

# WHY 1.2 and 1000ft WILL NOT PROTECT PUBLIC HEALTH & SAFETY

Robert F Kennedy-"Not all locations are suitable for an industrial-scale wind facility."

This area has far too many homes to attempt the safe siting of an industrial wind farm. It is noticeably evident from the following data that the greater part of rural Manitowoc County is not suitable for the siting of commercial wind energy development. The only way to mitigate incidents with noise, ice fling, flicker, blade throw, turbine collapse, and turbine fire is to implement adequate safety setbacks. Safety standard advocated by the wind industry are ridiculously inadequate and benefit no one but themselves.

"I'm passionate about this because I firmly believe wind power is part of the solution and not a problem, as some people think," Sagrillo says, "But that solution has got to be acceptable to the neighborhood. You can't just force things down people's throats."

(Source-Facing the Wind.[www.rednova.com/news](http://www.rednova.com/news))

Different setbacks for inhabited structures have been proposed, depending on whether the inhabited structure belonged to a landowner who is leasing land to the wind project. Again this distinction has no bearing on public health and safety, and should therefore not be allowed. In other words, if 1000 feet is necessary to protect one citizen, it is necessary for all citizens, whether or not they are receiving lease payments. (Source-8/27/04 State Model Wind Ordinance) If 1000 feet is necessary for safety, I have the right to be safe in my home and anywhere on my property.

## WINDRIGHTS

**Windustry-**Turbines should be sited no less than five-times their rotor diameter from property lines, unless written permission is given by the neighbor. *Explanation:* This recommendation is designed to protect wind rights of all landowners and minimize the impact of wind turbines on neighbors. Wind turbines produce wake effects 8-11 rotor diameters downwind. Requiring a setback of 5 rotor diameters from property lines provides a buffer that will protect the wind rights of all landowners in the vicinity of a wind project. We believe clear standards for property line setbacks are critical to preventing disputes over wind rights now and in the future. Without standards, conflicts among neighbors and among wind developers can arise. (Source-Wind Energy Easements and Leases: Best Practices and Policy Recommendations).

**Ontario, Canada-** In the absence of any specific local zoning or management issues, no turbine shall be positioned closer than five (5) rotor-diameters from the centre of the wind turbine to the lease property boundary in the dominant upwind or downwind direction, unless it can be demonstrated that site conditions, such as topography, natural features, or other conditions (e.g., offset of turbine locations) warrant a lesser

distance. In cases where the lessee holds a long-term lease on adjacent lands for wind energy development, this setback may be reduced to 1.5 times the total height of the wind turbine. No turbine shall be positioned closer than 1.5 times the total height of the wind turbine to the lease boundary in any other direction. (Source-Ministry of Natural Resources, Ontario, Canada)

**US Dept of the Interior, Bureau of Land Management**-No turbine shall be positioned closer than five (5) rotor-diameters from the center of the wind turbine to the right-of-way boundary in the dominant upwind or downwind direction, unless it can be demonstrated that site conditions, such as topography, natural features, or other conditions such as offsets of turbine locations warrant a lesser distance. In cases where the applicant holds a long-term lease right on adjacent Federal or non-Federal lands for wind energy development or the adjacent non-Federal landowner provides a setback waiver, this setback requirement may be reduced to 1.5 times the total height of the wind turbine. Further, no turbine shall be positioned closer than 1.5 times the total height of the wind turbine to the right-of-way boundary in any other direction. (Source-U. S. Dept of the Interior, Bureau of Land Management, Interim Wind Energy Development Policy)

**California Wind Energy Collaborative** -Scott Larwood of the University of California-Calculations reporting on a Danish study-The distance the turbines should be from each other for minimal wind interference: three rotor diameters when aligned perpendicular to the wind and 10 rotor diameters when parallel to the wind. Thus, the GE 1.4 MW turbine, with a 70.5 rotor span, requires 37-123 acres per tower, while each Vestas 1.8 MW turbine, with a 90-m rotor, requires 60-200 acres per tower. (Source-Permitting setbacks for wind turbines and the blade throw hazard, 2004 CA Wind Energy Collaborative Forum).

