial wind facility impacts. He discusses environmental, wildlife, site and cumulative impacts plus much more.

Thanks you for your attention to this very relevant document.

Kim Fried

Newark, Vermont

Testimony of Will Staats

To whom it might concern:

My name is Will Staats and I live in the Northeast Kingdom town of Victory, Vermont. I make my living as a professional Wildlife Biologist but also run a small guide business in my spare time. I am an avid hunter, trapper and have spent a good portion of my life exploring wild places. For the record I believe in global warming. It is this very fact that causes me concern about the plight of our sensitive mountain ridgeline habitat. In fact, as the climate warms, these high elevation islands of fragile habitat will become even more important.

I have walked hundreds of miles of mountain ridgelines in Vermont, north western Maine and northern New Hampshire. As a young man I camped along the Long Trail in Vermont's central Green Mountains snowshoeing long bobcat and fisher trap lines while sleeping nights in homemade shelters or a tent. In my professional career I have studied and worked in high elevation forests in northern Vermont and New Hampshire for 30 years. Working for Vermont Fish and Wildlife in the 1980's, I reviewed Act 250 permit applications for timber harvests planned for mountain ridges above 2500 feet and ski area development. I performed wildlife and forest habitat surveys on numerous mountain complexes. As a forester for a large timber company, I supervised logging operations on mountains in northern Vermont. In the 1990's, as a Wildlife Biologist in New Hampshire, I helped negotiate the High Elevation Memorandum of Agreement between State agencies, The Appalachian Mountain Club and numerous landowners resulting in specific guidelines for timber harvest above 2700 feet, ultimately protecting sensitive wildlife habitat. My broad experience working in this exceptional environment has provided me with a unique insight and understanding of why we must protect this rare, quickly disappearing type of habitat. I believe this was also recognized years ago by Vermont visionaries who put safe guards in place through Act 250. Sadly, this land use law allows no vehicle for input regarding energy projects plans for these habitats.

For the past four years I have been closely involved with the environmental review of a 33 Turbine IWT project in Northern New Hampshire involving four mountain summits. I've monitored all phases of this project including hiking the alignment, review of turbine locations, providing testimony, helping to formulate mitigation and developing pre and post construction studies. This project has given me a firsthand knowledge of what a

mountain looks like before and after an IWT project and has helped me better understand the process of proper siting, construction and resulting effects on the mountain ecosystem. It would take hundreds of additional pages of testimony to describe what I've learned through this experience. As part of this project, my agency has spear-headed two ground breaking wildlife studies on the affected mountain ridges, studying the ecology and the impacts to the American Marten and Bicknell's Thrush. These are the very first studies of this kind, performed in this habitat, involving these species.

It is important to emphasize that many proponents of Industrial Wind Turbine (IWT) projects have little or no experience in this environment. Frequently these proponents pay a brief visit only after a wind generation facility is built. One can only truly comprehend the scale of disturbance by first visiting an undisturbed mountain ecosystem and then being present for all phases of construction from design to the finished operation. In short, an "after the fact" bus tour cannot begin to reveal the story of these projects as they unfold.

Due to the rapid increase in wind development projects in the Northeast, Wildlife Biologists and Natural Resource Managers are expressing their growing concerns regarding large scale development and its impacts to sensitive habitat and the wildlife that inhabit these areas. High elevation land (2500 feet and higher) is a scarce resource in the Northeast and is limited to approximately 3 % of Vermont's total land area. Concerns for the sensitivity of this habitat prompted Vermont to enact the tough development law, Act 250, which requires a permit for any activity occurring above 2500 feet, including timber harvest.

Wildlife is impacted by IWT development at both stand landscape and the forest stand level. Impacts are dependent on wildlife species, location of the ridgeline and the greater landscape context. At a stand level, forest cover is removed and permanently lost for some species due to the project footprint. Important wetlands can be compromised or destroyed during construction and headwater, seeps and feeder streams directly impacted. For birds and bats, turbines pose a new source of mortality in these habitats. At a landscape level, habitat connectivity and resiliency across the forest landscape may be compromised depending on the scale of the project and its context within the surrounding forestland.

