



ADDITIONAL SUPPORTING DOCUMENTATION

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We are acutely aware that “there is ample scientific evidence to conclude that wind turbines cause serious health problems for some people living nearby”¹ and thereby of the emergence - and growing potential - for serious public health and safety impacts of wind turbines in Massachusetts exacerbated by the “rush to wind” and siting wind turbines too close to people. The right action to protect the health and safety of the citizens of Massachusetts is to invoke the **precautionary principle** in your final report and to mandate a moratorium on the construction of industrial wind turbines until more research and independent studies have been completed.

When the results of such independent studies are available, there needs to be an appropriate consultative and fair solution developed to solve the problems which have been caused by the currently constructed but unsafely sited turbine developments, **which are making people sick.**

According to the report from the highly political review of The Social and Economic Impact of Rural Wind Farms--which included a review of the adverse health impacts as well--recently held by the Senate in Australia, the following recommendation was made: “The Committee recommends that the Commonwealth Government **initiate as a matter of priority thorough, adequately resourced epidemiological and laboratory studies of the possible effects of wind farms on human health.** This research must engage across industry and community, and include an advisory process representing the range of interests and concerns.”²

In fact, on June 29, 2011 the Umatilla County commissioners in the state of Oregon approved changes to the county's wind turbine siting rules which require a minimum of a two-mile distance between a home and a wind turbine.

PRECAUTIONARY PRINCIPLE:

According to Heather Goldstone, Ph.D., science reporter for WCAI, a WGBH affiliate:

“The 1998 Wingspread Conference convened by the Science and Environmental Health Network crafted and adopted the following definition...

*“Where an activity raises threats of harm to the environment or human health, precautionary measures should be taken **even if some cause and effect relationships are not fully established scientifically.**”*

‘In this context the proponent of an activity, rather than the public bears the burden of proof.

‘The process of applying the Precautionary Principle must be open, informed and democratic, and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action.’³

“In 2005, UNESCO released a report aimed at clarifying when and how the precautionary principle should be applied:

‘The [precautionary principle] applies when there exists considerable scientific uncertainties about causality, magnitude, probability, and nature of harm’⁴

¹ Phillips, An Analysis of the Epidemiology and Related Evidence on the Health Effects of Wind Turbines on Local Residents, 7/3/10

² June 2011, The Social and Economic Impact of Rural Wind Farms, The Senate of the Commonwealth of Australia

³ <http://www.sehn.org/wing.html>



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“This would certainly seem to be the current situation with regard to claims of health impacts caused by wind turbines... the ... evidence at hand almost certainly meets the standards of the precautionary principle, and warrants further consideration by scientists and public policymakers.”

The World Health Organization states: “The precautionary principle. In all cases noise should be reduced to the lowest level achievable in a particular situation. When there is a reasonable possibility that the public health will be endangered, even though scientific proof may be lacking, action should be taken to protect the public health, without awaiting the full scientific proof.”⁵

Therefore, it is important to err on the side of caution and invoke the precautionary principle in construction of wind turbines in the Commonwealth of Massachusetts closer than 6.3 miles from human habitation (in other words, a temporary hold on turbine construction) until the research can conclusively determine what is a safe setback of turbines from people and to protect the health and safety of the citizens of Massachusetts.

MASSACHUSETTS POLITICAL CLIMATE AND PUBLIC HEALTH:

It is Governor Patrick’s goal to site 2,000 megawatts of wind turbines throughout Massachusetts by 2020, a policy that seems to be translating into “*site wind at any price*”. In addition, legislation recently enacted, such as the Green Communities Act of 2008, requires the development of wind facilities throughout the state. These aggressive goals and legislative mandates highlight the growing critical need to ensure that the locations and operations of all future wind facilities in our state provide adequate protective public health and safety oversight.

We urge you to commence a rigorous, independent and comprehensive study of the public health and safety effects of proximity to wind turbines in those communities where proximity to a wind turbine has already caused adverse impacts. The most recent incident has occurred in the town of Falmouth, where over 50 people are now physically ill.

In addition to assessing these impacts on residential neighborhoods, there is also a need to protect the health and safety of sensitive and less mobile populations – those in nursing homes, hospitals, schools, and prisons.

Wind turbines have already been erected near schools, and more are planned.⁶ School sites can involve complex constraints and should take into consideration the recent example of a turbine blade breaking, with parts hurled near an Ohio high school⁷ and the collapse of a turbine in a primary school playground in Scotland.⁸ Numerous documented instances of turbine malfunctions around the world exemplify the risks to public safety.⁹

According to a report on the renewable energy potential at state-owned facilities, wind turbines are also planned at three sites controlled by the Massachusetts Department of Corrections. Imprisoned populations may be particularly vulnerable to the health and safety effects of living near wind turbines.¹⁰

⁴ unesdoc.unesco.org/images/0013/001395/139578e.pdf

⁵ www.bvsde.paho.org/bvsci/i/fulltext/noise/noise.pdf, p17

⁶ http://www.mass.gov/Eoeea/docs/eea/press/publications/022409_renew_potential_study.pdf, p12

⁷ <http://www.morningjournal.com/articles/2009/02/10/news/mj594813.txt>

⁸ <http://www.windaction.org/news/24196>

⁹ www.windaction.org; www.wind-watch.org

¹⁰ http://www.mass.gov/Eoeea/docs/eea/press/publications/022409_renew_potential_study.pdf, p12



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The completed and operating wind turbines in our state are rapidly becoming “natural experiments” for demonstrating adverse impacts to the health and safety of the citizens of Massachusetts even though a decade of similar impacts by industrial wind turbines when sited too close to human habitation are documented in other states and countries.