## **BLADE FAILURE, BLADE THROW AND ICING**

This may not be something that happens every day, but these blades weigh several tons. If you were the landowner who owns the neighboring property when this happens, you wouldn't care less how rare it was. While incidents may seem rare, this is partially due to the fact that the wind industry is not required to provide this information and therefore, fails to do so. And keep in mind, common sense tell us, the more turbines installed, the higher the possibility for safety and life threatening incidents.

**AWEA**-In an article on the AWEA website, Mick Sagrillo of Sagrillo Power & Light, who is also a wind enthusiast, summarized some of the insurance risk associated with wind turbines as follows: "Liability coverage needs to address two areas. The first is liability coverage for property damage. While claims in this area are extremely rare, the possibilities include such things as a blade flying off or a tower falling down, thereby causing damage to someone else's property. The second concern centers around personal injury or death. Again this could happen if a blade flew off the wind system or the tower fell down. However, it could also happen if someone fell from the tower, or someone was electrocuted while working on or nearby the system. (www.awea.org)

**California Wind Energy Collaborative**, Scott Larwood of the University of California-Calculations reporting on a Danish study establish how far a blade of fragment could be

thrown at tip speeds at and above the normal operation maximum, expressed as multiples of the total turbine height, using data for 1.5-2.0 MW turbines. At the normal maximum, a blade could be thrown to a distance almost 1.5 times the turbine height and a hazardous fragment over 3.5 times the height. At twice the normal tip speed; a complete blade could be thrown over 2.5 times the turbine height and a hazardous fragment almost 6.5 times the height. The maximum fragment distance is 6.5 times the turbine height. Larwood also calculates blade and fragment thrown as a function of turbine height, finding that as height increases, the absolute distance they might be thrown increases, but as a multiple of turbine height, it decreases. Example: a 164-ft turbine (height to blade tip) could throw a whole blade about 2.4 times the height, and a fragment over 5 times the height. A 328-ft turbine could throw a blade about 1.25 times the height and a fragment about 3.75 times the height. His research concludes that a reasonable expectation for blade failure is 1 per 100 turbines per year. "I used to work in the industry and I've seen them fail. We talk about blade failure in our industry on a very limited basis. The first documented one was the turbine up in Putnam New Hampshire. They had a blade throw of 750ft. (Source-Permitting setbacks for wind turbines and the blade throw hazard, Audio and print, 2004 CA Wind Energy Collaborative Forum).

**Minnesota**, News Article-Tyler stated, "In the winter, the biggest problem is icing." Ice on the blades adds a lot of weight and drag, making the turbines slower and noisier than usual. Ice buildup is also dangerous because the turbines have been known to fling chunks of ice hundreds of feet. A buddy of Tyler's recently had his truck totaled by a block of ice that flew from a turbine, "It was pretty wicked," Tyler said. Fortunately, nobody was in the truck at the time. (Source-The Rake, Buffalo Ridge Minnesota).

**American Wind Energy Association**-Ice Shedding, Small pieces of ice may be thrown, recommended setback, 1.5 times the total height. Blade throw is extremely rare today, but shows that setbacks of 3-5 rotor diameters are common. (Source-Wind Power Technology and Siting Issues, Wind Powering America All-State Summit, May 19<sup>th</sup>, 2005)

**OK**-A week after it began operating, a 260-foot tall wind turbine near Weatherford collapsed early Friday. The wind was blowing at 12 mph. (Source-www.fieldlines.com)

**Germany**-A nacelle weighing up to 60 tones atop a 330-foot tower, equipped with 140-ft blades, will be a significant hazard to people, livestock, buildings, and traffic within a distance of 1.1 or 1.2 (565-ft) times the height of the tower. In Germany in 2003, the brakes of a wind turbine failed in high winds and the blades spun out of control at a much higher than normal rpm. A rotor blade struck the tower and the entire nacelle flew off the tower. Another rotor blade tore off and hurled away. The remainder of the turbine house fell from the tower. The generator separated from the transmission and fell some meters far away. The main parts of a wing hurled 250m in a southeast direction. Another wing hurled approximately 200 meters in a northeast direction. Other pieces of rubble were hurled as far away as 350m. All turbines discussed in this article are "upwind," three bladed, industrial-sized turbines and given the date, probably shorter than the turbines proposed for Manitowoc County. This distance is nearly identical to calculations of ice throw from turbines with 100-ft blades rotating 20 times per minute (1680-ft). (Source-www.gemeinde-reinsberg and Health, hazard, and quality of life near wind power installations. Dr. Nina Pierpont)

