On November 6 2014 Health Canada posted on their website “Wind Turbine Noise and Health Study: Summary of Results”.¹

We have been contacted by individuals from around the world who have expressed concern over content and the quality of this Health Canada web posting.

“Wind Turbine Noise and Health Study: Summary of Results” states:

“WTN annoyance was found to be statistically related to several self-reporting health effects including, but not limited to, blood pressure, migraines, tinnitus, dizziness, scores on the PSQI, and perceived stress” as well as related to “measured hair cortisol, systolic and diastolic blood pressure.”

These findings are additional evidence which support the health effects “conclusively demonstrated from exposure to wind turbine noise” identified by Health Canada and disclosed by the Honourable Rona Ambrose in a June 30, 2009 letter.

In the upcoming weeks and months, it is our intention to release a series of commentaries and disclose information on the “Wind Turbine Noise and Health Study: Summary of Results” and the Health Canada Wind Turbine Noise and Health Study.

In the meantime we have compiled the following relevant information to help inform those interested in Health Canada’s Wind Turbine Noise and Health Study.

Personal disclosure: We declare no potential conflicts of interest and have received no financial support with respect to the research and authorship of this commentary.

This commentary is public and may be shared.
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About Our References

This commentary provides references to support statements contained within.

References provided include:

• Peer reviewed references;
• Non peer reviewed references including grey literature;
• Statements and references authored by Health Canada and/or Health Canada
  representatives;
• References prepared for, or by, the Canadian Wind Energy Association and/or the
  American Wind Energy Association;
• References authored by consultants for members of the wind energy industry;
• Government and other documents obtained through Federal Access to
  Information and Privacy (ATIP) requests; and
• Other references.

Following Canada’s “Industry Led – Government Supported” Road Map

Over the past decade the Government of Canada has encouraged and provided substantial
support and funding to members of the wind energy industry. This support has included,
but is not limited to, funds for annual wind energy industry trade shows, promotional fact
sheets, production subsidies. 2 3 4 5 6 7 8 9
A 2012 Assistant Deputy Minister briefing note to the Minister of Health’s Office states “Canada’s vision for 2025 is that 20 per cent of electricity will be generated by wind power…” The briefing note cites the Wind Technology Roadmap stating it was “…was developed by Natural Resources Canada and Industry Canada in collaboration with industry stakeholders.”

Natural Resources Canada defines the Wind Energy Road Map to be an “…industry-led, government supported initiative that has developed a long-term vision for the Canadian wind energy industry and identified the major technology gaps and priorities to achieve a major increase in deployment of wind energy in Canada.”

The Wind Technology Road Map can be found at various Natural Resources Canada websites.
The Natural Resources Canada website also provides links to wind energy industry trade associations including the Canadian Wind Energy Association who they collaborated with to develop the Wind Energy Technology Road Map.

The “industry-led, government-supported” Wind Technology Road Map outlines a “…common vision where Canada becomes a global wind energy leader that meets more than 20% of its electricity needs through wind energy by 2025.”

The Natural Resources Canada web site provides rationale for the Wind Technology Road Map and states “Canada needs an action plan that will identify realistic pathways to the resolution of technology, markets and socioeconomic challenges.”

The Wind Technology Road states “Through a series of workshops, participants developed the vision, identified the barriers to achieving the vision, and articulated an action plan for overcoming those barriers.”

Industry, Government, and Road Map Action Items

The “industry-led, government-supported” Wind Technology Road Map states “Members of the Steering Committee, government and our industry will be using this roadmap to direct the actions that are necessary for Canada to develop its vast wind resources.”

To achieve the Wind Technology Road Map vision the “industry-led, government-supported” initiative identifies “key action items” that require collaboration between stakeholders including Government and Industry.
Major action items listed in the Wind Technology Road Map “… are anticipated to cost several hundred thousand dollars each.”\textsuperscript{21}

One of the “key action items” detailed in the 2010 Wind Technology Road Map includes an action item for Government and Industry collaboration to develop and maintain government documents that address concerns raised about wind energy projects including that of noise, infrasound and other.\textsuperscript{22}

**Road Map Next Steps and Health Canada’s Membership on the Interdepartmental Wind Technology Road Map Committee**

The Natural Resources web site outlines next steps for achieving the Wind Technology Road Map vision including the creation of the Interdepartmental Wind Technology Road Map Committee.
Natural Resources Canada Chairs the Interdepartmental Wind Technology Road Map Committee and maintains the Office of Energy Efficiency (OEE) which is “mandated to strengthen and expand Canada’s commitment to energy efficiency in order to help address the Government of Canada’s policy objectives”. 23

A February 2012 Health Canada document entitled “Health Canada Policy and Research Approach for Wind Turbine Noise” cites the Wind Energy Technology Road Map “National targets” of 20% of Canada’s electricity generation by wind power by 2025. 24

The February 2012 “Health Canada Policy and Research Approach for Wind Turbine Noise” also discloses that Health Canada (HC) is a member of the Interdepartmental Wind Technology Road Map Committee. 25

In June 2012 Health Canada announced the Wind Turbine Noise and Health Study which it stated had limitations, would be not be definitive and was designed to “inform policy”. 26

A 2013 report written by the Principal Investigator of the Wind Turbine Noise and Health Study reaffirmed the study has limitations. 27

The Health Canada Wind Turbine and Noise Study does not make reference to helping Canadians maintain and improve their health.

