De: Carmen Krogh

Envoyé: 30 novembre 2009 12:55

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Projet d'aménagement d'un parc éolien dans la MRC de L'Érable

Attached is a document that reviews refences complied by CanWEA to determine:

1.To what extent they support CanWEA's statement:

"Scientists conclude that there is no evidence that wind turbines have an adverse impact on human health"

2. To what extent they support CanWEA's statement

"These findings clearly show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health."

3. To what extent they respond to Dr. Nina Pierpont's research.

For reference the full text from CanWEA's web page is included at the end of this document in **Appendix A**.

Note: primary references of these articles were not reviewed.

From Carmen Krogh, BScPharm

Canadian Wind Energy Association	Purpose of This Document
On October 06, 2008 The Canadian Wind Energy Association (CanWEA) posted the following release on their web site. "10/06/2008 Scientists conclude that there is no evidence that wind turbines have an adverse impact on human health " Below are excerpts from this web posting "Response to a recent publication by Dr. Nina Pierpont" "For reference, the Canadian Wind Energy Association (CanWEA) has compiled a list of articles and publications on the subject from reputable sources in Europe and North America. Below are summaries of these articles:" "These findings clearly show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health."	A review has been made of the articles complied by CanWEA to determine: 1.To what extent they support CanWEA's statement: "Scientists conclude that there is no evidence that wind turbines have an adverse impact on human health" 2. To what extent they support CanWEA's statement "These findings clearly show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." 3. To what extent they respond to Dr. Nina Pierpont's research. For reference the full text from CanWEA's web page is included at the end of this document in **Appendix A**. Note: primary references of these articles were not reviewed.

Executive Summary
7 out of 7 articles **do not** "conclude that there is no evidence that wind turbines have an adverse impact on human health".
7 out of 7 articles **do not** state "that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health.".
7 out of 7 articles **do not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). 1 out of 7 articles **do** mention Dr Pierpont's case studies and **does** state "One cannot discount the information"
6 out of 7 articles **do** identify wind turbine noise as a health concern which must be considered. 1 out of 7 articles **do not** mention noise at all when assessing adverse health effects related to various forms of electricity generation.
7 out of 7 articles **do not** study patients or reports of patients describing adverse health effects when exposed to wind turbines.
7 out of 7 articles **do not** consider recent research such as that conducted by Dr Pierpont, Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France.

Article referenced by Canadian Wind Energy Association	Review Comments
1. INFRASOUND FROM WIND TURBINES – FACT, FICTION OR DECEPTION 2006 Geoff Leventhall Noise and Vibration Consultant www.wind.appstate.edu/reports/06-06Leventhall-Infras-WT-CanAcoustics2.pdf	Technical article concentrates on acoustics terminology. Author is not a health care professional. **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** state "that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does not** study patients or reports of patients describing adverse health effects when exposed to wind turbines. **Does not** mention other recent research conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France. **Does** state "Turbulent air inflow conditions cause enhanced levels of low frequency noise, which may be disturbing" Page 34 **Does** conclude "… there are wind turbine installations which may have noise problems." Page 36

Article referenced by Canadian Wind Energy Association	Review Comments
2. WIND TURBINE FACILITIES NOISE ISSUES - DECEMBER 2007 Ramani Ramakrishnan, Ph. D., P. Eng. Prepared for Ministry of the Environment of Ontario	This work is a literature review. Author is not a health care professional. **Does not** contain original research. **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** state "that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does not** study patients or reports of patients describing adverse health effects when exposed to wind turbines. **Does not** mention other recent research such as that conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France. **Does** state "There is an understanding that noise pollution can be the cause of serious health effects through short term and long term, or cumulative, exposure." Page 25 **Does** conclude "Literature review showed that additional research is still required to make definitive conclusions about wind turbine noise impacts as well as human response to wind farms. In addition, detailed research on meteorological conditions, and their impact on sound generation needs to be undertaken to realise definitive conclusions;" Page 56 **Does** conclude "The Ministry of the Environment's procedures to assess wind farm noise levels follow a simple procedure that is sound for most situations. However, additional concerns still need to be addressed in the next round of revisions to their assessment process. These revisions may need to be addressed after the results from future research provide scientifically consistent data for effects such as meteorology, human response and turbine noise source character." Page 56