Terrestrial wildlife using these habitats include those species found commonly at lower elevations but also species that are found almost exclusively at these higher altitudes. The softwood and mixed wood cover, with its associated complex stand structure, are preferred by American Marten, a species state listed as endangered in Vermont and state listed as threatened in New Hampshire. High elevation forests can provide stands of trees in an older, aged condition, interspersed with natural gaps and holes. Some wildlife use mountain ridgelines as a refuge from more developed areas at lower elevations. Over the years we have handled numerous black bears that seek out these areas for den sites due to their remote location. The mountain ridges may be the only undeveloped areas in a region and serve as critical corridors for wide ranging species including bobcat, lynx, bears, fisher and marten. These animals exist more successfully with infrequent human contact. One of the more rare birds in the Northeast, the Bicknell's thrush, resides exclusively in high elevation forests.

Many unanswered questions exist regarding the impacts of wind development on wildlife in these sensitive habitats and it may take years to more fully understand. How does increased human presence influence the use by wildlife in these habitats? What residual impacts are there to forest vegetation growing along roads and the project footprint over time? How do the dynamics of predator and prey change due to the edge effects of road cuts or hard packed snow roads in the winter months? We know that wildlife have hearing far more sensitive than humans. How is the noise impacting the ability of wildlife to communicate, hunt or breed?

It will be essential for resource managers and clean energy advocates the time to allow ongoing wildlife studies to be fully analyzed before committing to further industrial scale projects on additional ridgelines. Associated studies need a broader scope to evaluate the cumulative impacts of these projects in an extended landscape context instead of looking at each project in isolation. Biologists understand that it is critical to evaluate the importance of providing connectivity for wildlife across the greater landscape to ensure genetic exchange and

access to habitat resources. IWT projects that sprawl across miles of undeveloped ridgelines may be fragmenting important forestland habitat far greater than we now realize.

Over the years I have come to recognize the significance high elevation habitat has for the American Marten in Vermont. We have learned that marten, due to their small size and heavily furred feet, are able to exploit deep snow environments. Fisher, coyotes and other predators can be direct competitors with these animals but are less able to negotiate the deep fluffy snow conditions found on our mountain ridgelines. Here marten can more readily avoid competitors commonly found at lower elevations. Over the years I have detected marten tracks on numerous mountains in the Northeast Kingdom. Private land located on one of these mountains, Seneca, located in Newark, Brighton and Ferdinand, is currently being proposed for what would be the largest IWT development in Vermont. Incidentally, this project would also significantly impact conserved lands, (the former Champion Lands), paid for by Vermonters, and located directly adjacent to the proposed site.

Our research in northern New Hampshire has demonstrated that turbine access roads built on these remote mountains become vectors for coyotes and foxes. Maintenance vehicles traveling to and from the turbines continually pack the snow providing a firm base on which these canines travel from lower elevations to the ridgelines. We have followed tracks of these animals demonstrating this behavior on numerous occasions. Windswept turbine pads and road cuts contribute to the creation of a packed snow surface in the unbroken forest adjacent to these openings. Canine predators can now penetrate the mountain forest where the snow would previously have consisted of a loose and fluffy surface. As a result of the project construction, the ecological community of these forests have been drastically changed, possibly putting additive stressors on the endangered marten. Necropsies that we performed on our marten research animals revealed that a number of these animals were killed near the project area by coyotes, foxes and fisher. This research is currently under analysis and will be available to the broader public by next year.

Wildlife Biologists and Ecologists are alarmed about global warming and understand the need for sensible, responsible renewable power. However, given the scarcity and fragility of high elevation habitat, we need to question if these limited mountain ecosystems should even be considered at all as a choice for this type of intrusive development. As our wild lands continue to disappear at an alarming rate through a “death by a thousand cuts”, we have to ask ourselves “where will our wildlife reside in this ever shrinking natural landscape”?

