Comments Prepared for
The Massachusetts Department of Environmental Protection
(MassDEP)
Regarding the
Wind and Noise Technical Advisory Group
(WNTAG)

According to an email received on Monday, April 4, 2016 from Laurel Carlson at MassDEP:

"MassDEP and CBI will post all comments received on the DEP presentation online without edit and will include any supporting documents of a reasonable size."

Therefore it is understood that this document and the supporting documentation will be posted online at the Consensus Building Institute (CBI) website for the MassDEP WNTAG process.

The following is intended as a preliminary document in order to meet the MassDEP deadline for comments posted online at the CBI website.

OUTLINE

I. OVERVIEW

There are at least 21 wind turbine locations in Massachusetts where people living near wind turbines have reported health problems since 2010. The people did not experience the health problems they now report prior to wind turbine construction. When they leave their home, they do not experience the health problems. When they return to their home, they experience the symptoms. They report the symptoms become worse over time. The problem is not going away. The citizens of Massachusetts deserve to be returned to good health. The source of their health problems needs to be addressed and as soon as possible. It is not fair or right to knowingly harm people living in Massachusetts. The foundation of our democracy is that minorities have rights and the health of citizens should be protected.

To date no wind turbine has been permanently shut down by any Massachusetts agency. Some Massachusetts agency needs to step in and take action steps to help the people suffering if local boards of health are not protecting and helping people in their cities and towns.

It only makes good common sense that noise regulations and policies in our Commonwealth are reviewed for accurate interpretation of existing regulations, and if revisions are needed, the regulations are more restrictive because currently the health of people living in Massachusetts is being adversely impacted by noise from wind turbines nearby.

II. BACKGROUND

The Consensus Building Institute (CBI) was employed by The Massachusetts Department of Environmental Protection (MassDEP) for the Wind Noise Technical Advisory Group (WNTAG) process. According to the CBI website regarding WNTAG:

"In January 2012, MassDEP released for public review and comment a document called the Wind Turbine Health Impact Study.

After reviewing the study and over 500 comments, many accompanied by additional information for MassDEP review, MassDEP concluded that the information currently available suggests the need to consider revisions to MassDEP's noise regulations and policy to address wind turbine noise.

In response to the Wind Turbine Health Impact Study *and comments received, in June 2013, MassDEP convened a technical advisory group to consider potential revisions to its noise regulations and policy."*

The majority of the over 500 comments were highly critical of MassDEP. Some of the problems people pointed to include the following:

a. The bias of panel members.

b. Panel members met in secret, no record of the meetings or drafts of what was written was made public.

c. When materials were requested via the Massachusetts Public Records Law, MassDEP wrote that the public would be charged $18,824.01 (and possibly more) for documents related to the panel, how the panel was chosen, meetings of the panel, drafts of the panel findings, and communications with MassDEP and the Massachusetts Department of Public Health (MDPH). Furthermore, MassDEP stated that the documents received would be heavily redacted at the public's expense.

d. The Scope Document prepared by MassDEP and MDPH to be used by the panel as guidance for operating was broad and inclusive. The document the health panel produced was narrow and limited.

e. The Scope Document included instructions for the panel to conduct site visits to locations where people reported health problems because they lived too close to wind turbines. (Falmouth is only 45 minutes away from Boston and yet the panel never conducted a site visit to this or any other wind turbine location.)

f. Wind Wise Massachusetts submitted over 200 documents for review by the health panel. All documents were within the purview of the Scope Document. The panel never even saw, let alone review the documents on the CD-ROM submitted and received by MassDEP. Given this point alone, since the panel never reviewed a major submission by the public, the ***Wind Turbine Health Impact Study*** is invalid.

g. Misleading language was used in the document panel members signed their names to and there was inaccurate analysis of legitimate peer-reviewed journal articles.

h. As we all know, it is a challenge for people to speak about a sensitive issue such as personal health issues, a matter taken seriously and protected by HIPAA laws. People living and working near wind turbines mustered the courage to report their health problems for review by panel members in belief that their health problems would be taken seriously and they could help themselves and others. These comments were within the purview of the Scope Document and they were ignored. There was no help for people in Massachusetts experiencing the following problems:

    a. Sleep disturbance and sleep deprivation which leads to a whole host of ailments.

    b. Headache, tinnitus (ringing in ears), ear pressure, dizziness, vertigo (spinning dizziness), nausea, visual blurring, irritability, problems with concentration and memory, and panic episodes associated with sensations of movement or quivering inside the body that arise while awake or asleep.

    c. Tachycardia (fast heart rate) and high blood pressure.

    d. An increase in symptoms for people with pre-existing migraine disorder, motion sensitivity, or damage to inner ear structures (such as hearing loss from industrial noise exposure) as they are more susceptible than other people.

