

18-1607-EL-BGN

FILE

October 1, 2019

To the Honorable Power Siting Board:

My husband, John, and I live at 3336 Willoughby Rd Willard Ohio, 44890. We are in Richmond Township in Huron County. We are not a lease holder with a wind company and we have not signed a good neighbor agreement with any wind company. We are opposed to these industrial machines in our quiet, dark, peaceful communities. We are concerned with the noise, shadow flicker, infrasound, and the FFA red warning lights that will affect our quality of life and our health. We have concerns about our property values. We do not see a need for these to be built. We have attended township meetings, commissioners meetings and meetings hosted by the wind companies (public information meetings, etc.) and anti-wind unions. We have written to our local, state and federal senators and representatives.

The Ohio Power Siting Board Case-18-1607-EL-BGN: Emerson Creek Wind is now before you to review. You have been given the ability to approve or deny this certificate. I ask that you take this job very seriously and review every portion of the application. Please check the information and facts for accuracy and make sure the proposed turbines would not be placed to cause harm or hardship on the residents of this community.

Also keep in mind that we are not discussing one turbine or one project. We are talking about multiple turbines and multiple wind projects being proposed for Huron, Seneca, Crawford, Erie and Sandusky Counties. Apex has Republic Wind and Emerson Creek at the OPSB for review. They also have plans for Emerson West in Seneca County and Honey Creek in Seneca and Crawford Counties. I have heard that there might be another one also. S Power has just withdrawn Seneca Wind from the OPSB but can resubmit their application. The cumulative impact to the rural residents of these counties will have a significant impact on our lives.

I have finished reviewing the application for Case-18-1607-EL-BGN: Emerson Creek Wind. I have enclosed some concerns of mine; mostly focusing on Richmond Township and Turbine 80,81,82 and 83.

I am asking you to deny this certificate. If you approve it, to do so by making the setbacks farther from the property line of a nonparticipating residence than the Ohio state minimum setback requirements.

Christina Popa
3336 Willoughby Rd
Willard, Ohio 44890
cpopa45@hotmail.com
567-224-2929



18-1607-EL-BGN: Emerson Creek Wind

This is to certify that the images appearing here are an accurate and complete reproduction of a document delivered in the regular course of business.
Technician DR Date Processed 10/7/19

4906.10 Basis for decision granting or denying certificate.

(A) The power siting board shall render a decision upon the record either granting or denying the application as filed, or granting it upon such terms, conditions, or modifications of the construction, operation, or maintenance of the major utility facility as the board considers appropriate. The certificate shall be conditioned upon the facility being in compliance with standards and rules adopted under sections 1501.33, 1501.34, and 4561.32 and Chapters 3704., 3734., and 6111. of the Revised Code. An applicant may withdraw an application if the board grants a certificate on terms, conditions, or modifications other than those proposed by the applicant in the application.

The board shall not grant a certificate for the construction, operation, and maintenance of a major utility facility, either as proposed or as modified by the board, unless it finds and determines all of the following:

(1) The basis of the need for the facility if the facility is an electric transmission line or gas pipeline;

NA

(2) The nature of the probable environmental impact;

Socioeconomic Impacts

Apex: Part 1, page 23-"the project area and the surrounding communities have a low population density as compared to statewide estimates"

Chris: This is misleading; this rural agricultural area should not be compared with cities like, Cleveland, Columbus and Cincinnati. The homes in this area too densely populated to place a wind generation facility here. An example is Willard West Road from Section Line 30 to Willoughby Rd is approximately 2miles and has 13 residences on it. A small section of Towline 12, just west of Willoughby Rd has 4 residences on the north side of the road before the curve.

Apex: part 1, page 192-193- Turbine 82 potentially has set back conflicts as it is approximately 680 feet from an unknown power line; depends on turbine size used.

Land Use

Apex: Supplement number 1; page 152 viewpoint #77 listed as County 30 and 244; Chris: THIS IS INCORRECT: SHOULD BE COUNTY 30 AND 224

Apex: Supplement 1, page 110; list Willard Airport as being New Haven; Chris; THIS IS INCORRECT: WILLARD AIRPORT IS IN WILLARD OHIO

Recreation

18-1607-EL-BGN: Emerson Creek Wind

Chris: The Sorrowful Mother Shrine is located at 4106 Ohio 269 in Thompson Township in Bellevue, Ohio. The shrine, like many residences, will be in the cumulative view shed of the multiple wind farms being proposed for Seneca, Erie and Huron counties.

Per the Catholic Travel Guide the Sorrowful Mother Shrine is the oldest place of pilgrimage dedicated to the Blessed Mother in the Midwest and east of the Mississippi. This historic shrine, established in 1850, consist of 120 wooded acres. According to the Ohio Traveler.com the shrine has "all of the beauty of nature in a peaceful atmosphere".

The combination of all of these proposed industrial wind farms, with the hundreds of turbines which would be seen, has the potential to negatively impact the Sorrowful Mother Shrine. People come here to experience the silence and beauty of the outdoors. One online review I read was the shrine is a "great place for prayer and meditation". I would like to see it stay that way. Turbines 43 and 47 from the Emerson Creek Project will be close to the shrine.

Cultural, Archaeological, and Architectural Resources

Aesthetics

Apex: Part 5, Appendix c, page photo 6: looking west from Willoughby Road and Willard West Road.-

Chris: I feel this photo is misleading; shows an open field. Approximately ½ miles to the north is a nonparticipating homeowner, approximately ½ mile to the south is my residence and another residence, both nonparticipating home owners, and less the ½ mile east are multiple residences.

Apex: Supplement Number 1; page 44 Chris: I fell this map is misleading; if you enlarge the picture the turbines are the same size as the house, this would be wrong with the proposed size of these turbines

Apex: Supplement number 1, page 60 and 61; shows pictures of area and of view with 2 proposed turbines; states no additional turbines from Seneca or Republic Wind are visible with in this simulation Chris: Again I feel this is misrepresented information. The turbines in this picture would be T 82 and 83. My residence is ½ mile south of where they took this picture; Turbines 80, 81, 82, and 83 will be visible from my home. I am also in the view of the Seneca Wind Farm (application has been withdrawn). Actually if you look at the cumulative map from supplement number one, page 96, my residence would be in the view of 93 to 138 turbines;

Chris: per the Staff Report of Investigation for the Seneca Wind Farm, July 3, 2019, page 23 "Aesthetic impacts and considerations are always measured against the surrounding land use features and potential viewers' subjective opinions. "

There are 2 turbines proposed northwest of my residence and 2 proposed southwest of my residence. These turbines may be as tall as 650 feet. The only structures taller than these are located in Cleveland, Columbus or Cincinnati. These tall poles with rotating blades and red flashing lights on a concrete base will surely stick out and be an eye sore. They will not blend in with the surrounding area any more than a corn field or a farm would blend in downtown Columbus..

Economics

Apex: Part 5, Exhibit F, page 24 "operation and maintenance of the proposed facility is estimated to generate 9 full time jobs. Chris: The impact this will have on the area and the residences living here does not justify establishing a wind generation facility for 9 jobs.

Ecological Impacts

Chris: Per the Staff Report of Investigation for Seneca Wind farm, July 3, 2019 page 25 *The applicant would avoid siting wind turbines where karst features exist.*

Apex: Part 5, page 3: Six of the proposed turbine locations appear to be in the probable karst area. Page 4- four turbines are located inside the Capital Aluminum and Glass Source Water Protection Area. Page 4-5- Two Turbines is located within Bellevue City Inland Source Water Protections Area. Page 5- Forty Turbines are located within the Monroeville Village Inland Source Water Protection Area. They say it does not appear that the local geology and /or hydrogeology will be prohibitive in constructions of the wind turbines.

Apex: Part 19, page 18: "some of the study area (77 acres) is within an area designated as ineligible; however there are no impact planned to streams in this designated area"

Chris: Please review the karst area; please review the testimony given by Debra Didion at the Public Hearing for Republic Wind regarding the karst

Threatened and Endangered Species/Vegetation

Chris: The red headed wood pecker is a residence of my property.

