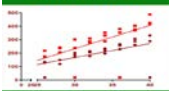


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# Exploring the need for government energy policy-makers to consider social impacts

<sup>1</sup>Jane Wilson, RN\*, <sup>2</sup>Carmen M Krogh, BScPharm, <sup>3</sup>Grace Howell, Med, EdD

<sup>1</sup>Ontario, Canada

<sup>2</sup>Independent Health Researcher, 1183 Cormac Road, RR4, Killaloe, Ontario, Canada, K0J 2A0

<sup>3</sup>Instructor, Social Foundations EDUC 5007, Western University Faculty of Education, Room 1113A, 1137 Western Rd., London, ON N6G 1G7, 519-661-2111 ext. 88619

### ABSTRACT

As governments around the world aim to develop and enact policies that promote benefits to the public good, there is an increasing need to identify and acknowledge the social impacts of such policies. In some cases, the social impacts may be unexpected. An example is the social impact related to renewable energy policies, particularly as related to industrial-scale wind power generation. In Ontario, Canada, the push toward large-scale or utility-scale wind power development has resulted in: economic change; social discontent in some affected rural communities; and, concerns about adverse health effects. If the usual avenues of social input to decision-making processes have been removed by legislation, an imposed government policy may result in loss of confidence and, despite the government's good intentions, may not achieve the intended outcome. While citizens may protest that a policy has inflicted significant social change without consent, some governments may maintain that the overarching goal of environmental benefit outweighs social concerns. This article explores the social impact of wind energy development in Ontario, Canada's rural communities, and suggests a greater role for social research in informing future policy development.

**Keywords:** Renewable energy, wind turbines, government policy, informed consent, social impact

### \*Correspondence to Author:

Jane Wilson, RN  
Ontario, Canada

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## Introduction

As utility-scale wind power generation facilities expand across Canada as part of a shift to clean energy, it is important for government policy-makers, decision-makers, stakeholders and the general public, particularly those with an interest in or responsibility for rural communities, to be aware of potential impacts. These impacts can include economic change, [1] risk of adverse health effects from exposure to the range of noise and other emissions from the power generators, [2] significant social change as quiet communities become the location for power plants, [3] and social upheaval as policy and legislation is altered to facilitate industrial development for a proposed social benefit. [4]

For example, in the case of large-scale wind power development in Ontario, Canada, wind power development has grown at a fast pace. [5] To encourage rapid development, legislation was passed by the provincial level of government which removed the normal process of community input to policy decisions. This resulted in “unwilling” communities being forced to “host” huge power projects. The ensuing negative impacts of such projects (reports of adverse health effects due to sleep deprivation, physical and psychological issues, loss of property value, significant alteration in community character and culture, change of the natural environment and landscape), risk to wildlife and endangered species were sometimes ignored or downplayed by government and other stakeholders. [6]

In the limited consultation leading up to the passage of Ontario’s Green Energy and Green Economy Act in 2009, energy policy experts warned of the possible results of a policy that forced change based on ideology. A professor in law and economics, who had been called upon in the past for advice on energy policy development, commented that the “renewable energy policies appear to be the product of an unholy alliance between two kinds of ‘greens’: on the one hand, environmental fundamentalists who insist that we should adopt any so-called ‘green’ climate change policies, whatever their actual impact on greenhouse gas emissions or the local environment and whatever their cost to the domestic economy, and, on the other hand, renewable energy project developers, who have

no interest whatever in the environment, but every interest in the colour of our money, whether in the form of taxes or increased electricity prices. This combination of irresponsibility and venality has produced a lethal brew of policies.” [7]

## Materials and methods

A review was undertaken of government documents, documents obtained under Freedom of Information legislation, peer-reviewed articles, online publications of government and social and/or health agencies and news reports, to assess the social impacts of the renewable energy policy regarding wind power development in Ontario.

One of the more obvious, and measurable, socio-economic effects of the new policy was the pressure on consumer electricity bills. As in so many other countries around the world, a focus on developing power generation from large-scale renewable energy sources resulted in higher electricity costs for citizens. In Ontario, the dramatic increase in consumer electricity bills over a short term led to the use of the term “energy poverty” as thousands of families struggled to cover costs.