MassDEP originally stated that the document produced by the panel members looking into adverse health impacts of wind turbines was merely a draft document and would be revised following their review of comments received by the public. The cut off date for comments was March 19, 2012. A final report was expected. The document written by the MassDEP panel was not revised and is called the ***Wind Turbine Health Impact Study***.

WNTAG was originally described as an answer to the flawed health panel, its meeting process and results in order to assess the impacts of wind turbines and protect the human health of MA citizens.

Unfortunately, over two years of WNTAG meetings have failed to produce wind turbine noise standards that will be adequately protective of human health. Furthermore, people in Massachusetts living near wind turbines are still reporting and experiencing health problems. There is significant credible evidence that there may be a tipping point whereby health damage becomes irreparable.

According to the MA state website under the Mission of MassDEP it: *"is the state agency responsible for ensuring clean air and water, the safe management of toxics and hazards…"*

Unfortunately the MassDEP panel review of health problems and the WNTAG panel have been missed opportunities in the arena of protecting the health and safety of MA citizens which is the very mission of MassDEP.

III. RELEVANT STATUTES, REGULATIONS, POLICIES

It is assumed MassDEP will review the following statutes, regulations and policies. It is important for MassDEP to further define specifically with the public and widely publicize the statutes, regulations and policies being reviewed.

M.G.L. Chapter 21A, Section 2 (10): provide for the prevention and abatement of…noise, and other pollution or environmental degradation.

M.G.L. Chapter 30, Section 61: "damage to the environment" shall mean any…air pollution…excessive noise…

310 CMR 7.00 Air Pollution Control

310 CMR 7.10 Noise

Article 97: Constitution of the Commonwealth of Massachusetts

It is important to note, these statues, regulations and policies give MassDEP the authority to regulate infrasound and low frequency noise (ILFN).

IV. FLAWED PROCESS

A. UNSATISFACTORY MEETING PROCEDURES

MassDEP assembled the WNTAG panel with people having a mix of backgrounds and skills which was viewed as lessons learned from the failed health panel, process and results. Although the panel was heavily weighted with members in favor of wind energy and with a financial incentive to promote wind energy, there were members looking for honest answers that would genuinely help people with health problems living near wind turbines and those near potential future wind turbine locations. Unfortunately CBI marginalized the minority members who didn't agree with the process, testing metrics, or outcomes.

It was viewed as a positive that meetings were held in public, however there were conference calls and materials shared with panel members the public was not made aware of by CBI or MassDEP.

It was viewed as a positive that public comments were allowed, however some members of the public who attended the WNTAG meetings were given a scant few minutes at the end of each meeting to make comments. They were not allowed to participate in the meetings, either through questions or comments even when they knew information about a topic being discussed that could add to or explain important information. They were denied the opportunity to deliver presentations based on their actual experience living near wind turbines or on their research into the impacts of wind turbine noise. Some of their short comments were not represented in full and/or were edited so the meaning and intent of their comments was not represented accurately on the CBI website. Members of the public traveled great distances in order to witness the meetings and to make a three minute comment at the end of the meeting that could be cut off in mid sentence. Some members traveled over five

hours and found that they were not allowed to even speak for three minutes because the CBI moderator decided the meeting was over before they could speak.

WNTAG was a missed opportunity. Members of the public with a great deal of background and expertise and the marginalized panel members could have helped MassDEP so people are not adversely impacted by wind turbines. As an example, panel members urged MassDEP to consider infrasound and low frequency noise (ILFN) when monitoring and assessing noise pollution from wind turbines. The full spectrum of noise impacts people nearby. Even though ILFN can be monitored effectively, MassDEP discounted this valid advice.

B. CONFLICTED CONSULTANT

If a report was to be completed regarding noise and MassDEP (a state agency) is involved, good common sense dictates that the contract should be awarded to a firm that is unbiased and/or at least does not profit from the wind energy industry.