Article referenced by Canadian Wind Energy Association	Review Comments
3. Wind Turbine Acoustic Noise Anthony L. Rogers, Ph.D. James F. Manwell, Ph.D. Sally Wright, M.S., PE June 2002 Amended January 2006 http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf	This work is a literature review. Authors are not health care professionals. **Does not** contain original research. **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** state "that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does not** study patients or reports of patients describing adverse health effects when exposed to wind turbines. **Does not** mention other recent research such as that conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France. **Does** state "In most countries, however, noise regulations define upper bounds for the noise to which people may be exposed." **Does** present a graph which indicates that wind turbines designs in the 2000s emit more dB than in the 1990s. Page 21 *This is contrary to what the wind energy industry is telling the public.* **Does** conclude "noise is a primary siting constraint." Page 23 **Does** conclude "Community noise standards are important to ensure livable communities. Wind turbines must be held to comply with these regulations." Page 24

Article referenced by Canadian Wind Energy Association	Review Comments
4. Research into Aerodynamic Modulation of Wind Turbine Noise: Final report Dr. Andy Moorhouse, Malcolm Hayes, Dr. Sabine von Hünerbein, Ben Piper, Dr. Mags Adams July 2007 http://usir.salford.ac.uk/1554/1/Salford_Uni_Report_Turbine_Sound.pdf	**Does** state purpose of study: "The aims of this study are to ascertain the prevalence of AM (aerodynamic modulation) from UK wind farm sites, to try to gain a better understanding of the likely causes, and to establish whether further research into AM is required." **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** "show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does not** study patients or reports of patients describing adverse health effects when exposed to wind turbines. **Does not** mention other recent research such as that conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France. **Does** present format of survey used which concentrates on aerodynamic modulation not adverse health effects. The survey **does not** ask respondents any questions about their health or adverse health effects. Pages 54, 55, 56 **Does** state further research may be needed. "On the other hand, since AM cannot be fully predicted at present, and its causes are not understood we consider that it might be prudent to carry out further research to improve understanding in this area." Page 47

Article referenced by Canadian Wind Energy Association	Review Comments
5. Electricity generation and health Anil Markandya, Paul Wilkinson September 2007 http://www.ncbi.nlm.nih.gov/pubmed/17876910.	This work is a literature review. . **Does not** contain original research. **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** "show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does not** study patients or reports of patients describing adverse health effects when exposed to wind turbines. **Does not** mention other recent research such as that conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France. **Does** comment on various forms of electricity generation and related health effects as they pertain to emissions not noise. **Does not** mention or consider noise ever in the report. **Does** state "The negative effects on health of electricity generation from renewable sources have not been assessed as fully as those from conventional sources" Page 19

Article referenced by Canadian Wind Energy Association	Review Comments
6. The Health Impact of Wind Turbines: A review of the Current White, Grey and Published Literature June 2008 Dr. David Colby Acting Medical Officer of Health Chatham-Kent Public Health Unit http://www.chatham-kent.ca/NR/rdonlyres/CA6E8804-D6FF-42A5-B93B-5229FA127875/7046/5a.pdf	This work is a literature review. **Does** not contain original research. **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** "show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does** make note of Dr Pierpont's 'case studies' Page 14 **Does state** regarding Dr Pierpont's case studies "One cannot discount the information" then proceeds to ignore it. Page 14 **Does not** reference to Dr. Pierpont's case studies in the References section. **Does not** study patients who describe adverse health effects when exposed to wind turbines. **Does not** mention other recent research such as that conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, or the Academy of Medicine of France. **Does not** comment on research of Frey and Haddon but rather lists it in "Additional Resources" section. **Does** identify noise as a health issue "noise is one of the few health issues surrounding wind turbines that can be measured and has guidelines that must be adhered to." Page 12 **Does** include 11 photos of wind turbines in the document and accompanying slides. **Does not** include any photos of humans or communities.

