

Human Health and Environmental Assessment in Canada: Implications for Wind Energy

1. Introduction

In Canada, environmental assessment (EA) is the legislated procedure that evaluates the predicted environmental effects of a proposed project (CEAA, 2010). The relevant statute, the Canadian Environmental Assessment Act (CEAA), defines “environment” in broad and open terms; while effects on humans are not explicitly mentioned, they are implicitly included. Accordingly, human health, as it is affected by environmental changes caused by development projects, falls under the mandate of the CEAA. The extent to which human health is assessed and the quality of this assessment has been questioned in the past, and health effects have repeatedly been shown to be inadequately represented in many EA reports (Cole, Wilhelm, Long, Fielding, Kominski & Morgenstern, 2004; Fehr, 1999; Morgan, 2011; Noble & Bronson, 2005; Steinemann, 2000). The current study focuses on one type of development project covered by the CEAA, wind energy projects, as a backdrop to examine the manner in which environment-related human health is typically assessed as a component of the Canadian EA framework. The strengths and limitations associated with integrating human health effect assessment within an EA process are considered. Overall, there is an apparent unease inherent in using the EA framework to evaluate health effects; however, given the Canada’s existing legislative and institutional context, human health considerations continue to be integrated within the EA process. Improvements should therefore be made in order to optimize this system.

2. The Place of Human Health in Environmental Assessment

EA is a regulatory process that aims to evaluate the risks that a development project may pose to the environment, and has a long-established methodology in Canada (Beanlands & Duinker, 1983). In the Canadian context, EA applies to proposed projects, which are typically comprised of the construction of a new physical work or changes to existing physical works (CEAA, 2010). In the past, EA has been most commonly understood and applied as a tool to evaluate the effects of a project on biophysical and ecosystem components of the environment, while effects on human systems have been generally underemphasized (Harris et al., 2009; Morgan, 2011). Human health is one such social effect that is continuously overlooked (Cole et al., 2004; Harris et al., 2009; Morgan, 2011; Noble & Bronson, 2005). This is despite the fact that many international policies, including the United States National Environmental Policy Act of 1969, were conceived to include social and health effects (Bhatia & Wernham, 2008; Morgan, 2011).

Over time, the health consequences of environmental change have gained in prominence on the international stage. The World Health Organization (WHO) and the United Nations Program have partnered to address this issue with the Health and Environment Linkages Initiative, which encourages the use of impact assessments and an integrated approach (HELI, 2004). An integrated

approach is defined as one that assesses “health-related problems deriving from the environment, and health-related impacts of policies and other interventions that affect the environment, in ways that take account of the complexities, interdependencies and uncertainties of the real world.” (Briggs, 2008). Procedurally, an integrated environmental health assessment often amounts to the inclusion of a stand-alone health impact assessment (HIA) within an EA. Despite formalized support for integrated environmental health assessment at both national and international levels, there appears to exist a disconnect between the discourse, as reflected in the scientific literature, policy statements, and legislation, and reality, as evidenced by real-world EA practice in many countries including Canada.

2.1. Canadian Context

In Canada, legislation dictates that EA must evaluate any potential health effects related to a change in the environment, itself the result of a proposed project. This is due to the stated meanings of the terms “environment” and “environmental effect” in the CEAA, which refer respectively to “all living organisms” and “health and socio-economic conditions”. This language should leave no doubt that human health outcomes of project-related environmental change must be considered in Canadian EA. In addition, all levels of Canadian government - territorial, provincial and federal - have endorsed the holistic formulation of the meaning of health proposed by the World Health Organization “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (Health Canada, 2004; WHO, 1987).

2.2. Health Impact Assessment

The specific component of EA that deals with human health effects has been termed Health Impact Assessment (HIA). Although an HIA can in theory be carried out as a stand-alone assessment in the absence of an EA, in the Canadian context the approach more commonly applied is the integration of HIA within a broader EA process (Health Canada, 2004; Noble & Bronson, 2005). In Canada, where HIA is integrated within the EA framework, HIA has developed as a complementary addition to the toolkit of project assessment, and has in some cases been scaled up the policy level as well (Morgan, 2011).

Generally, HIA methods are characterized by a mix of quantitative, qualitative and participatory techniques (Cole et al., 2004). As in general EA methods, the basic procedural approach is to compare baseline measurements and/ or models of indicator criteria to the potential effects likely to be caused by a project (Health Canada, 2004). In HIA, indicators can be comprised of direct health measures such as injuries, disease incidence, or stress levels, or indirect measures such as levels of chemicals in ambient environments or human tissues (Health Canada, 2004).

