

WCO | **WIND CONCERNS ONTARIO**

COMMENT
on the design of the
WIND TURBINE NOISE AND HEALTH
STUDY
Proposed by Health Canada

September 4, 2012

Prepared for the Board of Directors, Wind Concerns Ontario

PO Box 11059, 105 Guildwood Parkway, Scarborough ON M1E 1N0

windconcerns@gmail.com

COMMENT

Health Canada Wind Turbine Noise and Health Study

Stakeholder: Wind Concerns Ontario Inc.

Wind Concerns Ontario Inc. was formed in 2008 when citizens of south-western Ontario began sharing their concerns about existing wind power generation facilities in that area. Chief among the concerns was the rising number of reports of ill health which people associated with the environmental noise and sound pressure or infrasound coming from the turbine installations.

Wind Concerns Ontario was incorporated in 2009 and today has hundreds of members throughout the province of Ontario, and dozens of corporate group members. Since the passing of the Green Energy and Green Economy Act in Ontario, a piece of legislation that superceded 21 other democratically passed acts such as the Heritage Act, the Clean Water Protection Act and the Oak Ridges Moraine Protection Act, 6,500 industrial-scale or large-scale wind turbines have been built or proposed in Ontario. Some of the projects will incorporate as many as 200 wind turbines. (See Maps A and B, Appendix.)

And yet, problems remain unresolved with the earlier wind power projects such as those at Amaranth, Melancthon, Ripley, Kincardine, Ridgetown, and Cultus-Clear Creek-Frogmore. In 2011, the Mayor of Amaranth wrote several letters to the Government of Ontario, begging the Premier not only to halt approvals of wind power projects in that area but also to shut down the ones that exist, because the effects on citizens' health have been so significant. People have left their homes behind, unable to tolerate living with the noise and vibration. In 2011, a wind power developer in the Ripley area felt responsible enough to buy five homes from their owners – homes that had become uninhabitable. In some communities, the wind power generators are so close to residences and businesses that people are spending 24 hours a day exposed to the noise and vibration, including children in schools.

This is a grave situation. It is in fact a growing public health concern – a concern that is identical to those reported worldwide in virtually every wind project located in close proximity to human habitation.

Wind Concerns Ontario is pleased that Health Canada has announced its plans to design a research study to explore the relationship between wind turbine noise and the extent of health effects reported by and objectively measured in, those living near wind power generation projects.

We welcome this study principally because of its commitment to a clinical study of the noise/vibration produced by wind power generators and its effects on people. Our comments are offered in the hope that this globally important study will be the best it can be, and that it will serve to protect the health of Canadians.

Wind power generation and health effects: what we know to be true

Wind Concerns Ontario applauds the announcement that Health Canada will conduct a clinical study into the environmental noise and vibration produced by wind power generators. To date, most studies have been literature reviews; all have suggested the need for more research, except for one—the literature review conducted on behalf of, and paid for by, the global wind power development lobby and its regional subsidiaries, the American Wind Energy Association (AWEA) and the Canadian Wind Energy Association (CanWEA).¹

Here are excerpts from the decision by the 2011 Environmental Review Tribunal in Ontario, and from selected papers or articles (all peer-reviewed).

The Environmental Review Tribunal Decision, 2011

“All parties are in agreement that direct impacts such as hearing loss will not be caused by the [wind power] project.”² However, the Tribunal noted the existence of indirect health effects: “The Tribunal has found above that ‘serious harm to human health’ includes both direct impacts (e.g., a passer-by being injured by a falling turbine blade or a person losing hearing) or indirect impacts (e.g., a person being exposed to noise and then exhibiting stress and developing other related symptoms).”³

The Tribunal concluded that “This case has successfully shown that the debate should not be simplified to one about whether wind turbines can cause harm to humans. The evidence presented to the Tribunal demonstrates that they can, if facilities are placed too close to residents.”⁴

Shepherd et al: Evaluating the impact of wind turbine noise on health-related quality of life, 2011

What makes this study so interesting—and important—is that the study was of health-related quality of life of individuals living near a wind power generation facility, but none of the questions were related to the wind turbine noise: it was the respondents themselves who expressed that correlation. The researchers identified sleep deprivation and annoyance in the medical sense of that term, i.e., stress.

The conclusion was that “Our results suggest that utility-scale wind energy generation is not without adverse health impacts on nearby residents. Thus, nations undertaking large-scale

¹ The president of CanWEA admitted in an interview with Global TV news that there were indeed “indirect” health effects from turbine noise.

² Erickson v. Director, Ministry of the Environment, Environmental Decision Case No’s 10-121 and 10-122, page 182.

³ Ibid, page 190.

⁴ Ibid, page 207.

deployment of wind turbines need to consider the impact on the HRQOL [health-related quality of life] of exposed individuals. ...we conclude that night-time wind turbine noise limits should be set conservatively to minimize harm..."⁵

Independent review of evidence is needed

Earlier in 2012, the British Medical Journal published an editorial titled "Wind turbine noise seems to affect health adversely and an independent review of evidence is needed". Authors Doctors Hanning and Evans stated that adequate sleep is a prerequisite for good health and further noted that the impact of certain types of environmental noise on sleep and daytime functioning was well established. Adverse health reports from people living next to industrial-scale wind turbines are now appearing and although these are often dismissed as anecdotal, the authors said, the fact that there are great numbers of complaints so similar in nature itself constitutes epidemiological evidence of a "strong link between wind turbine noise, ill health, and disruption of sleep."

