

WCO | WIND CONCERNS ONTARIO

COMMENTS

Draft “Toolkit for Wind Turbines”

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1. INTRODUCTION

The following paper has been prepared to provide comments from Wind Concerns Ontario (WCO) on the draft “Toolkit for Wind Turbines” that was circulated for comment after the early December Communities Around Renewable Energy Projects Workshop. The Toolkit makes reference to the Ontario Wind Resistance website. WCO is a separate formal organization that has been representing communities affected by wind turbines since it was founded in 2008. Today it is a coalition of 20 community groups and hundreds of individual and family members who pay annual fees to support the activities of WCO. It is governed by volunteer Board of Directors that meets monthly and is elected at the group’s annual meeting. Organizations like Health Canada recognize WCO as a stakeholder on wind turbine issues and perhaps it should be included in future meetings of your stakeholders.

WCO’s province-wide grassroots network provides the organization with a unique perspective on the actual interactions between community organizations and wind turbine proponents. In addition to its formal members, WCO has access to a wider group of academics and technical specialists who are concerned about the effects of wind turbine projects. While it maintains a website (www.windconcernsontario.ca), its daily communication tool is through Facebook (<https://www.facebook.com/WindConcernsOntario/>) which has almost 2,000 followers. These social media tools are used to provide information on WCO and member organization activities, as well as to share validated information and developments on issues related to wind turbines. The coalition is also active on Twitter which is followed by media organizations and other stakeholder groups interested in the wind turbine issue in Ontario.

WCO is very active as an advocacy group on the behalf of communities affected by wind turbine projects. Over the past year, it provided comprehensive submissions when the Ontario government asked for input into the Large Renewable Procurement process, the review of the Technical Guide for monitoring wind turbine noise, and the Long-Term Energy Plan. WCO works cooperatively with municipal groups and other stakeholders that share our concerns to present a coordinated professional message to both the federal and provincial governments as well as members of Parliament and the Ontario Legislature.

Over the past year, WCO has partnered with the University of Waterloo and the Huron County Health Unit on a comprehensive study of wind turbine noise and community health. (The study is to build on the public health investigation initiated by the Huron County Health Unit.) As part of this relationship, WCO has worked to ensure that academics from the university have access to a complete perspective on wind turbine projects. Our experience is that the interaction between wind companies and the host communities is substantially different from the process promoted by the provincial officials and the wind industry trade association. We also found that many people affected by wind turbines are now unwilling to participate in many studies; they cooperated fully and in good faith in the past, only to be told that they are imagining the health issues that they are experiencing.

One of WCO's key roles in the proposed University of Waterloo health study is to ensure sufficient participation by the local community to deliver valid results. The reluctance to cooperate with academic studies may have affected the representative nature of people responding to your study, meaning you may not have a full perspective on the community views. The Huron County study has also been designed to ensure full participation by residents receiving benefits from the wind turbine projects but to identify them as a separate subgroup within the study as many wind turbine contracts restrict the ability of people receiving payments to comment negatively on wind turbine operations. Again, these restrictions may have coloured some of the responses that you received and reported.

Faced with a provincial government that does not show any interest in addressing these problems, Ontario community groups are also becoming an important conduit for citizen volunteers who bring a wide range of expertise to understanding the situations being experienced, and to actively challenge the frankly sloppy assessment work being done by the wind power developers and the government approval authorities. The volunteer expertise that is being applied to this issue is diverse, reflecting the variety of local conditions experienced in each community. As a result, projects are now being rejected through the appeal process before the Environmental Review Tribunal process, even though it was designed as an apparently impossible test for a successful appeal, and successfully challenged in the court system. Addressing the community concerns upfront would be more straight-forward.

While the creation of a "Toolkit" is a worthwhile objective, it needs to be aligned with the realities being experienced by the host communities if it is to be useful as a framework for assessing interactions with these communities. It is a concern to us that the work done in developing this "Toolkit" seems to have included very limited communication with Ontario communities. To understand the full impact of wind turbines on a community, the contents of the current draft suggest that the authors need to have more direct contact with the people who are being affected by wind turbines. These are the people that are coming to WCO for information and assistance and forming local support groups to deal with the problems being created.

2. CHANGING ENVIRONMENT FOR WIND TURBINES IN ONTARIO

There seems to be an undeclared assumption in the Toolkit that wind power is highly beneficial as a contributor to Ontario's energy mix and the only obstacle to complete acceptance is to find a way to persuade the host communities of the wisdom of these projects. That may have been an

understandable assumption in the early stages of Ontario's Green Energy program, but the learning from the implementation of this program makes it now highly questionable. The Toolkit needs to include recognition that the situation in Ontario related to wind turbines has changed rapidly even since the research behind it was undertaken; a large amount of new evidence to evaluate the effectiveness of that initial claim is widely available.

Over the past six years, the government claimed a number of benefits from the green energy program, including the following:

- **The investment in wind turbines allowed coal plants to be closed. Fact:** the Asthma Society this year presented a certificate to Bruce Nuclear in Kincardine recognizing the role of the refurbished nuclear facilities in allowing this change to be implemented.
- **The investment in renewable energy technology creates jobs. Fact:** Most jobs created are lower-skill, short-term construction jobs. In the 2011 report, Ontario's Auditor General warned that studies in other jurisdictions which showed two to four jobs were lost due to increased electricity costs for every job created.
- **Surplus electricity is being sold to other jurisdictions at a profit. Fact:** the IESO's reporting shows that the revenue recovered is below the rates provided for in the wind turbine contracts. Neighbouring jurisdictions are now promoting their lower electricity rates to lure Ontario businesses to relocate.

The discussions in rural Ontario about the impact of wind turbines have moved beyond these myths and are now focused on the actual experiences of people living among operating wind turbine projects.

In the late fall of 2016, the pace of change actually accelerated as the government began to respond to widespread public dissatisfaction with the effects that the previous Green Energy Plan had on the cost of electricity in the province. In this context, the unstated assumptions of the draft Toolkit seem to be out of touch with the current political realities facing the energy sector in Ontario. The following sections highlight some of the key changes that need to be reflected in the assumptions that underlie the Toolkit.

2.1. Large Scale Renewable Procurement RFP Suspended – In early October 2016, the Ontario government started to move in a new policy direction. Given the surplus of electricity generation capacity that will exist in Ontario for the next ten years, the Minister of Energy announced that it was suspending the second Large Renewable Procurement Request for Proposal Process (LRP RFP II) that was designed to seek proposals to add more renewable generation capacity (including wind) to the grid. This step was a clear demonstration of the realization that the government could not continue to add to the surplus of generation capacity as it would just result in further increases in hydro rates. The government is under pressure from a range of policy advocates and municipalities to go further and cancel the Feed-in-Tariff (FIT) 5.0 procurement and the LRP I contracts, as well as reviewing FIT contracts that have not reached commercial operation. Reducing, not expanding, generation capacity is the current focus of the government.