I would like to help dispel a myth regarding wind power and that is the notion that Vermonters can recreate near these huge machines. It has been inferred that snowmobiling and hunting can coexist with a IWT project but I can assure you this is the last place one would, or should, choose to pursue these pastimes. The danger of ice throw cannot be over emphasized. I have often worked near these turbines on our research projects in the winter and witnessed the large divots in the snow where ice has been flung from the turning blades. I have seen the steel stairs leading to the doors of turbines bowed and broken by ice falling from the nacelle. And, on one terrifying occasion, my truck was struck by flying ice that, had it hit me or anyone else close by, could have killed or caused serious injury. One operator of a wind installation told me these machines will throw a four hundred pound chunk of ice one thousand feet. And I would also add, having worked near and under these turbines on numerous occasions, I can say with certainty that the noise alone would prevent any sort of enjoyment I might get out of what was formerly mountain solitude.

Addressing climate change will require sacrifice, leadership and courage. Courage to admit when one is wrong. And I believe industrial wind, as currently proposed, is wrong for Vermont. We should not sacrifice one non-renewable resource, our ridgelines, in the misguided attempt to replace other non- renewable resources. We need to stop groping for symbolic non-productive solutions, as we literally tilt at windmills in our efforts to combat the real threat of global climate change.

Vermont’s Green Mountains have been instrumental in the creation of who we are as a people. The iconic ridgelines that frame our vistas and cradle our valleys have been aptly called the back bone of our state and have served to refine our cultural toughness and fierce independence. These high elevation forests evoke a sense of

mystery and adventure. They are the last wild places we have. Vermonters have cherished, gazing with admiration, the endless green folds of ridgelines leading to the horizon. We are drawn to these ridges to recreate and enrich our lives. The question before us is: do we sell our horizons' for a misguided attempt to solve this world crisis that calls for more creative, and bolder action? Vermont can help lead this effort by continuing to demonstrate true stewardship towards our irreplaceable mountains while at the same time designing creative solutions for meaningful conservation and innovation This alternative thinking will move us forward towards solving the impending crisis of climate change. We owe it to fellow Vermonters, our children and the mountains that we call home. You only get one chance to save our mountains and that time has come. Please help to support a moratorium on Industrial Wind Turbines.

I sincerely thank you for taking the time to read my lengthy testimony. Please feel free to call me with any questions. I invite you to climb these threatened ridges with me to discover this unique and irreplaceable mountain habitat before it is destroyed.

From: Pam Arborio
Sent: Tuesday, February 26, 2013 3:09 PM
Subject: Wind Power Payne

I'd like to share this email with you.

Vt. Fish and Wildlife Conservation Group

Attached is an editorial from Lawrence Payne in regards to our position on wind power from our web site. He has adopted our position on the subject. Sunday – Feb 3 edition.

When it comes to industrial wind power, I am sorry to say I have been more of a ridge straddler than a mountain protector. But no longer.

Like many Vermonters, I am concerned about climate change and I support the development of renewable energy. That includes wind, even though it will do little to reduce Vermont's carbon emissions. They are produced primarily by the gas that powers our cars and the oil that heats our homes, not the electricity that turns on our lights.

Still, wind should be part of the equation. Yet the more large-scale wind development I see on our mountaintops, the less I like it. Not the sight of the towers and turbines themselves, but the clearing, blasting, filling, leveling, grading and overall destruction that can be required to build high-elevation wind-tower pads, service roads and transmission lines.

God help our ridges if what happened to the Lowell Mountain Range is the first step in Vermont's path to energy independence. Talk about a footprint. No one knows how many tons of explosives were used to build the 3.2-mile-long, 21-turbine Kingdom Community Wind project. Or at least no one who knows is willing to say.

But it wasn't Lowell that finally pushed me off the fence. It was the developer behind the proposed Seneca Mountain Wind project in Brighton, Ferdinand and Newark.

Seneca Mountain and the other nearby summits that would be subject to the up to 40-turbine project are special. Not because they are in my backyard; they're not, although I wish they were. They are special because they are among the wildest and most wildlife-rich ridges in Vermont.

They are home to moose, bear, deer, pine marten and very likely Canada lynx, among many other species, and their trail-less summits are unlike any others I've climbed in Vermont. They consist of remote stands of bear-scarred beech that give way to open, mountain-top groves of old, gnarly yellow birch and towering spruce interspersed with moss-covered glades that are a pleasure to hunt, hike and explore.