Public Services, Facilitates, and Safety

Chris: While the set back in Ohio is that a wind turbine must be 1,125 feet in horizontal distance from the tip of the turbine's nearest blade at 90 degrees to the property lie of the nearest adjacent property, including a state or federal highway, **there is nothing stating that it can not be longer !!**

Chris: Blade shear, ice throw, safety- Please review the turbine safety manuals of the proposed wind turbine. Also please review the testimony provided at the OPSB safety/blade shear workshop held this year. Please review the testimony provided by Dennis Schreiner at the public hearing for Seneca Wind and for Republic Wind.

Chris: per the Staff Report of Investigation for Seneca Wind Farm, July 3, 2019, page 36 .. *it is unlikely that infrasound generated by wind turbines would pose significant health threat.* I disagree with this; I think there a lot of evidence to the contrary that is being ignored.

Chris: per the Staff Report of Investigation for Seneca Wind Farm, July 3, 2019; page 37- .. *did not find any adequate scientific arguments for the occurrence of health effects related to exposure to noise form wind turbines., other than disturbance related to audible noise and*

nocebo effect,....I disagree with this, I think there is a lot of evidence to the contrary that is being ignored.

Chris: Although the wind industry wants to classify the effects of the shadow flicker, noise and infrasound as an annoyance, I disagree. If I did agree I do not want to be annoyed every day for the rest of my life. I am prone to motion sickness and feel I will be adversely affected by the noise, infrasound and shadow flicker. Worldwide, when wind turbines are activated, there are some people who have experienced some significant health effects and have had to leave their home. Why???

Chris Please review the sound studies that Apex did. I feel this is misleading. Monitor 9 was used for background sound level monitoring in my portion of the project. This monitor was located at a residence on St Rt 224 and picked up noise from the traffic going down the highway and the farm machinery. The noise heard is much different than the noise on my front porch .5-.6 miles north on a country road. The results of this could easily make the dBA go higher. Also I do not think Apex accurately measures the infrasound.

Chris: Please review the testimony of Captain Michael Curran, Robert Byrd, Cathy Limbert provided at the Republic Wind and/or Seneca Wind Public hearings regarding infrasound.

Chris: enclosed is some information on shadow flicker, noise, infrasound and the health effects on humans and on communities increasing the setback distances to protect to people.

(3) That the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives, and other pertinent considerations;

Chris: I do not feel this is considered a low density population area. I have concerns about the karst.

Chris: NO TURBINE SHOULD BE APPROVED/ALLOWED THAT DOES NOT MEET THE SETBACK REQUIREMENTS FOR OHIO. NO TURBINE SHOULD BE APPROVED THAT WOULD CAUSE NOISE OR SHADOW FLICKER IN EXCESS OF THAT ALLOWED BY OHIO LAW. THIS SHOULD ALSO INCLUDE THE CUMULATIVE EFFECT OF ALL WIND TURBINES AND WIND GENERATION FACILITIES. Any turbine that would cause more than 30 hours of exposure to shadow flicker or more than the allowed noise limit should be eliminated. There should be no need for mitigating measures after the turbine would be erected.

Apex: part 6, shadow flicker, page 195 -197 table of nonparticipating residences with greater than 30 hours

Apex: part 1, page 92-7% of the receptors may be affected by more than 30 hours/year

Apex: part 1, page 72- effects of cumulative noise would exceed 49 dBA; this would be west of Turbine 80

(4) In the case of an electric transmission line or generating facility, that the facility is consistent with regional plans for expansion of the electric power grid of the electric systems serving this state and interconnected utility systems and that the facility will serve the interests of electric system economy and reliability;

Chris I do not feel this project would serve the public interest, convenience and necessity by providing additional electric generation to the regional grid. Wind energy is unreliable and inconsistent. Intermittent wind generation disrupts the grid. I do not feel Apex has demonstrated a need for this project.

(5) That the facility will comply with Chapters 3704., 3734., and 6111. of the Revised Code and all rules and standards adopted under those chapters and under sections 1501.33, 1501.34, and 4561.32 of the Revised Code. In determining whether the facility will comply with all rules and standards adopted under section 4561.32 of the Revised Code, the board shall consult with the office of aviation of the division of multi-modal planning and programs of the department of transportation under section 4561.341 of the Revised Code.

AIR/Water/Solid Waste/Aviation

Apex: Apex: Supplement 1, page 110; list Willard Airport as being New Haven; Chris; THIS IS INCORRECT: WILLARD AIRPORT IS IN WILLARD OHIO

Chris: Willard Airport is in Willard Ohio. It is my understanding that the City voted to protect their air space in regards to the Seneca Wind project which would have eliminated 2 turbines from the project. These turbines were farther west from the airport than Turbine 80, 81, 82, Or 83 in the Emerson Creek Project. Turbines 80, 81, 82 and 83 might need to be eliminated due to the airport

Chris: Mercy Health Willard is a rural hospital and part of the Mercy Health System; they have a helipad and transport patients to St Vincent in Toledo. What will the impact of these turbines be to the transportation of these patients??

Chris: Life Flight being able to land in this rural area could make a difference in the outcome of a critical patient.

Chris: In the Staff Report of Investigation for Seneca Wind Farm, July 3, 2019 page 52...*the proposed Seneca Wind farm project would have an adverse impact on military operation and readiness..... military aviation training routes are used by the 179th Airlift Wing of the Ohio Air National Guard..* These plans fly over my home.

Apex: part 1, page 212,216,218 medium intensity red strobes will be used at nighttime viability.. Nigh lighting could be somewhat distracting and have an adverse effect on rural residents that currently experience dark skies.

(6) That the facility will serve the public interest, convenience, and necessity:

Chris: I do not feel this project is needed or will serve the public interest, convenience and necessity. There is opposition to this project in Huron and Erie Counties.

Chris: The Erie County Commissioners denied the Pilot for this project. Apex States that in March 2018, the Huron County Commissioners approved a resolution to support Emerson Creek Wind Facility. This resolution has been rescinded and Huron County did not grant the Pilot for this project. In part 5, Exhibit F- Socioeconomic Report, page 28 states that Seneca County approved a resolution to make Seneca County an alternative energy zone. This project is no

longer in Seneca County. Seneca County is no longer an AEZ and the Pilot has been denied for the proposed wind farms in that county. Willard City Schools have since voted to remain neutral on this project.

(7) In addition to the provisions contained in divisions (A)(1) to (6) of this section and rules adopted under those divisions, what its impact will be on the viability as agricultural land of any land in an existing agricultural district established under Chapter 929. of the Revised Code that is located within the site and alternative site of the proposed major utility facility. Rules adopted to evaluate impact under division(A)(7)of this section shall not require the compilation, creation ,submission, or production of any information, document, or other data pertaining to land not located within the site and alternative site

No comment

(8) That the facility incorporates maximum feasible water conservation practices as determined by the board, considering available technology and the nature and economics of the various

No comment

Miscellaneous.

1-Apex: Part 1, page62- Generation Equipment Manufacture's Safety Standards and Setbacks- Exhibit N Safety Manuals- This is "confidential" and cannot be read by those reviewing the application. Chris: I ask you to please review these safety manuals. If the recommended setback distances in these manuals is greater than the Ohio requirement you should be choosing the longer set back to protect citizens from possible health and safety hazards

2-Apex: part 1, page 229 the applicant will comply with the manufacture's most current safety manual, unless such safety standards conflict with OAC Rule 4906-4-08---Chris: the longer setback distances should be enforced.

3-Apex: Part 7 Exhibit occupational health and safety Manuals page 2- Apex Clean Energy will always adhere to the most stringent of the safety policies and procedures and regulations. In any case where a safety related policy, procedure, or regulation of a given state where a project is located is found to be more stringent than in this manual the more stringent policy or procedure will be enforced.

Part 7 Exhibit Occupational health and safety- Safety will always remain the first priority in the company to protect our most valued resources, our people Chris: although these last 2 have to do with the employees I feel these standards should be applied to the residences of Ohio as well. THE MOST STRINGENT OF SAFETY POLICIES SHOULD BE ENFORCED.

4-What is the bond to decommission each turbine? \$300,000.00?

5-How can you review and approve a wind generation facility without knowing the exact number and type of wind turbines being installed??

18-1607-EL-BGN: Emerson Creek Wind

News
Documents
Search



**National
Wind
Watch**

**Presenting the facts
about industrial wind power**

Sign up for daily
updates

Keep Wind
Watch online
and independent!