2.2. Ontario's Long-Term Energy Plan – Also last fall, the Ontario Ministry of Energy (MOE) initiated a review of the Long-Term Energy Plan (LTEP) for the province. While the preliminary discussion

guide suggested a business as usual plan, statements by Premier Wynne and Minister Thibeault suggested that the province is now moving in a new direction. Premier Wynne admitted that mistakes have been made and pledged that the government “is going to find more ways to lower rates and reduce the burden on consumers”.¹ In a speech to the Empire Club,² Energy Minister Thibeault acknowledged the way the electricity system has been run — with the government arbitrarily mandating how much of the supply must be from nuclear, natural gas, wind, solar and other sources — has led to “uncompetitive prices.” He also admitted that signing 20-year-contracts for renewable energy projects that specified a generation technology was “arbitrary, and led to sub-optimal siting and heightened community concern.”

The Minister then proposed a new approach for the government in procuring electricity, getting the best deals on whatever sources of clean power are cheapest by calling for bids when more supply is needed. He wants the process to source new electricity capacity to be “technology agnostic,” and focus more on the outcome than on the way the power would be generated. He issued a challenge to the industry to rethink how the province’s electricity system works and find innovative ways to trim costs for people struggling with hydro prices.

2.3. Contribution to Carbon Reduction Targets – Contrary to popular myth, generation of electricity wind turbines (and solar) is actually working *against* success in obtaining Ontario’s carbon emissions targets. Once Ontario was able to completely retire the coal-fired plants when the refurbishment of the Bruce Nuclear plants was completed, the province’s generation system was largely free of carbon emissions as it is largely based on hydroelectric and nuclear generation.

In this context, the Ontario Society of Professional Engineers (OSPE) notes that adding more wind and solar capacity to the grid will actually *increase carbon emissions*.³ This is the case as wind and solar are intermittent sources of electrical generation that need flexible back up generation for periods when the wind and solar resources are not available. Storage at the scale required to be effective is prohibitively expensive and natural gas generation is providing this backup. The OSPE estimates that Ontario generates electricity at less than 40 grams of CO₂ per kilowatt hour. Wind and solar, because of the need for gas plant back-up generate electricity at about 200 grams of CO₂ per kilowatt hour. On this basis, adding more wind and solar capacity to the grid will increase CO₂ emissions.

The impact of wind (and solar) on the cost of electricity in Ontario is driving users away to other carbon emitting fuels. Electricity in Ontario is already a “green” resource that should be a useful tool in reducing carbon emissions. Instead, the high costs of the government’s renewable energy

¹ Benzie, Robert, Premier Wynne Call High Electricity Prices her mis Mistake, Toronto Star, Nov 19, 2016, <https://www.thestar.com/news/canada/2016/11/19/premier-wynne-calls-high-electricity-prices-her-mistake.html>

² Keith Leslie, Ontario Considers Offering Electricity Consumers New More Flexible Rate Plans, Global TV News, Nov 28/16, <http://globalnews.ca/news/3093380/ontario-considers-offering-electricity-consumers-new-more-flexible-rate-plans/>

³ Ontario Society of Professional Engineers, Ontario Electricity Dilemma, April 2015, page 15. <https://www.ospe.on.ca/public/documents/presentations/ontarios-electricity-dilemma.pdf>

strategy are actually driving electricity users away from electricity. In urban centres, electric heat is not affordable at current prices and home owners are switching to natural gas to heat their homes. In rural communities where natural gas is not available, people are returning to wood heat for their homes.

Bottom line is that if Ontario is going to achieve its carbon reduction targets, it needs to reverse the previous policies focused on wind energy as it is not contributing to the reduction targets and the resulting increases in electricity rates are forcing electricity users to find carbon emitting alternatives.

2.4. Usable Output from Wind Turbines – The problems with aligning the intermittent output from wind turbines with the nature of electricity demand in Ontario have been well documented. Peak output from wind turbines is in the spring and fall when demand for electricity is low while the peak demand for electricity is in the winter and summer months when the wind resource is not available. Similarly, the output from wind turbines is highest in the evening and at night when the demand for electricity falls. An estimate of the extent of the synchronization problem with the output from wind turbines and Ontario’s electrical requirement was provided by the Strategic Policy Economics study of carbon emissions and electrical generation completed as input to the Ontario Long Term Energy Plan. This study indicates that over 70% of wind generation does not benefit Ontario’s supply capability.⁴ Wind generation will not match demand in the IESO’s Ontario Planning Outlook projections as 50% of the forecasted production are expected to be surplus. On this basis, this report recommends phasing out wind generation as part of the LTEP.

This mismatch between wind power and demand is a key driver of increased electricity rates being seen in Ontario. The FIT contracts for wind turbines given them “First to the Grid” access, meaning that the electrical system has to accept this output whether it is needed or not and then dispose of it either through sales to other jurisdictions at bargain rates or to pay the hydroelectric generators and nuclear plants not to produce electricity. The costs associated with disposing of this surplus electricity, estimated at 17.6 cents per kilowatt hour for the first six months of 2016 are even greater than the premium rates in the FIT contracts. These add-on costs suggest that the Ontario government can negotiate expensive buy-out the existing FIT contracts and still reduce hydro rates by eliminate the costs of associated with the disposal of the surplus capacity.

Clearly, the new government direction, plus other reports and developments, have changed the community dialogue around wind turbines. The need for more wind turbine capacity and wind power’s role in reducing carbon emissions is under question. An Environmental Review Tribunal (ERT) hearing on the White Pines project is scheduled for later in January to receive testimony about the actual need for the project to proceed in the context of Ontario’s surplus power capacity as part of its assessment of the project. The real debate is on how far Ontario should go in canceling wind turbine contracts. To be

⁴Brouillette, Marc, Strategic Policy Economics, Ontario's Emissions and the Long-Term Energy Plan, Phase 2, pg. 20. http://www.strapolec.ca/uploads/Ontarios_Emissions_and_the_LTEP_-_Ph_2_Report_Final_December_2016.pdf

relevant in this context, the Toolkit should be focussed on developing energy initiatives that reduce the cost of electricity in Ontario while reducing carbon emissions. It is not clear that wind turbines have a role in meeting this objective.

3. SITE PREFERENCES AND PROCEDURAL JUSTICE

The actual separation between wind turbines and the nearby residents forms the core of most discussions between local residents and wind turbine proponents. In 2009, Ontario initially proposed a setback of 1 kilometre between wind turbines and residents. In responses to the draft regulations the Canadian Wind Energy Association (CanWEA) intervened suggesting a set-back of 550 metres. The concern was that the survey grid used in rural Ontario in the mid-1800s created lot sizes and a residential pattern that made any setback larger unworkable for the industry. Noise modeling was then used to claim that this was the distance needed to ensure that nearby residents are not exposed to audible noise emissions from wind turbines over 40 dB(A). The experiences of residents living among the wind turbines in early projects have shown that this limit is not sufficient, and this learning has been shared across rural Ontario. Despite these learnings, proponents of wind turbine projects continue to hide behind the Ontario setbacks and offer no additional information based on their experience in other projects.