The Vermont Fish and Wildlife Conservation Group, a group of Northeast Kingdom hunters and anglers that know the area as well as anyone, opposes the project. They note it would despoil "one of the few wild areas left in Vermont" and diminish the public use of adjoining conserved lands, in which Vermonters have invested millions. (Read the full statement at vtfwcg.org.)

I was hoping Eolian, the developer behind Seneca Mountain Wind, would at least be sensitive to their concerns. Instead, in a power-point presentation to the Vermont siting commission that struck me as arrogant and dismissive, I encountered this stunning statement: "Preventing any impacts to bear habitat associated with renewable energy development while allowing bear hunting is a fundamental disconnect."

Huh? Does Eolian really not understand the difference between preserving the habitat on which wildlife depends, and a management practice that produces public benefits and support for conservation while maintaining healthy, sustainable wildlife populations? And they're experts on renewable resources?

What Eolian is suggesting is akin to saying that because we fish for Atlantic salmon, developers should be able to dam and divert rivers without regard to the needs of salmon. Well, that's exactly what happened in the 1800s on the Connecticut River. Today there are no salmon to fish for, despite a decades-long restoration program that has cost tens of millions of taxpayer dollars.

The real disconnect here is between Vermont values and an out-of-state developer that wants to build the largest wind farm in Vermont, one that would forever alter more high-elevation habitat than either Kingdom Community Wind or the 17-turbine Sheffield wind farm.

So you can now count me among the growing number of Vermonters who support a bill in the General Assembly that would establish a three-year moratorium on wind development in Vermont.

Big-wind proponents say S.30 would send the wrong message. But there is nothing wrong with saying we value our undeveloped ridges and their wildlife habitats and intact watersheds. And that before we sacrifice our ridges for some greater good – and profit – we must make sure wind farms are thoughtfully sited where they will do the least harm. We should not leave it up to private developers, many of which have no roots in Vermont or are foreign owned.

(Page 3 of 3)

An independent environmental research firm has begun a study of the Deerfield Wind project's impact on bears before, during and after construction of 15 turbines slated to be built in Searsburg and Readsboro. The study was ordered by the Public Service Board, and it only makes sense to have that information in hand before allowing other wind farms to be built in similar high-elevation bear habitat.

I don't understand the rush to green-light big-wind projects in Vermont, unless it's driven by subsidies and tax breaks that are untenable, or by a concern that Vermonters might discover the emperor has no clothes. Many energy experts are skeptical of big wind's actual benefits in Vermont, and one expert has gone so far as to describe the manner in which the state treats renewable energy credits from wind as "a sham" that makes them seem much greener than they are.

Shouldn't we make sure the benefits are real before continuing to irrevocably change our ridge lines? That would be the Vermont way.

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Lawrence Pyne can be reached at pyneoutdoors@shoreham.net.

v

From: Rob Pforzheimer
Sent: Thursday, February 28, 2013 9:38 AM

Subject: Wind Turbine Battle Erupts Again in Fairhaven, MA - Noise

"She says the developer knows when state inspectors are out there, and believes the wind turbine company deliberately cuts the power, which cuts the noise.

She calls test results from October 15th a smoking gun.

Barteau said, "So what you see right here, is that 'whoa,' all of a sudden this turbine, 'shew,' it's not producing power."

http://www.abc6.com/story/21420343/wind-turbine-battle-erupts-again-in-fairhaven-ma?autoStart=true&topVideoCatNo=default&clipId=8512242#.US9cavGVoJI.facebook

Wind Turbine Battle Erupts Again in Fairhaven, MA

Posted: Feb 27, 2013 11:17 PM ESTUpdated: Feb 28, 2013 6:01 AM EST

by ABC6 Investigative Reporter Mark Curtis

mcurtis@abc6.com

Underneath the giant wind turbines in Fairhaven the whirring sound is unmistakable.

And even in the closest neighborhood, just over one thousand feet away, you can still hear it.

Residents say it's taking a toll.

Leah Isherwood, who lives near the wind turbines said, "It's awful, I can just hear the noise, all the time."