**UK-Turbine snap prompts safety fears.** Safety concerns have been raised after a turbine blade at Scotland's most powerful wind farm shattered. The incident raised real questions about the possible siting of turbines near houses and public roads. The blade literally flew apart in recent high winds. (Source-New.bbc.co.uk April 2005)

**Canada-**When blades have broken off they have planed up to 400 meters (Cemmeas, Wales. At Tafria, Spain, blades broke off on two occasions, the first in gusty winds, and the second in only light winds, reports Windpower Monthly. (Source-Archives and Collections Society)

**Michigan-**Wind turbine ordinance ready for public-To avoid the potential hazard of ice throw from the blades, commissioners have established setback restrictions of one-and-a half times the diameter of the blades multiplied by the height of the tower but not less than 1,250 feet from the property line. In addition, the wind turbine would be required to be designed to minimize shadow flicker on the roadway, structures or dwellings. (Source-Gaylord Herald Times 10-19-05)

**National Wind Coordinating Committee-**The distance a blade or turbine pieces may be thrown depends upon turbine height and blade length, piece size, and mass, topography and wind conditions, but rarely exceeds 1,500 feet. Most pieces will be found within 300-500 feet of the tower. (Source-Permitting of Wind Energy Facilities)

**American Wind Energy Association-**"One European group that has investigated the ice throw question recommends a setback of 1.5 times the sum of a turbine's hub height and its rotor diameter. (Source-Wind Energy and the Environment, AWEA)

**Addison-**In the document dated January 11, 2004 (Subject: Addison Wind Energy LLCUP-For the Record; Ice throw & More Questions about Foth & Dyke's 2/6/02 and 7/25/03 Ice Throw/Blade Throw Reports and Scott Ainsworth Testimony); there are industry standard accepted equations for determining the distance of ice throws. Based on these equations and the size of the proposed wind turbines (100 meter hub height, 43 meter blade length, 3-19 rpm operating speed, angle of 38 degrees), the ice throws could range from 131 feet at 3rpm to 2836 feet at 19 rpm. The tip of the blades will be traveling at approximately 200 mph at 19 rpm.

**Boreas-**Another study has been performed to incorporate the risk of ice throws, at a risk level of .00001 (10x's that of a lightning strike) (strikes/m/2/year and an icing category of "moderate" (3-5 days per year), the recommended safety distance would be 945 feet for a turbine with 50 meter diameter blades. The turbines for the proposed Twin Creeks Wind Farm are much larger, 86-meter diameter blades. It would require much larger setbacks to ensure that there would be zero chance of an ice throw reaching somebody on their own property or traveling along a public road. (Source-Boreas IV Finland)

## **SETBACKS**

Property lines should always be part of the setback formula in order to provide consistency and not endanger future uses on adjacent parcels. Mr. Depillas and Mr. Vickerman could not argue Supervisor's Goeke's concerns that implementing an adequate safety setback from a home rather than a property line is taking away a persons right to be safe on their own property and would actually make a portion of their property un-safe.

**Wisconsin**-"I can tell you the good developers tend to employ longer setbacks than 1000 feet. And the real good ones make it a practice of reserving a portion of the land payments (20%) to non-participating landowners. One developer in Columbia County has come up with a formula that provides some kind of financial compensation for every household within ½ mile of a turbine. (Source-e-mail to Dave Korinek from M. Vickerman, Renew Wisconsin) It seems to me this developer feels that there are problems associated with turbines up to ½ mile away.

