March 10, 2013

The Right Honourable Stephen Harper
Prime Minister of Canada
pm@pm.gc.ca

The Honourable Leona Aglukkaq
Minister of Health, Health Canada
minister_ministre@hc-sc.gc.ca

Ms Kathleen Wynne
Premier of Ontario
kwynne.mpp@liberal.ola.org
kwynne.mpp.co@liberal.ola.org

Mr. Robert Hornung
President of the Canadian Wind Energy Association
roberthornung@canwea.ca

Copy:

David S. Michaud, PhD
Principal Investigator, Wind Turbine Noise Study
Consumer and Clinical Radiation Protection Bureau
Healthy Environments and Consumer Safety Branch, Health Canada
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Ray Copes, MD
Director, Environmental and Occupational Health Branch
Ontario Agency for Health Protection and Promotion
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W. David Colby, MD
Medical Officer of Health
Chatham-Kent Health Unit
drdavidcolby@gmail.com

Ms Cheryl Gallant, MP
GallaC0@parl.gc.ca

Mr. Brain Howe
President HGC Engineering
bhowe@hgcengineering.com

Geoff Leventhall, PhD
Acoustical consultant
geoff@activenoise.co.uk

Mr. John Yakabuski, MPP
john.yakabuski@pc.ola.org

Open letter: Request that representatives of: CanWEA; the Government of Canada; and the Government of Ontario provide immediate and full disclosure of the health effects "conclusively demonstrated" from exposure to wind turbine noise.

Dear Prime Minister Stephen Harper, Minister Aglukkaq, Premier Kathleen Wynne, Mr. Robert Hornung,

I am writing to you in order to:

- Discuss statements reportedly made by the president of the Canadian Wind Energy Association (CanWEA), Mr. Robert Hornung; and
- Formally request that representatives of: CanWEA; the Government of Canada; Health Canada; and the Government of Ontario; provide Canadians immediate and full disclosure of the health effects "conclusively demonstrated" from exposure to wind turbine noise.

Contents

Notice to reader

The contents of this open letter should not be used to infer any bias for or against wind energy.

This open letter is not to be associated with and/or used to characterize any individual and/or organization.

Brett Horner has not received any financial support for the research, authorship, and/or publication of this open letter.

References cited

This letter provides references to support statements contained within.

References provided include:

- Peer reviewed references;
- Non peer reviewed references including grey literature;
- References prepared for the Canadian Wind Energy Association and/or the American Wind Energy Association;
- References authored by consultants for, or members of, the Canadian Wind Energy Association;
- Statements and references authored by Health Canada and/or Health Canada representatives;
- Other references

Introduction

I am a published peer reviewed author on the subject of wind turbines and health effects.

It is my understanding that the Government of Canada [1],[2],[3],[4],[5],[6] and the Government Ontario have provided financial and/or other assistance to the Canadian Wind Energy Association (CanWEA) and/or to members of CanWEA.

On February 26, 2013 it was reported that the president of the CanWEA, Mr. Robert Hornung stated "… we are still quite confident that the balance of evidence to date shows that wind turbines do not have an impact on human health …" [7]

I am writing to you regarding Mr. Robert Hornung's apparent failure to fully disclose the health effect "conclusively demonstrated" from exposure to wind turbine noise.

It is inaccurate to suggest the balance of evidence to date shows that wind turbines do not have an impact on human health.

I have included references in this open letter which support the conclusion that the balance of evidence demonstrates that wind turbines can harm human health at the sound levels experienced at typical receptor distances in Ontario, Canada.

Health defined: Canada

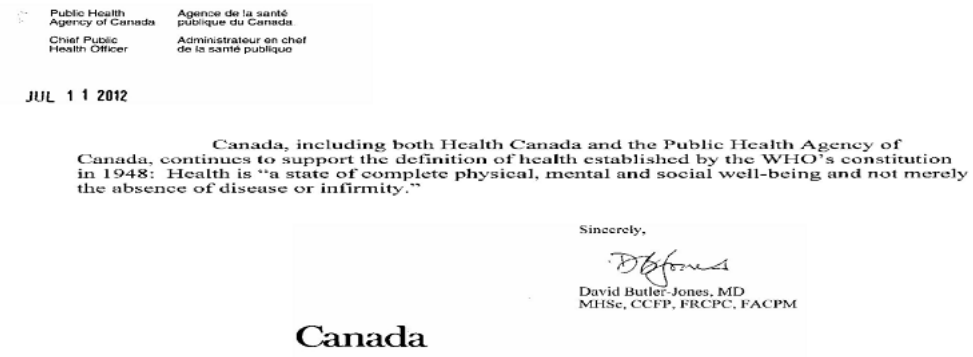
The World Health Organization (WHO) web site states: "Members of the United Nations may become members of the WHO by accepting its Constitution." [8]