Resource Systems Group (RSG) with Kenneth Kaliski as Senior Director states on their website the following: *"We assist developers of new energy sources such as wind, solar and biomass with analysis and permitting services needed to plan, construct and operate those sources and to evaluate environmnetal benefits of reduced air and water emissions."* [And yes, on their home page, the word environmental is spelled incorrectly, yet the Mass Dept. of *Environmental* Protection appointed the senior director as a member of WNTAG and sanctioned the company to produce a report our state agency at this point in time plans to use in order to define noise regulations and policies.]

It is asked of any critically thinking individual to answer the question, is there the possibility of even an appearance of a conflict of interest here by employing RSG?

If MassDEP was to support the use of this consulting firm, it is expected that MassDEP would conduct due diligence. Included with this comment are five emails with attachments regarding RSG and Mr. Kaliski. As per an email from MassDEP, it is expected that the documents will be posted on the CBI website regarding WNTAG. It is urged that MassDEP read these documents carefully.

To make matters worse, the RSG report states that the RSG work was in cooperation with Epsilon Associates, Inc. (another wind energy industry consultant) and Northeast Wind (a wind energy company.)

The study and report cost MA tax payers and rate payers well over $400,000, which most would consider a large amount of money.

According to a MassDEP email *"MassCEC was the sole funding source for the study."* The Mass Clean Energy Center (MassCEC) is dedicated to promoting wind-turbine development, not protecting neighbors from the health effects of wind turbines. Thus a conflict of interest was created between the promotional focus of the funding source (MassCEC) and the protection mandate of MassDEP.

After an honest review of the attached documents to the five emails, it is suggested that MassDEP write a formal letter to RSG requesting that MassDEP be eliminated from the cover of the report, especially since in an email from MassDEP received, the following was stated: "The choice to include us on the cover was made by RSG."

C. INCORRECT RESEARCH CRITERIA AND DATA

It was highly disappointing to hear from MassDEP via an email that *"MassDEP's contribution [to the RSG study] included defining the scope of the study and reviewing the results for completeness, clarity and ease of comprehension."* The RSG report has numerous obvious flaws and is not complete or clear or easy to comprehend. It was stated that MassDEP does not even have an acoustician on staff. It is recommended that MassDEP hire a staff person who is truly unbiased and has the skill and expertise to truly define the scope of such as study as well as to critically review such a report.

MA citizens have skills and expertise and can help MassDEP to understand some of the very obvious flaws of the RSG study and report. Some examples are highlighted below.

RSG insisted on keeping key data secret, including the locations of noise studies. Consequently, the data cannot be peer-reviewed. This is entirely unacceptable.

Since the study results and report are predicated on the data collected, it is important that MassDEP insist all data from the RSG "Research Study on Wind Turbine Acoustics in Massachusetts" is released into the public domain including audio files. Appendix B needs to be broken into smaller bites so it can be downloaded easily. The data could be broken down by testing sites. The data could be further broken down by seasons. Data not only should be public but it should be peer-reviewed.

The foundation of the study and report is the data. If the data is in question then it follows that the entire study and report are in question.

It therefore only makes good common sense that the data be collected again by an unbiased consultant with oversight of two unbiased qualified consultants. MassCEC can fund the fix of an error they made. This time it would be important for MassDEP to have direct oversight in the process. If there are not qualified employees to supervise such a process, and since there are wind turbines in MA, MassDEP needs to find the resources to hire an unbiased qualified employee who understands noise and its effects on human health, including infrasound and low frequency noise.

There are many variables in collecting data. It is wise to replicate the data collection in order to verify the study and report. Here are a just a few variables: were the microphones used calibrated appropriately, was the placement location of the microphones including the height of the microphones appropriate, were the screens on the microphones used appropriate, was the effect of heightened noise zones taken into account in the placement of the microphones, was the weather taken into account, were the microphone locations changed taking into account weather conditions and the variability of heightened noise zones, what is the topography of the land and the soil conditions? Were locations with more than one wind turbine monitored? If so, there are a whole host of other questions to be answered. Were locations inside homes monitored? We know noise may be amplified inside of homes and other structures. Most importantly, were the details verified by an unbiased qualified third party?

In order to understand noise and the impacts of wind turbines on humans, these and other questions need to be answered.

The RSG study and report failed to adequately account for the effects of wind shear or amplitude modulation which are significant factors affecting human perception of wind-turbine noise.