The concerns reported are not about the visual impact of the projects on the rural landscape, but rather the noise emissions that these turbine projects produce and the range of health effects being experienced as a result. This key driver of community response is largely ignored in your draft for the Toolkit. More concerning is the use of the comment from "Graeme" in Ontario on page 8 that "Oh Mary said that John up the road got headaches because of wind turbines" suggests that neither Graeme nor the authors have a full understanding of the real problems being created by wind turbines. The subsequent comment about research suggests a rather narrow reading of the recent literature around wind turbines and health issues. Inclusion of these comments in particular will almost guarantee the rejection of the Toolkit as a guide to wind turbine discussions as recent research studies completed by independent agencies present a different perspective suggesting that "Mary's" complaints are not trivial or unique but rather indicative of a serious problem.

Even the Ontario Minister of Energy acknowledges the current process is not working. In a speech to the Empire Club on November 28, Minister of Energy Glenn Thibeault said that signing 20-year-contracts for renewable energy projects that specified a generation technology was "arbitrary, and led to *sub-optimal siting* and heightened community concern."

If the Toolkit is to be a credible tool to facilitate the discussion of wind turbine siting within a community, it needs to be more reflective of the rapidly evolving understanding of this industrial equipment is having on the adjacent population. The wind industry position is that the Ontario regulations, that they helped write, provide sufficient protection. The experiences of residents of rural Ontario and the thousands of complaints filed with the government provide hard evidence that this is not correct. This situation underlies all community responses to new wind turbine proposals.

In some cases, the problems are so serious that medical doctors are recommending that affected people move out of their homes. When noise emissions are sufficient to force people to move out of a home that they can only sell at a loss, if at all, that is confirmation that the current Ontario setbacks are not sufficient to protect health. Though not mentioned in the draft Toolkit, a family living close to a Wainfleet wind turbine in the project studied as part of this project is one example of residents being forced to relocate. These impacts are prompting serious independent investigations of the actual environmental issues created by large turbine projects.

The bibliography provided to support the conclusions in the Toolkit is limited and extremely weak. It is astonishing that the paper by Fast et al, "Lessons learned from Ontario wind energy disputes,"⁵ which catalogued the difficulties with the implementation of wind power in Ontario, and confirmed that government ignored residents concerns about health and other issues, was not referenced at all, yet one of the Toolkit authors is a named contributor to that paper.

The understanding of the effect of wind turbines on the host community is rapidly evolving with a number of critical papers being published in the last two years. In October 2016, audiologist Jerry Punch and acoustician Rick James published a paper provides a good historical overview of various conflicting studies of wind turbine noise. Their conclusion was that the reviewed evidence "overwhelmingly supports the notion that acoustic emissions from [wind turbines are] a leading cause of [adverse health effects] in a substantial segment of the population".⁶

Summarized below are some additional examples of studies that should be acknowledged in your bibliography.

3.1. Health Canada – The "preliminary" findings from Health Canada's study between 2012 and 2014 that were released in November 2014 reported two contradictory findings — first, there are no health effects linked to wind turbines and then, yes, there *are* health effects related to wind turbines. The design of this study was criticized by epidemiologists and health professionals before the project began. A review of the survey instrument design after the project revealed that the finding of "no problems" was based on questioning respondents about a narrowly-defined 30-day timeframe during the late summer — in other words, participants were questioned about symptoms and events during a time when wind in Ontario is low and turbine noise emissions would be less. Responses to other questions by the same participants, that covered the whole year, showed that problems existed. This second result was confirmed when physical samples from the people reporting complaints showed the physical indicators of stress.

Data specifically provided directly to Wind Concerns Ontario by Health Canada in a stakeholder meeting indicate that respondents to this study reported that wind turbine noise was worse than

⁵ Fast, Stewart, et al, Lessons learned from Ontario wind energy disputes, Nature Energy, January 25, 2015. http://www.nature.com/articles/nenergy201528?WT.feed_name=subjects_wind-energy

⁶ Punch, Jerry & James, Richard, Wind Turbine Noise and Human Health: A Four-Decade History of Evidence that Wind Turbines Pose Risks, Hearing Health and Technology Matters, Oct 20, 2016, <http://hearinghealthmatters.org/journalresearchposters/files/2016/09/16-10-21-Wind-Turbine-Noise-Post-Publication-Manuscript-HHTM-Punch-James.pdf>

the road, rail and airport noise that formed the basis of the World Health Organization's night-time noise standards on which the current Ontario setbacks are based. The study showed that problems begin at 35 dBA which provides research data confirming that Ontario's noise standards based on 40 dBA are insufficient to protect human health. These findings provide validation to the complaints from 'Mary' and other residents in existing wind turbine projects.

3.2. Council of Canadian Academies – In April 2015, an independent expert panel, commissioned by Health Canada, released a comprehensive literature review that found there is sufficient evidence of a causal relationship between exposure to wind turbine noise and "annoyance." This report uses "annoyance" correctly in this context as a medical term meaning a serious mental state capable of degrading health. This led the panel to conclude that there was evidence of an adverse health effect. The report also found limited evidence to establish a causal relationship between exposure to wind turbine noise and sleep disturbance.

3.3. Cape Bridgewater, Australia – The Health Canada study was never designed to find a link between wind turbines and health issues; however, a study of the Cape Bridgewater Wind project in Australia was designed to achieve that. Financed by a wind power producer trying to understand ongoing community complaints about their project, the study asked residents to track the specific times when their symptoms occurred, lessened and grew worse. They were not logging audible noise but rather the physical pulsing sensations in their bodies that associated with low frequency noise and infrasound. These independently logged observations were then matched against the operating records for the wind turbines. This analysis pointed to specific wind turbine operations that were linked to residents' health complaints. The full report of this study was released in late 2015⁷ with the findings subsequently published in a peer-reviewed journal.⁸

The findings of this study that resident complaints can be independently linked to wind turbine operations is a critical step forward as it provided scientific backing for the widespread complaints about wind turbine noise being reported in Ontario. The study design approved by the wind project proponent limited the study to six homes and precluded any medical follow up on the noise impact on residents' health. The conclusion in the Cape Bridgewater study suggest important areas for further properly designed research in Ontario and is the foundation of the design of the proposed University of Waterloo study of wind turbine noise.

Wind turbine noise is a new field for acousticians and the testing of various approaches to assessing wind turbine noise emissions reported in this study is also an important contribution to this new area of study.

⁷ Steven Cooper, Cape Bridgewater Acoustics Study, www.pacifichydro.com.au/english/our-communities/communities/cape-bridgewater-acoustic-study-report/

⁸ Soundscape of a wind farm – The Cape Bridgewater experience, Proceedings of Meetings on Acoustics, Acoustical Society of America, Vol. 25 040004 (2016).

3.4. Enforcement of Noise Standards – All wind turbine projects are approved based on computerized noise modeling that demonstrates that the audible noise levels experienced at nearby residential buildings will not exceed the province’s (inadequate) standards. These models simplify the environment around wind turbines (i.e., no consideration is given to topography), assumes vegetative cover on the ground will absorb a portion of the noise (i.e., no consideration for bare frozen ground in the winter) and the process does not consider any error estimates that are normal for other statistical models. When residents are complaining about elevated levels of audible noise coming from the turbines they are essentially confirming that these computer noise models do not work.