Donate \$10

Donate \$5

Selected
Documents

All Documents

Research Links

Alerts

Press Releases

FAQs

Publications &
Products

Photos & Graphics

Videos

Allied Groups

Search all NWW

filed: March 25, 2019 • New York, Opinions

Tuning out infrasound dangers

| Credit: Roy Harvey | Observer | Mar 24, 2019 | www.observertoday.com ---

The Nuremberg Code (1947) is the universally accepted regulation on human experimentation. Each of the Code's 10 stipulations apply to the ongoing experiment in Arkwright where residents are subject to infrasound. No one, not even those who signed contracts with the wind turbine industry, were informed of the potential dangers of infrasound.

Industrial wind turbines produce infrasound. This is a fully documented fact. It is produced by the gigantic blades passing the pole. Up wind, that is. In a roughly 180-degree arc. The taller the pole, the greater the swath of infrasound. Audible sound is the 'whoosh' noise our neighbors in Arkwright constantly hear and which can be a terrible nuisance – but it is the sound we can't hear that has the well-known negative health effects on living organisms, including ourselves.

Each organ in our body has its own acoustic resonance in the infrasonic range, under 20 hertz. The human eye resonates at 18 hertz, just below the threshold of human hearing. Disturbances in the eye as well as the ear caused by infrasound are well documented. It's widely known that specific infrasound resonances directed at the brain can produce fear, anxiety, anger and so on.

Infrasound has been recognized and used as a weapon by the U.S. military. It was found to produce a wide range of ill effects: sleep deprivation to the point of torture, harm to the lungs and heart. Infrasound, however, was unreliable as a weapon and was abandoned. It didn't have the same ill effects on everyone. The same appears to be the case with infrasound produced by industrial wind turbines. Some individuals are more affected than others.

Many of the people in Arkwright as well as their animals are suffering from infrasound. They exhibit the classic symptoms extensively documented in the CIA/DIA declassified documents on infrasound, as well as contemporary academic studies: sleep deprivation, nausea, irritability, ear whistling, headache, heart irregularities, fatigue, depression, suicidal thoughts.

Keyword News Search

[exact phrase in "" •
~10 sec • results
by date]

Advanced Search

[Google-powered •
results by relevance]

Search News: New York

Search News: Opinions

LOCATION/TYPE

Select ▼

News Home

Archive



SUBSCRIBE B Y ...

Add NWW headlines
to your site (click here)

Latest News

Australia, Press releases:
Bald Hills Wind Farm decision: nuisance finding
Missouri:
Meteorologist discusses concerns about wind turbines
Iowa, Letters:
The breakdown on industrial wind in Iowa
Nebraska, Opinions:
Sen. Brewer: Push for further R-Project study
Iowa, Letters:
Iowa is lax on wind energy regulations
Massachusetts, Opinions:
Monti: NOAA responds to Vineyard Wind environmental impact
Ireland:
Professional objectors one of the 'biggest threats' to wind farms – IWFA chairman
Arizona, New Mexico:
Tucson Electric Power to double its renewable energy

News
Documents
Search

The wind industry ignores the infrasound generated by its turbines, focusing only on audible sound. New York state goes along with this deception, overlooking the life-threatening affects of infrasound when its dangers are so extensively documented. The state's action (or inaction) is tantamount to condoning the use of residents as guinea pigs, people deprived of informed consent.

Continued acceptance, installation and operation of the giant infrasound turbines constitutes a crime against humanity unless informed consent is obtained specifically regarding a full explanation of infrasound.

While all 10 points of the code are relevant to the apparently uncontrolled Arkwright experiment, this is point one:

"The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent: should be so situated as to be able to exercise free power of choice without the intervention of any element of force, fraud, deceit, duress, overreaching or other ulterior form of constraint or coercion and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision. This latter element requires that before the acceptance of an affirmative decision by the experimental subject there should be made known to him the nature, duration and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and their effects upon his health or person which may possibly come from his participation in the experiment. The duty and responsibility for ascertaining the quality of the consent rests upon each individual who initiates, directs, or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity."

Roy Harvey is a Mayville resident.

Source: Roy Harvey | Observer | Mar 24, 2019 | www.observertoday.com

This article is the work of the source indicated. Any opinions expressed in it are not necessarily those of National Wind Watch.

The copyright of this article is owned by the author or publisher indicated. Its availability here constitutes a "fair use" as provided for in section 107 of the U.S. Copyright Law as well as in similar "fair dealing" exceptions of the copyright laws of other nations, as part of National Wind Watch's noncommercial effort to present the environmental, social, scientific, and economic issues of large-scale wind power development to a global audience seeking such information. For more information, click here. Send takedown inquiry or request to excerpt to query@wind-watch.org. Send general inquiries and comments to query@wind-watch.org.

Wind Watch relies entirely on User Funding

Donate \$5



Share:



[Short URL: <https://wind-watch.org/news/?p=92257>]

output with New Mexico wind project

Iowa:

Iowa Utilities Board to launch investigation into proposed Alliant Energy rate increases

Australia:

Ocean off Victoria's Gippsland could be home to first offshore wind project

Ireland:

An Bord Pleanála gives Coole windfarm the green light

Michigan:

Wind farms restricted under new Monitor Township zoning ordinance

Australia:

Moyne councillors concerned about safety of wind farm transmission lines in shire after incident at Noorat

Scotland:

Tory MSP says Scottish Government must respect local decision over controversial Moray wind farm

North Carolina:

Why these state senators want ban on new wind farms in eastern NC

Missouri:

Wind farm project still on target for 2020

Letters, Missouri:

Board amends wind energy ordinance

Ireland:

Wind farms: 'EU law is more than adequate to act'

New York:

Wind-energy companies pitch benefits for LI in bid for contract

Massachusetts:

Baker makes few changes in offshore wind RFP

Ireland:

Irish Wildlife Trust object to Co Longford windfarm

North Carolina:

Brown files wind farm 'compromise' bill

Massachusetts:

State preparing for its second offshore wind contract

posted: June 23, 2019 • [Health](#), [Noise](#), [Infrasound](#)

Silent Menace (Part 1 of 2): Wind Turbine Infrasound – What You Can't Hear Can Hurt You

Author: [Deever, Donald Allen](#)

June 1, 2019 – Desert Report: Sierra Club California/Nevada Desert Committee

Sci-fi fans remember the tagline from the Alien movie poster, which ominously declared, "In space, no one can hear you scream." Likewise, research on the infrasound frequencies produced by industrial wind turbine blades is increasingly providing proof that what you can't hear, can hurt you. Accordingly, it is worth noting that there is a huge difference between the auditory terms "sound" and "noise." According to the Canadian Centre for Occupation Health and Safety, "Sound is what we hear. Noise is unwanted sound." When speaking of the sounds generated by industrial wind turbines, the operative term is "noise," and an important difference between sound and noise – including when infrasound noise is not heard by the ears – is that it can be felt by the brain and internal organs. Such an insight makes it all the worse to learn that infrasound noise can travel over much longer distances than previously admitted by the wind energy industry. Moreover, the intensity of potentially harmful levels of infrasound vibrations do not dissipate as quickly as formerly believed.

Along those lines, an important German study calculated the distances over which wind turbines can have unanticipated effects. The 2016 study warned how wind turbine-produced infrasound interferes with Comprehensive Nuclear Test-Ban Treaty monitoring equipment that is operated by Germany in the Bavarian Forest and Antarctica. The purpose of those stations are to verify compliance with the International Monitoring System that exists to detect nuclear explosions occurring in the atmosphere.[1] The conclusion of that study suggested that a distance of 20 kilometers between a single wind turbine and the monitoring stations should be considered a rule of thumb and that a separation of 50 kilometers should be maintained between multi-element wind energy facilities and monitoring stations. The introduction to that article tells of a variety of studies that already took place to identify the hazards that wind turbine infrasound were already wreaking on similar monitoring stations on Ascension Island, as well as a station in southern California where the monitoring equipment is located 35 kilometers from a so-called "wind farm." Moreover, the historical portion of that study mentioned, "Wind turbine noise

effects on seismometer stations have also been investigated and reported for example at AS104 station in Eskdalemuir, UK. Stammer and Ceranna investigate the increasing influence of wind turbines on seismic records, depending on the wind speed and on the number of newly build wind turbines in the vicinity of seismic sensors.” This suggests that wind turbine infrasound could interfere with the monitoring and prediction of earthquakes and associated tsunami warnings.