The information that we have compiled is important and must be taken into account in a fair and independent literature review.

HERE IS WHAT WE KNOW:

- Wind turbines are a new source of community noise, and as such their effects on public health are only beginning to emerge in the literature. The recognition of a new disease, disorder, or threat to health usually follows a set pathway.
 - First, doctors and practitioners attempt to fit symptoms into pre-defined diagnostic categories or to classify the complaints as psychosomatic.
 - Second, as evidence accumulates, case studies begin to appear in the literature, and exploratory research is undertaken to obtain better descriptions of the symptoms/complaints.
 - Third, intensive research is undertaken examining the distribution and prevalence of those reporting symptoms, the factors correlating with the distribution and prevalence of those symptoms, and ultimately cause-and-effect explanations of why those reporting symptoms may be doing so.¹¹
 - We are now between the first and second stage.
- Peer-reviewed scientific studies state noise from wind turbines is more annoying than that from most other sources at comparable sound levels. This annoyance is predominantly attributed to the unique sound characteristics of wind turbine noise.
- “There can be no reasonable doubt that industrial wind turbines whether singly or in groups (“wind farms”) generate sufficient noise to disturb the sleep and impair the health of those living nearby.”¹² Inadequate sleep has been associated not just with fatigue, sleepiness and cognitive impairment but also with an increased risk of obesity, impaired glucose tolerance (risk of diabetes), high blood pressure, heart disease, cancer, depression and impaired immunity as shown by susceptibility to the common cold virus. Sleepy people have an increased risk of road traffic accidents. Sleepiness, as a symptom, has as much impact on health as epilepsy and arthritis. It is not insignificant.”¹³
- **John Auerbach, Commissioner MA DPH, in the presentation delivered during his Regional Health Dialogues held throughout the state, shows that Governor Patrick’s top priorities are to address health and health determinants. The Commissioner further stated that the priorities of MA DPH are to promote wellness and reduce chronic disease in our state. Wind turbine construction will increase chronic disease in our state and therefore is the antithesis of the stated goals of the Governor and MA DPH.**

¹¹ CKWA - Shepherd - Witness Statement & Report - 11-01-17

¹² Hanning, Wind Turbine Noise, Sleep And Health, April 2010, p7

¹³ Hanning, Wind Turbine Noise, Sleep And Health, April 2010, p 8



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- In addition to sleep disturbance, symptoms of wind turbine noise include headache, tinnitus, dizziness, vertigo, nausea, visual blurring, eye strain, tachycardia, irritability, problems with concentration and memory, distraction, fatigue, feeling vibration, muscle spasm, nausea, nose bleeds, palpitations, pressure in the ears or head, skin burns, stress, tension, and panic attack episodes associated with sensations of internal pulsation when awake or asleep. These symptoms are consistent with international research and media reports documenting humans exposed to wind turbines who are reporting adverse health effects.
- The audible sound from wind turbines, at the levels experienced at typical receptor distances, is expected to result in an unacceptable percentage of persons being highly annoyed and many experiencing severe health problems.
- "...A number of other sources of industrial low frequency noise...have reproduced exactly the same symptoms as many residents adjacent to wind turbines are reporting, including the elevated blood pressure, the severe sleep disturbance from waking up in a panicked state, and what appears to be the Tako Tsubo heart attack episodes...where people adjacent to turbine developments are having heart attacks but are then shown to have normal coronary arteries... The mechanism for Tako Tsubo heart attacks has already been identified as a surge in stress hormones, particularly adrenaline. This surge in adrenaline is also suspected with the episodes of acute hypertensive crises being described by residents adjacent to wind turbines, both in Australia and in Canada. It is also suspected because it has been shown in animal studies, and it fits with the clinical descriptions of people waking up in a panicked state, anxious and frightened. We suspect that the body's fight/flight mechanisms are being abnormally stimulated, and this is provoking the body to release substantial amounts of adrenaline, even while people are asleep. This needs to be properly investigated.
- "... These episodes of sleep disturbance and nocturnal waking in a panicked state are being experienced by people living up to 10km [or 6.3 miles] away from existing wind developments in South Australia and New South Wales."¹⁴
- "Exposure to wind turbines may also visually induce adverse health effects. It is acknowledged wind turbine shadow flicker may cause annoyance and/or stress.
- "Wind turbines must be sited to protect humans from the adverse health effect of visually induced annoyance as well as noise induced annoyance."¹⁵
- The validity of research showing adverse human health impacts when industrial wind turbines are placed in proximity to homes, businesses, schools and institutions has been established. Physicians, public health officials and researchers around the globe are reaching the same conclusions based upon the reality that people living near wind turbines experience the same illnesses.¹⁶

¹⁴ S. Laurie, Address to Senate in Australia, 2011

¹⁵ <http://www.windvigilance.com/about-adverse-health-effects/visual-health-effects-and-wind-turbines>

¹⁶ http://www.windturbinenoisehealthhumanrights.com/wtnhhr_june2007.pdf, Accessed June 2010