Article referenced by Canadian Wind Energy Association	Review Comments
7. Fourth Ministerial Conference on Environment and Health Budapest, Hungary, 23–25 June 2004 World Health Organization http://www.euro.who.int/document/eehc/ebakdoc08.pdf	**Does** comment on various forms of energy generation, including wind, and related health effects as they pertain to emissions and accidents and does not study noise related effects. **Does not** contain original research. **Does not** "conclude that there is no evidence that wind turbines have an adverse impact on human health". **Does not** state "that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health." **Does not** review Dr Pierpont's research. (Wind Turbine Syndrome Manuscript). **Does not** study patients or reports of patients describing adverse health effects when exposed to wind turbines. **Does not** mention other recent research such as that conducted by Dr. Amanda Harry, Alves Perreira and Castello Blanco, Frey and Haddon or the Academy of Medicine of France. **Does** state "Wind energy can, however, have some potential burdens on amenity through …noise." Page 12 **Does** state "noise pollution may be a problem if turbines are situated close to centres of population" Page 70 **Does** state the review did not report on wind turbine related "issues such as sleep disturbance, school absenteeism, eventually resulting from noise in vicinity" Page 70

Appendix A
Full Text from Canadian Wind Energy Associations web site.

10/06/2008 Scientists conclude that there is no evidence that wind turbines have an adverse impact on human health

Response to a recent publication by Dr. Nina Pierpont

At present there are well over 10,000 wind turbines installed and operating in North America, and tens of thousands of people who live and work in proximity to these wind turbines. Of these individuals, a very small number have claimed that their health has been impacted by wind turbines. However, surveys of peer-reviewed scientific literature have consistently found no evidence linking wind turbines to human health concerns. It is important to note that all wind energy projects are required to undertake environmental assessments that assess the potential impacts of wind turbines on ecosystems and human health. The studies also ensure that the installations meet strict government regulations with respect to sound.

A recent publication by Dr. Nina Pierpont of Malone, New York entitled "Wind Turbine Syndrome" contends that wind turbines can impact the health of individuals living in proximity to wind turbines. This view, however, is not supported by scientists who specialize in acoustics, low frequency sound and related human health impacts. It is important to point out that Dr. Pierpont's work has not been published in peer-reviewed journals, a fact that raises questions as to the scientific validity of her research.

For reference, the Canadian Wind Energy Association (CanWEA) has compiled a list of articles and publications on the subject from reputable sources in Europe and North America. Below are summaries of these articles:

1. "Infrasound from Wind Turbines – Fact, Fiction or Deception?" by Geoff Leventhall in Vol. 34 No.2 (2006) of the peer-reviewed journal Canadian Acoustics. This paper looks at the question of whether or not wind turbines produce infrasound at levels that can impact humans. It directly addresses assertions frequently made by Dr. Nina Pierpont, author of a recent book entitled "Wind Turbine Syndrome". "In the USA, a high profile objector (Nina Pierpont of Malone NY) placed an advertisement in a local paper, consisting entirely of selected quotations from a previously published technical paper by van den Berg (Van den Berg 2004). However the comment "[i.e. infrasonic]", as shown in Fig 3, was added in the first line of the first quotation in a manner which might mislead naive readers into believing that it was part of the original. The van den Berg paper was based on A-weighted measurements and had no connection with infrasound. So, not only is the advertisement displaying the advertiser's self deception, but this has also been propagated to others who have read it. [...] The comment, [i.e. infrasonic], added into Fig 3 gives incorrect information. Claims of infrasound are

irrelevant and possibly harmful, should they lead to unnecessary fears."
www.wind.appstate.edu/reports/06-06Leventhall-Infras-WT-CanAcoustics2.pdf

2. "Wind Turbine Facilities Noise Issues" by Dr. Ramani Ramakrishnan for the Ontario Ministry of the Environment. This study looked into the claims made in the doctoral thesis of G.P. van den Berg, a source frequently cited by Dr. Pierpont. It concluded that: "The research work undertaken by G. P. van den Berg didn't provide scientific evidence to support the few major hypotheses postulated concerning the wind turbine noise characteristics."
http://www.ene.gov.on.ca/envision/env_reg/er/documents/2008/Noise%20Report.pdf