The RSG study and report failed to adequately account for the effects of infrasound and low frequency noise. Infrasonic pressure has been recognized by the Falmouth ZBA.

The turbine operation and shutdown protocols used for the report may be adequate for testing loud, continuous sound, but failed to provide satisfactory results for the intermittent, impact sounds associated with wind-turbine emissions.

Furthermore, the intermittent and impulsive nature of wind-turbine noise could not be accurately assessed from the short-term sound samples used for the RSG report.

Not enough measurements were taken at near or maximum sound power.

For its study and report, RSG should have used existing acoustical studies regarding excessive noise emitted by wind turbines located near homes, to inform its determinations on noise pollution prevention and noise limit compliance. Instead, it ignored those on-site studies.

Most important, actual experiences reported by neighbors to existing wind turbine projects in Massachusetts and elsewhere were not taken in to account in the WNTAG process or in the RSG report.

D. INADEQUATE FOLLOW-UP

The RSG report took well over a year to produce and the body of the report is 194 pages long. The appendices are much longer. It was released to WNTAG members just a week and a half before a scheduled meeting on the topic. This denied them an opportunity to carefully read and study the highly technical and hard to read report and fully comprehend the study itself. Furthermore, given the time constraints, it was entirely impossible for even the most highly qualified to understand the full implications of the study and report.

The time allotted for review by the public has also been too short given the implications and conclusions of the report.

Again, it is concerning that MassDEP was in charge of "*reviewing the results* [of the RSG study] *for completeness, clarity and ease of comprehension"* and had no problems with the study. Just the lack of transparency and secrecy regarding the data making peer review impossible and thus undermining any value the report might have invalidates this statement from MassDEP.

V. FLAWED RESULTS OF RSG REPORT

A. OVERVIEW

The RSG report shows clear evidence the present testing protocols are subject to substantial error.

Since all meaningful data are in the minority, all statements by RSG that refer to percentages are misleading.

Since the foundation of the study and report is the data and since the data is in question then it follows that the entire study and report are in question.

Most importantly, the RSG study results and report do not address the actual experiences reported by people living near wind turbines regarding their adverse health impacts.

B. LOW POWER OUTPUT

Not enough measurements were taken at or near maximum sound power.

C. PERIODIC SHUTDOWNS

The RSG report's use of periodic shutdowns in order to compare background measurements to impact measurements just before and after each shutdown has proven unreliable.

D. AMBIENT

RSG's view is inconsistent with the intent of the existing regulation MassDEP regulation.

E. AMPLITUDE MODULATION

Amplitude modulation needs to be accounted for appropriately in order to protect human health.

F. WIND SHEAR

The RSG report acknowledges that wind shear conditions can reach extreme levels, particularly at night. But it fails to account for the fact that wind shear can result in conditions in which hub-height wind is strong enough to generate maximum power and sound, while ground-level winds are calm thus reducing the ambient sound to very low levels (sometimes under 25 dB(A). This means that such events, which are clear violations of current MassDEP policy, can go undetected.

G. INFRASOUND

There is evidence from a variety of sources including scientific studies, peer-reviewed journal articles, white papers, and international noise conference slide decks and papers that infrasound and low frequency noise is adversely affecting people's health.

VI. RECOMMENDATIONS

A. REGULATION

1. OVERVIEW

MassDEP stated in an email; *"the outcomes of the RSG report will inform our consideration of regulatory requirements"* It is recommended that MassDEP carefully evaluate this statement.

It is appreciated that the public will be able to continue to submit comments regarding the RSG study and report as per the email statement by MassDEP, *"the opportunity to provide comment on the report and its use in the context of the DEP regulatory development process will continue."* It is recommended that the comments continue to be posted at the CBI website or on a readily accessible website that is widely advertised to the public.

Wind turbines produce a different type of sound from other sources. Wind turbine noise is more annoying than equally loud noises from such sources as airports and traffic due to the unique sound characteristics of wind turbine noise. These noises can be classified as audible including amplitude modulation and wind shear, and infrasound and low frequency noise.

Currently, MassDEP is trying to regulate wind turbine noise through existing regulations that were never designed or intended for the unique characteristics of wind turbines. The full spectrum of noise must be measured in order to fully understand the health impacts of wind turbines.