The WHO web site lists Canada as a WHO member country. [9]

The WHO Constitution 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." [10]

As a member of the WHO, Canada accepts the "fundamental right" of every human being to the highest attainable standard of health.

Canada continues to support the WHO definition of health. Correspondence dated July 11, 2012 from David Butler-Jones of The Public Health Agency of Canada states (See excerpt below):



Public Health Agency of Canada / Agence de la santé publique du Canada
Chief Public Health Officer / Administrateur en chef de la santé publique

JUL 1 1 2012

Canada, including both Health Canada and the Public Health Agency of Canada, continues to support the definition of health established by the WHO's constitution in 1948: Health is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

Sincerely,

David Butler-Jones, MD
MHSc, CCFP, FRCPC, FACPM

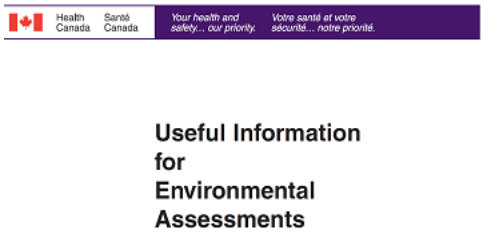
Canada

In his 2005 peer reviewed article, *Noise annoyance in Canada*, Health Canada's Dr. David Michaud acknowledges the WHO defines health as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" stating:

> "According to the World Health Organization (WHO), health should be regarded as "a state of complete physical, mental and social wellbeing and not merely the

absence of disease or infirmity" (World Health Organization 2001). Under this broad definition, noise induced annoyance is an adverse health effect." [11]

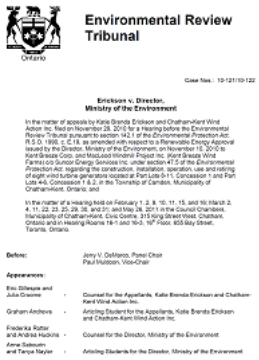
The following 2010 Health Canada document is "Published by authority of the Minister of Health." [12] and states:



"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)." [13]

Wind turbines can harm humans

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. [14] The ERT decision stated:


Environmental Review Tribunal

Ontario

Erickson v. Director, Ministry of the Environment

"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." [15]

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." [16]

In Canada and elsewhere some people exposed to wind turbines experience physiological and/or psychological symptoms and/or reduced quality of life and/or degraded living conditions and/or adverse social economic impacts. Reported effects include annoyance and/or sleep disturbance and/or stress related health impacts and/or reduced quality of life. [17] [18] [19] [20] [21] [22] [23] [24] [25] [26] [27] [28]

In some cases the effects are so severe that Canadian families have effectively abandoned their homes and/or been billeted by wind energy developers and/or negotiated financial agreements with wind energy developers. [29]

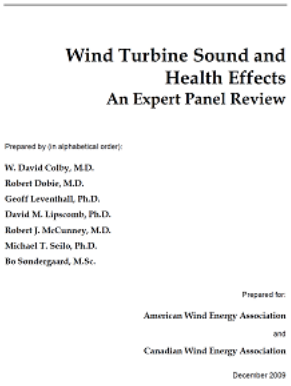
Unwanted sound (noise), visual impacts (shadow flicker), stray voltage and social economic impacts are identified as plausible causes of annoyance and/or other adverse effects.