As a result, the editorial concluded, "governments must ensure that the public will not suffer harm from additional ambient noise. Robust independent research into the health effects of existing wind farms is long overdue, as is an independent review of existing evidence and guidance on acceptable noise levels."⁶

Infrasound/low frequency noise can harm

Alec Salt, professor at Washington State University in the Cochlear Fluids Research Laboratory, has written several papers and presented to conferences on the infrasound or low frequency noise, most recently at the international Inter-Noise conference in New York in August 2012. In a communication to Wind Concerns Ontario and others, Dr. Salt said that he is convinced now more than ever, based on his research, that the infrasound produced by industrial wind turbines can cause harm to human health, and further, that the harm may be irreversible for some people with long exposure.

Infrasound affects individuals even though it cannot be heard, he demonstrates, and can result in sleep deprivation which in turn can cause indirect health effects such as elevated blood pressure, anxiety, memory dysfunction and more. "[This] is not speculation," Dr. Salt said in his presentation to the international scientists. "[The] phenomenon now needs to be studied in more detail." The wind power development industry, however, completely denies the impact of infrasound, saying that sound that cannot be heard, cannot have an effect.⁷

⁵ Shepherd D, McBride D, Welch D, Dirks K, Hill E. 2011. Evaluating the impact of wind turbine noise on health-related quality of life. *Noise and Health*, Vol. 13 (54), pages 333-339.

⁶ Hanning C, Evans A. 2012. *BMJ* 2012; 344: e1527

⁷ Salt A. 2012. Wind Turbines can be hazardous to human health. Presentation to Inter-Noise conference. Available at <http://oto2.wustl.edu/cochlea/wind.html>

Conclusions: what we know to be true

- The volume and consistency of reports from across Ontario and around the world constitute epidemiological evidence of health effects from wind turbine noise.
- The existence of these health effects has been proven.
- The health effects may result from direct and indirect pathways.
- Wind turbine noise and infrasound affects health-related quality of life.
- Governments have a responsibility to conduct an independent review and appropriate research to protect the public.
- The wind power generation industry, its lobby group in Canada the Canadian Wind Energy Association, and its aligned NGOs such as CAPE, Environmental Defence, and the Suzuki Foundation consistently deny the existence of health effects from large-scale wind turbine noise and infrasound.

Comment on Health Canada public statements on the proposed study

Wind Concerns Ontario has comments about the wording of the announcement of the study into wind turbine noise and health effects.

It is worth repeating that Wind Concerns Ontario commends Health Canada for taking this step to engage in this important research, and also for its flexibility in allowing the 30-day comment period to be extended to accommodate the summer vacation period.

Our comments follow.

Document: Notice to Stakeholders

We disagree with the statement that “there is insufficient evidence to conclude whether or not [sic] there is a relationship between exposure to the noise from wind turbines and adverse health effects.” In fact, the Environmental Review Tribunal in Ontario in the 2011 Chatham-Kent decision said that there was enough evidence to conclude that there is harm to human health. The World Health Organization has also produced a document on the burden of illness from environmental noise (although wind turbine noise is not mentioned specifically). Moreover, the sheer number and consistency of complaints from people living near industrial-scale wind turbines the world over is proof in itself of a relationship between the turbine noise/infrasound and ill health.

We have moved beyond debating whether there is a relationship between large-scale wind turbines and health.

Document: news release July 10, 2012

We strenuously object to the use of the word “farm” at any time where wind power generation facilities are concerned. The wind power development lobby has gone to great lengths to portray these facilities as benign, even pastoral installations—the fact is, they are power generation facilities that are industrial in nature.

We disagree with the use of the word “potential” as applied to health effects; the health effects are real, and have been documented. It is a matter of determining the degree of the effects not the existence of the health effects.

Document: Questions & Answers, dated June 27, 2012

We disagree with statements in the answer to question 13, What are the health effects of wind turbine noise? The response mentions “insufficient evidence” again when clearly there is (see above) including the decision of a judicial Tribunal which considered evidence from scientists hired by the Wind Industry as well as numerous scientists conducting research independent of any industry or governmental organization. Another statement is that “the most rigorous

studies available to date do not show a link between exposure to wind turbine noise and harm to human health.” While we agree that there is no evidence (nor complaints) that Industrial Wind Turbine noise has damaged the hearing of any individual, the assessment of studies as “rigorous” is premature given the absence of any significant clinical study. It is a fact that there is an indirect pathway to health effects from turbine noise; without a well designed clinical study it is not possible to estimate the extent of that impact. The vast majority of papers prepared to date have been reviews of literature and all but one conclude there is a need for more research. This includes the report from the Chief Medical Officer of Health for Ontario, who noted in her 2010 report that there was a significant gap in information on environmental noise and on actual measurements of that noise in the field.

Wind Concerns Ontario comments on study design

The rest of our remarks in this comment paper pertain to the document/paper by Michaud et al, Health Impacts and exposure to wind turbine noise: research design and noise exposure assessment, as this is the prime document outlining the study design.