The great distances that infrasound waves travel from their source was also documented in a study by the Los Alamos and Sandia Laboratories, published in 2014.[2] In New Mexico, infrasound from sixty wind turbines could be detected 90 kilometers from the source under favorable conditions at night. The present trend of the wind energy industry is to push for more offshore than onshore facilities, yet studies in acoustics show that sound waves travel further over water than land, and that cooler water temperatures create inversions that cause sound waves to bend downward and become amplified which is a thought that leads to a study in Finland.

A 2016 Finnish pilot study belatedly made international news in 2018, when the Finnish Association for Environmental Health studied 200 persons affected by wind turbine infrasound. The report showed the severity of adverse health symptoms did not decrease for the first 15 kilometers from the source. It also determined that the effects were not correlated with the expectations of the persons being studied. This represented a major finding, since few countries require more than a 2 kilometer setback of wind turbines from homes.[3] The results of the Finnish study should not have been a surprise among occupational medical health professionals. In 1999, a report was published by the International Journal of Occupational Medicine and Environmental Health,[4] which stated, “Owing to its long wavelength, infrasonic noise is less attenuated by walls and other structures, it is able to propagate over long distances and may affect the human organism even though the latter is far from its source.”

In light of the proliferation of wind energy, one might ask, “How long have the negative effects of wind turbine-generated infrasound been known?” The first solid evidence for estimating the levels of annoyance from infrasound on humans was found thirty-two years ago. In 1987, Neil Kelley pioneered the field of wind turbine noise annoyance when he presented a study at the WindPower '87 Conference and Exhibition in San Francisco.[5] His lecture was titled A Proposed Metric for Assessing the Potential of Community Annoyance from Wind Turbine Low-frequency Noise Emissions. That research was carried out at the Solar Energy Research Institute in Golden, Colorado, and sponsored by the U.S. Department of Energy. Kelly's lab-based report directly linked infrasound to annoyance among

human subjects, thereby indirectly linking stress-related disorders from annoyance to wind turbine infrasound.

Since infrasound lies in the inaudible frequency range of less than 20 Hertz, “What you can’t hear, can’t hurt you” was a mantle of protection the wind industry hid under for decades. Few governments embrace the concept of wind energy as enthusiastically as Germany, yet a highly-publicized 2017 report from their Max Planck Institute found that infrasound, even though it is inaudible, can produce measurable effects in recorded brain function.[6] According to their report, “this study is the first to demonstrate that infrasound near the hearing threshold may induce changes of neural activity across several brain regions, some of which are known to be involved in auditory processing, while others are regarded as key players in emotional and autonomic control.”

This 2017 study from the Max Planck Institute, “Altered Cortical and Subcortical Connectivity Due to Infrasound Administered Near the Hearing Threshold – Evidence from fMRI”, also broached the topic of increased cortisol secretions that occur as a result. According to the authors of that report, “since the brain’s response to prolonged near-threshold IS [infrasound] involves the activation of brains areas which are known to play a crucial role in emotional and autonomic control, a potential link between IS-induced changes of brain activity and the emergence of various physiological as well as psychological health effects can be established.”

Citing earlier research, the authors stated, “It has been reported in several studies that sustained exposure to noise can lead to an increase of catecholamine and cortisol levels. In addition, changes of bodily functions, such as blood pressure, respiration rate, EEG patterns and heart rate have also been documented in the context of exposure to below- and near-threshold IS (infrasound).” The references to those citations are contained in that study. Equally enlightening is a study that was published fifteen years earlier (2002) in Sweden, “Low Frequency Noise Enhances Cortisol Among Noise Sensitive Subjects During Work Performance.”[7]

Pre-dating the research from the Max Planck Institute, back in 1985, infrasound was similarly found to increase secretions of the hormone cortisol (causing a flight or fight response), which, at sufficiently high levels, can stress the body and mind to trigger annoyance, apathy, confusion, fatigue, an inability to concentrate, and painful pressure in the ears, all of which represents merely short term symptoms. Too much cortisol in the long term eventually weakens immunosuppressive action, weight gain, brain damage, hyperglycemia (elevated blood sugar levels that lead to diabetes), and a shut down of digestive and endocrine functions. In the end, prolonged cortisol production can lead to hypertension.[8] Fast-forward approximately 25 years to 2011, when Canada’s Environmental Review Tribunal

made history by officially declaring that the health debate is no longer whether wind turbine noise is harmful to human health but has evolved into one of the degree of harm, Erickson v. Director, Ministry of the Environment. 2011. Environmental Review Tribunal Nos. 10-121 and 10-122.[9] A simple experiment to witness the end of the debate over wind turbine noise can be seen by going to Google Scholar and observing the results from searching the terms “wind turbine” AND “health effect” together.[10]

On January 26, 2019, congratulations were issued by Cape Cod Wave Magazine to the people of Falmouth, Massachusetts, following their long fight to win a court decision to have a wind energy facility removed from their town. The courts sided with neighbors when it was demonstrated beyond a reasonable doubt that the harmful effects of infrasound emanating from the wind turbines did not justify their existence, and therefore the company was ordered to cease operations and dismantle the towers.[11] Such a legal pronouncement indicates that an understanding concerning the adverse effects of industrial wind turbines has advanced beyond the realm of political opinion and moved into the arena of evidence.

Next month: Part 2 of this series will explore research on potentially harmful effects on animals, pets and wildlife, and will look at the facts or fantasy of President Donald J. Trump’s recently criticized comment that wind turbine infrasound can cause cancer.

Dr. Donald Allen Deeever is a former park ranger, science teacher, flight instructor, freelance journalist, and PhD with majors in nursing education, software development, and writing pedagogy. He recently helped defeat the Crescent Peak Wind project in Southern Nevada, one of the most misplaced wind energy developments in history. He and his wife live in Searchlight on their own ten-acre nature preserve.

1)

<https://www.researchgate.net/publication/309540267> The influence of periodic wind turbine noise on infrasound array measurements

2) <https://agupubs.onlinelibrary.wiley.com/doi/pdf/10.1002/2014JD022821>

3) <https://syte.fi/2019/01/10/pilottitutkimus-osoittaa-infraaanihaitan-vahenevan-merkittavasti-vasta-yli-15-kilometrin-paassa-tuulivoimaloista/>

4) [http://cybra.p.lodz.pl/Content/10252/IJOMEH_1999_Vol_12_No_2_\(159-176\).pdf](http://cybra.p.lodz.pl/Content/10252/IJOMEH_1999_Vol_12_No_2_(159-176).pdf)

5) <https://www.nrel.gov/docs/legosti/old/3261.pdf>

- 6) [//docs.wind-watch.org/infrasound-alters-brain-connectivity.pdf](http://docs.wind-watch.org/infrasound-alters-brain-connectivity.pdf)
- 7) [//docs.wind-watch.org/waye2002.pdf](http://docs.wind-watch.org/waye2002.pdf)
- 8) [//docs.wind-watch.org/danielsson2009.pdf](http://docs.wind-watch.org/danielsson2009.pdf)
- 9) <http://www.amherstislandwindproject.com/environmental-review-tribunal-for-suncor-kent-breeze.pdf>
- 10) [https://scholar.google.com/scholar?q="wind+turbine"+AND+"health+effect"](https://scholar.google.com/scholar?q=)
- 11) <http://capecodwave.com/falmouth-town-turbines-shut-down-forever-two-neighbors-react/>

Download original document: "[Silent Menace \(Part 1 of 2\): Wind Turbine Infrasound - What You Can't Hear Can Hurt You](#)"

This material is the work of the author(s) indicated. Any opinions expressed in it are not necessarily those of National Wind Watch.

*The copyright of this material resides with the author(s). As part of its noncommercial effort to present the environmental, social, scientific, and economic issues of large-scale wind power development to a global audience seeking such information, National Wind Watch endeavors to observe "[fair use](#)" as provided for in section 107 of U.S. Copyright Law and similar "fair dealing" provisions of the copyright laws of other nations. **Send queries to [query/wind-watch.org](mailto:query@wind-watch.org).***



Sign up for daily updates

Keep Wind Watch online and independent!