Peter Goben also lives in the nearby neighborhood and said, "It' sounds like a jet engine hovering over your house."

Chelsea Isherwood said, "I get a lot more headaches now and I think that is from lack of sleep."

While many want the wind turbines gone, others support the project hoping it will save the town money.

Fairhaven resident Robert Mayo, who supports the wind turbines, said "When they get it straightened out, with who is buying what, and with electric, it might be less money for us in taxes."

Fairhaven Wind partner Sumul Shah said, "Taking advantage of wind allows us a very affordable way of providing clean energy."

Still others are indifferent.

Fairhaven resident Laurie Thompson said, "But I don't live near them, thank God." Mark Curtis asked, "So they don't bother you?"

Thompson responded, "Nope, not where I live, no!"

And that seems to be a big factor.

The closer you live to them, the louder the noise - and the louder the opposition.

ABC6 Chief Reporter Mark Curtis said, "Construction of these wind turbines began in November of 2011, but construction of something else very important started going on over in this direction, a short time later."

Many residents say they would not have voted to build a new school had they known wind turbines would be 23 hundred feet away

Former Fairhaven business owner Louise Barteau said, "I believe an injustice has been done to people here in this town."

Concerned about noise and health complaints, state inspectors conducted sound studies of the wind turbines - night and day.

That too, has erupted in controversy.

Louise Barteau said, "Why would this turbine suddenly not produce power?"

Barteau has been pouring over energy records online.

She says the developer knows when state inspectors are out there, and believes the wind turbine company deliberately cuts the power, which cuts the noise.

She calls test results from October 15th a smoking gun.

Barteau said, "So what you see right here, is that ‘whoa,' all of a sudden this turbine, ‘shew,' it's not producing power."

Sumul Shah is the CEO of Solaya Energy, which put up the turbines.

He denies manipulating the test results.

ABC6 Reporter Mark Curtis asked, "And you don't think there were any irregularities?"

Shah said, "There weren't any and I can tell you since I was the one who operated the turbines during most of the sound testing that I certainly did not impact the way the turbine ran during the testing period."

ABC6 Reporter Mark Curtis asked, "And you'd say that under oath?

Shah responded, "I would say that under oath, all the time, any day."

The State of Massachusetts continues to investigate the noise complaints, including allegations of manipulation.

In the meantime, people want relief.

Homeowner Peter Goben spoke of the wind turbines saying, "They are bothering me. I just keep waking up, waking up, waking up."

Neighbor Chelsea Isherwood said, "If you could at least shut them down at night, so people could get some sleep around here that would be a blessing to me."

Other communities with similar problems have turned off turbines overnight, but in Fairhaven, the jury is still out.

On Wednesday morning, officials from Fairhaven Wind issued a letter the State of Massachusetts DEP, admitting some of the noise testing was flawed.

The statement said, in part, "Clearly this was a mechanical error... we sincerely regret the inconvenience that this error caused on the noise testing."

Fairhaven wind blamed the data collection mistake on human error, and denies it tried to actually manipulate the test results.

It told the State of Massachusetts it would be willing to participate in new wind-noise studies, if need be, and that's what the state would prefer, after it discarded the tainted data.

From: Kim
Sent: Thursday, February 28, 2013 7:40 AM
Subject: Fwd: surplus windpower costs Ontario

Dear Siting Commission,

We have talked a lot about the need for planning, real long range system planning, and threshold planning, for these large and getting larger projects. We need to learn the lessons going on presently around the world that clearly show what happens when a PSB looks only at applications one at a time in a void. Must we repeat the errors of other countries and states that rushed to solve a problem, or be the leaders, and now will have to do the necessary planning that should have been done a long time ago. Planning after the project complete is expensive to the environment and citizen/ratepayers.

Sincerely,

Kim Fried

-----Original Message-----
From: Rob Pforzheimer
Sent: Thu, Feb 28, 2013 1:28 am
Subject: surplus windpower costs Ontario

http://www.thestar.com/business/2013/02/26/surplus_wind_power_could_cost_ontario_ratepayers_up_to_200_million_ieso.html

Surplus wind power could cost Ontario ratepayers up to $200 million: IESO

Surplus wind power could cost Ontario ratepayers millions and compromise power system, says electricity system operator. It says renewable energy market rules must change

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STEVE RUSSELL / TORONTO STAR

Power-generating windmills don't always produce power when it's most needed.