Peer reviewed and other references acknowledge modern wind turbines produce sound characteristics which are plausible causes for annoyance and/or other health effects. These characteristics include amplitude modulation (swooshing); [30],[31],[32],[33],[34] audible low-frequency noise; [35],[36],[37] infrasound; [38],[39] tonal noise, impulse noise; [40] and night time noise. [41]

Audible noise is the cause: CanWEA sponsored panel members

In 2009, The American Wind Energy Association (AWEA) and Canadian Wind Energy Association (CanWEA) "…established a scientific advisory panel …" [42] and funded a literature review *Wind Turbine Sound and Health Effects: An Expert Panel Review* (Colby et al., 2009).

In 2010 Mr. Robert Hornung discussed the findings of Colby et al. (2009) and stated "… the sound of wind turbines can be annoying for some individuals and that may cause them to feel some stress etcetera." [43]


Wind Turbine Sound and Health Effects
An Expert Panel Review

Prepared by (in alphabetical order):

W. David Colby, M.D.
Robert Dobie, M.D.
Geoff Leventhall, Ph.D.
David M. Lipscomb, Ph.D.
Robert J. McCunney, M.D.
Michael T. Seilo, Ph.D.
Bo Sondergaard, M.Sc.

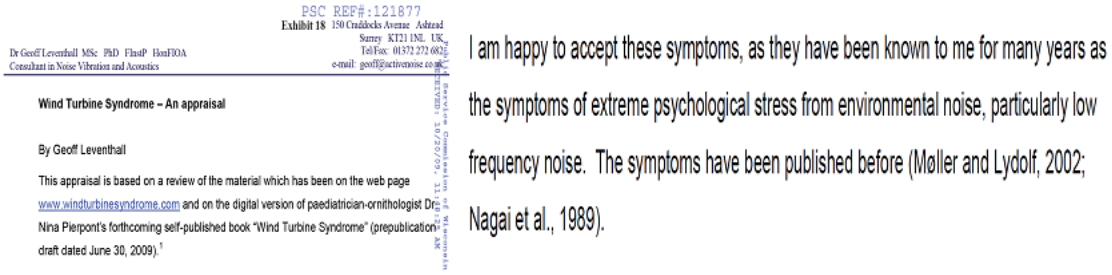
Prepared for:
American Wind Energy Association
and
Canadian Wind Energy Association
December 2009

The authors of Colby et al. (2009) discuss Dr. Nina Pierpont's case series study which includes Canadian participants. The symptoms reported by individuals exposed to wind turbines include: sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, and panic episodes associated with sensations of internal pulsation or quivering when awake or asleep. [44] Pierpont (2009) coined these symptoms "Wind Turbine Syndrome".

Colby et al. (2009) reports "Wind Turbine Syndrome" symptoms "… are not new and have been published previously in the context of "annoyance"…" and are the "… well-known stress effects of exposure to noise …" [45]

In independent works Colby et al. (2009) coauthors, Dr. Geoff Leventhall and Dr. David Colby, attribute "Wind Turbine Syndrome" to be symptoms of stress caused by audible wind turbine noise.

For example in 2009 Colby et al. (2009) coauthor Dr. Geoff Leventhall states he is happy to accept "Wind Turbine Syndrome" symptoms as he has known about them for years. (See excerpt below)



PSC REF#:121877
Exhibit 18

Dr Geoff Leventhall MSc PhD FInstP HonFIOA
Consultant in Noise Vibration and Acoustics

150 Craddocks Avenue Ashtead
Surrey KT21 1NL UK
Tel/Fax: 01372 272 682
e-mail: geoff@activenoise.co.uk

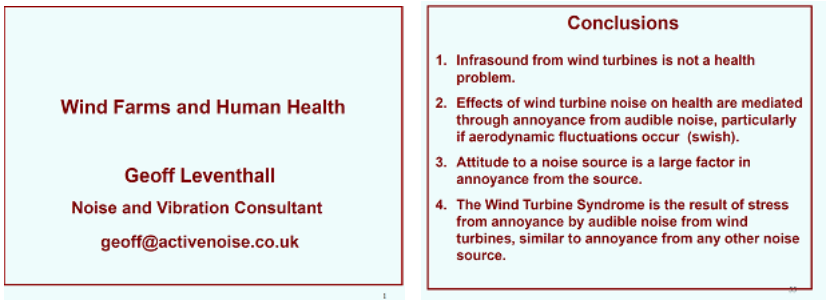
Wind Turbine Syndrome – An appraisal

By Geoff Leventhall

This appraisal is based on a review of the material which has been on the web page www.windturbinesyndrome.com and on the digital version of paediatrician-ornithologist Dr. Nina Pierpont's forthcoming self-published book "Wind Turbine Syndrome" (prepublication draft dated June 30, 2009).[1]

I am happy to accept these symptoms, as they have been known to me for many years as the symptoms of extreme psychological stress from environmental noise, particularly low frequency noise. The symptoms have been published before (Møller and Lydolf, 2002; Nagai et al., 1989).