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- Faced with mounting evidence of health and safety concerns near wind turbines, numerous jurisdictions in the U.S. and other countries have initiated their own health impact reviews. Several examples follow:
 - Japan: The Environment Ministry has started a four-year study of the possible health hazards of wind turbines.¹⁷
 - Canada: The medical officer of Grey Bruce in Canada was asked by the health unit board of directors to prepare a report on a possible study for the region.
 - Australia: The senate has accepted testimony from around the world concerning the adverse impacts of wind turbines.
 - Oregon: “The Oregon Public Health Division is responding to concerns about the potential health impacts of wind energy facilities on Oregon communities. We are working with a broad range of stakeholders to:
 - identify and document the major health issues, questions or concerns related to wind energy facilities
 - use the best available science to evaluate potential health risks
 - work with partners and decision-makers to ensure health is considered during the siting process
 - provide community members with timely and useful information, and opportunities to be involved in our work

The Oregon Public Health Division, in consultation with our steering committee, has finalized a list of research questions looking in to what potential health impacts, if any, wind energy facilities may have on Oregon communities. Scientists at Oregon's Office of Environmental Public Health (OEPH) are now reviewing the best available research in order to answer those questions. OEPH will release a draft of the report for public comment in the summer of 2011, with a final report due out in the fall of 2011.¹⁸

- Maine: The Maine Medical Association has adopted a resolution to work with health organizations and regulatory agencies to provide scientific information of known medical consequences of wind development in order to help safeguard human health and the environment.¹⁹

¹⁷ <http://www.asahi.com/english/TKY201001180410.html>

¹⁸ <http://public.health.oregon.gov/healthyenvironments/healthyneighborhoods/builtenvironments/healthimpactassessment/pages/windenery.aspx>

¹⁹ www.mainemed.com/annual/2009/2009_Proposed_Resolutions.pdf

- Nina Pierpont M.D., Ph.D. published a book titled *Wind Turbine Syndrome, A Report on a Natural Experiment* (December 2009) which describes the common illnesses caused by living or working near wind turbines. According to Dr. Pierpont:

“The symptoms that people report follow a common pattern, or cluster, which I call ‘Wind Turbine Syndrome...’

“People suffering from these health effects were, in nearly all cases, supportive of these wind energy projects. Let me be clear on this. Moreover, they were assured that as the closest neighbors they would not experience any disturbance or illness. Of the 10 families (38 individuals) included in my "Wind Turbine Syndrome: A Report on a Natural Experiment" ..., 9 families have had to leave their homes, and the tenth has sued and is living in misery. Mind you, this is just the families in my report; I have since learned of numerous people, globally, who suffer from Wind Turbine Syndrome and are being forced to leave their homes. My phone and email in-box are loaded with these complaints.

“...Whether the precise pathophysiological mechanism I lay out is correct or not, there is no serious dispute among medical doctors that these people suffer from bona fide and serious illness--and that its cause is the wind turbines, and that this constellation of illness disappears when these people remove themselves from the vicinity of the turbines. I repeat, there is no serious clinical dispute about this.”

- Christopher Hanning, M.D., retired director of the Leicester Sleep Disorders Service in England, has authored a report titled *Wind Turbine Noise, Sleep and Health*. He writes “...there is compelling evidence that wind turbine noise can and does disturb sleep and impair the health of those living too close and that current guidance is inadequate protection.”

He adds: “In my expert opinion, from my knowledge of sleep physiology and a review of the available research, I have no doubt that wind turbine noise emissions have been clearly associated with sleep disturbances.”²⁰

- In a press conference on May 7, 2010, Michael Nissenbaum, M.D., reported to the Vermont legislature on his research into the health effects of living within 3,500 feet of wind turbines. He explained:

“It is a medical fact that sleep disturbance and perceived stress result in ill effects, including and especially cardiovascular disease, but also chronic feelings of depression, anger, helplessness, and, in the aggregate, the banishment of happiness and reduced quality of life.”

“If industrial wind turbines installed in close proximity to human habitation result in sleep disturbance and stress, then it follows as surely as day follows night that wind turbines will, over the long term, result in these serious health effects and reduced quality of life.”

He then presented a summary of his research:

²⁰ http://windvigilance.com/downloads/Wind_Turbine_Noise_Sleep_Health.pdf



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"In my investigation of Mars Hill, Maine, 22 out of about 30 adults ('exposed') who live within 3500 feet of a ridgeline arrangement of 28 1.5 MW wind turbines were evaluated to date, and compared with 27 people of otherwise similar age and occupation living about 3 miles away ('not exposed').