3. Wind Energy: a Case Study in Environmental Health

Wind energy is an attractive emission-free alternative to fossil-fuel-based energy sources, in particular because it is a relatively mature and deployable technology in comparison to other

renewable energy technologies (Rod, 2011). Globally, wind energy is the fastest growing renewable technology, with 39 GW of capacity being added in 2010, which was three times the increase seen in 2005 (REN21, 2011). In Canada, installed capacity of wind has increased steadily over the past decade; in 2011 installed capacity totaled more than 4600 MW, with an expected 1000 MW to be added by 2012 (CanWEA, 2011). The Atlantic provinces have abundant wind resource availabilities, and the provincial governments have made formal commitments to increase wind energy production in their jurisdictions. Despite these favourable conditions, wind energy development is often contentious, in part because of the perceived health risks posed by wind turbines to local residents (Ferguson-Martin & Hill, 2011; Fischlein, Larson, Hall, Chaudhry, Rai Peterson & Stephens, 2010; Rod, 2011). The EA process has the potential to ensure that ensure that this emerging industry does not come at the expense of unwarranted impacts on the physical and social environment, including human health.

3.1. Health Concerns Addressed in Wind Energy EA

The impacts of wind turbines on human health have been extensively discussed in the academic and public domain, yet the topic remains controversial (Knoppper & Ollson, 2011). There are frequent discrepancies between the number, nature and significance of health impacts of concern to local communities, in comparison to those reported by proponents and regulators. Health concerns can generally be categorized as the effects related to audible and inaudible sound, visual effects, effects on physical safety, and mental well-being or annoyance.

Overall, the procedures applied to address the potential health impacts of wind energy projects do not conform to the WHO's holistic conceptualization of health as endorsed by Canadian authorities. The assessment methods evidenced in wind energy EA demonstrate a tendency to rely on biomedical and quantitative indicators of human health status. Relying exclusively on this type of health information fails to capture the great complexity of health determinants such as social, cultural and psychological well-being, all of which are intrinsic to the modern definition of health. The wind energy case study provides one example where an alternative approach has been attempted: the use of the criterion percent highly annoyed. Annoyance is quantified and modeled, but remains ultimately subjective. The end result is in unresolved tension between two approaches: on the one hand, the desire to rely on quantitative and biomedically observable changes in health status, and on the other, the move towards incorporating qualitative and subjective self-reporting of perceived health outcomes. The middle ground between these two poles has yet to be fully developed.

4. Recommendations

There are both benefits and limitations to assessing health concerns within an integrated environmental health assessment approach. There may be opportunities for complementary methods to assess the health effects of development projects on human health, such as stand-alone human health risk assessment tools. However, given the legislated nature of health as a component of the environment which must be assessed within project-level EA, it is unlikely that the necessity

to take health into account will disappear without a substantive revision of the terms of the CEEA. Therefore, it behooves regulators as well as practitioners to address environmental health issues in a full and responsible manner. To move toward this goal, well-formulated methods must be developed and validated (Cole et al., 2004). Further, developing scientifically rigorous approaches is critical to be able to obtain reliable and consistent results (Health Canada, 2004; Greig & Duinker, 2011).

To address the current lack of health expertise within EA circles, EA practitioners should strengthen their cooperation and collaborative ties with health professionals and health researchers. The potential to use HIA to further increase public participation should be realized, through earlier and more meaningful means of involving local communities in planning and decision-making processes.

Lastly, cumulative effects are of utmost importance when considering the health effects of environmental change. It may be that project-level EAs do not offer an adequately broad scope for addressing cumulative health effects. In this case, health should also be included in higher level environmental management schemes, such as Strategic Environmental Assessment (SEA). SEA, or an equivalent broadly-scoped evaluation process, could resolve the fundamental disconnect between the scale of costs and benefits associated with development projects like wind farms. In the case of wind energy, the risks are disproportionately borne by local communities, while the benefits are shared regionally (in the case of economic development) or even globally (in regards to lower greenhouse gas emissions from foregone fossil fuel combustion). Current resource and environmental management regimes are lacking a fulsome manner to address this disparity, leading to conflicts amongst stakeholders, unfulfilled development goals, and a fundamental lack of environmental justice.

5. Conclusions

There is unease inherent in an integrated environmental health impact assessment approach. This is owing to a number of factors, including divergent methods of EA and HIA practices, separate development paths of the two disciplines, and poor collaboration across disciplinary boundaries. However, there are strong theoretical arguments and legislative reasons for integrating health concerns within EA. As with any management tool, successful integrated environmental health assessment requires appropriate and effective implementation. It will therefore necessitate a commitment on the part of regulators and practitioners alike to more fully integrate health concerns into EA practice, in part by applying well-formulated and scientifically rigorous methods. As well, greater public participation in environmental health assessment should be fostered to address environmental justice inequalities.

Canada is in a position to act as a leader in developing the area of integrated environmental health assessment, as it has already developed a number of guidance and policy documents on the subject. The relevant federal department, Health Canada, has demonstrated an interest in pursuing integration, evidenced for example by the fact that Health Canada staff members are at the forefront of research on the potential health effects of wind turbine sound (e.g. Keith, Michaud & Bly, 2008).

The health effects of wind turbines specifically continue to be a contentious topic of public debate, and reliable assessment methods, including sound scientific monitoring and legitimate public participation, will be required to answer the concerns of the public. This will only be accomplished if the assessment of health in EA is prioritized and allocated sufficient resources.

6. Works Cited

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