The Health Canada Wind Turbine and Noise Study team includes members who are from Natural Resources Canada or have other connections to the wind energy industry.

Health Canada: Noise Annoyance is a Health Effect

Health Canada (2005) 28 and other references acknowledge that annoyance is an adverse health effect. 29, 30, 31, 32, 33, 34 Excerpt from Health Canada (2005) below:
The Principal Investigator of the Wind Turbine Noise and Health Study has also stated that “noise-induced annoyance is an adverse health effect”.35

The World Health Organization (WHO) acknowledges noise induced annoyance to be a health effect36,37 and the results of WHO research “…confirmed, on an epidemiological level, an increased health risk from chronic noise annoyance…With this background, it is urgent that noise in residential areas is reduced to an acceptable level.”38

In western European countries noise induced sleep disturbance and annoyance are estimated to account for 903 000 and 587 000 disability-adjusted life years respectively.39

Health Canada’s Justification to Increase the Percentage Highly Annoyed

Some individuals exposed to wind turbines report adverse effects including annoyance, sleep disturbance, stress-related health impacts and reduced quality of life.40 41 42 43 44 45 46 47 48 49 50 51 In some cases, Canadian families have effectively abandoned their homes, been billeted by wind energy developers or negotiated financial agreements with developers.52

In 2009 the In a June 30 2009 letter Honourable Rona Ambrose, disclosed

“Health Canada provides advice on the health effect of noise and low-frequency electric and magnetic fields from proposed wind turbine projects, particularly for environmental assessments done under the Canadian Environmental Assessment Act. To date, their examination of the scientific literature on wind turbine noise is that the only health effect conclusively demonstrated from exposure to wind turbine noise is an increase of self-reported general annoyance and complaints (i.e., headaches, nausea, tinnitus, vertigo).”53

Excerpt from the Hon. Rona Ambrose June 30, 2009 letter:
The Hon. Rona Ambrose is currently the Minister of Health.

Prevention of health effects is a fundamental principle of public health policy and noise management.54

“Health Canada is the Federal department responsible for helping Canadians maintain and improve their health, while respecting individual choices and circumstances.”55

Specifically Health Canada (HC) states it is responsible for protecting the health and safety of Canadians against unsafe radiation emitting devices including noise from wind turbines.56

The 2004 Health Canada presentation below, acknowledges community health benefits from a reduction in annoyance.

The following 2010 Health Canada document is “Published by authority of the Minister of Health.”57 and states:
“Health Canada considers the following noise-induced endpoints as health effects: noise-induced hearing loss, sleep disturbance, interference with speech comprehension, complaints, and change in percent highly annoyed (%HA).”

It would be reasonable to expect that Health Canada would help Canadians maintain and improve their health by protecting them from wind turbine noise annoyance.

However for years now Health Canada employees including the Principal Investigator of the Wind Turbine Noise and Health Study propose/recommend wind turbine noise criteria which they predict will result in adverse health effects. (i.e. result in an increase percentage highly annoyed).60, 61, 62

Health Canada’s “justification”63 for their wind turbine noise criterion fails to employ critical accepted noise principles. Specifically the Health Canada authors propose a noise criterion which:

- is not based on a dose response relationship specific to wind turbines;
- does not adjust (+5dB) to reflect IWT are usually a newly created source of noise;
- does not apply adjustments for audible amplitude modulation;
- does not apply adjustments for audible low frequency noise;
- is not to be considered a strictly applied limit.
- is predicted to result in adverse health effects (i.e. an increase in percentage highly annoyed).

More recently a 2013 report written by the Principal Investigator of the Wind Turbine Noise and Health Study states that in regards to wind turbine noise “…more attention should be directed towards low frequency noise (16-160Hz), tones and amplitude modulation and how to better model these impacts, including how these change across the seasons.”64

CanWEA, The Road Map, and Wind Turbine Noise Annoyance

The Canadian Wind Energy Association (CanWEA) is a wind industry trade association.
CanWEA is a lobbyist organization which seeks to advocate for their members and remove barriers to wind energy development across Canada.