It is important that new regulations start by stating their purpose as to protect people living and working near wind turbines from encountering disturbing and dangerous physiological and psychological impacts and mounting health problems (formerly inadequately classified as annoyance or nuisance), from sound emissions emitted by wind turbines.

Followed by a statement that it is the responsibility of the developer to ensure there is no physiological or psychological harm, or other adverse impact on people living and working near wind turbines.

The regulations or policies must be clear that if a project, as locally permitted, fails the noise compliance monitoring then the developer of a project must remedy the problem.

Until the problem is rectified, the project must shut down. It is the responsibility of the developer, owner and/or operator and their advising acousticians to detail mechanisms whereby the problem may be solved.

That the industry and its advisors are liable if harm is caused, is not only equitable, but it is remarkably simple:

- It focuses attention on what causes harm and will encourage developers and their advisors to quickly build an understanding of that problem;
- It does not exclude sound pressure waves inside houses as a cause of harm;
- It implicitly accounts for topography and wind variations;
- It will focus developers and their acoustic advisors' attention on improving the layouts of multiple wind turbines by avoiding the spacing between adjacent wind turbines to be too close and thereby causing additional turbulence.
- It will focus the attention of developers and turbine manufacturers on dampening the speed of turbine reactions to wind speed and wind direction changes;
- It will focus developers and their acoustic advisors' attention on utilizing the wind turbine signature to understand sound pressure waves around and inside homes, workplaces and other buildings; and on the impact on neighbors of wave peaks as opposed to pressure averages to which the body does not respond;
- It lends itself to the fitting of automatic feedback controls which will help to not cause harm.

Neither this industry, nor any other, has the right, or social license, to harm its neighbors from excessive noise pollution.

Even a 10kw wind turbine in Massachusetts has caused reported health problems for people living nearby from audible noise and infrasound and low frequency noise.

At this point in time in order to not harm the health of people living and working near wind turbines in Massachusetts, it is recommended that no wind turbines be allowed within 1.24 miles from the property line of the nearest neighbor as a minimum.

2. COMPLIANCE TESTING - GENERAL

Whilst proving compliance to incompetent regulations does not protect anyone, all existing projects must be properly and routinely tested for compliance.

Currently compliance testing (to the existing noise standards) is often being fudged. This can be dealt with by the use of a relatively simple protocol that can be written to ensure that compliance testing is thorough, independent and complete.

It is quite possible that rigorous compliance to existing standards for sound pressure may contribute to some reduction in the severity of health impacts in some locations; but because the standard is faulty, forcing proper compliance to faulty standards, is by no means a full solution.

The purpose of compliance testing is to ensure that a wind project does not exceed the noise levels set by noise standards.

3. INDEPENDENT ACOUSTICIAN

Under no circumstances is the same organization or individual that provided opinions or expert advice at the planning permit hearings, or pre-construction noise predictions, to be engaged to undertake compliance testing.

Whilst the owner of the wind project will be responsible for the investigator's costs, the investigator's appointment documents must clearly state that the investigator has an equal and separate responsibility to the project neighbors for the accuracy of his findings; and that such findings and data will be made publically available.

In all cases an investigator in delivering a compliance opinion must personally sign off on the opinion; and where that person is part of a multi-professional practice, partnership or corporation, the senior person in that entity must also sign off on the opinion.

The compliance report must be prepared by a licensed acoustics expert who is in compliance with the acoustician code of conduct so the document can be automatically tendered in court with the required acknowledgment by the report's author(s) that the report will be deemed valid in court.

All acoustic terminology, noise predictions and sound measurements shall comply with recognized international standards (ANSI, IEC and ISO).

4. MEASUREMENT TOOLS

All noise sampling must be attended by a qualified acoustician.

Slow response meters are adequate for measuring continuous sound, but they understate the maximum level of some impulsive sounds. The impulsive nature (amplitude modulation) of wind-turbine sound is best measured with the fast meter setting.

Since wind-turbine noise is so variable, any one instance of measurement is only a small sample, so it is important to conceive the worst case needed in order to determine compliance.

Sound levels for compliance are to be measured using instruments that can measure unweighted sound from 0.5 Hz hertz to 20 kHz and analyze the data in 1/3 octave bands across the audible range, 1/12 octave bands across the LF range and narrow band (FFT) over the infrasound range.