Donate \$10

Donate \$5

News Watch

Selected Documents

Research Links

Alerts

Press Releases

FAQs

Publications & Products

Photos & Graphics

Videos

Allied Groups

Search all NWW

posted: September 26, 2019 • Health, Noise, Wildlife

Silent Menace (Part 2 of 2): Wind Turbine Infrasound – What You Can't Hear Can Hurt You

Author: Deever, Donald Allen

September 1, 2019 – Desert Report: Sierra Club California/Nevada Desert Committee

Infrasound is classified as any noise with frequencies less than 20 Hertz (twenty cycles per second), the typical lower limit of human hearing. The previous article in this series discussed hazards of infrasound exposure over extended periods of time, whether people are aware of the source or not. This follow-up article explores the potential for damage to pets and wildlife, and wraps up the infrasound discussion with a factual look at the U.S. President's recent controversial comment that the noise from industrial wind turbines can cause cancer.

It is at the cellular level where cancer occurs and where infrasound is believed to cause damage, possibly even down to the DNA level. One of the more curious reports along these lines came out of Denmark in 2014, when a breaking news story from the World Council for Nature went viral, and newspaper headlines around the world reported that 1,600 minks on a Denmark farm were born prematurely, most stillborn.[1] Scientists researching the phenomenon were unable to link the mass deaths to disease or toxins. The only unique factor they found was that the incident occurred after four industrial wind turbines were placed 328 meters from the farm. If the wind turbines were the cause, it is unknown whether the birth defects were the result of infrasound vibrations affecting fetal cells during mitosis or whether the harm was due to electrical effects from the wind turbine cables buried in the moist ground nearby. Such a report raises questions concerning harm caused to wildlife and especially to their developing young. Moreover, a concern that is in need of resolution is the effect that infrasonic vibrations might produce on pregnant humans, as well as the effects on pets and livestock.

According to Hearing Health USA website, scientific studies show that out of the ten animals known to possess the most

Search Documents

Go to multi-category

search »

ISSUES/LOCATIONS

Select ▼

Documents Home



SUBSCRIBE Add NWW documents to your site (click here)

Latest Documents

Health, Noise, Wildlife:
Silent Menace (Part 2 of 2): Wind Turbine Infrasound – What You Can't Hear Can Hurt You
England, Wildlife:
Avian vulnerability to wind farm collision through the year: Insights from lesser black-backed gulls (*Larus fuscus*) tracked from multiple breeding colonies
Health, Noise:
Pilot study on perceived sleep acceptability of low-frequency, amplitude modulated tonal noise
Health, Japan, Noise:
Epidemiological study on long-term health effects of low-frequency noise produced by wind power stations in Japan
Health, Noise, Technology:
Influence evaluation of infrasound by using both of biological information and infrasound sensors in the vicinity of wind turbine facilities
Noise, Regulations, Sweden, Technology:
In situ measured facade sound insulation of wind turbine sound

sensitive hearing, three of those species are dogs, cats, and horses.[2] Considering the tendency to put wind energy developments on rural lands, where such animal partners are prevalent, it is possible that humankind's domesticated animals may also suffer, especially when one realizes that infrasound is a human designation based on what sound frequencies are audible to our ears. What has been classified as infrasound can be quite audible to animals with a hearing spectrum wider than our own.

In reference to laboratory animals, U.S. Animal Welfare Act regulations fail to address noise, but the Institute for Laboratory Animal Research Guide for the Care and Use of Laboratory Animals provides recommendations for considering noise control when designing and operating animal facilities.[3] Back in 1996, a researcher at Merck Research Laboratories provided evidence that rats who were unintentionally exposed to infrasound (due to a malfunctioning ventilation system) suffered from a variety of effects. Dr. Sherri Motzel cited clear-cut effects of sound on response to drug treatment, water intake, blood pressure, reproduction, glucose metabolism, and immune function. One study conducted at Merck Research Laboratories by Dr. Motzel and her colleagues demonstrated that infrasound in the range 1-10 Hertz was responsible for weight loss in rats in the study. This study and other reports in the literature indicate that much more emphasis should be placed on monitoring and controlling noise levels at multiple frequency and intensity ranges outside human hearing ranges in animal facilities because of the potential for adverse effects on study data and outcomes.[4]

Many animals are known to be able to hear infrasound, such as cows, cuttlefish, ferret, goldfish, horses, octopi, pigeons, rock doves, squid, and whales. Likewise, not only are some animals able to hear infrasound frequencies, but certain species such as alligators, elephants, giraffe, hippopotamus, okapi, and rhinoceros use infrasound frequencies in their communications. When a record-breaking twenty-nine sperm whales beached themselves on North Sea shores in 2016, Utrecht University in the Netherlands performed studies into the cause of the deaths. Natural and unnatural (i.e. manmade) factors were explored, but manmade trauma was limited to possibilities of entanglement, ship-strikes, ingestion of plastics, or chemical pollution.[5] Industrial wind turbine infrasound was never considered for the fatal strandings despite the fact that many of the whales died in view of massive offshore wind turbines.

Important honey bee communication takes place between 12-13 Hertz.[6] How the production of infrasound from wind turbines might effect their ability to communicate directions

Noise:
How do audio and visual characteristics of wind turbines contribute to noise annoyance?
Denmark, Europe, Germany, Italy, Netherlands, Noise, Regulations, Technology:
Implementation of the issue of noise from wind turbines at low frequencies
Oregon, Wildlife:
Evidence of region-wide bat population decline from long-term monitoring and bayesian occupancy models with empirically informed priors

may represent a threat to bee populations and pollination and needs to be investigated. There are no shortage of studies by the World Health Organization that warn of the health consequences of audible noise damage,[7] but if a certain species is unable to hear infrasound noise, they may still be vulnerable to adverse effects: infrasound produces vibrations in the inner ear canal that causes stress to the brain. Moreover, as the mink farm in Denmark may have indicated, vibrations occurring at a cellular level might interfere with the normal reproduction of cells and produce birth defects.

Many animals, including humans, can be vulnerable to the ravages of cancer, and in this current century, scientists have pinpointed many newly suspected causes of the disease. When President Donald J. Trump suggested in a speech, on April 2, 2019 (at a Republican fund raising event) that infrasound can cause cancer, newspapers nationwide had a field day with that comment,[8] soundly suggesting that no such evidence has ever been gathered or surmised, and that the President's comment was an unfounded attack on "green" wind energy. But was it?

An unclassified military study conducted in Portugal over a 20-year period was titled, "Low Frequency Noise: A Major Risk Factor in Military Operations." [9] It is noteworthy that there is no question mark punctuating the end of that title. According to that medical study, 70% of individuals are susceptible to the development of Vibroacoustic Disease due to the cumulative effects of noises below the threshold of human hearing. Such adverse effects have been especially documented among pilots and other members of flight crews, who are continuously exposed to infrasound noise from the spinning of jet turbines or propellers. Moreover, according to that report, low frequency noise can trigger early aging processes and is not uncommonly responsible for forcing flight crew members into early retirement.

Some cases cited in the Portuguese study included data showing that 10% of workers who were regularly exposed to infrasound in an aeronautical plant developed late-onset epilepsy, which is a rate that is fifty times higher than what would be diagnosed in a general population. Using electron microscopy studies, researchers found that among infrasound exposed populations, low frequency noise damage appears to target the respiratory system, causing bronchitis, recurring infections of the oropharynx, and pleural effusion. Furthermore, high resolution CT scans identified atypical instances of lung fibrosis among non-smokers. Likewise, cardiovascular diseases represent a significant threat from infrasound where the thickening of the pericardium is known as a hallmark of Vibroacoustic Disease. That thickening acts

like a blanket that covers the walls of major blood vessels, pericardia, aortic and mitral valves, and carotid arteries, diminishing their effectiveness.

But what about the claim of cancer caused by infrasound noise as suggested by POTUS? The Portuguese military study went on to claim, "The genotoxic component of LFN [Low Frequency Noise] has already been demonstrated in both animal and human models." The medical term "genotoxic" refers to toxins (carcinogens, mutagens, and teratogens) that cause damage to DNA, which in turn may produce cancer, birth defects, and other genetic mutations. Specifically, when it comes to cancers caused by infrasound, low frequency noise-induced tumors have been identified in squamous cell carcinoma in the lungs, and similarly infrasound-induced cancerous tumors have been found in hollow organs such as the bladder, colon, kidney, and larynx, since hollow organs are more affected by vibrations and suffer worse. The report also stated, "Lupus is a common observation among LFN flight attendants and other LFN-exposed populations." Military studies conducted in the U.S. add credence to the study from Portugal.