Comments on the wind power generation industry

We object to the statement in the first paragraph of the Michaud paper to the effect that: “The continued success and viability of wind turbine energy [sic] in Canada, and around the world, will rely upon a thorough understanding of the potential health impacts and community concerns that underscore public resistance.”

This implies that the study is biased in support of wind power generation and that the intent of the research is to serve the goal of continuing power generation from wind energy in a way that prevents public resistance. We believe that the statement of the research purpose should be to objectively study the noise/infrasound and other factors, with a view to providing clinical research on the health effects being reported. Statements about the “success” of wind power generation are subjective, not relevant and imply bias. We remind Health Canada that wind power is not necessary in Ontario under the current supply mix, provides no significant usable power, and has no impact on reducing emissions from Ontario’s negligible coal-based generation. In most industries, a product that costs more, produces less, and does not replace older obsolete products would not be considered a “success”.

2.1 Research objectives

We agree with the three objectives of the research as stated, but would add that shadow flicker and exposure to electrical contamination should be included as areas of study as they also affect human health. It should be noted that existing regulations in Denmark on shadow flicker, if applied to Ontario projects, would immediately reduce this particular impact on human health. The Green Energy Act and its supporting regulations do not provide any protection or recourse for Canadians affected by this environmental effect.

2.2 Research outcomes

We are concerned about the stated limitation of the research results, both in the Michaud et al paper and in correspondence to us from Minister of Health, the Honourable Leona Aglukkaq: “..this research is being conducted to provide additional insight into an emerging issue; however, the results will not provide a definitive answer on their own.”

We would think the study results could achieve more than that, and that as a regulatory body, Healthy Environments and Consumer Safety should certainly have as its goal to provide information that can be used to regulate wind power generation machines and projects, such as for setbacks, night-time noise levels, and shadow flicker. This is essential to protect the health and safety of Canadians.

(Note: in our view, the term “setback” will need to be carefully defined. Setbacks vary throughout the country and notably from those in Europe or Australia. For example, in one area in Germany, the “setback” is measured from the edge of a turbine *zone* to the perimeter of a residential *zone*. In Ontario, the “setback” is from the base of a single turbine, to the centre of a “receptor” or a person’s home.) CanWEA literature and Government of Ontario statements do not mention these fundamental differences.

As outlined in the introduction to the study, the Canadian wind power generation industry has plans for a massive expansion of wind turbine power generation in Canada in the near term. Through our work with individuals that are affected by the current level of turbine development in the densely populated areas of Ontario, we can see that there are real health effects on some people living nearby. Other jurisdictions, such as states in Australia, have responded with setback requirements of two kilometers, a distance that they see as needed to eliminate the most severe impacts on human health.

In Ontario, the government has set out a 550-metre setback but is not able to provide any science-based justification for this distance. Since it was established, the size of turbines have continued to increase and now plans are underway to install the newest 3-MW turbines that are causing such great problems in Waterloo, Australia. Ontario’s 550-metre setback has not been maintained as the industry scales up its product.

Even that 550-metre setback is not being respected in all turbine projects in Ontario. For example, a turbine was recently erected in a parking lot of a CAW Recreation Centre in Port Elgin. The closest residence to the turbine is 205 metres with 117 homes and 700 vacant subdivision lots within the current 550 metre setback. There is a YMCA Daycare within 800 metres and two elementary schools — one at 1,100 metres and one at 1,300 metres. This turbine was allowed to proceed based on an approval that predated the current regulations. Clearly, if the 550 metre setback was based on any science, it is therefore puzzling that the Ontario government maintains it is protecting the health of its citizens while allowing such an installation.

Similarly, the current Ontario regulations allow for participating landowners to waive their rights to a 550 metre set-back. While some may argue that adults should be allowed to make decisions on their own living conditions, these rules have resulted in children living closer than even the Ontario

regulations consider as a safe limit. Essentially, Ontario has set a limit but is still facilitating considerable exemptions to that limit.

The federal government will need to set clear setback standards for wind turbines. It is important that this happens as soon as possible as the cost of implementing proper set-back standards will only increase as time passes. Action on this matter is now overdue and this Health Study needs to be sufficiently robust to inform government action when it is completed, or earlier if evidence of harm is confirmed during the study. Setting precautionary standards is an accepted practice in health-related matters.

2.3 Research design

WCO comments on methodology

Study Locations: The design proposes to focus on eight-to-12 turbine installations in Canada.

Our concerns: This industry is rapidly evolving and as a result, industrial wind turbine projects can have a broad range of characteristics. For the results of the study to be reflective of the current wind industry practices in Ontario in particular, the installations selected for the study need to align with the design of installations currently being proposed. It will be key to the success of the study to avoid comparing apples to oranges in terms of the projects studied.