3. "Wind Turbine Acoustic Noise", A White Paper by Dr. Anthony Rodgers at the University of Massachusetts at Amherst. This paper looked into the issue of both sound and infrasound (low frequency sound) and concluded "There is no reliable evidence that infrasound below the perception threshold produces physiological or psychological effects."
http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf

4. "Research into Aerodynamic Modulation of Wind Turbine Noise", University of Salford, UK, July 2007. This paper looked into claims that it was not infrasound, but "amplitude modulation" (AM) that presented problems. The paper concludes that "This shows that in terms of the number of people affected, wind farm noise is a small-scale problem compared with other types of noise; for example the number of complaints about industrial noise exceeds those about windfarms by around three orders of magnitude" and that "The low incidence of AM and the low numbers of people adversely affected make it difficult to justify further research funding in preference to other more widespread noise issues."
http://usir.salford.ac.uk/1554/1/Salford_Uni_Report_Turbine_Sound.pdf

5. "Electricity generation and health" in the peer-reviewed journal The Lancet. The paper concludes that "Forms of renewable energy generation are still in the early phases of their technological development, but most seem to be associated with few adverse effects on health" http://www.ncbi.nlm.nih.gov/pubmed/17876910

6. "Health impact of wind turbines" , prepared by the Municipality of Chatham-Kent Health & Family Services Public Health Unit. This is a comprehensive review of available literature on the subject. This paper concludes and concurs with the original quote from Chatham-Kent's Acting Medical Officer of Health, Dr. David Colby: "In summary, as long as the Ministry of Environment Guidelines for location criteria of wind farms are followed, it is my opinion that there will be negligible adverse health

impacts on Chatham-Kent citizens. Although opposition to wind farms on aesthetic grounds is a legitimate point of view, opposition to wind farms on the basis of potential adverse health consequences is not justified by the evidence." http://www.chatham-kent.ca/NR/rdonlyres/CA6E8804-D6FF-42A5-B93B-5229FA127875/7046/5a.pdf

7. Energy, sustainable development and health, World Health Organisation, June 2004. The study finds that "Renewable sources, such as photovoltaic and wind energy, are associated with fewer health effects. [...] The increased use of renewable energy, especially wind, solar and photovoltaic energy, will have positive health benefits, some of which have been estimated." There is also a table on page 79 showing the relative health effects of nearly all sources of energy, which clearly shows wind as negligible. http://www.euro.who.int/document/eehc/ebakdoc08.pdf

These findings clearly show that there is no peer-reviewed scientific evidence indicating that wind turbines have an adverse impact on human health.

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Re: Projet d'aménagement d'un parc éolien dans la MRC de L'Érable

The following has been taken from the Wind Watch web site and should be of interest to the government of Quebec.

The government of Japan is to study effects of wind farms on health[1]

The Environment Ministry will launch its first major study into the influence of wind turbines on people's health next year, it has been learned.

Much is expected of wind power as a source of clean energy, but people living near wind power facilities are increasingly complaining of health problems. The low-frequency sound produced by the wind turbines at such facilities-sound that is difficult to discern with the naked ear-is suspected of causing such conditions as insomnia, tinnitus and hand tremors.

Due to a lack of substantiating data, the ministry has deemed it necessary to study the matter. It will launch a four-year examination of all 1,517 wind turbines in the country in April.

The study will try to ascertain to what extent health problems are being caused by the low-frequency sound, through such means as questioning local residents.

It will examine the relationship between wind turbines' operating hours and the times of day when people's health deteriorates. It also will make continual measurements of such elements as the level of the low-frequency sound.

The study's attempt to determine the causality between the low-frequency sound and health problems will take into account such factors as weather conditions and the distance between homes and wind power facilities.

The Yomiuri Shimbun
www.yomiui.co.jp
29 November 2009

There are global reports of residents suffering symptoms of adverse health effects from wind turbines. It is important that 3rd party health studies be conducted before more wind turbines are built.

I urge that the government of Quebec support the conduct of authoritative health studies before allowing more wind turbines into the province. This will avoid potential health risks associated with wind turbines and will protect the health of the population. Thank you for giving this your consideration.

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[1] link: http://www.wind-watch.org/news/2009/11/28/government-to-study-effects-of-wind-farms-on-health/