Under normal expectations of procedural justice, one would expect that a government agency would be responsible for enforcing these approval conditions. Instead, the MOECC is dependent on the wind company to enforce these standards. Project operators are given 18 months to prove that they are operating in compliance with the approval limits. The testing protocol established by the MOECC is extremely complex making it virtually impossible to gather enough data to prove compliance. For example, for a project that began operation in 2010, acoustic consultants working on the compliance report still have not been able to meet the defined MOECC requirements for the noise compliance.

While the MOECC District staff is aware of noise problems, they seem unable to fulfil their mandated oversight responsibilities and to bring the projects into compliance. They are short staffed and not provided with appropriate equipment or training to complete the task. For example, the microphones used by the MOECC cannot be used when temperatures are below 0°C. Many complaints are received about elevated noise levels when bare fields are frozen but the MOECC does not have the equipment needed to check for compliance in these situations.

3.5. Community Noise Testing – When it became clear that the MOECC was not going to enforce the approval conditions or effectively respond to residents’ complaints, a number of community groups and municipalities have initiated their own testing programs. Based on the current understanding of wind turbine noise, these testing programs are more comprehensive than those set out by the MOECC as they cover the full range of noise emissions including audible noise, low frequency noise and infrasound produced by wind turbines. This work has been the subject of presentations at a number of acoustics conferences and a peer-reviewed article,⁹ and identifies infrasound noise levels inside homes near wind turbines with frequencies below 1.0 Hz that related to the frequency of the turbine blades passing the tower. These observations are missed if equipment limited to measure noise above 20 Hz is used.

For your Toolkit to be accepted by communities, it must include discussion of the full range of noise emissions from wind turbines and procedures used to ensure that wind turbine projects at least operate within their approved limits. If you are interested in understanding this issue and

⁹ Kevin Dooley and Andy Metelka, Acoustic interaction as a primary cause of infrasonic spinning mode generation and propagation from wind turbines, Proceedings of Meetings on Acoustics, Acoustical Society of America, Vol. 20 040002 (2014).

current findings in more detail, we can provide you with names of appropriate municipal and technical measurement experts to contact.

- 3.6. **Canadian Centre for Occupational Health and Safety** – Exposure of workers to vibrations has been a concern for occupational health; the federal government’s Centre for Occupational Health and Safety has published a fact sheet on vibration and health on its website.¹⁰ This fact sheet notes that exposure to vibrations in the 0.1 to 0.6 Hz frequency range in sea, air or land vehicles cause motion sickness. After extended exposure, whole-body vibration can affect the entire body and result in a number of health disorders. Whole-body vibration is also linked to fatigue, insomnia, stomach problems, headache and "shakiness" which are common symptoms being reported by some people who are living among wind turbine projects.

As the current Ontario regulations only deal with audible noise emissions from wind turbines, there is currently *no protection* from this threat to health. Even though the Canadian government identified infrasound as an Occupational Health and Safety issue, there are no setback requirements from work locations, whether they are agricultural barns or more traditional work locations. This information on exposure to whole body vibrations also applies to residential locations and on this basis, communities in rural Ontario are looking for guidelines in any Toolkit that you create to address this issue.

- 3.7. **Polish Institute of Public Health** – In August 2016, the Polish Institute of Public Health issued a position paper¹¹ on health issues related to wind turbines. The Institute appears to play a similar role to Ontario’s Medical Officers of Health in that it is an independent body that provides risk assessments and advice related to environmental health issues. The paper criticizes the current regulations on siting wind turbines as inadequate as, similar to the situation in Ontario; they only focus on simplistic measures of audible noise. A series of other risks are identified including characteristics of wind turbine noise (modulation/impulsive/tonal character), shadow flicker, ice throw, impact of multiple turbines on noise emissions and the risk of turbine tower/blade failure. The distance needed to protect exposed populations from each of these risks is calculated separately. The conclusion is that the wind turbines should be located 2 kilometers from buildings as a minimum. Again, this is another government agency that has concluded the setbacks established in Ontario are not enough to protect human health.

If a Toolkit is to be accepted by community as a starting point for discussions about wind turbine siting, it needs to reflect this type of detailed insights into the full range of impacts of wind turbines on adjacent activities.

¹⁰ Canadian Centre for Occupational Health and Safety, Fact Sheet: Vibration and Health, https://www.ccohs.ca/oshanswers/phys.agents/vibration/vibration_effects.html.

¹¹ National Institute of Public Health (Poland), Position of National Institute of Public Health on Wind Farms, <http://www.pzh.gov.pl/en/position-of-the-national-institute-of-public-health-national-institute-of-hygiene-on-wind-farms/>, August 3, 2016

3.8. World Health Organization – In 2016, the World Health Organization announced that a review of wind turbine noise standards was underway. Previously, wind turbines were assessed under the WHO’s Night Time Noise standard which set a threshold of 40 dBA. Based on growing evidence, including the input from the Health Canada study, that wind turbine noise is different from the road, rail and airport noise that the standard was designed to address, the development of a separate standard for wind turbine noise was announced. While this regulatory assessment is not complete, the results should have an immediate impact on Ontario where wind turbine noise levels are anchored in this assessment.

3.9. Huron County Health Unit Investigation – In 2015 and early 2016, a series of new wind turbine projects began operation in Huron County increasing the number of wind turbines operating in the County to 330. Complaints to municipal and Health Board officials escalated sharply largely due to the increase in the number of affected residential locations to 4,640. The Medical Officer of Health had been monitoring the situation for some time and decided in March 2016 that there were sufficient clusters of complaints to warrant an investigation of wind turbine noise and health under Ontario’s Health Promotion and Protection Act. At the same time, the University of Waterloo study was in development stages and WCO reached out to the Health Unit; the study is now proceeding on the basis of a partnership between the Health Unit and the University of Waterloo. The on-line survey tools have been peer-reviewed (including reviewers from Health Canada) and the recruitment of participants is expected to start in February 2017.

The preceding section on turbine siting points to a broad range of evidence that indicates that the setbacks established by the Ontario government are not sufficient to protect human health. This information is fully understood by most communities being asked to host wind turbine projects and to be effective this information needs to be reflected in the Toolkit rather than simply rejected as it is in the current draft. Separation from residences is a key requirement for siting wind turbines in rural southern Ontario as documentation related to the approval process indicated that the wind industry understood that a setback much above 550 metres would prevent wind turbine projects being developed in most areas of rural Ontario due to the basic settlement patterns.

4. WIDER ENVIRONMENTAL IMPACT

In addition to the noise and health issues, acceptance has grown over the past year that more rigorous assessment is needed to identify the destructive impact of the poorly sited and operated wind turbines on endangered species such as migrating birds and bat populations. After a two-year battle at the Environmental Review Tribunal and two levels of the Ontario Courts, the Ostrander Point project in Prince Edward County was cancelled due to the project’s impact on endangered Blandings Turtle habitat. In this situation, research and expertise recruited by the local citizen naturalist groups pointed out numerous flaws in the impact analysis conducted by the project proponent and various government agencies whose mandate is protection of the environment. A lawyer acting for the Ministry of the Environment and Climate Change (MOECC) had suggested that the positive contribution of wind turbines in addressing climate change overrode concerns about the impact on endangered species. In

their ruling, the ERT indicated that this was not the case.¹² Consideration must still be given to endangered species and balance must be achieved.