In 2016, the Ontario Association of Food Banks stated in its annual report that the effect of higher electricity bills on food bank use was akin to the world-wide recession in 2008. Government responded by creating low-income assistance programs specifically to offset the higher electricity bills on low-income families. The programs were branded “insufficient” by the Association, however, as the eligibility requirements were functionally “incredibly low and restrictive.” [8]

## Understanding rural community concerns

The community response and concerns about health, the environment, and other issues became emblematic of the government’s push toward large-scale wind power development, albeit restricted to the rural communities affected by the policy.

As citizen opposition grew in Ontario, [9] the government response was to create and maintain a project approval process that assumed people were self-centred and not in line with the overarching policy goals, in other words, “NIMBYs”

(Not In My Backyard). [10] The former Premier of the Province of Ontario used this unhelpful term to justify the legislation removing local land-use planning powers, as a pre-emptive notice to citizens who might object. [11]

In 2016, Nature Energy published a paper by eight Canadian academics who commented on the choice the Ontario government had made in forcing through its energy policy on communities, and the apparent unwillingness to acknowledge or approach negative effects on communities. While governments maintained that evidence of adverse health effects from the noise emissions from industrial-scale wind turbines was not conclusive, the authors disagreed with the government's approach. "A central health problem is that epidemiologic evidence is incomplete and uncertain, although public policy takes an 'innocent until proven guilty' view of this evidence, rather than a more precautionary approach." However, the authors also considered some of the evidence and indicated "depending on the evidence cited, there is epidemiologic evidence to sustain various interpretations of wind-turbine impacts on well-being." [12]

In response to expressed health concerns, the Ontario government published a report on wind turbine noise and health impacts in 2010, based on a literature review carried out by the office of the Chief Medical Officer of Health. While the brief review claimed no direct link between wind turbine noise and adverse health effects, the report concluded that the lack of actual noise measurements in areas where turbines had been located was a significant knowledge gap. [13]

Government documents, however, show that after the first major wind power project began commercial operation in Ontario, and after passage of the Green Energy Act that enabled accelerated wind power development, the ministry responsible for regulating wind power installations and responding to citizen reports of excessive noise was unable to carry out such measurements. [14]

Moreover, in an admission by government staff, wind power developers routinely underestimated wind shear, a critical factor in calculating the impact of wind turbine noise emissions, a fact that was overlooked by the government approval process, and led to improper siting of

several of the power generating machines. For example, of the 133 turbines at Melancthon, Ontario, government staff stated that 35 of them were located too close to "receptors" (people's houses) and should be operating in maximum noise reduction mode in certain atmospheric conditions. [15]

### **Noise: the evidence**

Wind turbine noise was frequently cited by citizens as a public concern when wind power projects were put forward. It was known among communities already living with wind power projects that noise was a problem and, also, that government response was inadequate. [4]

Following the first wind power projects in 2006, the Ontario government informed citizens that they could report excessive noise and other effects. However, in documents released to Wind Concerns Ontario, a coalition of community groups, there is evidence that these reports, identified as "Pollution Incident Reports," were largely ignored.

In the eight-year period between 2006 and the end of 2014, there were, according to government documents, over 3,000 individual incident reports and 100 "master" files which contained dozens of individual reports. The response rate was poor: over 50 percent received no response from government; 31 percent were noted as a "planned" response. According to the documents provided, only one percent of the calls received a "priority" response. In addition, the documents contained notes from government staff, provincial environment officers, who recorded problems with wind turbine noise and possible adverse health effects, but apparently little action was taken in spite of the officers' recommendations. The process became, Wind Concerns Ontario said, "issues management" rather than response and resolution. [16]

The number of noise reports became so significant in one Ontario health jurisdiction that the public health unit launched an investigation into the citizen complaints of noise, vibration and health effects. [17]

Despite the government's apparent lack of acknowledgment of a problem with its energy policy, the knowledge base and evidence

about wind turbine noise was growing. Wind turbine noise has been identified as a problem and a source of adverse health impacts, often associated with sleep disturbance which can lead to a range of other, indirect health effects. [18]

In 2009, an expert panel convened by the American Wind Energy Association and Canadian Wind Energy Association (the industry's trade associations) published a paper that listed symptoms of "wind turbine syndrome" as sleep disturbance, headaches, tinnitus or a feeling of pressure in the ears, dizziness, vertigo, nausea, problems with concentration and memory, all associated with sensations of internal pulsation, and are "well-known stress effects of exposure to noise." [19]

