

## **Results Statistically Significant**

### **University of Waterloo Research Chair Industrial Wind Turbine (IWT) Study**

**Commentary by Carmen Krogh, BScPharm**

**November 12, 2013**

#### **Background**

During an October 17, 2013 symposium held in Toronto and facilitated by former Toronto Mayor David Miller, a poster entitled '*Wind Turbine Noise, Sleep Quality, and Symptoms of Inner Ear Problems*' was displayed. Authors are Claire Paller, Phil Bigelow, Shannon Majowicz, Jane Law, and Tanya Christidis of the University of Waterloo Research Chair Industrial Wind Turbine (IWT) Study team.<sup>1</sup>

The study results have generated media and public attention. This commentary is intended to provide some observations and context regarding the University of Waterloo IWT study results.

Additional details are provided in the Appendix.

#### **Disclosure**

I 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.

#### **Executive summary**

##### *Statistically significant results*

A review of the poster indicates no disclosure that the results are preliminary.

The poster states:

“All relationships were found to be positive and statistically significant.”

“The relationship between vertigo and  $\ln(\text{distance})$  was statistically significant ( $P < 0.001$ ) when controlling for age, gender, and county. The relationship between tinnitus and  $\ln(\text{distance})$  approached statistical significance

(P=0.0755). Both vertigo and tinnitus were worse among participants living closer to wind turbines.”

The method is described including that of the statistical analysis:

“All analyses were performed using SAS 9.22. Descriptive and multivariate analyses were performed to investigate the effect of the main independent variable of interest (distance to nearest wind turbine) on the various outcome measures.”

### *Participation in context<sup>1</sup>*

Based on the circumstances regarding wind energy development in Ontario, rural residents reported reluctance to participate due to a belief that their input would not be treated with care and concern and could possibly be misrepresented. These perceptions are reported by those living with IWT developments whose health effects have not been acknowledged. This is despite numerous complaints and/or communications with: federal and provincial government representatives; MOE Spills Action Line; IWT developers; public health officials; and other.

Without an acknowledgment of effects, achieving remedy is an issue. For example, the Whitworth family has reported adverse health effects and social-economic issues relating to a step-up transformer station located in close proximity to their family home. Although government officials are aware of these reports, 7 years have passed with no solution offered [see Appendix].

Some reported that a number of the questions lacked sensitivity and were viewed as intrusive. In addition, the questionnaire was lengthy and sleep disturbance and fatigue appear to have contributed to a low level of motivation to participate.

In spite of the uncertainty and challenges, a significant number of residents participated - i.e., 396 participants.

### *Social issues and perceptions*

The Green Energy Act (GEA) established regulations for siting industrial wind turbines in advance of carrying out further research into the reported health effects presented during the GEA standing committee hearings.

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<sup>1</sup> Author's note: these comments are based on feedback, correspondence and other sources from those with pending and operating wind energy projects. Comments include those relating to health and social-economic issues including those of perception.

The GEA removed municipal decision-making rights. The imposition of IWT facilities on residents without consent i.e. lack of control of the rural community's living environment, has resulted in a loss of trust in the government, its policy, processes and systems.

Other perceptions are in regards to a lack of respect for Ontario rural families including the use of stereotyping terminology related to concerns about health effects. Examples include characterizations such as: "NIMBYISM" [not in my backyard] by the former Premier of Ontario <sup>2</sup>; "anti-wind", "anti-wind activist", "opponent"; and attributing effects based on expectations and/or fright factors, i.e. *nocebo* effect.

Processes associated with the EBR (Environment Bill of Rights) and the REA (Renewal Energy Approval) impose an inordinately high burden on small rural communities and municipalities - i.e. time, legal costs and other impacts such as stress and social-economic.

During an Environmental Review Tribunal (ERT) - REA appeal process, Ontario Ministry of Environment counsel and some their expert witnesses have commented on the claims of adverse health effects associated with living in close proximity to industrial wind energy facilities. This is in spite of some of the residents being unable to live in their homes.