In addition, the White Pines project in Prince Edward County and the Fairview projects in Clearview Township near Collingwood have also received adverse rulings and are now in the remediation hearing stage dealing with the impact on endangered Little Brown Bats. As geographers, one would expect that the Toolkit authors would also be concerned about the wider impact of a proposed technology on the natural environment and the gaps in the assessments undertaken by the proponents, and the incomplete reviews undertaken by the designated authorities in the environment and natural resources ministries.

A recent report from the American Bird Conservancy recommended U.S. Fish and Wildlife rules about separation of wind turbines from the Great Lakes (already more stringent than rules in Ontario) be increased to 16 km setbacks.¹³ This is important from the Ontario perspective as so many turbine projects have been built or are proposed in the path of major bird migration routes along the Great Lakes despite Canada's international treaty obligations to protect migrating birds. In fact, the wind turbine project located on Wolfe Island was identified by United States bird migration expert in his Environmental Review Tribunal testimony as the second worst turbine project for bird kills in North America due to its position in the path of migrating birds.

In rural communities of Chatham-Kent, wind turbine projects are reported to be causing problems with well water contamination due to vibration. This is not a unique situation but to this point, these factors have not been considered in assessing wind turbine projects.

The Toolkit needs to be amended to add process that considers the impact of wind turbine projects on the wider environment.

5. FINANCIAL BENEFITS AND DISTRIBUTIVE JUSTICE

One of the Toolkit's going forward principles suggests that a better distribution of the financial benefits would address key concerns. The data presented in the current draft do not reflect the full reality of costs and benefits of wind turbine projects currently being developed in Ontario.

5.1. Scale of Wind Turbines and Wind Turbine Projects – The provincial direction on wind turbine projects has changed considerably since the three wind turbine projects selected as the focus of the study were developed in Ontario. The differences are very significant, meaning that the findings of the study behind the Toolkit do not really apply to the situation going forward with projects currently involved in the Renewable Energy Approval process, and those that would likely be proposed if Ontario restarts the suspended RFP process.

¹² Environmental Review Tribunal, Prince Edward County Field Naturalists v. Ontario (Environment and Climate Change), Case # 13-003, June 6, 2016, page 48.

¹³ Michael Hutchins, American Bird Conservancy, Wind Turbines On The Great Lakes Threaten Migratory Birds, August 5, 2016. <https://abcbirds.org/article/wind-turbines-on-the-great-lakes-threaten-migratory-birds/>

The number of turbines involved in these projects is very small compared with current projects. The projects awarded contracts in March 2016 were in the 50 MW to 100 MW range suggesting that larger projects are necessary to achieve approval under the new RFP bidding process which had an average contract price of 8.59 cents per kilowatt.

Most recent projects built in Ontario also use the much larger 3.0 MW turbines. While power developers claim newer turbines are quieter in terms of audible noise, the larger blade sizes actually produce higher levels of low frequency noise and infrasound, resulting in more immediate and severe complaints about health issues. Projects currently involved in the REA process are using the even larger 4.0 MW turbines.

Figure 1: Details for Studied Projects

Project	Turbine Size	# of Turbines	Capacity	Annual Revenue ¹⁴
Wainfleet	1.8 MW	5	9 MW	\$3,086,586
Gunn’s Hill	1.8 MW	10	25 MW	\$8,573,850
Adelaide	2.2 MW	18	40 MW	\$13,718,160

5.2. Payments to Leaseholders – By providing the annual income generated by each of the projects under study, Figure 1 shows estimates of the total income that is available for distribution between the project proponent and the various stakeholders. This is key information that provides the basis to evaluate the current sharing arrangements of the financial benefits of the project.

The draft Toolkit references payments to leaseholders of \$8,000 per annum or about 1.3% of the total revenue per turbine of \$617,300. The specific lease payment varies from project to project but payments in the range of \$20,000 to \$30,000 have been reported for most projects over the past five years or about 3.2% to 4.9% of annual revenue per turbine. A more recent project in Wainfleet, West Lincoln and Haldimand offered over \$40,000 per site. Even at the higher rates, the leaseholder is not being paid a significant share of the total annual revenue from the project. With the leases requiring the landowner to surrender complete control of the land to the wind proponent while also exposing the landowner to substantial liabilities at the end of the contract term, even the larger payments are not sufficient to offset the impact on the landowner.

5.3. Indigenous Community Involvement – While though the Aamjiwnaang First Nation community is a 25% participant in Suncor’s Adelaide project, the Toolkit authors did not mention this type of community involvement which is promoted by the Ontario government as a core objective of the Green Energy Program. In Dutton-Dunwich, the Invenergy project proposed for that community was given more favourable treatment because of indigenous community participation. This

¹⁴ Based on nameplate capacity producing at 29% annual actual output and FIT contract price of 13.5 cents per kilowatt hour.

treatment was granted even though the participating First Nations were located near the Ontario-Manitoba border; the fact is, the project was opposed by both the local Indigenous community and the wider local community in a municipally-sponsored referendum. Essentially this policy is using funds from electricity consumers into support Indigenous community programs. The programs are probably warranted but should be funded out of the Ministry responsible for Indigenous Affairs.

- 5.4. **Municipal Property Tax Revenue** – The property tax revenue being provided to local municipalities is also limited by provincial regulation. In most cases, each turbine, which is highly profitable for the project owner, is only subject to the property taxes that are equivalent to the amount paid for a small bungalow. This is a concern for municipalities that are being asked at the same time to provide urban-type fire suppression and other services to support these projects. If the Toolkit is going to address distribution of the financial benefits of wind turbine revenues, municipal property tax revenues are a key issue that should be included. The Toolkit should be addressing the cost of servicing these projects compared with the property tax revenue that they generate.
- 5.5. **Property Values** – The impact of a wind turbine project on adjoining property values is another area where the costs of a wind turbine project are not being borne by the project. In the first wind projects in Ontario, the proponents made offers to purchase adjacent properties where people were reporting health issues. The power developers did not admit liability but claimed they would re-market the properties they had bought. This practice ended when the companies discovered what the local property owners knew: they could not resell the properties without taking a substantial loss. A good example is the 2007 Ripley project where Suncor in partnership with the Spanish firm, Acciona, bought a number of farm properties whose residents were forced to move by the project. Since that time, wind projects depend on their ability to impose their emissions on neighbouring properties without consent, and without providing appropriate compensation. This issue needs to be addressed as part of the discussion of Distributive Justice if the Toolkit is to be credible. As the impact is substantial, the types of compensation involved needs to go well beyond a few thousand dollars annually or planting a few trees in an attempt to obscure the presence of the turbines.