Corporations that profit from the wind energy industry claim, with some measure of justification, that there is limited evidence pointing to the adverse health effects of infrasound noise from industrial wind turbines. However, what they fail to mention is that a plethora of evidence exists on the pathogenic effects of infrasound from other sources, and that wind turbines produce infrasound in the same frequency range as these other sources. The key to researching the dangers of wind turbines then is to research what is already known about the health effects of infrasound (low frequency noise) to exposed subjects in fields such as aviation, and to study the symptoms and sources of Vibroacoustic Diseases in general.

On the basis of the evidence presented in these two articles, it is reasonable to be concerned about the adverse effects on human health that are caused by wind turbine infrasound. In matters of land planning where consequences to the environment are anticipated, it is usual that projects are rejected only if negative effects have been demonstrated.

Such a policy is in contrast to the way in which medical devices and pharmaceuticals are approved. When human health is involved, the FDA does not license a product until its safety has been demonstrated. Because infrasound may have serious consequences on human health, it is appropriate that approval of wind turbine facilities be proactive: safety must be assured before permits are awarded.

In 2018, the World Health Organization published new environmental noise guidelines that were a long time in coming. Back in 2010, member states in the European region met in Parma, Italy, for the Fifth Ministerial Conference on Environment and Health. During that meeting, requests were made of WHO to update their noise guidelines to include for the first time such serious concerns as wind turbines. To fulfill that request, WHO grudgingly conducted "systematic reviews of evidence ... to assess the relationship between environmental noise and the following health outcomes: cardiovascular and metabolic effects; annoyance; effects on sleep; cognitive impairment; hearing impairment and tinnitus; adverse birth outcomes; and quality of life, mental health and well-being." The reason for asserting that WHO was reluctant to be completely forthcoming in their reviews is based on their statement, "As the foregoing overview has shown, very little evidence is available about the adverse health effects of continuous exposure to wind turbine noise." Considering the plethora of current scholarly research that is available on the adverse health effects of wind turbine infrasound, such a statement comes across as disingenuous.

Despite their seeming reluctance, WHO guidelines noted that wind turbine noise above 45 dB was found to be harmful. It is significant that WHO did not temper their assessment with terms such as "may be" but instead boldly stated "is associated with adverse health effects." In particular, WHO listed the following seven most commonly reported critical health outcomes of exposure to noise, wind turbine or otherwise:

1. Cardiovascular disease;
2. Annoyance;
3. Cognitive impairment;
4. Hearing impairment and tinnitus;
5. Adverse birth outcomes;
6. Quality of life, well-being and mental health;
- and 7. Metabolic outcomes.

Regarding nighttime exposure only, WHO listed "effects on sleep." Furthermore, the WHO report stated, "Wind turbines are not a recent phenomenon, but their quantity, size and type have increased significantly over recent years. As they are often built in the middle of otherwise quiet and natural areas, they can adversely affect the integrity of a site." They also admitted that they were "not aware of any existing interventions... to reduce harms from wind turbine noise." Moreover, the report confirmed, "Wind turbines can generate infrasound or lower frequencies of sound than traffic sources." The report also went on to confirm that "the repetitive nature of the sound of the rotating blades and atmospheric influence leading to a variability of amplitude modulation ... can be a source of above average annoyance."

Considering that the most harmful noise from wind turbines has been found to be in the infrasound range, which is below the threshold of human hearing, decibel levels are not the most scientifically sound measurements. As the report conceded,

"Standard methods of measuring sound, most commonly including A-weighting, may not capture the low-frequency sound and amplitude modulation characteristic of wind turbine noise." Even more significant was the admission that "it may be concluded that the acoustical description of wind turbine noise by the [usually reported] means ... may be a poor characterization of wind turbine noise and may limit the ability to observe associations between wind turbine noise and health outcomes." In the end, WHO did confirm that quantifiable scientific evidence exists to imply that wind turbine noise causes annoyance.

While that particular WHO report and their associated guidelines were targeted at Europeans, the report was clear in its warning that "In terms of their health implications, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience." It is noteworthy that the term "wind turbine," not counting the many instances of that term in the index and reference pages, occurs approximately 150 times in the full WHO report [http://www.euro.who.int/_data/assets/pdf_file/0008/383921/noise-guidelines-eng.pdf].

In regards to providing FDA-type protection to the public by putting the burden of health effects proof on the corporations, twenty years earlier, WHO (1999) provided three major environmental management principles that they believed should be applied by governments to noise management policies: [<https://www.who.int/docstore/peh/noise/Comnoise-5.pdf>]

1) The precautionary principle: "In all cases, noise should be reduced to the lowest level achievable in a particular situation. Where there is a reasonable possibility that public health will be damaged, action should be taken to protect public health without awaiting full scientific proof."

2) The polluter pays principle: "The full costs associated with noise pollution (including monitoring, management, lowering levels and supervision) should be met by those responsible for the source of noise."

3) The prevention principle: "Action should be taken where possible to reduce noise at the source. Land-use planning should be guided by an environmental health impact assessment that considers noise as well as other pollutants."

This two-part presentation of research on the adverse health effects from industrial wind turbine infrasound noise clearly points to a need to implement such WHO noise management principles in order to more adequately protect both human lives and wildlife.

Dr. Donald Allen Deever is a former park ranger, science teacher, flight instructor, freelance journalist, and PhD with majors in nursing education, software development, and writing pedagogy. He recently helped defeat the Crescent Peak Wind project in Southern Nevada, one of the most misplaced wind energy developments in history. He and his wife live in Searchlight on their own ten-acre nature preserve.

- 1) <https://wcfm.org/2014/06/07/windfarms-1600-miscarriages/>
- 2) <https://hearinghealthusa.com/top-10-animals-best-hearing/>
- 3) https://www.aaalac.org/resources/Guide_2011.pdf
- 4) <https://www.ncbi.nlm.nih.gov/books/NBK25435/>
- 5) <https://www.uu.nl/en/news/results-of-investigation-into-2016-mass-mortality-event-of-sperm-whales-published>
- 6) <https://www.beeculture.com/a-closer-look-sound-generation-and-hearing/>
- 7) <https://www.masterresource.org/wind-turbine-noise-issues/wto-wind-turbine-noise-as-a-health-hazard/>
- 8) <https://www.washingtonpost.com/politics/2019/04/03/trump-claims-that-wind-farms-cause-cancer-very-trumpian-reasons/>
- 9) <https://apps.dtic.mil/dtic/tr/fulltext/u2/p014113.pdf>

Silent Menace (Part 2 of 2): Wind Turbine Infrasound – What You Can't Hear Can Hurt You

This material is the work of the author(s) indicated. Any opinions expressed in it are not necessarily those of National Wind Watch.

The copyright of this material resides with the author(s). As part of its noncommercial effort to present the environmental, social, scientific, and economic issues of large-scale wind power development to a global audience seeking such information, National Wind Watch endeavors to observe "fair use" as provided for in section 107 of U.S. Copyright Law and similar "fair dealing" provisions of the copyright laws of other nations. Send queries to query@wind-watch.org.