CanWEA is also a member of the Wind Technology Roadmap Industry Steering Committee. 65

In 2009, The American Wind Energy Association and The Canadian Wind Energy Association “…established a scientific advisory panel …”66 and funded a literature review, Colby et al. (2009).
The authors of Colby et al. (2009) discuss acknowledge wind turbine symptoms and report that symptoms such as headaches, nausea, tinnitus, vertigo “… are not new and have been published previously in the context of “annoyance”…” and are the “… well-known stress effects of exposure to noise …”67

In 2009 the president of the Canadian Wind Energy Association stated; “… the sound of wind turbines can be annoying for some individuals and that may cause them to feel some stress etcetera.” 68

HGC Engineering is a listed member of CanWEA.69

In December 2011 the Ontario Ministry of Environment released a report prepared by then Canadian Wind Energy Association member, 70 HGC Engineering.

HGC (2010) states in the conclusions:

“The audible sound from wind turbines, at the levels experienced at typical receptor distances in Ontario, is nonetheless expected to result in a non-trivial percentage of persons being highly annoyed. As with sounds from many sources, research has shown that annoyance associated with sound from wind turbines can be expected to contribute to stress related health impacts in some persons.”71
A 2011 Canadian Wind Energy Association media release advises those impacted by wind turbine annoyance stating

“The association has always acknowledged that a small percentage of people can be annoyed by wind turbines in their vicinity. … When annoyance has a significant impact on an individual's quality of life, it is important that they consult their doctor.”

Authors Note: it appears this CanWEA media release is no longer available on the CanWEA website. Please contact CanWEA for a copy or contact us for a PDF version of the CanWEA media release.

Health Canada Summary of Results and Serious Harm to Human Health

A 2011 Ontario Environmental Review Tribunal (ERT) considered evidence and testimony under oath and found that wind turbines can harm humans if they are placed too close to residents. The ERT decision states:

“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. The debate has now evolved to one of degree.”

The ERT decision also found that “‘serious harm to human health’ includes … indirect impacts (e.g., a person being exposed to noise and then exhibiting stress and developing other related symptoms). This approach is consistent with both the WHO definition of health and Canadian jurisprudence on the topic.”
A 2014 review article published in the Canadian Journal of Rural Medicine states in its conclusion:

“There is sufficient evidence to support the hypothesis of Colby and colleagues that documented symptoms can result from annoyance to audible IWTs. Amplitude modulation of IWTs, audible LFN, and tonal, impulse and nighttime noise can contribute to annoyance and other effects on health. In addition, there is emerging evidence that suggests inaudible LFN or infrasound from IWTs may result in negative health effects…

Based on current knowledge, we expect that, at typical setback distances and sound pressure levels of IWTs in Ontario, a nontrivial percentage of exposed people will be adversely affected.”76

The 2014 Canadian Journal of Rural Medicine review article also states:

“In 2013, research funded by the Ontario Ministry of the Environment indicated a statistically significant relation between residents’ distance from the turbine and the symptoms of disturbed sleep, vertigo and tinnitus, and recommended that future research focus on the effects of wind turbine noise on sleep disturbance and symptoms of inner ear problems.”77

On November 6 2014 Health Canada posted on their website “Wind Turbine Noise and Health Study: Summary of Results” 78 stating:

- WTN annoyance was found to be statistically related to several self-reported health effects including, but not limited to, blood pressure, migraines, tinnitus, dizziness, scores on the PSQI, and perceived stress.
- WTN annoyance was found to be statistically related to measured hair cortisol, systolic and diastolic blood pressure.

Authors note: WTN is the acronym for “wind turbine noise”.79

**Time for Definitive Action**

The World Health Organization states “The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.”80

Health Canada has reportedly spent over 2 years and 1.8 million dollars to report findings which further support the conclusion that if placed too close to residents wind turbines can harm humans.
It is now time that Health Canada fulfill its stated responsibilities and take definitive action to protect Canadians exposed to wind turbine noise and help them maintain and improve their health.

Please look forward to our future series of commentaries and information on the "Wind Turbine Noise and Health Study: Summary of Results" and the Health Canada Wind Turbine Noise Study.

Respectfully submitted,

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End Notes

2 EcoEnergy for Renewable Power, Natural Resources Canada, web update June 1 2009
4 Minister of Natural Resources Lisa Raitt (Thursday, 10 Sept 2009)
9 The Honourable Joe Oliver, Minister of Natural Resources Canada, Letter of correspondence August 10, 2012
10 Briefing Note to the Ministers Office, Update on the Development of Federal-Provincial-Territorial Guidelines on Wind Turbine Noise
11 Briefing Note to the Ministers Office, Update on the Development of Federal-Provincial-Territorial Guidelines on Wind Turbine Noise
15 http://www.nrcan.gc.ca/energy/renewable-electricity/wind/7327
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Any errors or omissions are unintended
Following Canada's Wind Technology Roadmap and Health Canada's Wind Turbine Noise and Health Study

Any errors or omissions are unintended


CanWEA member directory http://www.canwea.ca/about/membersdirectory_e.php?viewAll=yes last accessed March 10, 2013

CanWEA member directory http://canwea.ca/about/membersdirectory_e.php?letter=H last accessed August 22, 2010