By ignoring realistic compensation for residents of neighbouring properties, the Toolkit ignores important ethical issues: it implicitly supports allowing people to be exposed to harmful noise emissions from wind turbines. The research may not yet be conclusive but on the basis of the precautionary principle, by excluding a need to provide compensation for people who can demonstrate medical issues related to the wind turbine operations, the Toolkit crosses an important ethical line by suggesting, in effect, that people should continue to be exposed to conditions that can contribute to health issues. The precautionary principle is widely used in regulatory contexts. In the case of automobile safety, recalls are initiated where a small number of problems are sufficient for an order to fix all similar cars. When one takes one's car to the dealership in response, there is no need to prove the risk actually exists in each car — rather, the problem is fixed. There are sufficient people with medically confirmed health issues related to

wind turbines to apply the same principle to people living in the host communities by once again offering to purchase properties from people adversely affected by the project.

5.6. Other Municipal Property Tax Revenue – Municipal property tax revenues are based on the assessed value of the land and buildings in a community. When a wind turbine project is placed in a community and depresses land values, this in turn lower property tax revenue from these affected properties. This revenue must be made up by increasing the tax burden on other properties in the community. The size of this impact will depend on the nature of development in the host community and specific location selected for the project. There are numerous examples across Ontario where turbine projects have been sited with no consideration for their wider economic impact. For example, the Canadian Auto Workers (now Unifor) turbine in Port Elgin was located immediately adjacent to a subdivision under development, effectively blocking the sale of these properties and the potential increase in property taxes to Saugeen Shores. The draft Toolkit does not consider this impact on municipal finances. To be useful, it needs to provide a means of evaluating the impact of the project on the municipal property tax revenues from the surrounding area.

5.7. Community Funding – Equally controversial are payments made as “community benefit” funds to the local municipality. The situation varies from municipality to municipality but the amounts generally range to about 0.5% of total annual revenue. The proposal is generally presented as a total 20-year amount and frequently contains restrictive conditions on municipal activities and how the funds are to be used. In December, 2016 the Municipality of Huron East repealed its support for the 2014 “Unwilling Host” resolution as condition to receiving community funding from the local wind turbine project. The ethics of this transaction are interesting as it is not clear how this payment in exchange for an action differs from a payment from a local developer for favourable zoning changes to accommodate a proposed retail plaza.

If it does not include inappropriate restrictions, these payments can be seen as compensation for lost property tax revenue caused by the wind turbines. The experience of Southgate Township indicated that wind companies have substantial flexibility in determining the amount of these payments. In 2015, when the Township rejected in the initial Community Fund offer, Samsung came back with a substantial increase in the proposed amount.

To be useful in these discussions, the Toolkit should provide some processes for evaluating whether or not the community funding on offer will actually provide a net benefit to the municipality.

5.8. Energy Poverty – The impact of these projects on energy costs in Ontario raise issues of Distributive Justice for seniors and other low income families across the province who cannot afford the increases in electricity costs. These increases are related to premium costs included in the FIT contracts and upgrading the electrical grid to support transmission of this intermittent power from rural areas to urban centres. Further, disposing of the surplus electricity that the government is committed to purchase under contract, even though it is not required in a situation of falling demand, is an even larger cost issue.

These payments placed social service agencies under strain with the executive director of United Way of Bruce-Grey reporting said that Ontario’s electricity bills were the direct cause for more

than 70% of the aid provided to clients in early 2016.^{15, 16} The executive director said this situation was worsening and could not continue.

The Ontario Association of Food Banks issued a report¹⁷ outlining their perspective from the front lines of the problem. They report that the rapidly rising cost of hydro is a special concern for low-income Ontarians, noting that rates have risen over 100% in the past 10 years and “show no sign of relief”. They report that hydro rates have increased at 3.5 times the rate of inflation for peak periods and 8 times for off-peak periods. The result has been 60,000 homes being disconnected last year for non-payment of bills.

The relief provided for low income families is seen as a “drop in the bucket”. The programs are not accessible for many families that need assistance and the \$30 to \$50 per month is not sufficient to ease the burden on struggling families. The \$130 annual HST rebate proposed to start in January is similarly seen as inadequate to help families with a \$300 to \$700 monthly hydro bill.

As Ontario is forecast to have a surplus of power for the next 10 years, the cost of generating surplus electricity will continue to be an issue even if the bidding process lowers the base rates paid for power generated. Premier Wynne has admitted that these decisions were a mistake and vows to take action to address them; the proposed Toolkit should also deal with this issue.

5.9 Sales of Wind Projects – The Toolkit also does not include references to the sales of wind project once developed, even though Suncor announced this step for all its Ontario projects, including the Adelaide-Metcalf project, which was studied as a project for the Toolkit.¹⁸ Suncor is not unique in taking this step with Korean consortium Samsung selling its share in the massive K2 project in Huron County and U.S.-based Invenergy selling its Kent Breeze project in Chatham-Kent. Many of these sales have taken place despite the companies’ statements about long term commitments to the host communities or the Ontario government in the case of Samsung. This trend suggests that wind projects may be highly profitable in the development phase and with risks increasing during the operating phase. This issue should be worth exploring in the Toolkit in greater detail given the long-term impact on the community and the large liabilities at the end of the project’s life.

The preceding section shows that Ontario’s FIT program has created a large pool of revenue for wind turbine proponents and highlights how very few stakeholders affected by the project actually benefit from this program. A large number of stakeholders face the negative effects of the wind turbine project but receive no compensation for these impacts. The impact on municipal revenues also needs

¹⁵ Owen Sound Sun-Times, Rural Ontario in Crisis due to high Hydro Rates, July 29, 2016
<http://www.owensoundsuntimes.com/2016/07/29/rural-ontario-in-crisis-due-to-high-hydro-rates-local-united-way-head-says>

¹⁶ United Way of Bruce-Grey, Utility Assistance Report, June 2016, <http://unitedwayofbrucegrey.com/wp-content/uploads/2016/08/Bruce-Grey-Utility-Assistance-report-2015-2016-web.pdf>

¹⁷ Ontario Association of Food Banks, Hunger Report 2016, December, 2016, <https://oafb.ca/wp-content/uploads/2016/11/Hunger-Report-Digital.pdf>

¹⁸ Renewables, Suncor Starts Ontario Wind Sale, Nov. 3, 2016, <http://renews.biz/104801/suncor-starts-ontario-wind-sale/>

consideration. Finally, the high electricity prices that have resulted from the Green Energy program are creating significant problems with energy poverty in Ontario.

In its discussion of the financial benefits and distributive justice, the draft Toolkit is very narrow in its focus and it really does not address the real issues of adequately compensating the groups that have been identified. The government never did a cost-benefit analysis on the Green Energy program. The preceding discussion of distribution justice suggests that if a proper analysis was done, the cost of addressing these impacts will show that wind power is not a viable economic option for meeting the province's electricity requirements. The impact of these projects on the host community and electricity users in the province at large is just too broad. In essence, Ontario's FIT program has become a very profitable source of revenue for proponents who are increasingly off-shore investors.