By: John Spears Business reporter, Published on Tue Feb 26 2013

Coping with surplus wind power will cost Ontario electricity ratepayers up to $200 million a year if market rules don't change, says the power system operator.

Moreover, it says, if it can't control the flow of wind and solar power onto the Ontario grid, then "reliable and economic operation of the power system is, at best, highly compromised and likely not feasible."

The Independent Electricity System Operator (IESO) makes the statements in a filing with the Ontario Energy Board.

It is responding to complaints from big wind power companies that the IESO's proposals to impose new market rules on wind and solar power will cost them millions in lost revenue.

The dispute comes as more and more renewable power is about to flow onto the province's power grid.

About 2,700 megawatts of wind and solar power are currently feeding electricity into Ontario's system, three-quarters of it wind. That amount is set to more than triple by January, 2016.

Solar power generally flows into the system when it's most needed, when demand for power is high.

But wind often blows at the wrong time — overnight when demand, or "load" on the system is low — and dies when demand is high.

"It is not unusual for the wind to fall off in the morning at the same time as the morning load picks up," says the IESO.

At present, the IESO can't control the flow of wind and solar onto the system in the same way it can control the output of other generators. It all flows onto the grid, and is paid a fixed price.

When there's more power than the system can handle, the IESO sells it to neighbouring provinces and states — sometimes at a loss, and sometimes actually paying them to take it.

Those losses are absorbed by ratepayers, and added to the electricity bill as the "global adjustment," which now often exceeds the price of energy by a wide margin.

So far this month, for example, the market price for power has averaged 2.96 cents a kilowatt hour. The global adjustment has been 5.73 cents a kwh. Consumers pay delivery and debt.

Another strategy is to close down a nuclear unit. But nuclear units can't be re-started in a hurry; it takes a couple of days. During that time, demand can rebound, forcing the IESO to buy more power from gas-fired plants.

Bruce Power has developed techniques for reducing the output from some of its units without closing them outright. But there's a cost to that as well: Bruce Power still gets paid for its lost output. And the reduced output doesn't always soak up the entire surplus.

Without being able to control the renewable output, the IESO says, "by 2018, reliable and economic operation of the power system is, at best, highly compromised and likely not feasible."

Terry Young, vice president of the IESO, says that doesn't mean the power system will become physically unreliable if the rules don't change:

"We wouldn't put ourselves in a position where reliability is compromised, but in order to do that it's going to become more expensive to maintain it," he said.

The IESO has drawn up new rules that will allow it to shut output from wind and solar operators off the system when there's surplus power.

The renewable power generators are fighting the new rules vigorously.

Most have 20-year contracts with the Ontario Power Authority giving them unrestricted access to the power grid.

That, they say, was part of the deal when the Ontario government launched its campaign to encourage renewable energy in 2009.

“It is nothing less than a reversal of government policy with respect to encouraging the use of renewable power,” the power companies have told the energy board.

They have asked the board to force the IESO to review its new rules.

From: Rob Pforzheimer
Sent: Monday, February 11, 2013 10:33 AM
Subject: Wind Rush CBC documentary on youtube

The CBC Doc Zone documentary, "Wind Rush" is now posted on you tube.
A growing anti-wind movement says giant turbines have gone up without sufficient research into health impacts.
In the rush to embrace wind power, have the people who live among the wind farms been forgotten?

http://www.youtube.com/watch?feature=player_detailpage&v=JiCQabGuKFk

From: Rob Pforzheimer
Sent: Tuesday, February 12, 2013 10:12 AM

Subject: Turbines 'tarnish property values'

Turbines 'tarnish property values' http://www.windaction.org/news/37357

In a decision believed to be the first time an Australian court has recognised the adverse financial impact of wind farms for neighbours, magistrate Kate Hughes ruled a property would be worth 17 per cent less if a 14-turbine facility were erected next door. For one part of the property, in regional Victoria, she accepted a 33 per cent fall in value was likely.