**Wisconsin**-"I served from 1995 to 2001 on a statewide advisory committee that was to have set guidelines for the siting of wind farms. However, the Wisconsin Department of Natural Resources and PSC, which led the effort, never followed through. So now, four years later, numerous wind facilities are being planned across the state with no guidelines. If these standards had been finished, as they should have been several years ago. There never would have been a proposal for a wind facility so close to Horicon Marsh, and there would be guidance in place for other installations. Wind towers in Wisconsin should be well placed, not thrown up helter-skelter across the landscape with no thought of the migration and major movement of birds and bats". (Source-Letters to the Editor, Wind Farm Siting Rules, Karen Etter Hale)

**National Wind Coordinating Committee** -1.25 to six times the height of the wind turbine structure from public roads and highways, and 1.25 to four times the height of the wind turbine structure from adjacent property lines. Distances less than 500 feet may be appropriate for major structure failure but are not adequate for thrown or wind-blown pieces of turbines. The setback should provide adequate protection from falling ice, blown turbine parts, and major structural failure. (Source-Permitting of Wind Energy Facilities)

**Demolition Consulting Services**-" I would say 1.1 times the height of the tower would not be adequate. I would suggest 1.5 times the height of the tower. If the tower toppled, the turbine section would hit the ground, break up, and move outward way from the impact area". (Source-Herb Duane, Demolition Consultant)

**O.S.H.A.**- there must be a clear space for the fall of the structure of at least 45 degrees on each side of the intended fall line and 1 ½ times the total height of the chimney. (Source-Technical manual, [www.osha.com](http://www.osha.com)) This statement refers to demolition by deliberate collapse, which would be a safer, controlled environment, un-like the potential collapse of a turbine.

**A & C Society**-"The aspect of noise has traditionally been demonstrated by imposing a set-back between the industrial turbines and residential property, (note "property" rather than "residence": children have the right to play in their parents back yards, however extensive). Such set-backs have shown a consistent trend towards increase and whereas ¼ mile was in the past a guide line used by the wind turbine industry in their proposals, the regulatory planning authorities are now looking at significantly increased

figures (i.e. 2km in Germany, 2 miles in parts of California-both areas with significant experience with wind turbines) or are no longer permitting land based wind farms (Denmark) or making controversially expensive commitments to offshore installations (Scotland). (Source-Archives and Collections Society, Some health aspects of wind driven industrial turbines)

**New York State Energy Research And Development Authority**-Property lines should always be part of the setback formula in order to provide consistency and not endanger future uses on adjacent parcels. Use of property lines in determining setbacks assures that future uses of un-built adjacent parcels will not be exposed to unreasonable noise impacts.

**Shawano- Property Line Setbacks**: 2 times the total height of the WECU from all ownership property lines, but in no case less than 500 feet. **Structure Setbacks**: 4 times the total height of the WECU from all sensitive receptors and livestock facilities, but in no case less than 1,000 feet.

**Riverside County-CALIFORNIA-Restrict the placement of wind turbines within 2 miles of residential development unless the applicant supplies documentation that the machine(s) will not produce low frequency impulsive noise.**

**BENONA TOWNSHIP-MICHIGAN-Setbacks from existing residences**-When initially constructed, the base of all WTG's shall be located no closer than ½ mile (2640) feet from any portion of the nearest residential structure

**Pere Marquette Charter Township, MICHIGAN-Siting Setbacks.** Large WECS shall be setback from adjacent property lines, public road rights-of-way, railroads, above ground transmission towers and lines and overhead electrical power lines serving more than one (1) dwelling or business a minimum of two (2) times the Height.

**Burt Township-MICHIGAN**-Each commercial wind turbine generator shall be setback from any adjoining lot line and any adjoining public or private road right-of-way or easement a distance equal to 1500 ft. The setback shall be measured from the outermost point on the base of the wind turbine generator.

**Eveline Township-MICHIGAN**-Each wind turbine generator shall be setback from any adjoining lot line a distance equal to 2600 feet.