**Wind Watch relies entirely
on User Funding**

Donate \$5



Share:



[Short URLs: <https://wind-watch.org/doc/?p=5428> | <http://wndfo.net/D5428>]

Translate: **FROM** English | **TO** English

Some possibly related stories:

- Statement of Sarah Laurie (overview: evidence of health risks)
- Researchers Have Been Underestimating the Cost of Wind and Solar
- Health effects of wind power — Wikipedia
- How Does Wind Turbine Noise Affect People?
- Malcolm Swinbanks: Questions Taken on Notice
- Wind Turbines and Ghost Stories: The Effects of Infrasound on the Human Auditory System

→ <https://lincoln.ne.gov/city/plan/dev/wind/index.htm>

→ <https://lincoln.ne.gov/city/plan/dev/wind/working-group-info/>
Chapman Corbett

Facts about Industrial Wind Turbine Noise

- Wind farm proponents; (wind developers, participating landowners, and government officials); often rely on an industry-backed study to deny health problems. One often cited is the Massachusetts Department of Environmental Planning (DEP) "Wind Turbine Health Impact Study, which has been under a great deal of criticism, with one scientist (Raymond S. Hartman, PhD) saying it "fails to rise to the level of reliable scientific research, is incomplete, biased, distorted, without scientific merit, and not to be used as the basis for public policy." Meanwhile, there are peer-reviewed papers and studies that find links between turbine noise and ill health. Because this is currently not settled, proven science, no one, including governments can claim certainty. Because it is uncertain and involves public health and safety, government must maximize safety measures such as noise limits and setbacks to protect its citizens.
- The FACTS are:
 - The closer people are to wind turbines, the greater the negative impacts to them. Close proximity increases exposure to noise pollution, and other risks and annoyances.
 - Not all, but some more sensitive people suffer adverse health effects as a result of living near large wind turbines. This is a result of exposure to the audible and inaudible sound industrial wind turbines produce.
 - Scientific studies show wind turbines disturb sleep, and sleep disturbance is proven to cause impaired health.
 - Peer-reviewed scientific studies have proven the existence of infrasound (McPherson), and how it physically affects people (Salt and Kaltenbach), (Salt and Lichtenhan). "Large wind turbines generate very low frequency sounds and infrasound (below 20 Hz) when the wind driving them is turbulent. The amount of infrasound depends on many factors, including the turbine manufacturer, wind speed, power output, local topography, and the presence of nearby turbines (increasing when the wake from one turbine enters the blades of another). Infrasound cannot be heard and is unrelated to the loudness of the sound that you hear. Infrasound can only be measured with a sound level meter capable of detecting it (and not using the A-weighted scale)." - Alec N. Salt, PhD.
 - It is known that infrasound causes health problems. And it is now being established through sound studies in Brown County, Wisconsin and the Cape Bridgewater Wind Farm in Australia that large wind turbines create infrasound that can be measured in nearby homes. These are facts. The only debate is what safety measures must be taken for mitigating this. LFN and infrasound must be included in zoning regulations.
- What a Few of the Peer Reviewed Studies are Saying:
 - ✂ Ambrose - Wind turbine acoustic investigation - Infrasound and low-frequency noise - A case study 2012 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 the rapid onset of adverse health effects during the study confirms that wind turbines can harm humans if placed too close to residents.
 - Hanning - Turbine Noise Seems to Affect Health Adversely 2012 In a survey of people residing in the vicinity of two US wind farms, those living within 375-1400 meters (1,230 – 4,593 feet) reported worse sleep and more daytime sleepiness, in addition to having lower summary scores on the mental component of a health survey than those who lived 3-6.6 km (1.9 – 4.1 miles) from a turbine, with a sharp increase in effects between 1 km and 2 km. A New Zealand

survey showed lower health related quality of life, especially sleep disturbance, in people who lived less than 2 km from turbines. A large body of evidence now exists to suggest that wind turbines disturb sleep and impair health at distances and external noise levels that are permitted in most jurisdictions.

- **Jeffery - Adverse health effects of industrial wind turbines - 2013** Industrial wind turbines can harm human health if sited too close to residents. Harm can be avoided if IWTs are situated at an appropriate distance from humans. Owing to the lack of adequately protective siting guidelines, people exposed to IWTs can be expected to present to their family physicians in increasing numbers. The documented symptoms are usually stress disorder-type diseases acting via indirect pathways and can represent serious harm to human health.
- **Nissenbaum - Effects of industrial wind turbine noise on sleep and health - 2012** 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.
- **Phillips - Properly interpreting the epidemiologic evidence about health effects of industrial wind turbines on nearby residents 2011** There is overwhelming evidence that wind turbines cause serious health problems in nearby residents, usually stress-disorder-type diseases. It is always possible that further research will reveal that, under certain circumstances, turbines can be sited near people's homes with minimal health risk. Such is always possible for any exposure, given the nature of science (open to additional information) and changing technology. But our current knowledge indicates that there are substantial health risks from the existing exposure, and we do not know how to reduce those risks other than by keeping turbines several kilometers away from homes. Dismissal of health effects cannot be seen as honest disagreements about the weight of the evidence.
- **Salt - Infrasound from wind turbines could affect humans 2011** 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. We can conclude that based on well-documented knowledge of the physiology of the ear and its connections to the brain, it is scientifically possible that infrasound from wind turbines could affect people living nearby.

Don't Ignore New Information

- Knowledge about this is changing fast. A groundbreaking study by sound engineer Stephen Cooper completed at the Cape Bridgewater Wind Farm in Australia proves the connection between large wind turbines and its effects on people. It found a link between an operating wind farm and the sensations of 6 residents in 3 of the nearest homes. The results of this study have prompted a senate inquiry in Australia.
- Cooper's is the first study of effects on people that included a cooperating wind farm operator, in conjunction with a researcher that does not work exclusively for wind farms. Six subjects, 3 couples from different homes, were participants in this study. They were self-selected as being particularly sensitive and susceptible to wind farm acoustic emissions, so much so that one couple has abandoned their house. Cooper found that these six subjects are able to sense attributes of the wind turbine emissions without there being an audible or visual stimulus present, and that these responses correlate with the wind turbine power being generated but not with either the sound or vibration.
- It finds that something is coming from the wind turbines to affect these people and that something increases or decreases as the power output of the turbine increases or decreases. See <http://www.pacifichydro.com.au/pacific-hydro-releases-cape-bridgewater-wind-farm-acoustic-study/>

- Events in Brown County, Wisconsin support the Cape Bridgewater study. A study was done at the Shirley Wind farm involving four acoustical consulting firms and included Hessler Associates, who derives significant income from wind development projects. The study found "sufficient evidence to classify LFN and infrasound emanating from the turbines as a serious issue, possibly affecting the future of the wind industry". It "showed unequivocally that low level infrasonic sound emissions from the wind turbines were detectable..." The long-term response for inhabitants at one residence studied was severe for the wife and child, causing the family to move, while the husband has experienced no ill effects. This illustrates the complexity of the issue.
- After this independent sound study was done and with careful consideration, the Brown County Board of Health declared industrial wind turbines a human health hazard. See <http://bccrwe.com/index.php/8-news/16-duke-energy-s-shirley-wind-declared-human-health-hazard>

These studies mean that: (1) wind farm operators cannot say there are no known effects and no known people affected. (2) Local governments charged with protecting the health and welfare of citizens cannot say any longer that they know of no adverse effects.

The Only Proven Safety Measure is a Safe Setback

- Setbacks must be measured from a non-participant's property line. A setback measured from a dwelling limits the non-participating landowner's use of their property, and greatly reduces protections for non-participants from noise pollution and its proven ill effects, shadow flicker, property devaluation, and potential property damage from blade failure or fire.
- All landowners should have the right to do with their land what they choose as long as it doesn't harm or impede a neighboring land owner. A setback for safety reasons, regardless of its distance, must be maintained. Any zoning that allows a wind turbine to be built next to a non-participant's property line eliminates that property owner from safely using that land. It creates an easement over the neighboring, non-participating property that eliminates the owner from any further developments. This amounts to an uncompensated taking of private property rights.
- Because of widespread concerns about health and safety, many jurisdictions scattered around the United States and Canada have adopted larger setbacks in recent years.