Examples include:

"The expert evidence, so-called, that you're going to hear, if you do hear it, consists of largely of hearsay and unconfirmed assertions and speculations, we will say, and a lot of it is fear mongering and kind of rabble-rousing." <sup>3</sup>

"But if we want to oppose wind turbines, we should not be pretending that there are adverse health effects that aren't there. So there isn't the evidence to support that, so that's – and I still hold to that conclusion." <sup>4</sup>

"Wind turbine activist organizations have repeatedly requested that wind turbines not be used in the province of Ontario until there is a study conclusively proving that there are no health effects. There never will be such a study." <sup>5</sup>

"My belief on the basis of the currently available evidence is that there is nothing that proves there is an adverse health effect, a serious, because usually the adjective "serious" is added, a serious health effect is engendered by wind turbines." <sup>6</sup>

Other factors include the onerous burden of proof of causality rather than invoking prevention and precaution; continued rapid approval of projects despite evidence of

health, environmental and social impacts, disregard of the wishes of communities; and costs to appeal a REA or litigate, or funding to relocate families to achieve relief.

Funding for the University of Waterloo Research Chair Industrial Wind Turbine (IWT) health study was provided by the Ontario Ministry of Environment. When combined with other perceptions, a lack of trust and confidence in the study process is exacerbated.

In an effort to reassure the public about “Concerns related to health effects”, the MOE has cited the University of Waterloo Research Chair health study while it was in the process of being conducted and prior to its completion.

For example, the MOE states in a 2012 EBR approval:

“The Ministry of the Environment (MOE) is aware of the health concerns some people have expressed about the potential impact of wind turbines.”

“The government has also committed to establish the Ontario Research Chair (ORC) in Renewable Energy Technologies and Health to address the technological, health and safety aspects of renewable energy. To meet this commitment, the Council of Ontario Universities awarded the research chair position in February 2010 to Dr. Sivothythaman, a faculty member at the University of Waterloo, following an independent and competitive application process. The 5-year ORC program brings on board researchers with expertise from the faculties of Engineering and Applied Health Sciences and will include clinical and epidemiological studies of health effects of turbine noise.”<sup>7</sup>

To encourage participation in the University of Waterloo health study: “Upon completing the survey, participants will be entered into a draw to win a \$250 gift certificate to Canadian Tire or a Samsung Galaxy tablet, valued at \$250.”<sup>8</sup> Some reported being offended – i.e., Samsung is an IWT developer and markets IWT products.

Concern has been expressed as to why the poster was presented during a “Symposia of the Ontario Research Chairs in Public Policy” and why these results were not released to the rural public – i.e., those living with IWTs.

## Conclusion

Rural residents were encouraged by the statistically significant results. The questions being asked are how many studies are needed and how long it will take before the government responds to the issues.

In the meantime, based on the published peer reviewed references and the reports of those exposed to IWT facilities, there is sufficient knowledge to invoke prevention and precaution before risking the health and social-economic impacts on Ontario's rural residents.

It is unclear whether the Ministry of Environment will react to the evidence available and the statistically significant results reported by the University of Waterloo study.

It remains to be seen if the MOE will respond by invoking prevention and precaution, and whether there will be a pause before approving more IWT projects.

Those reporting health issues in operating projects should not be forgotten and should be given remedy as soon as possible.

Respectfully submitted,

Carmen Krogh BScPharm  
Ontario, Canada

### **Appendix**

The symposia held at York University, Toronto indicates a focus on public policy: <sup>9</sup>

#### **Symposia of the Ontario Research Chairs in Public Policy**

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##### **Tackling Ontario's Challenges**

##### **Experts and Decision-Makers Meet to Explore Ontario's Key Policy Challenges**

University of Waterloo Research Chair Industrial Wind Turbine (IWT) study results were publicly displayed during the symposium session on sustainability. <sup>10</sup>

The Ministry of Environment funds the University of Waterloo Research Chair: <sup>11</sup>

## CHAIRS IN ENVIRONMENTAL SCIENCE

Three Chairs conduct key research in renewable energy and green chemistry and engineering

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The Ontario government, through the Ministry of the Environment, has provided funding to support the establishment of an Ontario Research Chair in Renewable Energy Technologies and Health, and two Chairs in Green Chemistry and Engineering.

Funding for the Chairs consists of \$300,000 per year for five years for the chair in Renewable Energy Technologies and Health, and \$250,000 per year for five years for each of the two chairs in Green Chemistry and Engineering.

The Green Energy Act (2009) removes barriers and is committed to fostering growth of renewable energy projects. Many rural residents report being frustrated that the government is not listening to those in rural jurisdictions who have to live with the risk factors and consequences of a wind energy facility in close proximity to family homes and in a quiet rural area.