The following characteristics are seen as most critical:

- **Proximity to population** – Most of the projects underway in Ontario are located in highly populated rural areas with the turbines being placed with minimal separation from rural communities, including schools, and farm homes. Employment locations and livestock operations are not even considered during the placement process. Example: turbines are located in East Luther where the population density is nine people per square kilometer; however, a development is proposed for North Gower, part of the City of Ottawa, where the population density is 34 people per square kilometer. In fact, in the North Gower instance, 450 homes will be within 2 km of the proposed 2.5 MW, 190-metre turbines.
- **Ambient Noise** – The locations being selected for wind power development in rural Ontario generally have low ambient levels of existing noise. There is no existing noise source, such as traffic or ocean waves, that “masks” the audible noise created by these turbines. Information from areas where there are other sources of ambient noise will not provide meaningful results for the rural Ontario situation.
- **Turbine Density** – Initial turbine installations in Ontario were widely spaced but the current proposals are for much higher-density installations. In one rural township north of Goderich Ontario, a wind power developer is proposing to add an additional 138 turbines to an initial project of 22 turbines. Another company has also leased land in the township and is proposing at least another 66 turbines. If all of these projects proceed, there will be no area within the township that is not affected by some level of noise from wind turbines.
- **Dual and Triple Installations** – As turbine companies encounter more resistance to leasing land, they are now proposing very high density installations on the lands that they do control. In a

development southeast of Listowel, the company is proposing to install three turbines on the back half of a 120-acre farm. Rural homes are located just beyond Ontario's 550 metre set-back and the hamlet of Britton is within 1,000 metres. This is a concern because studies show that turbines located close together amplify the noise generated as the wake of one turbine passes through another turbine.

- **Turbine Size** – The size of turbines being installed is also increasing with new developments. Older projects used 1.6 MW turbines with 2.5 MW turbines being common in current proposals but now 3.0 MW turbines being proposed in some locations.⁸ Even if Ontario's setbacks were appropriate to protect health for the noise produced by the smaller turbines used in earlier projects (and research is showing they are not), we need more information for the much larger turbine designs being proposed currently. Computer noise modeling from the turbine manufacturers is not sufficient to protect health.
- **Installations in Water** – While not currently underway, there are proposals to install turbines in the Great Lakes bordering Ontario. The dynamics of sound movement over water is different from over land and this should be considered in your study design. On Lake Huron, for example, the prevailing winds are from the west and the eastern shore of Lake Huron is lined with residential communities that will be downwind from any offshore installation. Set-backs need to be confirmed for these installation situations to protect these residents from adverse health affects.

WCO looks to the Health Canada study to play an important role in establishing standards for wind turbine installations but to be relevant to the situation in Ontario, the turbine installations selected for study need to reflect the current and future state in this rapidly developing industry. If the sites selected just reflect old technology and configurations in environments that do not relate to the current situation in Ontario, the study will not have credibility.

Sampling Process: The study design indicates that the study will be conducted on a sample of randomly selected dwellings within the wind turbine area. Once identified by this process, only volunteers will be studied.

Our comment: First, it is not clear how many people Health Canada plans on including in the study, if indeed there is a limit.

WCO's experience in working with people living in areas where turbines are operating suggests that the proposed approach to identifying participants for the study has the potential to introduce significant bias into the results. To eliminate this bias, the following situations have to be addressed in the sampling process:

- In an established wind project, it is our experience that the most seriously affected residents are forced from their homes within six months to a year. Unless the testing is done immediately

⁸ The wind turbine at Exhibition Place in downtown Toronto is familiar to many, but it is not an indication of what is being built and proposed in rural Ontario today. Its rated capacity is 660 kW or .66 MW, a fraction of the 2, 2.5 and 3 MW turbines now being built. At 94 metres it is also considerably smaller than turbines being built and proposed, some as tall as 190 metres.

after the start-up of a wind turbine project, the proposed process will exclude the key individuals that should be the focus of the study.

- Wind companies have purchased problem properties from affected residents and these purchase agreements include non-disclosure or “gag” orders that prevent them from discussing the nature of their problems.
- Others have signed leases with wind companies to host turbines on their land. Our experience is that many of these contract holders are suffering in silence. There have been reports that some even have second homes or have made other arrangements so they move on windy nights to get sleep. Given the wider problems in the community, the leaseholders are reluctant to publicly acknowledge their problems. Many of these leases also have gag clauses that prevent the leaseholder from discussing any turbine issues.
- People with health problems are reluctant to discuss them as they are hoping to still sell their properties so that they can move away from the problem.
- Potential participants may not have confidence in a study. Their experiences have already been ignored or even belittled by wind power development companies and various levels of government. The study team will need to communicate with communities in a way that will build trust and ensure confidentiality.
- Reports show that different members of the same household may respond differently to the same level of exposure to the environmental noise and infrasound produced by the turbines. In one case, one member of the family cannot sleep in the home while his wife seems to be unaffected. For this reason, the study must be designed to assess all residents in a given house.

Every business that is responsible to its shareholders, strives to minimize its liabilities and expand its markets. The wind power generation industry is perhaps one of the most successful in achieving these goals. As such, we have observed through our international network, many instances of the Industry influencing and affecting independent studies through legal, contractual, political and “on the ground” initiatives. We ask that Health Canada be cautious and alert to attempts by NGOs, wind developers, and industry organizations to influence this critical clinical study.

WCO’s experience with reports from communities throughout the province suggests that steps will have to be taken to ensure that the sampling process is reviewed to ensure the study group accurately represents the population present at the time the wind power project concerned started operation, rather than the population living there at the time of the study.