6. ROLE OF MUNICIPALITIES

Despite indications that the study involved discussions with municipal officials, the Toolkit does not discuss any actions taken by municipalities to address their residents' concerns about wind turbine projects. Municipalities have the central role in planning for and regulating general land use development within their municipal boundaries; however, their planning authorities relative to wind turbine projects were overridden by the Green Energy Act. The Act did not change various municipal authorities under the Municipal Act to regulate noise as a public nuisance and to take steps to protect the health and wellbeing of its residents.

Though not mentioned in the Toolkit, the Township of Wainfleet was a municipal leader in addressing resident concerns about the wind turbine project that was studied. Based on their Municipal Act responsibilities for the 'health, safety and well-being of persons'¹⁹, the township enacted a municipal by-law that established a 2-kilometer setback from homes in Wainfleet. Even though this by-law is consistent with the emerging consensus on the minimums required to protect residents from low frequency and infrasound, the wind company challenged this by-law in court. Since the science to support this position was not available at that time, the court found against the municipality. Suncor responded in a similar manner to a by-law initiative Plympton-Wyoming to regulate low frequency noise and infrasound from the Cedar Point project that in municipality.

Municipalities both independently or as part of groups such as the Multi-Municipal Wind Turbine Working Group (primarily Bruce and Grey Municipalities) are meeting on a regular basis to exchange information and to coordinate activities relative to wind turbine project proposed or active in their communities. The Township of Wainfleet organized a meeting of municipal officials from across the province and an executive committee of that group have continued to meet exchange information and lobby provincial government.

The Toolkit makes reference to the "Unwilling Host" resolutions that were approved in response to Premier Wynne's statements in her first Throne Speech that the government was looking for municipalities who were willing to host these projects. In 2016 municipal governments were active

¹⁹ Municipal Act, 2001, S.O. 2001, c. 25, Section 11(2)(6), <https://www.ontario.ca/laws/statute/01m25>.

developing several resolutions concerning energy policy in Ontario including resolutions calling for Municipal Support to be a mandatory requirement of any future wind turbine contract offers. This received widespread support with formal resolutions from 116 municipalities— more than 25% of Ontario municipalities. Copies of the resolutions were provided to the IESO and the Minister of Energy. The size and geographic diversity of the municipalities supporting this position indicates that concerns with the government’s placement of energy facilities extends well beyond rural Ontario with the Cities of Ottawa and Hamilton also adding their support. As this feedback is being provided to geographers, a map, as well as a list of these municipalities is included in Appendix 1.

As local citizens are looking to their municipal governments to act on their behalf, it is clear that the role of municipalities in the wind turbine process needs further investigation and elaboration in the Toolkit. Municipalities have broad experience in ensuring that proper evaluation of projects proposed for their area takes place. Returning this role to the municipalities would be an important step forward in addressing the problems created when they were removed.

7. COMMUNITY PARTICIPATION STRUCTURES

A core principle of the Toolkit is that broader community participation will strengthen acceptance of wind turbines. In Ontario, there are examples of projects that have paid lip service the concept of a community project but when you look at the actual structure of the organization, it has little or nothing to do with the community affected by the project.

The Roubos wind project in the western part of the Township of Mapleton is a good example. Originally it was granted a FIT contract as a one-turbine project proposed by one local landowner. It was approved based on a project submission that only considered the impact on the single property on which the turbine was located even though the requirements for the noise study confirmed that the impact was larger. Subsequently the Ontario Power Authority, in a move that was never publicly explained, canceled the FIT contract for the project. In June 2016, the project resurfaced as a “community project.” The original proponent is still the primary owner but a community energy cooperative based in Kitchener-Waterloo now owns a portion. No additional participation from the rural community of Mapleton is involved in the project so the “community structure” created to involve outside investors will have done nothing to increase support in actual host community.

The situation is very similar with the Gunn’s Hill Project in East Oxford that is one of the three projects involved in this study behind the Toolkit. The people in the area have never supported the project and this situation was confirmed by the results of the study. In fact, the community group raised large sums of after-tax dollars to mount an appeal of the project in front of the Environmental Review Tribunal, as is their right.

When the project ran into financing difficulty, the “community” structure discussed in the Toolkit was created. This group *does not* include significant community participation. The members of the so-called community alliance are outside investors, the staff of ProWind (the project developer) and representatives of a Toronto-based environmental organization. The sole local, who was named as Chair

of the community organization, is now president of the wind development company, which is itself a Canadian offshoot of a corporation in Germany.

It is odd to suggest that this outside group hiding behind the façade of a community organization, will change local population's perception of the project. The real situation is confirmed by the survey results which indicate that the project, even in its new format, does not have community support. Concerns about impact of the noise emissions on the nearby resident population take precedence over sham organizational structures.

This situation raises the question of how the authors have defined "community involvement" in its analysis of the benefits. To be considered as having an impact on project acceptance, it would seem appropriate to include only groups that are located within a limited distance of the wind turbine project. There also should be some measure of how the group reflects all the residents in an area. In many wind turbine projects, a small group of landowners agree to participate and impose a project on a community despite the wishes of the wider community. Creating a "community" structure around these landowners does not change the basic relationship. In the LRP I RFP process, the IESO encountered a related issue when it awarded bonus points to a project where 75% of the adjoining landowners indicated support for the project. They found that in many cases the adjoining landowners were separate corporate entities controlled by the same family essentially rendering this measure of community support meaningless.

Gunn's Hill therefore cannot be used as the example of how community involvement will change community support for projects. Instead it demonstrates the importance of addressing the substantive core issues that are causing the concerns about wind turbines in rural Ontario. These will only be addressed by providing sufficient separation between the turbines and neighbouring residents. The Toolkit will not be seen as credible if it suggests that minor payments to nearby residents will address these fundamental issues.

8. CONCLUSION

In the preamble to the Toolkit, it is stated that the development was based on major issues raised in studies of the community reaction to wind turbine siting in Ontario. Further, it is stated that the Toolkit is based on "empirical, in-depth research" with a "range of stakeholders."

The purpose of the Toolkit is to serve as a "springboard" for "empathetic and constructive discussion."

Given that none of the issues raised in preceding sections of this Comment document were raised or discussed in the Toolkit, and that the sum total of contact with an actual community-based organization or citizens' group seems to be a review of a single website (not owned by a formal organization), it is difficult to see how the claims made for this Toolkit are true.

The bibliography is emblematic in that in its spare list of five references, one was from the vested-interest, well-funded wind power industry trade association, and the other from a pro-wind power

online news service. Again, peer-reviewed articles on health, on the lack of social justice in Ontario, on negative impacts from the push for industrial-scale wind power development for the natural environment, local and provincial economies and on human health are all missing, though plentiful.

May we say finally, that we applaud any and all efforts to improve the situation regarding the siting of wind power projects in Ontario communities, but we remain disappointed that so many important issues have not been identified, or given the weight they deserve in this Toolkit.

Thank you.

Jane Wilson, RN, B.A.