"Here is what was found:

"82% (18/22) of exposed subjects reported new or worsened chronic sleep deprivation, versus 4% (1 person) in the non-exposed group. 41% of exposed people reported new chronic headaches vs. 4% in the control group. 59% (13/22) of the exposed reported 'stress' versus none in the control group, and 77% (17/22) persistent anger versus none in the people living 3 miles away. More than a third of the study subjects had new or worsened depression, with none in the control group. 95% (21/22) of the exposed subjects perceived reduced quality of life, versus 0% in the control group. Underlining these findings, there were 26 new prescription medications offered to the exposed subjects, of which 15 were accepted, compared to 4 new or increased prescriptions in the control group. The prescriptions ranged from anti-hypertensives and antidepressants to anti-migraine medications among the exposed. The new medications for the non-exposed group were anti-hypertensives and anti-arthritics."²¹

- Alec Salt, Ph.D., of Washington University in St. Louis, an NIH researcher and inner ear specialist published a peer-reviewed article which he discussed at a 2010 international conference on adverse health effects of industrial wind turbines. The following is from his presentation.
 - "For years, people have been told that infrasound you cannot hear cannot affect you.
 - This is completely wrong.
 - Because the inner ear does respond to infrasound at levels that are not heard, people living near wind turbines are being put at risk by infrasound effects on the body that no one presently understands.
 - For industrial turbines a cautious approach could require setbacks of at least 2 kilometers (1.25 miles), as well as
 - In-home monitoring of both A-weighted (audible) and G-weighted (infrasound) noise levels 24 hours/day for all dwellings within 2 miles, and
 - Health monitoring studies for those living within 2 miles (with consent)."²²
- Daniel Shepherd, Ph.D., Senior Lecturer at the Auckland University of Technology and co-founder of the World Health Organizations' Quality of Life (WHOQOL) field centre in New Zealand, states the following: "Many nonacoustical factors determine how annoyed one will become towards a source of noise. Degrees of annoyance to noise cannot be measured by acoustical equipment such as sound level meters; instead it can only be described by the listeners themselves. Thus, the response of the individual to the sound is just as important as the acoustic properties of the sound wave. The 'people' side of noise is commonly absent from acoustics reports, where acousticians have a tendency to treat a spectrum analyzer or a free field microphone as equivalent to a human being. The reality is that the bulk of the annoyance response is likely to be explained by a collection of interacting traits and contextual factors that include age, attitude to the noise source, personality, mental functioning, time of day and noise sensitivity..."

²¹ <http://www.windaction.org/documents/27196>; <http://windconcernsontario.files.wordpress.com/2009/08/mars-hill-nissenbaum1.pdf>; <http://vodpod.com/watch/2060980-interview-with-dr-michael-a-nissenbaum>

²² http://windvigilance.com/downloads/symposium2010/swv_symposium_presentation_infrasound_your_ears_hear_it_2.pdf

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- “The word annoyance is often misinterpreted by the general public as a feeling brought about by the presence of a minor irritant. The medical usage, in contrast, exists as a precise technical term and defines annoyance as a mental state capable of degrading health. Suter (1991) presents a formal definition of annoyance: *‘Annoyance has been the term used to describe the community’s collective feelings about noise ever since the early noise surveys in the 1950s and 1960s, although some have suggested that this term tends to minimize the impact. While ‘aversion’ or ‘distress’ might be more appropriate descriptors, their use would make comparisons to previous research difficult. It should be clear, however, that annoyance can connote more than a slight irritation; it can mean a significant degradation in the quality of life. This represents a degradation of health in accordance with the World Health Organization’s (WHO) definition of health, meaning total physical and mental well-being, as well as the absence of disease.’*²³
- Sarah Laurie, M.D., has been working with people living in Australia, where she has found that people living 10 km away from the nearest turbine experience adverse health impacts. She states, “I have also been told of episodes of extremely high blood pressure in conjunction with severe headaches and nausea, a sensation of one’s heart leaping out of one’s chest, and a ‘sense of impending doom’. This clinical description is identical to that described by patients experiencing acute hypertensive crises. Such a clinical condition has previously been described in conjunction with the clinical use of excess adrenaline, and with a very rare adrenal tumour called a phaeochromocytoma. In some of the affected residents where this clinical situation has been described, both these explanations for their symptoms have been positively excluded. The cause of these episodes is still unknown. One affected resident has had five episodes of this, only ever occurring when the turbines are turning.”²⁴
- Other researchers have linked proximity to wind turbines with vibro-acoustic disease.²⁵
- *Audiology Today* devoted a 2010 major section to the topic Wind Turbine Noise, What Audiologists Should Know to inform professionals throughout the United States and the world that “wind turbines are becoming an important community health issue, especially when hosted in quiet rural communities that have no prior experience with industrial noise or urban hum”...“Evidence has been mounting over the past decade, ...that these utility-scale wind turbines produce significant levels of low-frequency noise and vibration that can be highly disturbing to nearby residents.”²⁶ The stated purpose was “to provide audiologists with a better understanding of the types of noise generated by wind turbines, some basic considerations underlying sound-level measurements of wind-turbine noise, and the adverse health effects on people who live near these turbines.”²⁷
- Robert Thorne, Ph.D., a leading acoustics expert for more than 30 years, whose doctorate is in the field of psychoacoustics, states: “Wind has audible and sub-audible character. That is, measurement of wind sound will always present sound levels in the audible, low-frequency and infrasonic frequencies. Adverse health effects are due to extreme psychological stress from environmental noise, particularly low frequency noise... Sound in the low frequencies can be heard if the sounds are loud enough. Infrasound, however, is more perceptible rather than heard at relatively lower levels of ‘loudness’. The research documented ... indicates ‘ordinary’ wind has a laminar or smooth infrasound and low-