**Wasco County, OR**- At least 5 rotor diameters from property lines.

**Boone County, IL**-2000 feet from a residence

**Martinsburg, NY**-1500 feet from a residence

**Lee County, IL**-1400 feet from residences (stated with turbine height of 212ft.)

**Alameda County, CA**-3 times the height or 300 feet whichever is greater from a property line.

**Contra Costa County, CA**-3 times the height or 500 feet whichever is greater from a property line.

Kern County, CA-4 times the height or 500 feet whichever is greater from a property line.

**Solano County**-3 times the height or 1000 feet whichever is greater from a property line adjacent to residential zoning, or 3 times the height in other zonings.

**Wabaunsee, KS**-Every system shall meet the following minimum setbacks:  
Setback from the nearest property lines a distance equal to twice the height of the system, including the rotor blades.

**Geary, KS**-Individual wind turbines shall be set back from all property lines a distance equal to at least two times the turbine height. Individual wind turbines shall be set back from residential structures a minimum of 1500 feet.

**New York**-Setbacks, Ice and Blade Throw: Setbacks from adjacent property lines, right-of-ways, easements, public ways or power lines (not to include individual residential feed lines) shall be two times the maximum windmill height or one and one half times the maximum calculated ice or blade throw distance to the maximum point of impact whichever is greater and that such calculation shall be determined by a certified professional engineer at the owners expense.

**Michigan**-Hamlet Township, Setbacks must be at minimum, twice the height of the total structure (tower and blade combined) on all sides of the site boundary.

**NZ**-Turbines too close to homes-Ms. Lucas, speaking for the Guardians, told the hearing commissioners that the 70 wind turbines proposed for the hills southwest of Makara, each 125 meters tall, were too large to put within two kilometers of any residence. International research showed it was “general protocol” to allow a 2km buffer, even with smaller turbines. In NZ there were no consented wind energy developments with more than a handful of houses closer than 2km. (Source-Walkato Times)

**Australia**-To avoid adverse noise impacts on the amenity of the surrounding community, wind farm developments should include sufficient buffers or setbacks to noise sensitive premises. As a guide, the distance between the nearest turbine and a noise sensitive building not associated with the wind farm is to be 1km. These guidelines provide that wind farm developments should be constructed and designed to ensure that noise generated will not exceed 5dB(A) above the background sound level or 35dB(A) using a 10-minute  $L_{A\ eq}$ , whichever is greater, at surrounding noise-sensitive premises. (Source-Guidelines for Wind Farm Development, Planning Bulletin, Western Australia)

**Australia**-Wind Farm Under Scrutiny. The Myponga/Sellicks Hill wind farm will be scrutinized after claims that developer TrustPower plans to move seven of the turbines within one kilometer of dwellings. (Source-The Times)

## **NOISE**

**Lincoln Township-** turbines noisy as usual, tremendously loud---extremely loud, rushing noise---loud whooshing and fierce chopping noise, sounds like a jet at times, intolerable---loud whooshing noise is not even drowned out by corn dryer---tremendously loud, even inside the garage with the doors closed---very noisy, can't sleep-turbines were noisy all night---it's so loud the noise is coming through the windows of the house, it's really a bummer when it wakes you up in the middle of the night and you can't sleep. (Source-Lincoln wind turbine 1-800 noise reports, this is just a sample)

**England-**Dr. Amanda Harry has conducted her own survey on the effects of wind turbine noise. "I have recently had the opportunity to meet some people living near wind turbines. The range of distance from the nearest turbine to their properties was 300 meters to one mile. Of these, 93 percent said that they felt the effects of the turbines had adversely affected their lives. 93 percent are experiencing more headaches, and over 70 percent are having problems sleeping and suffering from anxiety symptoms. Some people are having to leave their homes at times "to get away" from the nuisance. In addition to this, much consideration should be made to the location of these structures so that they are not in a position to cause harm or distress to their neighbors. The community as a whole should be involved in consultation and dialogue around planning issues-but, first full and independently acquired information should be made freely available to the general public. (Source-More attention must be paid to harmful affects, Dr. Amanda Harry)

**UK-**Farmers have been warned they could face legal action from people claiming damaged health from the low frequency noise emitted by wind turbines. Damage arising from wind turbines in Germany has resulted in preliminary insurance payments in excess of 200m. (Source-www.fwi.co.uk. -Turbines to land farmers in court)