5. INSTRUMENT LOCATION

Whilst the turbine layout and the topography may indicate to the compliance investigator that certain buildings and workplaces are the most likely locations where the sound limit might be exceeded, the project operator, city or town officials and boards and state agencies will provide the investigator with copies of all noise complaints received. The investigator will then decide which houses and other places need investigation and will then seek permission from the occupants to place measuring equipment within their homes.

6. PRE-CONSTRUCTION SOUND MODELING

a. AMBIENT NOISE

Ambient audible noise measurements should be collected prior to construction.

Ambient audible noise levels are those that reach the property line of the nearest neighbor to the proposed wind turbine project at the most quiet time of year and the quietest time of day.

Tourism is the third largest industry in Massachusetts. Many locations in Massachusetts are considered tourist locations and therefore typically a short period of time during the year is considerable noisier than the rest of the year. Many of the tourist locations in MA are typically semi-rural or rural and therefore very quiet.

In order to limit the combined noise level from all sources, the ideal time to collect ambient sound samples is between midnight and 4:00 a.m.

Ambient sound measurements should be collected when there is no wind. 5 mph of wind may cause a noise measurement of 30 dB(A).

Ambient sound measurements should be collected only during attended monitoring of the equipment by unbiased licensed acousticians. Attended monitoring will eliminate interfering sounds such as spring peepers and other frogs, barking dogs and traffic.

7. POST-CONSTRUCTION COMPLIANCE

The fundamental purpose of a compliance check is to ensure that existing projects with wind turbines of 10 kW or greater capacity have actually been properly investigated before being deemed compliant to the guidelines, policies, rules and regulations existing at the time they received permits.

The human response to wind turbine noise must be considered as an important factor in determining if wind turbines are too loud.

Compliance testing needs to be based on measurements not predictions. Risk cannot be modeled away.

Compliance monitoring must be done in secret and without prior notice because operators of wind turbines can control power output and noise at will, and can do so during a test period.

Wind developers install turbines to maximize output. Therefore, compliance testing at low power is not acceptable. During testing, the wind turbine must be operating at maximum power output, and that level must be determined and continuously monitored independent of the owner of the facility.

Measurements should include all identifiable noise sources, including the wind turbine operating at maximum power.

The fast meter must be used to measure sound in order to guarantee that the peaks will be recorded. Humans hear the sound peaks. Averaging during compliance monitoring removes the peaks.
Hub-height wind speed and power output must be determined by independent means.

Compliance testing of a wind turbine or more without shutting off all wind turbines in the area is not acceptable.

To avoid the effects of wind shear and wind-induced microphone pseudo-noise, ambient sound samples should be collected when ground-level winds are less than 1 meter per second.

At the time of the compliance check, the investigator will also be required to investigate the levels of the wind turbine signature inside any house which residents thereof are reporting sleep and health impacts. Should the levels inside these houses exceed 10dBA over ambient, then the houses will be reclassified as “unsafe”.

a. TIMING

Compliance measurements must start within 60 days of commencing full operation.

b. DURATION

The testing must be of sufficient duration to investigate the various operating conditions including wind speed and direction, atmospheric condition and night and day.

c. SHUTDOWN

The investigator may require one or more shutdown periods where no turbine/s are operating to obtain information on background noise and confirm the narrow band signature for the subject turbines. The operator must comply with such requests.

d. AUDIBLE NOISE

Audible noise from any wind turbine that is the subject of complaints must be evaluated in combination with all other sounds.

1.) AMPLITUDE MODULATION

Peak levels of amplitude modulation must be appropriately monitored.

2.) WIND SHEAR

Wind shear conditions must be appropriately monitored.

e. INFRASOUND AND LOW FREQUENCY NOISE

In order to protect the health of people in Massachusetts, the full spectrum of noise needs to be taken into account in any discussion about wind turbines, including infrasound and low frequency noise (ILFN). ILFN can be measured and therefore regulated.

There is credible evidence that ILFN adversely impacts the health of people. Highly regarded acousticians Stephen Ambrose, Rick James and Rob Rand among others have written about the negative human impacts of infrasound. Psychoacousticians Daniel Shepherd and Bob Thorne have written peer-reviewed journal articles and white papers. Scientist Mariana Alves-Pereira has been working in this field for over 20 years and has written numerous peer-reviewed journal articles.

B. POLICY

It is recommended that there is no policy change at MassDEP until the honest research has been completed in order to know what will indeed stop the adverse health impacts people living and working near wind turbines are experiencing.