²³ CKWA - Shepherd - Witness Statement & Report - 11-01-17

²⁴ 2011_AU_S Laurie senate submission 390

²⁵ <http://visitwalesnow.org.uk/VAD%20press%20release.pdf>

²⁶ *Audiology Today*, July/August 2010, p21

²⁷ *Audiology Today*, July/August 2010, p29

frequency flow pattern when analysed over short periods of time. Wind farm activity appears to create a “pulsing” infrasound and low-frequency pattern. These patterns are illustrated in sonograms... The hypotheses derived from professional research reported ... is that wind farm noise has an adverse effect on susceptible individuals due to these pressure variations as well as audible noise due to the wind turbines. These effects may be cumulative.”²⁸

- The careful research of Amanda Harry, M.D. in England,²⁹ Bridget Osborne, M.D. in Wales,³⁰ Robert McMurtry, M.D. in Canada (a former Assistant Deputy Minister of Health),³¹ and Robyn Phipps, Ph.D. in New Zealand,³² has confirmed the substance of the above findings.
- Mariana Alves-Pereira, Ph.D. and Nuno Castelo Branco, M.D. of Portugal are studying the effects of infrasound. They have found that echocardiograms in aircraft technicians revealed thickening of cardiovascular structures, namely the pericardium. Regarding the pathology of low frequency induced noise, it is characterized by the abnormal production of organized collagen, can be preliminarily assessed with echo-imaging techniques, develops over years of exposure to LFN, has been identified in several occupational groups (aeronautical, heavy industry, factories), and has been identified in several environmental settings, such as in LFN-rich homes. They have studied the adverse impacts of wind turbines on human health. It is reported that the low frequency noise from the wind turbines has caused health to visibly deteriorate, with increased cognitive impairment and severe noise intolerance.³³
- The reports that claim that there is no evidence of health effects are based on a very simplistic understanding of epidemiology and self-serving definitions of what does not count as evidence. Though those reports probably seem convincing prima facie, they do not represent proper scientific reasoning, and in some cases the conclusions of those reports do not even match their own analyses.³⁴

PERSONAL STORIES:

- According to the proceedings of the First International Symposium sponsored by The Society for Wind Vigilance on the Global Wind Industry and Adverse Health Effects Globally, “many individuals living in close proximity to industrial wind turbines report experiencing adverse health effects. In some cases families have felt compelled to abandon their homes to protect their health.
 - “Pleas for recognition of their situation remain largely ignored by authorities and the public at large.
 - “‘I can’t believe the government is doing this to me’...’interference with the normal political processes’...’our rights as citizens...have been eroded’ illustrate the feelings of hopelessness by those impacted by industrial wind turbines.”³⁵

²⁸ Thorne, Wind Farm Noise Guidelines, March 2011, p. 6

²⁹ http://www.wind-watch.org/documents/wp-content/uploads/wtnoise_health_2007_a_harry.pdf

³⁰ <http://www.telegraph.co.uk/education/3326712/Wind-farms-make-people-sick-who-live-up-to-a-mile-away.html>

³¹ <http://www.wind-watch.org/www-noise-health.php>; <http://alleghenytreasures.wordpress.com/2010/01/10/dr-robert-mcmurtry-on-the-issue-of-wind-turbines-and-health/>; <http://online.wsj.com/article/SB10001424052748704240004575085631551312608.html>

³² <http://www.ohariupreservationsociety.org.nz/hipps-moturimutestimony.pdf>

³³ Alves-Pereira, Branco, Low Frequency Noise and Health Effects

³⁴ Phillips, An Analysis of the Epidemiology and Related Evidence on the Health Effects of Wind Turbines on Local Residents, 7/3/10

³⁵ <http://www.windvigilance.com/international-symposium/proceedings-first-international-symposium>



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The files we submit will contain numerous personal stories from people suffering in the state of Massachusetts and around the world. In total we will submit over 50 personal stories from four locations in Massachusetts and from other states in the U. S. as well as from Australia, New Zealand, Japan, and numerous countries in Europe. Below find excerpts from several of the stories. The lived experiences of the many thousands of people who are too close to wind turbines confirm the fact that there is a problem. Wind turbines make people physically sick.

MASSACHUSETTS PERSONAL STORIES:

Falmouth, MA

- Resident: "Physiologically we both have suffered from extreme loss of sleep, head and ear pressure, ears popping constantly, headaches, grinding teeth, high blood pressure, racing heartbeat, loss of breath, dizziness and vertigo. We both know that our hearing has been impaired. And the ringing in our ears that we have both developed becomes unbearable at times (and it is getting worse)... Having been driven from our home hundreds of times because of unlivable conditions, the money that we have spent on gas alone must be in the thousands of dollars. Right now we are living in a 'Limbo'--not knowing what is going to happen, not being able to plan for the future. We still lose sleep, we still get headaches and all the other symptoms, and we still have to hide from, or try to mask, the turbine 'noise'. We know that we will not be able to live with that turbine so close to us across the street. It is always there. It has already beat us up pretty good. We cannot take much more."
- Another resident: "When the blades of the turbines are spinning, it is sheer hell at my home and backyard. The peace and serenity that I used to have, vanished. Also gone are the rejuvenating nights of sleep... I feel tortured.... Since the turbines have been installed, my health has deteriorated. My blood pressure is off the charts and I experience elevated heart rates."
- A third resident: "Since the Falmouth Waste Water Treatment Facility Turbine #1 became operational, the following changes in what I perceive to be my "normal 24 hour cycle" have occurred directly to me, caused by the turbine; - Disturbed sleep in terms of changed sleep in the number of awakenings during the night and quality of that sleep. - The after-effects during the day following disturbed sleep have caused lack of energy, moodiness and have impacted memory abilities. - Frequent and long duration headaches never before experienced when not associated with the flu... The impact of turbines too often are classified under 'quality of life' rather than illness issues. Build industrial turbines 1779 feet from service critical personnel. Build them next to your emergency room doctors and nurses, your firemen and policemen, your state troopers and your servicemen and women. Then ask yourself, whose quality of life are we talking about? Theirs or yours? Whose illness are we talking about? Theirs or yours?"
- A fourth resident: "My health continues to deteriorate from the noise and nuisance of these machines. I do not need a room full of 'experts' with fancy sound-measuring equipment (which is not even being used to measure what really bothers us) to tell me that I should not be bothered by the noise. I know and feel what I hear. My doctors and I know what occurs within my body when I am subjected to wind turbine noise. Stress, anxiety, depression... I am distressed. How long can this continue? I want my life back. My wife and grandkids want me to have my life back. I am sick of not being able to work in my garden and having to leave my home because the town chose to build two turbines with total disregard for their impact on residents. I am not about to leave. I have worked on my woodland garden



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scheme since 1978. We have built our 2nd 'dream' home on this property after the first was destroyed by fire in 1999. I have more into this home than I could come close to selling it for."

- A fifth resident: "I took my 78-year-old mother ... out to California to meet her great granddaughters. Within a day and a half my headaches were gone, there was no more dizziness and the ringing in my ears was much quieter. I also began to sleep again. It was wonderful. There was also a good level of stress just getting around and dealing with my mother out there...yet no headaches. Within 24 hours of returning home all the symptoms returned in full measure. Within a few days I was again nearly incapacitated... The medical problems I experience daily are 1. Moderate to unbearable headaches without interruption, day or night while I am in my home. 2. Moderate to severe Tinnitus, which does vary from day to day and relates to how well I manage to rest. 3. Very frequent interruption in sleep. I often wake with a start and do not fall back to sleep easily at all. This is very relatable to the wind turbine activity and much worse in times of changing wind direction or barometric pressure. 4. Difficulty concentrating, completing tasks and thinking clearly, which would be an obvious side effect from the ongoing lack of rest. 5. Anxiety and vertigo which correlate to all the above as well as an almost visceral feeling like I am in danger. There is something going on in my system that seems to release an adrenaline or perhaps a fight or flight response that is undeniable and very hard to deal with. 6. I am in considerable pain every day. The combination sets the stage for intense muscle tension and I do still work growing flowers out of my home. I have always worked hard physically but this added stress is making it harder and harder to get what I need to do done. 7. On more difficult occasions I have a certain pounding in my chest that feels like an overloaded heart beat or something...racing pulse that feels like I have been running or exercising but with nausea rather than shortness of breath."

Woods Hole Research Center (100 kW) Northwind turbine - Falmouth, MA

- "I live near the Woods Hole Research Center wind turbine and every night there is a low vibration that keeps me up. I hope people ... will have some compassion as you can't imagine what it's like unless you are experiencing the effects. What I'm not hearing overall in our country is a maximum grasp for conservation so that we don't have to use so much energy... The vibration from the wind turbine is a constant, vibrating my whole house and has increased my resting heart rate 20%. It's such a strong vibration that my heart is trying to keep time with the vibration. It is vibrating a steel pole in my yard--you can see it. I hardly hear the traffic on Woods Hole Road compared to this."

Hull 2 Turbine – Hingham, MA:

- **Hingham resident:** "Below are some thoughts in response to your questions about living near the Hull Wind 2 turbine. Both the turbine sites in Hull have the air traffic from Logan Airport but the Hull Wind 2 turbine is bordered on one side by an estuary designated by the state as an Area of Critical Environmental Concern, which is the side we live on. The other side of HW2 is just off the major road that feeds into town. So I guess that's why many of the Hull neighbors don't complain--they're probably used to listening to a lot of ambient noise from that major roadway.

To me the noise is annoying because we went from having absolute silence and lots of nature noises to having an industrial machine spinning at all hours of the day and night... But just because it isn't always loud, it's still annoying because of the type of noise the turbine emits. It's an unnatural, constant sound, like a plane going by but it just never goes over.



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The noise is especially bad when you have a window or two open when the weather is warmer. We often have to close the windows at night to avoid hearing the noise. But the noise isn't the only issue--we shut the blinds in our bedroom window to avoid having the blinking lights at the top of the turbine shining into the room at night.

And the reflection of the turbine at times off of every shiny surface in my home on some days is downright aggravating. The flicker and shadow, while not constant, is annoying. We don't even get the shadow over our house--it's over the open marsh area and the houses across the river in Hull. The shadow has made it nearly impossible to look out over the marsh at times. The giant shadow going over the marsh can make you dizzy.

It's hard to explain why there are so few formal complaints. I often work from home and a lot of my neighbors are away at work all day... I'm here a lot ... I often see the reflection of the turbine off of every surface, including my computer screen, the windows, the breadbox, and more. I often end up moving to another room because I can't concentrate. But all of these issues occur at different times and in different intensities...