Potential Sources of Health Effects: The study design appears to be focused on audible sound and is designed to find linkages between it and direct health effects. Hearing loss is even mentioned as one possible result.

Our comment: While audible sound can be annoying for people living too close to a wind turbine, we are not aware of any reports of hearing impairment resulting from living too close to a wind turbine. Indirect pathways for health effects *must* be considered in the study.

Low Frequency Noise: The study mentions infrasound; this is a major step forward as many of the wind power developers in Ontario at least, deny the existence of infrasound, though it clearly does exist and has been the source of much study connected with urban noise sources.

Our comment: WCO's experience from working with individuals exposed to wind turbines is that low frequency noise is more important as an indirect cause of health issues related to turbines. Most people who are sensitive to wind turbine noise report an inability to sleep in their homes and sleep deprivation can lead to many health issues. This suggests that the study needs to be more focused on low frequency noise levels *inside* homes in addition to the noise outside of the home. (In Ontario, the Ministry of the Environment has conceded on numerous occasions that it did not possess the equipment or the capacity to measure the noise produced by wind power generators, so there is little or no experience to be relied on.)

Shadow Flicker: There is no mention of "shadow flicker" or the strobe effect from the blades passing in front of the sun. Again, this effect is real, and has been much studied, particularly in the case of its effects on helicopter pilots, who can lose focus and even become incapacitated while flying.

Our comment: Shadow flicker caused when the turbine is positioned between a receptor and the sun also has been reported as a serious problem. If the turbine is positioned incorrectly relative to a house, it can cause moving shadows on the inside of the house that can also interrupt sleep. Several vulnerable populations are at risk from shadow flicker. People suffering from photosensitive epilepsy are at risk for seizures when exposed to shadow flicker, and setbacks of greater than one kilometer have been suggested as necessary for safety.⁹

Autistic children are also adversely affected by moving shadows and situations are being reported where turbines are being positioned where they will cast shadows on buildings and playgrounds associated with schools that provide special programs for autistic children. Shadow flicker is regulated in many European countries but as far as WCO is aware, there are no federal or provincial regulations dealing with this issue.¹⁰ Several municipalities in Ontario are proceeding to introduce nuisance by-laws that regulate shadow flicker in their municipalities.

Electrical Contamination: This is another effect of industrial-scale wind power generation projects that is being reported to WCO, and suggests that there is another set of health problems related to wind turbine developments that are not linked to noise or shadows but rather due to contamination of the electrical distribution system in the area.

Our comment: The electrical grid in rural Ontario was not designed to accommodate the energy demands of current farming practices and the additional demand to support the heating, cooling and other electrical requirements of the wind turbines, are adding to the burden. After turbines start

⁹ Harding G, Harding P, Wilkins A. 2008. Wind turbines, flicker, and photosensitive epilepsy. *Epilepsia*, 49 (6):1095-1098.

¹⁰ Harrison, John. Retired professor of physics, Queen's University. Presentation to Wind Concerns Ontario, June 16, 2012.

operating, neighbouring homes and farm operations are reporting new problems with stray voltage and/or dirty power coming from the electrical grid. As these problems go away when the turbines are not generating power, there seems to be a link to wind turbines. Residents of one home in the Kincardine area report that they turn off their main power switch at night to allow them to sleep properly. There is no mention of electrical contamination as a potential source of health problems in the study design. Confirming its presence requires a separate type of testing but the work required is relatively straight-forward so it should not be a large addition to the study design, or the. Alternatively, the issue could be acknowledged and noted for future study. Several wind project proponents have acknowledged the existence of this impact but assign responsibility to the power distribution utility.

Proposed Measurements: The proposed study design suggests that noise levels in a home will be based on estimated transmission loss with windows partially open and then that these will be validated by sound sources within the home.

Our comment: This approach does not align with the actual experience of wind turbines.

Reports from people living with turbine noise indicate that low frequency noise is amplified, rather than lessened within the home. There have been reports of individuals living in a trailer outside the home to escape the higher noise levels in their home. They also report that the problem is worse in the winter when the windows are closed and the ground is frozen and not covered by vegetation. The construction material of the home seems to have little impact on low frequency noise; highly insulated homes with brick or concrete walls can have the same or worse problems as homes that would appear to be more permeable.

These comments confirm the need to rely on actual measurements both inside and outside of homes to properly assess the impact of the wind turbines on the residents of these homes. Testing needs to be conducted both in summer *and* winter conditions with windows both open *and* closed.

Seven- day Study Period: The study proposes limited sleep monitoring to a period of seven days.

Our comment: While this may be required to contain the costs of the study, it does not guarantee an accurate assessment of the sleep issues, if the turbines are not operating in that seven-day period or if the winds are from a direction that transfers the impact to another location. It also does not capture the potential for different effects between summer and winter conditions. To fully understand the information provided on sleep, it will be necessary to capture information on wind speed and direction for the study period and extend the length so that days where the wind turbines affect the location are included in the study.

In addition, it will be absolutely essential to preserve the security of the study data, and to ensure that the sleep study period not be announced publicly; with regret we must tell Health Canada that the wind power developers do have control over the power produced by their machines and therefore the noise produced, and there is a serious potential for the companies to reduce output or halt operations altogether, to influence measurement of noise.