Currently, MassDEP could clarify the policy in place. References to recommendations below are found in the body of this document.

The policy in place limits the increase to 10 dB(A) above ambient, and could be clarified so all parties know it means the combined sound from all sources.

Clarify that the use of lower-height wind measurements (such as those from 10-meter markers on MET towers) to predict hub height wind speeds for pre-construction modeling and post-construction mitigation orders is not permissible.

Clarify that the turbine off – turbine on – turbine off protocol in wind-turbine noise testing is not permissible.

Clarify that night-time and day-time ambient sound levels, taken during the quietest time period respectively, must be adjusted for the lowest seasonal level.

Clarification to account for the effects of wind shear and to avoid microphone pseudo-noise contamination, all ambient sound level measurements should be done with wind speeds less than 1 meter per second measured at 10 meters above ground or more.

Clarification of any requirements for shut down and mitigation, taking in to account that, so far, all mitigation measures other than shutting down wind-turbine operation have failed.

Clarification established in terms of sampling and location of sampling.

MassDEP might consider, adopting a 6dBA above Ambient, rather than a 10 dBA limit as in the current policy. This lower number was accepted as credible by the Falmouth ZBA in its ruling regarding their town wind turbine. The town of Bourne has adopted the lower number also.

C. PERMIT

At this point in time it is advised that permits for wind turbines are not issued by MassDEP.

D. ENFORCEMENT

MassDEP must ensure compliance with the option of assessing penalties for noncompliance. There should be significant financial penalties for failure to comply with the regulation.

Most importantly, wind turbine/s must be shut down immediately when out of compliance in order to protect human health.

Despite the fact that both MassCEC and MassDEP are under the aegis of the Massachusetts Department of Energy and Environmental Affairs (EOEEA), there should be a clear separation between MassCEC, an agency that promotes wind development, and MassDEP, the agency that is deputized to protect the public from the adverse impacts of that development.

It is further recommended that the Department of Environmental Affairs be again separated from the Department of Energy since there are conflicts of interest in the goals and missions of each agency.

E. ADDITIONAL RECOMMENDATIONS

It seems we are back at the starting point of 2010 when several Massachusetts concerned citizens and our State Representatives met with the Commissioner of the Department of Public Health. This was the first meeting with a state agency in Massachusetts regarding the health impacts of wind turbines. The Commissioner of MDPH acknowledged there was a problem and stated he would look into it and get back to us in two weeks. That never happened. There has been a great deal of knowledge gained since 2010 but there have unfortunately been many missed opportunities. People in Massachusetts are still suffering. The over 500 comments received by MassDEP following the release of the draft document called the *Wind Turbine Health Impact Study* have not been answered by MassDEP or WNTAG. These comments should be answered by action steps to return the people living and working near wind turbines to good health.

Based on current and past research and the reported effects on wind turbine neighbors, Massachusetts needs an honest scientific health study [not a literature review] conducted by qualified unbiased experts on the effects of wind turbines, including the impacts of infrasound and low frequency noise on humans before changing its noise regulations and policies so there is an understanding of the problems and what it takes to provide a healthy environment for the citizens of our Commonwealth.

There are still at least 21 locations in MA where people living near wind turbines report health problems since the wind turbine/s became operational. It is critical the state agency in charge of protecting their health be effective in eliminating the problem and returning these MA citizens to good health, a basic human right of MA citizens. If MassDEP will not address these health problems and put an end to the cause of health degradation, perhaps a different MA state agency such as the Massachusetts Department of Public Health is needed to take on the responsibility.

F. POTENTIAL STARTING POINT

As a starting point and an act of good faith, it is important that MassDEP accurately implement, enforce and monitor the effects on public health of the current noise regulation (301 CMR 7.10) regarding audible noise as in the body of these comments. Compliance testing was intended to limit the total combined noise to 10 dBA above ambient instead it is being used to measure only the contribution of air contamination from the wind turbine noise.

Following the above steps, the next logical step is assessment of health problems for people living and working near wind turbines who had originally filed noise complaints. This will help determine what symptoms remain and what next steps are in order to eliminate the health problems.

A number of Massachusetts citizens contributed to the content of this document. Appropriate materials from experts around the world were utilized in compiling the information contained in this document.

Respectfully submitted by: Lilli-Ann Green