Then there's the issue of who would you complain to? This turbine was built on the town line of Hull and Hingham, so it's not clear who people should call to complain. The Hingham officials say it's a Hull problem and Hull says you don't live in Hull so we can't help you."

Newburyport, MA

- Resident: "My personal experience with the visual impact of wind turbines in close proximity to residential property, especially the neighbors in close range to the turbine, has been a real issue. The turbine destroys the tranquility of the neighborhood and the freedom to enjoy the natural world around us. The light flicker is analogous to having a strobe light penetrating into almost every room in your house at the same time. If you walk outside you can see the continuous movement of the shadow from the large blades covering the entire street. To say the least, it is very overwhelming, distracting and disconcerting."
- Another resident: "I feel them when I experience the impacts of noise, shadow flicker, and red flashing lights at my home, as well as the rotating blade movement that distracts my concentration as I sit in my favorite family room chair. There are times when it seems the colors of the blades in a particular light penetrate even the curtains. It is truly a feeling of invasion of property that I recognize no short-term visitor will ever understand."
- A third resident: "Noise and flicker modeling was done by experts who assured us the studies were correct. Noise would not be an issue and flicker would be not be perceived. However, reality is different than models... We did not know that shadow flicker can occur at night with a full moon; that we hear it at night when the noise levels are quieter; and that it is not as quiet as a refrigerator. Some neighbors have taken to sleeping with window fans and TVs running to drown out the low frequency hum... Drapes do nothing, yet people close them still, at the end of the day, and the strobe effect can make you dizzy for hours afterward, like an amusement park ride that spins around. Sometimes you can't go in your back yard because the flicker is still there. It has truly affected the quality of our lives. I feel for people who can't get out of their houses on their own."



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Charlemont, MA

- “The turning of the blades has a sinister, dizzying vertigo-inducing quality with a shape that by turns reminds me of a 747 jet plane about to take a nosedive or a 3-pronged dagger. Some perhaps instinctive response always seems to trigger a subtle alarm state and I am always looking to see where it is, even at the supposedly harmless distance of 2 miles. Every time I see the wind turbine, I want it to go away... The flashing red light at night is always a disturbing influence. It dominates the whole skyline at night.”

UNITED STATES PERSONAL STORIES:

Illinois

- “Complaining is not something that our family is known for doing and we teach our children to look for the positive aspects of life, but this has gone too far with the turbines. Someone needs to speak up... We can still hear the sound through the walls. It is so upsetting to our family that this is happening. We're going to have to move someday. We are being forced to move from our dream home that we designed and built (with our own hands)... Trying to enjoy a beautiful sunny morning after a rough night, but are currently getting shadow flicker. It's like the lights are being turned on and off in the house and on our property... This is a nuisance that no one should be forced to live with. In addition to the shadow flicker, the turbine noise is pulsating through the house this morning.”

Wisconsin

- “As soon as the turbines began spinning, she had a tightening in her chest, pain in her chest and gasping for air, as well as headaches. Wanda has a history of headaches, which were not improved by living in her new residence. She had migraine headaches in the past. She says the headaches she is getting now are not migraine headaches, yet they are more severe. She takes large amounts of non-prescription pain killers, going from one brand to another looking for relief... Then came eye pain. It feels like the left side of her head is inflamed, although it is not. As time went on the headaches became excruciating and the left eye hurt more. She mentions she is becoming forgetful. Talking on the phone is painful and she tries to avoid it. She also realizes she is more crabby than in the past over simple, “stupid stuff.” Another issue is lack of sleep. Frequently she gets only an hour of sleep, looking at the clock over and over as the night goes on. She tried Benadryl for sleep, but it did not work. This spring the health effects got worse. She had severe abdominal pain. She had an upper GI series with negative results. She had an abdominal CAT scan with “all is OK results.” One doctor told her stress was the cause. The only new element in her life is the industrial wind turbines.”
- The turbines have been “keeping Ann and her children from sleeping well at night. They were tired all the time. They were also getting frequent headaches... The same turbine noise has driven Ann out of her own bedroom ‘I can’t stand to be in that room anymore. I don’t sleep at all. My sleep has been terrible.’ Instead she sleeps on the couch where a fan on their pellet stove helps counter the turbine noise. ‘My number one complaint is how tired I am all the time,’ says Ann, ‘I never had that before, ever.’ ... After one of the children was recently diagnosed with a severe stress-related illness, the Wirtzes decided they’d had enough. They decided the health of their family was more important than keeping their home, and they were abandoning it.”



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New York

- “Several months ago, a neighbor and I drove through the industrial wind complex in Lewis County. While doing so, I experienced a severe case of vertigo and my passenger became nauseous. This definitely caused me concern as the only other time this had happened was when I had driven through another turbine complex in the Southwest.”
- “During our visit to New York State, we viewed an area with wind turbines. The noise level near wind turbines measured 50 dB on the deck while we were eating. The two of us had reactions – [my friend] had pressure across her head and I had pressure in my eustachion tube and got sort of confused at the end of our only 4.5 hour stay. [The wife who lives in the house near the wind turbines] has intense headaches and ringing in her ears - her doctor ... prescribed drugs. [The husband] cannot sleep and has heart palpitations. Many of their neighbors are [also] suffering.”