On June 7, 2011 Dr. Leventhall presented to the National Health and Medical Research Council at a "Scientific Forum" on "Wind Farms and Humans Health". [46] Dr. Geoff Leventhall attributed "Wind Turbine Syndrome" symptoms to annoyance by audible noise from wind turbines. (See excerpt below)



Wind Farms and Human Health

Geoff Leventhall

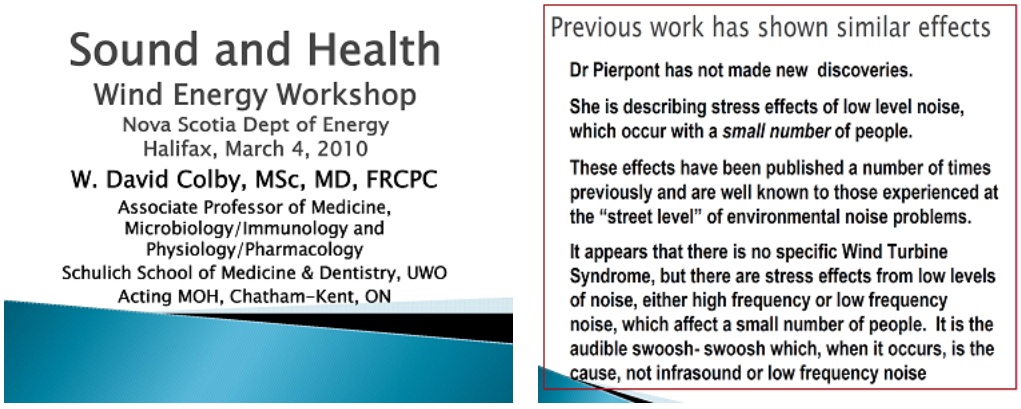
Noise and Vibration Consultant

geoff@activenoise.co.uk

Conclusions

1. Infrasound from wind turbines is not a health problem.
2. Effects of wind turbine noise on health are mediated through annoyance from audible noise, particularly if aerodynamic fluctuations occur (swish).
3. Attitude to a noise source is a large factor in annoyance from the source.
4. The Wind Turbine Syndrome is the result of stress from annoyance by audible noise from wind turbines, similar to annoyance from any other noise source.

In 2010 Dr. David Colby, coauthor of Colby et al. (2009) attributed "Wind Turbine Syndrome" symptoms to be caused by audible amplitude modulation (swoosh-swoosh). (See excerpt below)



Sound and Health

Wind Energy Workshop

Nova Scotia Dept of Energy

Halifax, March 4, 2010

W. David Colby, MSc, MD, FRCPC

Associate Professor of Medicine, Microbiology/Immunology and Physiology/Pharmacology

Schulich School of Medicine & Dentistry, UWO

Acting MOH, Chatham-Kent, ON

Previous work has shown similar effects

Dr Pierpont has not made new discoveries.

She is describing stress effects of low level noise, which occur with a *small number* of people.

These effects have been published a number of times previously and are well known to those experienced at the "street level" of environmental noise problems.