**Netherlands-**On quiet nights the wind park can be heard at distances of up to several kilometers when the turbines rotate at high speed. On these nights, certainly at distances between 500 and 1000m from the wind park, one can hear a low pitched thumping sound with a repetition rate of about once a second (coinciding with the frequency of blades passing a turbines mast), not unlike distant pile driving, superimposed on a constant broadband, 'noisy' sound. A resident living a 1/5km from the wind park describes the sound as 'an endless train'. (Source-Effects of the wind profile at night on wind turbine sound. G.P. van den Berg, Science Shop for Physics)

**Scotland-**Research suggests that guidelines on the noise from wind farms urgently needs to be revised as studies on modern, taller turbines found that even at low wind speeds, vibrations can be picked up as far away as 10km. Professor John Fflowcs, professor of engineering at Cambridge University and a world expert on acoustics and noise reduction, said: "The regulations are dated and in other was inadequate. It is known that modern, very tall turbines do cause problems, and many think the current guidelines fail adequately to protect the public." (Source-The Scotsman)

**National Wind Coordinating Committee -**Noise setbacks-Because noise diminishes with distance adequate setbacks are the primary tool for preventing noise problems. An appropriate distance may range from 100 feet to 1/2 mile. If the residences are at locations shielded from prevailing winds, a greater setback is needed than if they are in an exposed location. Manmade noise is noticeable to many receptors when it exceeds the naturally occurring background noise by about 3 dB. Tonal (distinct frequency)

noise is much more noticeable at the same relative loudness level because it is composed of one or more distinct tones, which stand out against broadband (multi-frequency) background noise. (Source-Permitting of Wind Energy Facilities)

**Arlin Monfils**-Let me stress the importance of taking your time and asking the questions and researching the answers. Don't be intimidated by the attorney's of the utilities, their deadlines are their problems and don't make them yours. Once the turbines are up and operating the wind turbine noise will be there. It will not be constant and it may not be above the decibel level that they establish as a maximum, but it will be irritating, at any time of the day or night it will vary in its intensity with the wind direction and speed. It violates the very basis of what a zoning ordinance is meant to protect. The welfare of the people who already live in that community. The responsibility of your zoning board and your town board is to protect the resident's of your community. (Source-Problems associated with wind turbines, Arlin Monfils, Lincoln Town Chairman)

**NZ**-Wind farms may force small school to close-"There's nothing we can do if the noise becomes so bad that we can't run a classroom." A member of the Te Pohue School Board is concerned the noise created by the swishing of turbine blades would drive teachers and children to distraction and eventually cause the roll to drop and the school to close. (Source-Hawke's Bay Today 12-31-05)

**NZ**-Manawatu residents say they are being driven stupid by the sound-Wendy described three consecutive days of relentless noise and throbbing from 18 turbines 2.5km from her Ashhurst home. Meridian has already paid an undisclosed sum to move one Manawatu family who could not live in their house because of noise and vibrations. The turbines sound at Te Apiti, 3km away, was like a truck rumbling past his house, though "it doesn't pass in seconds, it can rumble for hours." (Source-Dominion Post 11-16-05)

**New York**-Whoosh spells uneasy progress-"You hear the whipping when a blade arc's. Sometimes it's like an engine running. You hear the gears creaking...it's terrible." Foringer said. Wayne Danley, who lives across the ridge, is considering legal action over a turbine so close to his home that it wake him up at night. (Source-DemocratandChronicle.com)

**West Virginia**-'The hills are alive'...with the sound of windmills-Addressing citizens concerns, David Groberg, **project developer for Invenergy Wind LLC of Chicago**, said the company would attempt to keep the giants **a distance of one mile from any given residence. He said noise and strobe lighting effect would not be an issue at that distance.**

**Lawrence University**-The World Health Organization recommends that ambient noise levels be below 35 dB for optimum sleeping conditions. The Dutch study, "Effects of the wind profile at night on wind turbine sound", shows that although noise is always present, certain aspects of turbine noise, such as thumping and swishing, became very noticeable at night. Residents as far as 1900 meters from the wind farm complained about the nighttime noise. (Source Primer for Addressing Wind Turbine Noise, Daniel Alberts, 11-20-05)