The Canadian Wind Energy Association published a media release in 2011 in which it advised people experiencing any problems from wind turbines in the vicinity of their homes to seek help: "The association has always acknowledged that a small percentage of people can be annoyed by wind turbines in their vicinity. ... When annoyance has a significant impact on an individual's quality of life, it is important that they consult their doctor." [20]

"Annoyance" in this context is a term denoting stress or distress and is acknowledged by a number of authorities as an adverse health effect in itself. The U.S. Environmental Protection Agency states that [noise-induced] "... 'annoyance' can have major consequences, primarily to one's overall health." [21]

The Australian federal government was sufficiently concerned about reports of poor health among wind power project neighbours that it struck a special Senate Committee on wind turbines. As a result of its recommendations, Australia now plans an independent expert scientific committee on industrial sound to "conduct multi-disciplinary research into the adverse impacts and risks to individual and community health and well-being associated with wind turbine projects." The Committee was particularly concerned about the reaction of the wind power industry to citizen complaints: "the committee believes that these complainants deserve to be taken seriously." [22]

The noise emissions from wind turbines are

unique, says Australian acoustician Steven Cooper. In his study, done with cooperation of a wind power developer, he noted that homes were abandoned. Cooper says: "Typical acoustic descriptors for noise do not cover the disturbance that was experienced leading to the use of two other descriptors, one being vibration and the [other] one being sensation." He observed that certain wind speeds were associated with the symptoms reported, including sleep disturbance, a feeling of pressure in the head, and nausea. [23]

In Canada, Health Canada conducted a \$2.1-million, non-definitive randomized study, which produced inconsistent results: it could not find a direct link between wind turbine noise and health impacts, [24] but it did find that people living 550 meters to 2 km away from wind turbines were "highly annoyed" (annoyance being an acknowledged adverse health effect), up to 25 percent for people living at the Ontario setback limit of 550 metres. [25]

According to a set of diagnostic criteria developed by Dr. Robert McMurtry, former Dean of Medicine at Western University, and health researcher Carmen Krogh, the complaints presented most often by people exposed to wind turbine noise are associated with sleep disturbance, which in turn can result in increased levels of stress and/or psychological distress. Another frequent complaint relates to inner ear symptoms including vertigo and tinnitus. [26]

A special concern is the possibility of adverse health effects on vulnerable populations such as children and the elderly. Children with autism, for example, may be particularly susceptible due to their well documented hyper-acuity or sensitivity to environmental noise. [27] This was a gap in Health Canada's research which was also identified in the Council of Canadian Academies' 2016 report on wind turbine noise and health. [28]

The effect on some families has been significant. A review by family physician Dr. Roy Jeffery and others notes that, "In some cases, Canadian families have effectively abandoned their homes, been billeted by wind energy developers or negotiated financial agreements with developers." [29]

## Discussion: understanding and empathy

With adverse health effects being a prominent, documented and observable result of government social policy, there is an opportunity for policy-makers and stakeholders to employ social research to evaluate, amend and implement energy policy that results in a minimum of negative effects for citizens.

We agree with Songsore et al that Ontario's policy environment "may have generated the perverse effect of amplifying mistrust and conflict in some circumstances" [30] and with Fast et al, who advise that approaches to approval and siting processes "should be routinely examined in light of new evidence and changing circumstances." [4]

We concur with Baxter et al [31] that there is a "need to add health risk perception to the agenda for social research on turbines." The challenge for social research in future will be to "thoroughly and empathetically understand" the situations for the people of rural communities living with wind turbines, and all their concerns, particularly about health.

Energy policies in Ontario were put forward as a way to improve the environment for everyone and to promote health; however, the reality is that many people feel betrayed [32] by their own government, and have been forced in some cases to take drastic action to protect the health of their families. [29]

Social research can play a critical role in providing the evidence government needs to evaluate policies, especially those promoted for the general public good, and to showcase the social impacts of those policies.

Jane Wilson RNBA is a health care specialist writer/editor; Carmen Krogh BPharm is an independent researcher on the topic of wind energy and the potential risk of harm to human health; Grace Howell MEd EdD is research coordinator and an instructor on Social Foundations in the Faculty of Education, Western University.

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