It appears that there is no specific Wind Turbine Syndrome, but there are stress effects from low levels of noise, either high frequency or low frequency noise, which affect a small number of people. It is the audible swoosh- swoosh which, when it occurs, is the cause, not infrasound or low frequency noise

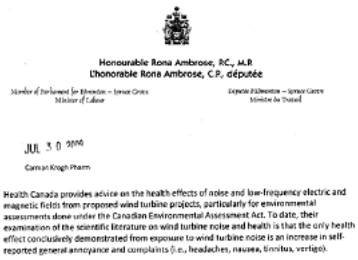
Health effects "conclusively demonstrated" and predicted: Health Canada

In February 2009 Stephen Bly, Chief, Acoustics Division Consumer and Clinical Radiation Protection Bureau Health Canada formally provided advice to me stating:

> "The Acoustics Division's current assessment of the scientific literature on wind turbine noise and health is that the only health effect conclusively demonstrated to date is an increase in annoyance and complaints." [47]

In a June 30 2009 letter Honourable Rona Ambrose, states:

> "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)." [48]



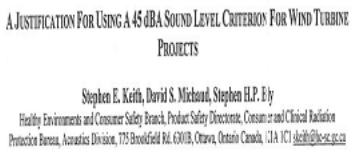
Honourable Rona Ambrose, P.C., M.P.
L'honorable Rona Ambrose, C.P., députée

JUL 30 2009

Health Canada provides advice on the health effects 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 and health is that the only health effect conclusively demonstrated from exposure to wind turbine noise is an increase in self-reported general annoyance and complaints (i.e., headaches, nausea, tinnitus, vertigo).

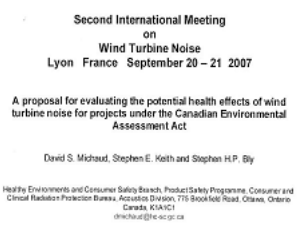
These "conclusively demonstrated" health effects are proposed and expected by representatives of Health Canada.

Dr. David Michaud and other members Health Canada's Acoustics Division propose increasing the percentage of Canadians highly annoyed by wind turbine noise. The Health Canada authors of Keith et al. (n.d.) [49] Keith et al. (2007) [50] and Keith et al. (2008) [51] (below) propose a 45dBA wind turbine sound limit and predict an increase in the percentage highly annoyed from exposure to wind turbine noise.



A JUSTIFICATION FOR USING A 45 dBA SOUND LEVEL CRITERION FOR WIND TURBINE PROJECTS

Stephen E. Keith, David S. Michaud, Stephen H.P. Bly



Second International Meeting
on
Wind Turbine Noise
Lyon France September 20 – 21 2007

A proposal for evaluating the potential health effects of wind turbine noise for projects under the Canadian Environmental Assessment Act

David S. Michaud, Stephen E. Keith and Stephen H.P. Bly

JOURNAL OF LOW FREQUENCY NOISE, VIBRATION AND ACTIVE CONTROL Pages 253 – 265

A proposal for evaluating the potential health effects of wind turbine noise for projects under the Canadian Environmental Assessment Act[1]

Stephen E. Keith[†], David S. Michaud[‡] and Stephen H.P. Bly[†]

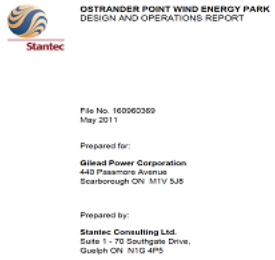
Received 27th August 2008

Dr. David Michaud and the other Health Canada authors do not base their annoyance predictions on dose response data for wind turbines.

Based on dose response data for wind turbines Health Canada Study Team Member, Sabine Janssen, reports with a highest allowed immission level of 45 dB(A) it could be expected that "… less than 14% of the exposed population to be highly annoyed indoors by wind turbines and less than 29% to be highly annoyed outdoors." [52]

Health impacts expected in Ontario Canada

Stantec is a listed member of CanWEA. [53] Stantec provides consulting services for CanWEA and/or members of CanWEA. Stantec (2011 May) states:


OSTRANDER POINT WIND ENERGY PARK
DESIGN AND OPERATIONS REPORT

Stantec

File No. 160960369
May 2011

Prepared for:

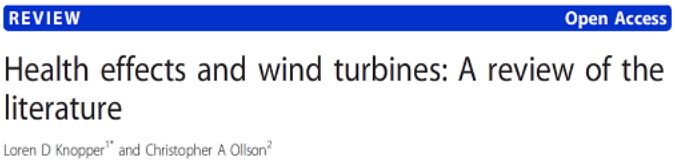
Gilead Power Corporation
440 Passmore Avenue
Scarborough ON M1V 5J8

Prepared by:

Stantec Consulting Ltd.
Suite 1 - 70 Southgate Drive,
Guelph ON N1G 4P5

"What is clear is that some people living near wind turbines experience annoyance due to wind turbines. … Some people are also disturbed in their sleep by wind turbines." [54]

Dr. Christopher Ollson and Dr. Loren Knopper provide consulting services for CanWEA and/or members of CanWEA. Knopper and Ollson (2011) states:


REVIEW Open Access

Health effects and wind turbines: A review of the literature

Loren D Knopper[1*] and Christopher A Ollson[2]

"What is clear is that some people living near wind turbines experience annoyance due to wind turbines … Some people are also disturbed in their sleep by wind turbines." [55]

Dr. Copes is the Director, Environmental and Occupational Health Branch, Ontario Agency for Health Protection and Promotion. A 2010 literature review coauthored by Dr. Copes reports wind turbine noise annoyance and sleep disturbance is common between 30 and 45 dBA. (See excerpt below)


National Collaborating Centre for Environmental Health
Centre de collaboration nationale en santé environnementale
JANUARY 2010
Wind Turbines and Health
Karen Rideout, Ray Copes, Constance Bos

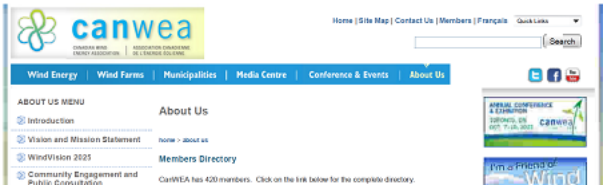
- Annoyance and sleep disruption are common when sound levels are 30 to 45 dBA

Ontario wind turbine noise guideline limits permit, [56] and projects are being approved for, [57] noise levels of up to 51 dBA (formerly 53 dBA) at a defined noise receptor (family home).

An April 9 2010 internal Ontario Ministry of Environment memorandum obtained from a Freedom of information request states:

> It appears compliance with the minimum setbacks and the noise study approach currently being used to approve the siting of WTGs will result or likely result in adverse effects …" [58]

HGC Engineering is a listed member of CanWEA. [59]



The President of HGC Engineering is Mr. Brian Howe. The HGC Engineering web site states Mr Brain Howe is:

> "… a leader in the assessment of noise from wind power projects. He speaks frequently at Canadian Wind Energy Association (CanWEA) Symposiums, as well as other major international conferences. Brian is an ongoing contributor to acoustical knowledge in the field having prepared a "best practices" guide for CanWEA in 2007 and provided input on the assessment methods contained in the Ontario Green Energy and Green Economy Act (2009). Brian is the Chairman of the CSA Technical Subcommittee on Acoustic Noise Measurements of Wind Turbines." [60]

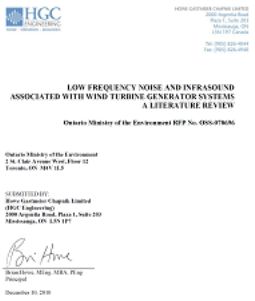
HGC Engineering has conducted sound measurements at Canadian wind energy projects where some Canadians exposed to wind turbine noise reported high annoyance and/or sleep disturbance and/or other adverse effects. Some of these Canadians retained legal counsel to resolve issues caused by the wind turbine noise and have negotiated an agreement with the wind energy developer to purchase the home.

In December 2011 the Ontario Ministry of Environment released a report prepared HGC Engineering and signed by Mr. Brian Howe.

The Ontario Ministry of Environment reports "… three experts in the field of noise, vibration and acoustics reviewed and validated the report" [61]

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." [62]



HGC (2010) also states:

> "Stress symptoms associated with noise annoyance, and in particular low frequency annoyance include sleep interference, headaches, poor concentration, mood swings" [63]