**Canada**-Noise levels, particularly the low-frequency ‘thump’ each time a blade passes the turbine tower, are the subject of much research, and the UK regulatory spends more of its budget researching noise from wind turbines than on all other environmental noise problems. “For existing wind farms we are satisfied that there are cases of individuals being subject to near-continuous noise during the operation of the turbines, at levels which do not constitute a statutory nuisance or exceed planning conditions, but which are clearly disturbing and unpleasant and may have some psychological effects. (Report from Welsh Affairs Select Committee).

Noise is recognized as a significant cause of stress and stress-related illness in modern society, and local residents have reported health problems. This is particularly apparent from New Zealand Standard 6808 (39) Note to Para 1.3 “WTG’s (Wind Turbine Generators) may produce sound at frequencies below (infrasound) and above (infrasound) and the audible range” and the statement from the Darmstadt Manifesto: “More and more people are describing their lives as unbearable when they are directly exposed to the acoustic and optical effects of wind farms. There are reports of people being signed off sick and unfit to work, there is a growing number of complaints about symptoms such as pulse irregularities and states of anxiety, which are known to be from the effects of infrasound.”

**Recent reports from Denmark indicate government buy-back of residential property in an increasing radius from wind turbines, particularly down-wind.**  
(Source Archives and Collections Society, Ontario Canada)

**US**-Wind Energy Facility noise regulations are necessary because of wind turbine noise characteristics and because such noise is site-specific and difficult to predict. Wind energy facility noise is a recognized public health and safety issue. Wind developers and affected landowners should not be able to “opt out” of government regulations by private contract. This is simply a bad policy and would monetize government regulations. (Source-Mike Grainey, Hearing Officer)

## **FLICKER**

**UK**-At a distance of 10 rotor diameters (equivalent to 400-800 meters) a person should not perceive a wind turbine to be chopping through sunlight, but rather as an object with the sun behind it. This limits the zone of potential shadow flicker and normally there are no buildings in these zones. (Source-www.dti.gov.uk)

**Finland**-Turbine switched off because of flicker-Wind turbine next to Whitemoor Prison to be switched off at certain times of the year because shadow flicker is upsetting inmates. “This turbine gives off sweeping shadows and is one reason why it should not have been built next to homes, factories or prisons.” (Source-Cambs Times 24 04-07-05)

**Lincoln Township**-Two years after installation, a study showed that 33% of residents 800 ft to ¼ mile from the turbines found shadow from the blades to be a problem, 40% ¼ to ½ mile away, 18% ½ to 1 mile away, and 3% 1 to 2 miles away. (These turbines are only 285 feet of potential shadow flicker, compared to the 471 ft proposed Navitas

turbines) (230 people were sampled in the study) (Source- Lincoln Township Wind Turbine Survey, Agricultural Resource Center, UW Wisconsin Extension)

**Roberts**-Wind turbines are unique structures. Unlike other power plants, they have blades that will be rotating in the free atmosphere. The current setback of 1000 feet is not adequate for the proposed 500ft turbines. (Source-Please refer to the letter and graph from Jeff Roberts)

**MI**-The home in the shadow flicker video that was shown at the December Wind Energy Advisory meeting was 1300 feet from a 325-ft turbine.

## **FIRE**

**UK**-A huge wind turbine went up in smoke in a massive blaze seen for miles-a 200-foot turbine burst into flames. The fire was so fierce all three 75-ft long fiberglass blades eventually dropped off and thick black smoke could be seen for miles. (This was a second-hand turbine previously used on a wind farm in Germany) Engineers from Vestas had been working on the affected turbine after an oil leak was detected. The turbine had been restarted when the fire started. (Source-Sunderland Today, 12-24-05)

**MN**-A South Dakota man died and two people were injured in a fire at a large wind turbine. One man died at the scene after he fell 210 feet, while two other people escaped after climbing down. According to the report, they were replacing a bolt when the fire started. (Source-Pioneer Press)