**Green Energy Act, 2009**



### Preamble

The Government of Ontario is committed to fostering the growth of renewable energy projects, which use cleaner sources of energy, and to removing barriers to and promoting opportunities for renewable energy projects and to promoting a green economy.

The lack of resolution for those reporting adverse health effects has eroded confidence in the government. For example, the Whitworth family has been reporting health, farm animal and social-economic impacts from a transformer station since 2006. The family has been advised on behalf of the Premier of Ontario, that the MOE has done all it is prepared to do and has formally closed the family's file.

From: [MOE.CCUENE@ontario.ca](mailto:MOE.CCUENE@ontario.ca)  
To: [tcsikwhitworth@aol.com](mailto:tcsikwhitworth@aol.com)  
Sent: 9/4/2013 10:49:30 A.M. Eastern Daylight Time  
Subj: correspondence to Premier Wynne

I am writing in regard to your June 28, 2013 email to Premier Kathleen Wynne. Your message was brought to the attention of the Ministry of the Environment (MOE), and I am responding on behalf of the ministry.

As indicated in previous correspondence from the ministry, the MOE has undertaken a comprehensive response to your concerns, completed its outreach and investigation into your concerns, and has formally closed its file.

I have been advised that the MOE has done all that it is prepared to do and no further steps will be taken.

Jeff Arp

Supervisor

Corporate Correspondence Unit

Ministry of the Environment

The family inquired about how to log a complaint in the day time:

**From:** TCSJKWHITWORTH@aol.com [mailto:TCSJKWHITWORTH@aol.com]  
**Sent:** October 31, 2013 9:59 AM  
**To:** Glassco, Jane (ENE)  
**Cc:** Matthews, Nancy (ENE)  
**Subject:** Complaints

Please tell me how I log a complaint in the day time. It was terrible here on and off during the night and it is still bad this morning. Cheryl is trying to get some rest and our dog is still shaking.

We have been told by the MOE that our file is closed and it would appear that our concerns are not been logged. Again how do I get our concerns on the system when it is bad here in the day time?

It was confirmed that the MOE is not taking any action on the family's complaints:

**From:** Jane.Glassco@ontario.ca  
**To:** TCSJKWHITWORTH@aol.com  
**CC:** gary.tomlinson@ontario.ca  
**Sent:** 10/31/2013 4:32:45 P.M. Eastern Daylight Time  
**Subj:** RE: Complaints

Ted; thank you for your email. Yes, the ministry has closed your file at this time and the Ministry will be not taking any action on your complaints.

The Ministry of Environment typically cited the University of Waterloo Research Chair health study as part of the Environmental Bill of Rights process. For example, a citation occurred in an EBR decision dated July 17, 2012 which is prior to the completion of the study and while it was in process.



**EBR Registry Number:** 011-3999

**Ministry Reference Number:**  
4059-8EUVDG

**Ministry:**  
Ministry of the Environment  
**Date Proposal loaded to the**

**Registry:**  
June 30, 2011

**Date Decision loaded to the**

**Registry:**  
July 17, 2012

**Proponent:** Capital Power GP Holdings Inc.  
70 York Street  
Suite 1720  
Toronto Ontario  
Canada M5J 1H9

Concerns related to health effects

The Ministry of the Environment (MOE) is aware of the health concerns some people have expressed about the potential impact of wind turbines. The Ontario Chief Medical Officer of Health's report concluded that scientific evidence available to date does not demonstrate a direct causal link between wind turbine noise and adverse health effects. Scientific evidence to date indicates that, at the typical setback distances in Ontario, there is no direct health risk from wind turbine noise, including low frequency noise and infrasound.

The government has also committed to establish the Ontario Research Chair (ORC) in Renewable Energy Technologies and Health to address the technological, health and safety aspects of renewable energy. To meet this commitment, the Council of Ontario Universities awarded the research chair position in February 2010 to Dr. Sivothythaman, a faculty member at the University of Waterloo, following an independent and competitive application process. The 5-year ORC program brings on board researchers with expertise from the faculties of Engineering and Applied Health Sciences and will include clinical and epidemiological studies of health effects of turbine noise.