President

Warren Howard, M.A. (Geography), MBA

Executive Committee member

For

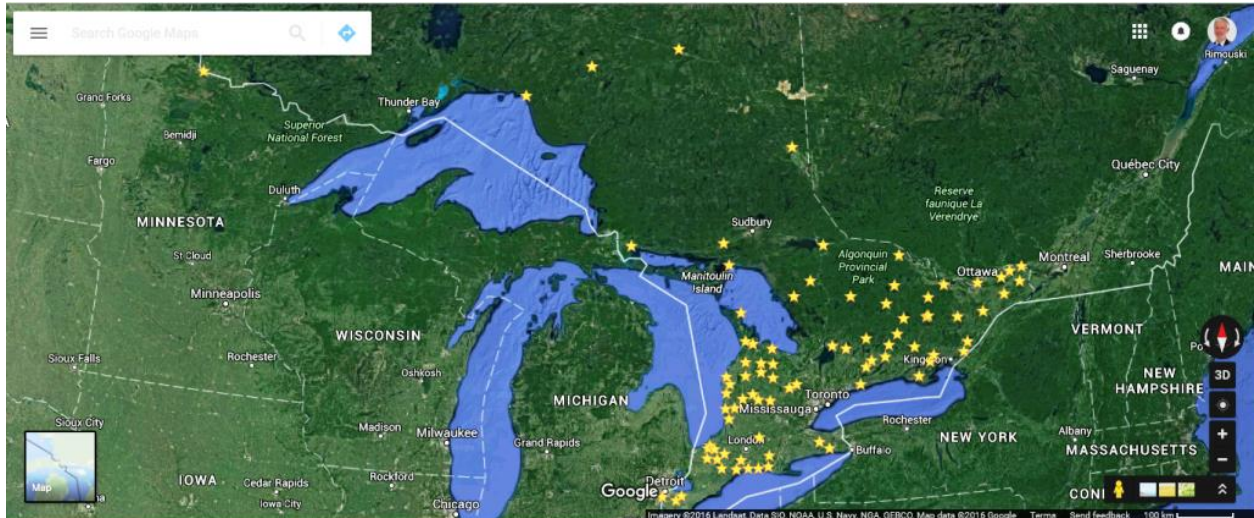
The Board of Directors and membership

Wind Concerns Ontario

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APPENDIX 1.

Map of Ontario municipalities demanding substantive change to wind power approval process (to July, 2016)



(Source: Ron Higgins, Mayor, North Frontenac)

Municipalities Approving a Resolution Calling For Mandatory Municipal Support for Projects

- | | | | |
|----|--------------------------------------------------|----|------------------------------------------|
| 1 | Addington Highlands, Lennox and Addington County | 15 | Bruce Mines, Algoma District |
| 2 | Adelaide-Metcalf, Middlesex County | 16 | Cavan-Monaghan, Peterborough |
| 3 | Alfred & Plantagenet, Prescott-Russell County | 17 | Central Elgin, Elgin |
| 4 | Amaranth, Dufferin County | 18 | Central Huron, Huron |
| 5 | Asphodel-Norwood, Peterborough County | 19 | Chamberlain, Timiskaming |
| 6 | Algonquin Highlands, Haliburton County | 20 | Champlain, Prescott-Russell |
| 7 | Armour, District of Parry Sound | 21 | Chatsworth, Grey County |
| 8 | Arran-Elderslie, Bruce County | 22 | Clarington, Region of Durham |
| 9 | Ashfield-Colborne-Wawanosh, Huron County | 23 | Dutton-Dunwich, Elgin |
| 10 | Bayham, Elgin County | 24 | Dufferin, County of |
| 11 | Bluewater, Huron | 25 | East Ferris, Nipissing District |
| 12 | Brethour, Timiskaming District | 26 | East Hawkesbury, Prescott-Russell |
| 13 | Brockton, Bruce | 27 | Edwardsburgh, Leeds and Grenville County |
| 14 | Brooke-Alvinston, Lambton County | 28 | Elgin, County of |
| | | 29 | Elizabeth-Kitley, Leeds and Grenville |
| | | 30 | Essex, Essex County |
| | | 31 | Enniskillen, Lambton County |
| | | 32 | Fauquier-Strickland, Cochrane District |

33	Gananoque, Leeds and Grenville	69	Mono, Dufferin County
34	Georgian Bay, Muskoka	70	Morris-Turnberry, Huron
35	Georgian Bluffs, Grey	71	Nairn and Hyman, Sudbury District
36	Greater Madawaska, Renfrew County	72	North Frontenac, Frontenac County
37	Greater Napanee, Lennox and Addington	73	North Glengarry; Stormont, Dundas and Glengarry
38	Grey Highlands, Grey	74	North Grenville, Leeds and Grenville
39	Hamilton, City of	75	North Kawartha, Peterborough
40	Hastings, County of	76	North Middlesex, Middlesex
41	Hastings Highlands, Hastings County	77	North Perth, Perth
42	Havelock-Belmont-Methuen, Peterborough	78	North Stormont; Stormont, Dundas & Glengarry
43	Hawkesbury, Prescott-Russell	79	Northern Bruce Peninsula, Bruce
44	Hornepayne, Algoma	80	Norwich, Oxford
45	Howick, Huron	81	Ottawa, City of
46	Huron, County of	82	Perth, County of
47	Huron East, Huron	83	Perth East, Perth
48	Huron-Kinloss, Bruce	84	Peterborough, County of
49	Kawartha Lakes, City of	85	Pickering, Durham
50	Killaloe, Hagarty and Richards, Renfrew	86	Plympton-Wyoming, Lambton
51	Killarney, Sudbury District	87	Port Colborne, Niagara
52	Kincardine, Bruce	88	Prescott-Russell, United Counties of
53	Lakeshore, Essex	89	Prince Edward, County of
54	Lambton, County of	90	Rainy River, Rainy River District
55	LaSalle, Essex	91	Ramara, Simcoe County
56	Laurentian Hills, Renfrew County	92	Sarnia, Lambton
57	La Vallee, Rainy River	93	Simcoe, County of
58	Leeds and the Thousand Islands, Leeds and Grenville	94	South Algonquin, Nipissing
59	Lennox & Addington, County of	95	South Bruce Peninsula, Bruce
60	Madawaska Valley, Renfrew	96	Southgate, Grey
61	Mapleton, Wellington	97	Southwald, Elgin
62	Magnetawan, Parry Sound	98	Stratford, Perth
63	Marathon, Thunder Bay District	99	Sundridge, Parry Sound
64	McDougall, Parry Sound	100	Tillsonburg, Oxford
65	McNabb Braeside, Renfrew	101	Timmins, City of
66	Meaford, Grey	102	Trent Lakes, Peterborough
67	Merrickville-Wolford, Leeds and Grenville	103	Tiny, Simcoe
68	Newbury, Middlesex	104	Tudor and Cashel, Hastings
		105	Tweed, Hastings
		106	Tyendinaga, Hastings
		107	Uxbridge, Durham
		108	Val Rita-Harty, Cochrane District

109 Warwick, Lambton
110 Wainfleet, Niagara Region
111 Welland, Niagara
112 Wellington North, Wellington

113 West Elgin, Elgin
114 West Grey, Grey
115 West Lincoln, Niagara
116 Zorra, Oxford