February 12, 2013 by Pia Akerman in The Australian

A federal magistrate has accepted that wind farms slash the value of surrounding properties, saying she found it "hard to imagine" any prospective buyer could ignore such development.

In a decision believed to be the first time an Australian court has recognised the adverse financial impact of wind farms for neighbours, magistrate Kate Hughes ruled a property would be worth 17 per cent less if a 14-turbine facility were erected next door.

For one part of the property, in regional Victoria, she accepted a 33 per cent fall in value was likely.

The ruling came in a... [continue via Web link]

Web link: http://www.theaustralian.com.au/national-affairs/c...

Submitted on Friday, February 22, 2013 - 16:02 Submitted by anonymous user: [71.169.141.254] Submitted values are:

Name: Ann Ingerson
Town: Craftsbury
Organization: The Wilderness Society
Title: Economist

2) Energy Sources and/or Facilities: Please check the type of energy generation you wish to comment upon: Other Energy Sources, Facilities or General Comment

3) Comment :
The Wilderness Society offers the following brief comments in response to the draft possibilities and options document dated 2/3/2013.

1.a. Procedural Mechanisms
Options 1 and 2: Tiered Siting Review
This option suggests establishing a tiered siting process that provides expedited review for smaller or less controversial projects. Federal NEPA regulations have a tiered system with projects of increasing complexity subject to a categorical exclusion (CE), an Environmental Assessment (EA) - with finding of no significant impact (FONSI), or a full Environmental Impact Statement (EIS) (see http://www.epa.gov/compliance/basics/nepa.html). While the federal process may be more formal than Vermont needs, NEPA examples might help the Commission, PSD or PSB to define appropriate thresholds. We suggest that nameplate capacity in MW may not reflect a similar level of complexity and controversy for all project types. Rather than rely solely on MW capacity, tiers might be defined by area disturbed, proximity to residences or priority natural areas or some other threshold related to social and environmental impacts.

1.b. Timing
Option 1: Increased Notice to Towns
Towns notified should include all those with views, property values, water resources, traffic, or other strategic interests affected by the project, not just the town where a project is located.
The likelihood that projects will change substantially during an extended notice period is listed as a "con" for this option. This might actually be considered a "pro" as sufficient notice may provide time for project redesign to address community concerns before a project enters the permitting process. After that point, design changes can create significant delays by requiring an amended petition to the Board.

1.c. Siting Criteria
Option 4: Open-Season Portfolio Review

This proposed process seems similar to the standard offer program, but applied to larger-scale projects. The idea of the PSB considering multiple options for meeting a defined need, and choosing the one(s) that provide greatest public good, is attractive, particularly if demand-side resources are included. It offers some of the advantages of a comprehensive landscape-explicit energy plan by allowing comparison of multiple alternatives, while also harnessing the power of the market and encouraging innovation. Obstacles might include the difficulty of coordinating the schedules of multiple project proponents and their investors. A "pulsed"
schedule might also require hiring temporary staff to support the PSB during an open-season session, rather than benefiting from consistent experienced staff.

Option 5: Climate Change Costs and Benefits The air pollution criterion of Section 248/Act 250 was not originally written with greenhouse gases in mind and the Vermont DEC is just beginning to follow EPA's lead in regulating GHGs. At this point, accounting for net GHG emissions is not rigorous or standardized; rather all renewable energy sources tend to be treated as "carbon neutral", and it is assumed all renewables replace the marginal grid energy sources, neither of which is necessarily accurate. For biomass facilities, recent science suggests that high GHG emissions at the stack, combined with associated incremental changes in terrestrial carbon stocks, give different sources of biomass very different emissions profiles. Likewise, hydroelectricity reservoirs can release large quantities of carbon dioxide and methane for several decades (though Vermont's reservoirs are probably all past this stage, many of Canada's are not). Accounting for net GHG emissions should also include carbon losses due to clearing of vegetation and emissions from any increased spinning reserves necessary for grid integration of intermittent power sources. More detailed guidance as to how to calculate climate change benefits would be very helpful.