2.4 Wind turbine noise measurements and modelling

Use of Noise Models:

Noise models are generally seen as a weak tool as no model is better than its assumptions and inputs. This situation was highlighted in the extensive July 4, 2012 decision by the New Zealand Environmental Law Court in the case of Palmerston North City Council vs. New Zealand Wind Farms (Decision Number - [2012] NZEnvC 133). The Court found that the actual noise generated by the turbines and measured in the field differed *significantly* from the projected turbine noise that resulted from use of the model, and further, that the environmental characteristics did not accurately capture the affect of all wind directions. Testing of the real sound levels at various residences found that the turbine installation was found to be operating outside of approved sound levels.

Similar experiences are being reported anecdotally for Ontario wind turbine installations and the Ontario Ministry of the Environment and independent acousticians are being requested to verify actual sound levels at various existing turbine installations. In the case of the Enbridge Underwood project near Kincardine, Ontario, noise testing after the turbines were installed confirmed that the levels of noise being experienced at some “receptors” was greater than predicted in the model that supported the Natural Resources Canada environmental assessment of the project, reviewed by Health Canada as part of the application for ecoENERGY grants.

Assumption: Use of the 40dBA World Health Organization Night Noise Standard:

The introduction to the study seems to indicate an assumption that the WHO Night Noise standard of 40 dBA as an appropriate benchmark that is also applicable to wind turbines. In section 1.2, wind turbine noise is described as “similar to that produced in buildings by heating, ventilation, and air-conditioning systems”. These comments cause people involved with the wind issue to question the level of familiarity that the authors have with the real issues related to wind turbines and health.

The comments vary substantially from the real life experiences of people living close to wind turbines and the descriptions of the noise that they provide. Most important, they overlook a key characteristic of wind turbine noise that residents find most annoying — the cyclical whooshing sounds that turbines generate. Some jurisdictions impose a 5dBA penalty for these types of noises but Ontario has exempted wind turbines from this penalty.

Rather than assuming pre-defined standards for the level of appropriate noise, whether they are the WHO standard of 40 dBA or the 35 dBA if the normal penalty for cyclical sound is included, it would seem less biased if the study examined people’s health responses and the actual level of noise causing this response were collected and then, on the basis of these results, determine a level of exposure (dosage) to wind turbine noise that can be considered safe.

Additional comments re: study

Group carrying out Health Canada study

The documents released to date do not discuss who will actually be carrying out the research, whether it will be a government agency such as the Canadian Institutes of Health Research (CIHR) or another entity such as the Royal Society.

As Healthy Environments and Consumer Safety is a regulatory body, we would expect the research to be carried out by another agency. The choice will be critical both to the quality of the study results, and to the “buy-in” of all participants.

Membership of Design Committee

We have two concerns regarding membership of the Design Committee for the proposed study.

1. Two of the four authors of the design study have previously published work identifying their opinion that the sound conditions experienced by those suffering are not a cause for concern. In a 2008 work, *A Justification for Using 45 dBA Sound Level Criterion for Wind Turbine Projects* by Stephen E. Keith, David S. Michaud, and Stephen H. P. Bly stated that “Health Canada derived a noise criterion of 45 dBA as the level at which mitigation is recommended for wind turbines operating in quiet rural areas.” The proposed design study follows these basic assumptions despite the amount of additional research and the actual experiences with turbines that have taken place since the original work was published in 2008.

The Health Canada study needs to move beyond these preconceived assumptions and develop a scientific, rather than a policy review, basis for recommended health standards. The field of wind turbine noise is rapidly developing with new research taking place that contradicts these assumptions.

2. To ensure the fullest understanding of the effects of wind turbines on humans, the design team needs to be expanded to include identified Canadian experts, such as Dr. Robert McMurtry (former Assistant Deputy Minister with Health Canada, former Dean of Medicine at the University of Western Ontario, and an Officer in the Order of Canada) and independent researcher Carmen Krogh (former editor of the *Compendium of Pharmaceuticals and Specialities*), for example. Dr. McMurtry has held many important health roles in the medical community and Ms. Krogh’s expertise is being leveraged in jurisdictions around the world. Both should be added to the design team (Note that Dr McMurtry and Ms Krogh are not members of Wind Concerns Ontario, but are independent in their research and comment). John Harrison, retired professor of physics at Queen’s University, has also devoted much time and study, particularly to the “disconnect” between regulations of large-scale wind power generators and the reality of the noise/vibration and health effects. Dr Harrison would be another valuable resource for the committee.

We would like to add here that any input from the wind power development industry lobby group should only be entertained with thorough analysis. We are still frankly appalled that the Canadian Wind Energy Association (CanWEA) and its U.S. counterpart could actually countenance (and finance) a study

that concluded that no further research into the health effects from large-scale wind turbine noise would ever be needed. We also strenuously reject any research that concludes that yes, there may be problems with the environmental noise and low frequency noise produced by wind power generators, but that this risk has to be accepted for the greater good of society.

Advisory panel

We would further recommend therefore, that Health Canada form an advisory panel of people who have been living with wind turbine noise and infrasound to inform the research group. This has been done before in areas such as hepatitis C, for example, where the input from people experiencing the health problems proved to be of great value.