Summary of evidence

- WHO defines health as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity".
- The WHO Constitution states: "The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being …" [64]
- Canada supports the WHO definition of health.
- Health Canada's Dr. David Michaud states under the WHO definition of health "… noise induced annoyance is an adverse health effect."
- Peer reviewed studies [65],[66],[67] demonstrate wind turbine produce sound which is perceived to be more annoying than other equally loud sources of sound.
- Annoyance to wind turbine noise starts at wind turbine dBA sound pressure levels in the low 30's and rises sharply at 35 dBA. [68],[69],[70]
- Ontario Ministry of Environment wind turbine noise guidelines permit noise of 40 dBA up to 51 dBA [71] (formerly 53 dBA) at a family home (receptor).
- A 2009 panel report sponsored by AWEA and CanWEA determined "Wind Turbine Syndrome" 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 …" [72]
- In 2009 Health Canada examined the scientific literature on wind turbine noise and determined the 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). [73]
- Members of Health Canada's acoustics division propose wind turbine sound levels which are predicted to increase the percentage of exposed Canadians being highly annoyed. [74],[75],[76]

- At the levels experienced at typical receptor distances in Ontario, sound from wind turbines is expected to result in a non-trivial percentage of persons being highly annoyed and research has shown that annoyance associated with sound from wind turbines can be expected to contribute to stress related health impacts in some persons. [77]

Request for full disclosure of "conclusively demonstrated" health effects

The citations in this open letter represent a sample of references which support the conclusion that wind turbines can harm human health at the sound levels experienced at typical receptor distances in Ontario. Additional references can be provided upon request.

Reported effects include annoyance and/or sleep disturbance and/or stress related health impacts and/or reduced quality of life.

The references cited in this open letter include, but are not limited to, citations by CanWEA sponsored authors or members, and Health Canada.

Members of Health Canada's Acoustics Division have identified health effects "conclusively demonstrated" from exposure to wind turbine noise.

Members of Health Canada's Acoustics Division propose imposing health effects on a non trivial percentage of Canadians exposed to wind turbine noise.

Members of, and/or consultants for, CanWEA acknowledge some people experience annoyance and/or sleep disturbance and/or stress related health impacts as a result of exposure to wind turbines.

Failure to fully disclose these and other citations represent errors of omission.

Health Canada (2004) states: "Government's job is to provide citizens with accurate and appropriate information so that they can protect themselves." [78]

In the interest of human health protection I request that representatives of: CanWEA; the Government of Canada; Health Canada; and the Government of Ontario; provide Canadians immediate and full disclosure of the health effects "conclusively demonstrated" from exposure to wind turbine noise.

Informed Canadians look forward to your response.

If you should have any questions or require copies of the references cited in this letter please do not hesitate to contact me.

Yours truly,

Brett Horner BA CMA
Killaloe, ON
Canada
brett.s.horner@gmail.com
613-754-2736

References

[1] EcoEnergy for Renwable Power, Natural Resources Canada, web update June 1 2009
[2] Government of Canada Announces $9.2 Million for Alberta Wind Energy Project, (July 7, 2008) Natural Resources Canada
[3] Minister of Natural Resources Lisa Raitt (Thursday, 10 Sept 2009)
[4] ecoENERGY for Renewable Power Program Power Program Date Modified: 2011-02-25 http://www.ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm
[5] About Renewable Energy, http://www.nrcan.gc.ca/energy/renewable/1297
[6] ecoENERGY for Renewable Power Program, http://ecoaction.gc.ca/ecoenergy-ecoenergie/power-electricite/index-eng.cfm
[7] Rob Gowan Tuesday, February 26, 2013Industry stands behind turbines, http://www.lucknowsentinel.com/2013/02/26/industry-stands-behind-turbines
[8] WHO | Countries, http://www.hc-sc.gc.ca/ahc-asc/intactiv/orgs/organi-eng.php (cited February 23, 2013)
[9] WHO | Countries, http://www.hc-sc.gc.ca/ahc-asc/intactiv/orgs/organi-eng.php (cited February 23, 2013)
[10] The Constitution was adopted by the International Health Conference held in New York from 19 June to 22 July 1946, signed on 22 July 1946 by the representatives of 61 States (Off. Rec. Wld Hlth Org., 2, 100), and entered into force on 7 April 1948. Amendments adopted by the Twenty-sixth, Twenty-ninth, Thirty-ninth and Fifty-first World Health Assemblies (resolutions WHA26.37, WHA29.38, WHA39.6 and WHA51.23) came into force on 3 February 1977, 20 January 1984, 11 July 1994 and 15 September 2005 respectively and are incorporated in the present text. Accessed July 15, 2012
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