1.d. Board Membership
Option 1: Five-Member PSB
"Cons" text suggests that the expertise of board members is irrelevant if the right standards guide their decisions. In determining the public good, the PSB must determine whether environmental harm is "undue" in light of expected energy benefits. Even very detailed standards cannot eliminate the need for very basic value judgments, and values are influenced by expertise as well as professional and personal interests. Ensuring that the Board incorporates a broader variety of backgrounds, including environmental and resource expertise, would encourage deeper discussion leading to the best final decision.

Option 4: ANR Representative on PSB
"Cons" text notes that PSB members are completely independent, while an ANR employee would represent the governor. The differences are not really so stark, as PSB members are appointed by the governor while many ANR staff are civil servants with careers that span multiple administrations.
In New Hampshire, where the Fish and Game Director or representative sits on the Site Evaluation Committee, staff have found it awkward to negotiate permit conditions while being blocked from communicating with their superiors about a pending docket. Not sure how to solve this, but wanted you to be aware of the issue.

2.a. Public Participation, General
Option 8: Website
New Hampshire's Site Evaluation Committee website might also be a model, http://www.nhsec.nh.gov/index.htm. Please include ANR permits and required studies in addition to formal PSB documents. The public has even less access to these documents than to PSB filings.

5.b. Cumulative Impact
Option 1: Require Assessment for All Applications "Cons" text notes that requiring a cumulative impacts assessment for all projects could cause early projects to restrict later possibly better projects. It seems that the converse would be more likely. If a project is not required to assess how it may restrict possible future projects (e.g. by tying up a scarce resource or crossing a defined scenic or fragmentation threshold), it is more likely that inferior projects will trump later superior ones.

It would be helpful to clarify the intended meaning of cumulative impact:

1) Does it mean simply assessing the project in a landscape context? To some extent I believe this analysis is already done, although it may not receive sufficient weight in the balancing of energy benefits against environmental damage. Examples might include determining whether a project fragments a high-integrity habitat block, encroaches on an exemplary rare natural community, destroys habitat for a species of conservation concern, blocks critical landscape connections, or degrades a high-value scenic vista or recreational experience. Detailed ANR guidance about specific attributes to assess, with indicators as to what level of impact should be considered "undue", would improve consistency and predictability. (NH wind siting guidance developed by a stakeholder group but not yet officially adopted, might be a model. See http://www.nhsec.nh.gov/documents/siting_guidelines.pdf). This definition of cumulative impact still follows the project-by-project approach, and hence could allow degradation in small increments right up to some threshold of acceptability.

2) Or does it refer to the more technical definition used in federal NEPA processes? In broad terms, this involves identifying specific past, current and likely future activities in the region that affect environmental attributes relevant to the project, and assessing how the proposed project interacts with those activities to either multiply or mitigate the combined effects. This more specific type of assessment requires sophisticated techniques to predict future development trends and model the interaction of multiple environmental effects. This level of detail may be justified where several projects (energy and other) are proposed or "in the pipeline"
concurrently, or where concentrated development is expected to occur in the future. Unsure how PSB would determine when this requirement kicks in.

If a landscape-explicit energy plan precedes the permitting process, and that plan addresses cumulative impacts when defining the desired types, numbers, scales and locations of energy facilities, then a project-level cumulative impacts assessment would

only need to provide updates in light of any new information that has emerged since the plan was developed. For instance, natural occurrence mapping is incomplete state-wide and detailed site surveys may turn up new information. Or recent non-energy development may contribute to cumulative impacts such that additional energy development at a particular location would cross a threshold of acceptable disturbance.

6. Monitoring Impact
Option 7: Decommissioning Fund
A minor point, but worth clarifying. "Pros" text refers to decommissioning as "returning the land to its original condition". In many cases, this is impossible (nuclear facilities and ridgetop wind with major blasting come to mind). Better wording might be "restoring the site to a stable condition" (so that further maintenance is not required in order to keep runoff, soil, pollutants, waste, invasive species, etc. from affecting other nearby lands).

Thank you again for the opportunity to comment. We have been very impressed with this process, and the creativity of the commission members as well as their open process

The results of this submission may be viewed at:
http://sitingcommission.vermont.gov/node/7/submission/827