Many of the design proposals do not seem aligned with real, on-the-ground experiences. Having a group of people who are living with the noise and other health-related issues would contribute to validation of the study design.

Conclusion: a question of ethics?

Last, we would ask that that Health Canada, in respect of the Precautionary Principle and basic precepts of public health, request that provinces engaged in supporting wind power development, especially Ontario, halt approvals of new projects until the results of this study are available, and have been analyzed with regard to implications for health and safety.

If we look at the experiences in other industries, whenever there is a question of health and safety, the product concerned is withdrawn or recalled until safety can be established. For example, in the United States earlier this year, automotive manufacturer Chrysler recalled all 2010 Jeep Wrangler models following eight consumer reports of a problem that could lead to fires in the engine.¹¹

Similarly, a recall was issued in August 2012 for fruit that may have been contaminated with salmonella, after 22 people became ill in Canada and about 100 in the U.S.

Our point is that in Ontario, we have documented reports of well over 100 people being made ill from exposure to the environmental noise and infrasound produced by wind power generators, and yet, these machines continue to be installed. Given the lack of action on the part of the Ministry of the Environment of Ontario, and the dismissive responses from the wind power developers themselves, the real situation is that many more people are ill and either unable (due to clauses in their contracts with the power developers) or unwilling to report their health problems.

We believe that a moratorium on approvals of these power projects is mandatory until the health and safety of Canadians is assured.

Thank you for the opportunity to comment on the proposed study. Our comments reflect those of our member organizations and hundreds of individual members of Wind Concerns Ontario.

¹¹ Wall Street Journal, May 20, 2012. Available at: <http://blogs.wsj.com/drivers-seat/2012/05/20/chrysler-recalls-jeep-wranglers-that-could-catch-fire/>

Respectfully submitted by

The Board of Directors

Wind Concerns Ontario

PO Box 11059

105 Guildwood Parkway

Scarborough, Ontario, M1E 1N0

windconcerns@gmail.com

SUMMARY OF RECOMMENDATIONS

Remove bias from all study documents.

The goal of the study is to provide objective evidence-based information; clinical data from the study population is essential.

The question is not “whether” there are health effects or the “potential” for health effects—this has been established.

Care must be taken in the selection of study areas and study population.

Other health issues such as shadow flicker and electrical contamination need to be considered.

There is an opportunity to enrich the Working Group with Canadian researchers who have already participated in work on this issue.

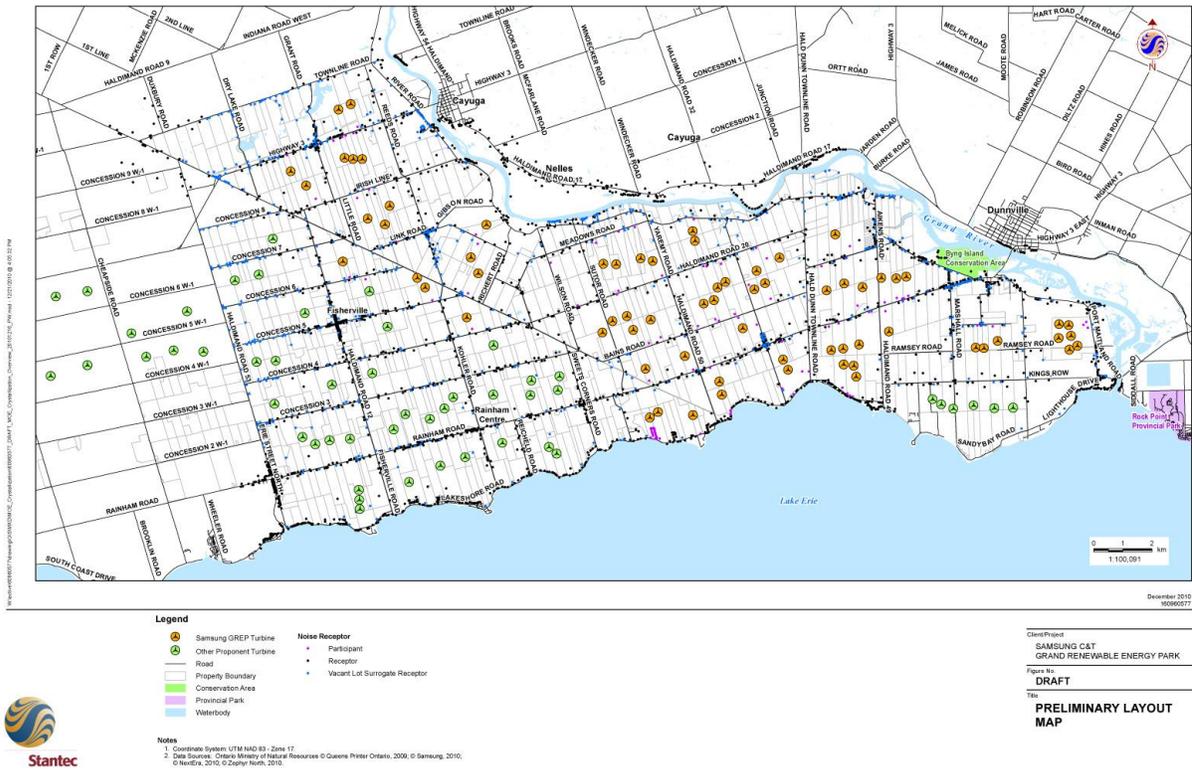
A citizens’ panel could inform the Working Group and bring real-life experience to the validation of the study design.