Maine

- “After fifteen months of life under the turbines everything has been destroyed ... I feel that [my husband] gave his life the other night. He died for these issues, for trying to bring light to the truth. It was luck and grace that the efforts to bring him back were successful [after a heart attack] ... ‘You can feel the pressure on your chest’... How many other people are suffering silently? How long will it take for the right “agencies” to see what is happening? Why are we being treated like lab rats?”

GLOBAL PERSONAL STORIES:

Australia

- “We now suffer headaches, chest pains, a feeling of heart palpitations, and continuous lack of sleep... I have never seen my wife of 18 years look so tired, stressed and unhealthy. This is a huge concern. My children are also more tired and emotional... We have now gone to the desperate measure and moved out of our family home on our farm.”
- “My husband ... has been experiencing regular panic attacks, an average of 2 a week, which greatly resembles a heart attack when you are having one... My husband is becoming more emotionally distressed; I was a happy go lucky woman who loved life and people, who now feels a great weight on her shoulders that at times becomes unbearable.”
- “Since the operation of the ... wind turbines my health has deteriorated. I no longer sleep through the night, waking at approx 2am/3am/4am, with lips vibrating and pins and needles in my legs and arms. Over the last year my eyesight at night when I wake and look at the clock has become blurred and can take a while before I can see the numbers... I can wake suddenly with heart palpitations and a sense of what happened? It is the sudden onset of palpitations and body vibrations I find most frightening and distressing.”



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Italy

- “To put it in a nutshell: We moved into and enjoyed our new house (Scansano, Italy) for exactly 4 weeks - until the newly erected 121m wind turbines ... started operating. I quickly developed the following symptoms, with which I'd never been troubled before: insomnia, panic attacks at all times of the day and night, fast heart rate, nausea, tinnitus, depression, loss of concentration. Coupled with this I heard a strange humming or buzzing noise in my house, loud enough to be extremely distressing and also perceived by visitors. I couldn't enjoy a peaceful evening outside on my terrace and I couldn't invite friends or relatives for this reason. I became paranoid about returning home after a day's work because I knew I would not be able to rest. After a year of keeping a diary of the daily horror ... and spending extended periods away from home to recuperate, we moved out for good – abandoning the work of a lifetime. Our house is unsaleable, our old age 'pension' worthless.”

Ontario, Canada

- “Stephana Johnston and her neighbor canvassed 15 square km of their neighborhood, now known as the Clear Creek/Cultus/Frogmore Industrial Wind Turbine Zone in southwest Norfolk, bristling with 18 densely sited Vestas 1.65 MW turbines within a 3 km radius (from Johnston to Martin, 5/27/10). They discovered: • 8 abandoned houses • 11 vacant houses for sale • 9 occupied homes for sale, and • 3 residents — including herself — who live at their properties during the day but sleep elsewhere at night. Johnston also said there has been: • 1 successful suicide, and • 1 suicide attempt within this radius.”

United Kingdom

- “The following is a list of health deficits those who have stayed on the farm and work there for up to 12 hours a day are now suffering from: John Davis – Heart attack within 1 week of turbines starting operations, tinnitus, hearing loss, vertigo, depression, ongoing bladder issues. Eileen Davis - 2 episodes of pneumonia requiring hospital admission, kidney/bladder issues requiring removal of kidney, pseudo gout episodes x 2 in knee. Julian Davis – pneumonia that took 6 months to clear leaving “scarring” in lungs, depression, atrial fibrillation. John & Eileen Davis – ongoing sleep issues – Eileen says she sleeps better in hospital than at home. None of these 3 had any significant health issues or deficits prior to June 2006.”
- “The turbines can thump incessantly for days and nights on end. One house cannot even see any of the 7 turbines but the residents had to leave their premises, in a desperate attempt to gain some respite from the incessant noise that kept them awake, made them ill, and stopped them enjoying their house and gardens. In other cases residents were obliged to attempt sleep by means of playing a radio all night long, in an effort to drown out the noise of the turbines or play “musical bedrooms”, changing from one room to another, sometimes several times, during the night, in a vain attempt to gain some relief from the noise from the turbines. The noise of the turbines has been variously described as “a clog in a tumble drier”, “a train continually passing though the room”, “a c130 Hercules flying outside your window”, “distant pile driving”, and “someone mixing concrete in the sky”. People report that this is a noise they “feel” rather than “hear”. They report that their heart appears to be trying to keep in sync with the beat from the blades and they experience great discomfort should that beat change. It is especially bad during the night-time hours. My wife is an asthmatic and, on several occasions, whilst suffering an attack, has felt her breathing trying to keep “in synch” with the beat from the turbines. We are not alone in experiencing these sort of noise conditions.”



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Japan

- OKAWA, Tsuyoshi - "He and his family had to sleep at a hotel far from the turbine. Now they stay in their house in the daytime and sleep in an apartment far from the turbine at night."
- KAWASUMI, Toru – "80% of the residents are complaining about headaches and sleep disturbances. Their symptoms disappear when the turbines stop."

CONCLUSION:

We do have the ability to learn from the mistakes that have already been made, both here and elsewhere. Massachusetts could lead the world in the regulations for the safe implementation of wind turbine technology.

The right action to protect the health and safety of the citizens of Massachusetts is to invoke the precautionary principle and to mandate a moratorium on the construction of industrial wind turbines until more research and independent studies have been completed.