<i>Government Entities</i>	
Catarunk, Maine	7,920 ft.
Moscow, Maine	7,920 ft.
Haut-Saint-Laurent, Montérégie, Québec	6,562 ft.
Fayette County, Pennsylvania	6,000 ft.
Carteret County, North Carolina	5,280 ft. from all abutting property lines
Frankfort, Maine	5,280 ft. from property line
Umatilla County, Oregon	5,280 ft. from "unincorporated community"
Mason County, Kentucky	5,280 ft. from property line
Trempealeau County, Wisconsin	5,280 ft. from inhabited structures
Hillsdale County, Michigan	5,280 ft. from residences
Sumner, Maine	5,280 ft. from property line
Newport, North Carolina	5,000 ft. from neighboring property lines
Ellis County, Kansas	4,921 ft. from rural residences
Rumford, Maine	4,000 ft. from property line
Clifton, Maine	4,000 ft. from occupied structures
San Diego, California	3,937 ft. from residences
Halifax, Nova Scotia	3,281 ft. from habitable building

Claybanks Township, Michigan	3,000 ft. from property line
Cape Vincent, New York	2,953 ft.
Potter County, Pennsylvania	2,900 ft.
Wareham, Massachusetts	2,800 ft. from residences
Goodhue County, Minnesota	2,700 ft. from non-participants
Roanoke County, Virginia	2,640 ft. from residences
Tipton County, Indiana	2,640 ft. from residences
Union Township, Wisconsin	2,640 ft. from residences
Perry, New York	2,640 ft. from residences
Rock County, Wisconsin	2,640 ft.
Buckland, Massachusetts	2,640 ft. from residences
Granville, Pennsylvania	2,500 ft. from property line
Charlton, Massachusetts	2,500 ft.
Allegany, New York	2,500 ft.
<i>Advisory Boards</i>	
UK Noise Association	5,280 ft.
French Academy of Medicine	4,921 ft. from residences
National Research Council	2,640 ft.
<i>Turbine Manufacturers</i>	
Volkswind	1,640 ft. (US) 3,280 (Germany)
Vestas Safety Manual	1,300 ft.

One Mile = 5,280 feet ½ Mile = 2,640 feet ¼ Mile = 1,320 feet
1,000 ft = 305 meters 1,000 meters = 1 km = 3,281 ft = 0.62 mi

RECOMMENDATIONS

Any zoning change that reduces the protections provided under the current Lancaster County limit of 35dBA at night significantly impacts the health of non-participating land owners.

The appropriate setback distance must be measured from the non-participant's property line, not their residence. To ensure citizen health, safety, and property rights, the setback should correspond to a distance of ten rotor heights, or not less than one mile from the non-participant's nearest property line, (unless agreed to).

LFN and infrasound must be included in zoning regulations, and the zoning specify that all post construction sound measurements can be requested by a nonparticipant, and be measured with C-weighted sound measurements to ensure that it is not excessive. The costs of all such testing should be paid by the wind developer, not the county.

The Lancaster County Health Department was provided information from Brown County, Wisconsin regarding wind turbines causing health risks. Based on responses from the Health Department, it appears this information was ignored. Ignoring this information is dangerous for our citizens.

If there is no clear scientific consensus about safety, the county must err to the side of caution and have strict sound limits and significant setbacks.

→ Cindy Chapman
nebraska



February 20, 2019
Nebraska

Lancaster County Board approves strictest distance rule in state for wind turbines, homes

Nancy Hicks | Lincoln Journal Star | Feb 19, 2019 | journalstar.com



[1]

Wind turbines dot the landscape near Odell. The Lancaster County Board approved a 1-mile distance required between homes and wind turbines Tuesday. Journal Star file photo

Wind energy developers in Lancaster County will be required to place turbines at least 1 mile from any home that is not being paid to participate in the project.

The mile rule, the strictest in the state, will give homeowners some comfort and protect the quality of life in rural areas, said County Commissioner Deb Schorr.

The County Board approved the rule and other minor changes in the county's wind farm rules on a 3-2 vote Tuesday morning.

"This is a quality-of-life setback." It is a protection in the mind of nearby homeowners, and will help with community buy-in, but won't kill the project, Schorr said.

"This is a stalling tactic," said Commissioner Sean Flowerday, who joined Jennifer Brinkman in opposing the mile rule.

Voting for the mile rule were Schorr, Roma Amundson and Rick Vest.

Opponents to a wind farm being considered for southern Lancaster and northern Gage counties, who have organized as Prairie Wind Watchers, proposed the mile limit.

An original proposal required a mile setback from any turbine to the property line of a nonparticipating property. Commissioners ultimately approved a mile setback to a dwelling.

Three years ago, the county set minimum setbacks for wind turbines of 1,000 feet to a property line, with potentially longer distances depending on the height of the turbine.

The previous rules also set noise limits of 40 decibels in the daytime and 37 decibels at night for nonparticipating property owners and 50 decibels both day and night for participating properties.

Developers have provided studies showing that a turbine would need to be set back at least a mile in order to meet those noise standards, said Mark Hunzeker, a Lincoln attorney representing Prairie Wind Watchers.

A mile standard is easy and inexpensive to enforce, he said.

Enforcing noise limits after a turbine is in place is difficult, Hunzeker said. No one thinks a county board would order an expensive turbine to be removed if it violates noise regulations. At best, the wind farm would have to regulate the times of operation or speed of the turbine, he said.

Supporters of the proposed wind farm pointed out the county already has a science-based noise rule that sets distance requirements.

Do not add another layer of requirements that are not based in science or law, said David Levy, an Omaha attorney representing NextEra Energy, the company considering developing a wind farm in the county.

A study done by NextEra that indicates a mile setback is appropriate used modeling based on one of the louder turbines that was being considered for this area, said David Kuhn, with NextEra.

New technology might create less-noisy turbines that could be placed closer to homes without violating the noise rules, he said.

“There is no reason to add this other requirement,” he added.

A bill (LB373) in the Legislature, proposed by Sen. Tom Brewer of Gordon, would require counties to have zoning regulations if they wish to host wind energy facilities, including preventing towers within 3 miles of a residence without the property owner’s written permission.

Commissioners in Lancaster County did endorse requiring a wind farm developer to do post-construction testing to ensure turbines meet noise standards, and approved some minor changes to zoning language meant to clarify intent.

URL to article: **<https://www.wind-watch.org/news/2019/02/20/lancaster-county-board-approves-strictest-distance-rule-in-state-for-wind-turbines-homes/>**

URLs in this post:

[1] Image: **https://www.wind-watch.org/news/wp-content/uploads/2019/02/5c6c6e18b272c.image_.jpg**

: August 13, 2019 • [Iowa](#)

Public health officials: wind turbines bad for your health

Credit: Wind Turbines Can Cause Sickness, Say Public Health Officials | Sara Belmont | KWWL | WHO-TV | August 12, 2019 | [kwwl.com](#) | [whotv.com](#) ~~

The Madison County Board of Public Health is going on record to say that there are legitimate negative health effects caused by wind turbines.

Board Chair Dr. Kevin de Regnier said the board identified two concerns after a review of scientific literature and months of hearings and meetings with residents and MidAmerican Energy.

The two health concerns identified are:

1. "Flicker" caused by the sun reflecting off turbine blades creates a strobe effect that can cause headaches and nausea.
2. "Infrasound" is a soundwave just below what the ear can actually detect. It is created by the turbines disturbing wind flow. It, too, can cause headaches and nausea.

"Resolved that the Madison County Board of Health determines that there is the potential for negative health effects associated with commercial wind turbines and that current setbacks are inadequate to protect the public health," said Madison County Public Health in a statement.

The board recommends that any future wind turbine projects be 1.5 miles from any residence.

However, the Iowa Environmental Council disputes these claims and said there is not any proven health consequences associated with wind turbines.

Dr. Peter Thorne, head of the Occupational and Environmental Health department at the University of Iowa, spoke with the Madison County Board of Public Health last Thursday. Dr. Thorne presented findings from two comprehensive reviews of peer-reviewed science. The findings did not show any scientific evidence that infrasound causes health concerns, according to the Iowa Environmental Council. That paper can be viewed [here](#).

The Iowa Environmental Council also noted that Dr. de Regnier voted against the resolution.

The County Board of Supervisors will discuss this Tuesday morning at 10 a.m

filed: August 13, 2019 • Iowa

County board says wind power may be bad for your health

| **Credit:** Aug 13, 2019, Chris Gothner, kcci.com ~~

WINTERSET, Iowa – The Madison County Board of Health says there is the potential that wind turbines could be bad for your health.

The board passed a resolution* recommending that any future turbines be built at least a mile and a half from non-participating homes.

The Iowa Environmental Council argues that no peer-reviewed scientific studies have found links between wind turbines and health issues.

*“Resolved: that the Madison County Board of Health determines that there is the potential for negative health effects associated with commercial wind turbines and that current setbacks are inadequate to protect the public health. The Board encourages those entities with jurisdiction within the County to require a one and one-half (1-1/2) mile setback for future wind turbine projects.”

Source: Aug 13, 2019, Chris Gothner, kcci.com