In view of the seriousness of this situation, and the rising reports of ill health effects, we believe the only ethical approach is for Health Canada to request that provinces halt approvals of new industrial-scale wind power generation projects until the results of this study are released and analyzed, and that the protection of the health of Canadians can be assured.

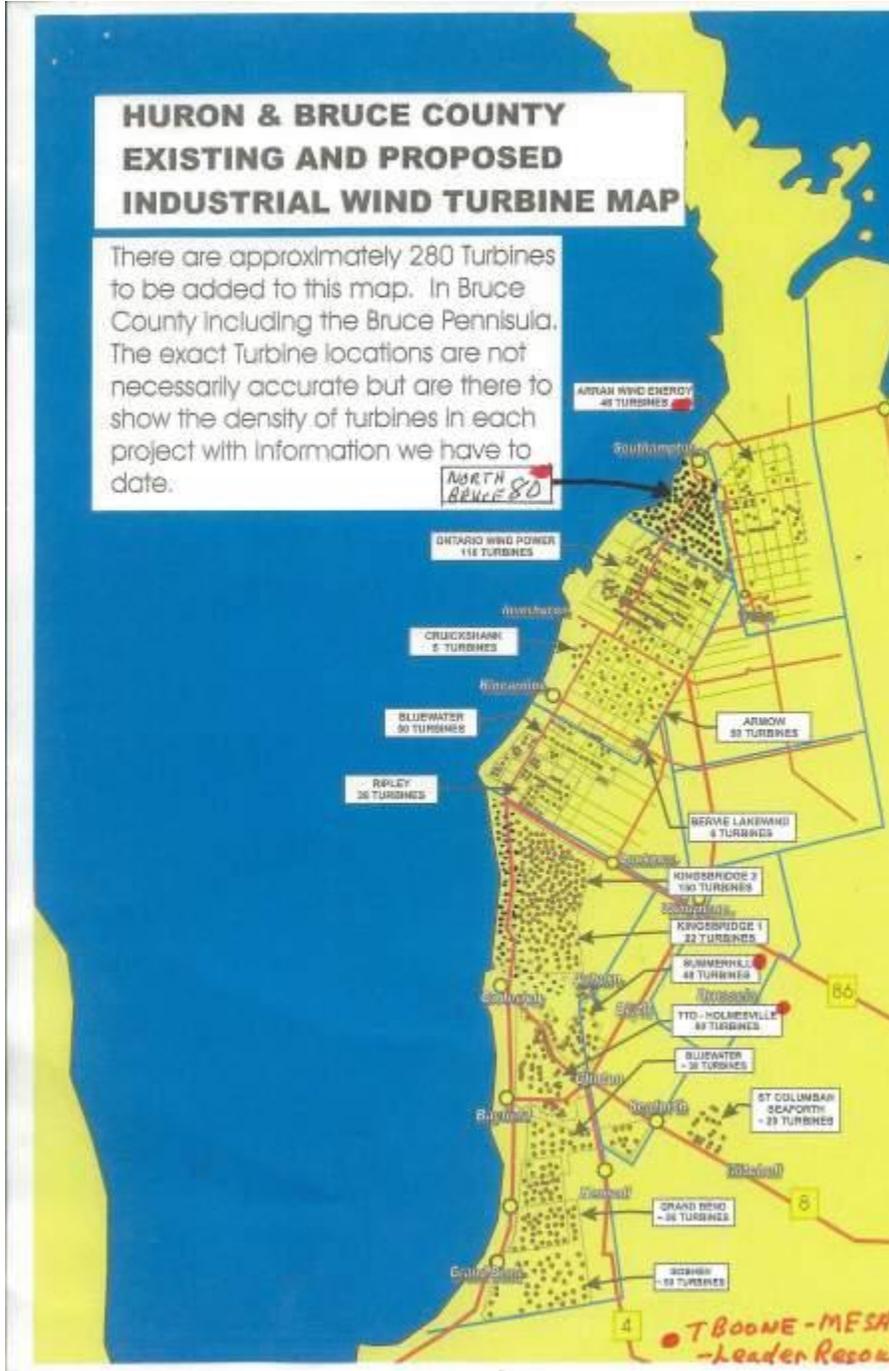
APPENDIX:

A. MAP of Haldimand-Norfolk area with turbines proposed as of 2012.

The vast majority of residences will be within 2-km of at least one turbine.



- B. MAP of Bluewater area, proposed turbines. Note the machines proposed for this area are 2.5 and 3 megawatt (MW)



C. PHOTO

A house on Wolfe Island, near Kingston, Ontario. Note that these turbines are now much smaller and of lower capacity than machines being proposed for other locations in Ontario, but health problems are reported here.



D. List of communities in Ontario where noise complaints have been routinely reported:

Kincardine
Grey Highlands
Ripley
Clear Creek-Cultus-Frogmore
Harrow
Ridgetown
Amaranth
Shelburne
Melancthon
Wolfe island
Grand Valley
Chatham-Kent
Ashfield-Colborne-Wawanosh