However, a more recent EBR dated February 15, 2013 does not cite the University of Waterloo Research Chair:

**Proponent:** K2 Wind Ontario Inc. operating as K2 Wind Ontario Limited Partnership  
100 Simcoe Street  
Suite 105  
Toronto Ontario  
Canada M5H 3G2

**EBR Registry Number:** 011-8307  
**Ministry Reference Number:**  
4850-922KFZ  
**Ministry:**  
Ministry of the Environment  
**Date Proposal loaded to the**  
**Registry:**  
February 15, 2013  
**Date Decision loaded to the**  
**Registry:**  
July 23, 2013

In December, 2010, the MOE's consultant on low frequency noise stated:

“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.”<sup>12</sup>

Dr. Bigelow agrees with the quote from the above report and notes the influence of other factors:

From: [pbigelow@uwaterloo.ca](mailto:pbigelow@uwaterloo.ca)  
To:  
CC: [carmen.krogh@gmail.com](mailto:carmen.krogh@gmail.com)  
Subject: RE: RETH: unethical research  
Date: Wed, 6 Mar 2013 20:19:09 -0000

Thanks for the quote from Brian Howe's report. I do agree that wind turbines will cause a non-trivial percentage of individuals living in areas around wind facilities to be highly annoyed. The question does remain about what are the actual percentages of those who are highly annoyed at varying distances from the wind turbines and the influence of the many other factors, such as size and operational characteristics of the turbines, that influence annoyance and other health outcomes.

A resident who had to relocate due to adverse health effects comments:

“The health segment was just a small part of their green energy research. The government has thousands of complaints and people are very clear. They are getting sick when these projects start up. Their symptoms resolve when they are away and they return when they go back into their homes.

This is not rocket science. They have treated the affected families horribly and instigated "research" that takes years leaving people hanging, some abandoning their homes and yet leaving the projects running and building even more.

There aren't very many people that trust this government anymore and for valid reason considering all they have been put through and so any government funded research is of course of concern. No one should be blaming the victims for this. The poster was displayed in a public venue and the results were clear on the ones who did participate.

The whole story needs to be told.

They need to stop the turbines and let people sleep and be able to live in their own homes in safety while they investigate the "well known and documented" emissions coming off of them.

Here are a couple of sample questions from their survey:

How satisfied are you with the way your body looks?

I feel that 'big businesses' are invading my landscape  
or

I live in a progressive community with a sustainable future  
or

I am concerned about keeping the garden/backyard tidy.”

## References

<sup>1</sup> Paller, C et al, Wind Turbine Noise, Sleep Quality, and Symptoms of Inner Ear Problems, Poster presented during the Symposium on Sustainability (Thursday, October 17, 2013)

<sup>2</sup> Martin, C., (12 February, 2009) NIMBY mentality unacceptable when it comes to green-energy projects, McGuinty says. The London Free Press.

<sup>3</sup> Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Environmental Review Tribunal Opening Statement of F. Rotter, MOE Counsel Feb 1, 2011, p. 41, l. 8

<sup>4</sup> Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Environmental Review Tribunal Transcript of Dr. D. Colby, Mar 29, 2011, p. 39, l. 11

<sup>5</sup> Case Nos.: 10-121/10-122 Erickson v. Director, Ministry of the Environment Environmental Review Tribunal Transcript of Dr. D. Colby, Mar 29, 2011, p. 49, l. 17

<sup>6</sup> Case Nos. 13-002/13-003 Alliance to Protect Prince Edward County and Prince Edward County Field Naturalists v. Director, Ministry of the Environment Environmental Review Tribunal Transcript by Dr. C. Baines, pg 8004, l. 4.

<sup>7</sup> EBR Registry Number: 011-3999, July 17, 2012, Capital Power GP Holdings Inc.

<sup>8</sup> Orangeville Banner (Nov 26, 2012) University studying local impact of wind turbines  
<http://www.orangeville.com/news-story/1482592-university-studying-local-impact-of-wind-turbines/>

<sup>9</sup> Symposia of the Ontario Research Chairs in Public Policy  
<http://www.glendon.yorku.ca/cousymposium/english/index.php>

<sup>10</sup> Symposium on Sustainability (Thursday, October 17, 2013)  
<http://www.glendon.yorku.ca/cousymposium/english/programs/sustainability/index.php>

<sup>11</sup> Council of Ontario Universities - Chairs in Environmental Science Three Chairs conduct key research in renewable energy and green chemistry and engineering <http://www.cou.on.ca/about/chairs-and-awards/chairs-in-environmental-science.aspx>

<sup>12</sup> Low frequency Noise and Infrasound Associated with Wind Turbine Generation Systems, A Literature Review, Ontario Ministry of Environment RFP December 10, 2010 [MOE consultant report]