

# Including climate change in Environmental Assessment in Canada: Proposed Reforms

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## **Abstract**

The impacts and risks of climate change have been increasingly recognized within Canada and worldwide. In recent years, Canada has committed to reducing the nation's contribution to greenhouse gases and prioritized sustainable development initiatives. Since environmental assessment (EA) is an important process for potentially minimizing the environmental harm of projects and accounting for external risks to project success, climate change considerations in EA are especially relevant. Canada has been a global pioneer for incorporating climate change considerations into EA. However, scholars recognize several existing challenges which are limiting the effectiveness of incorporating climate change considerations into Canadian EA processes. Inconsistent application of guidelines, insufficient quantification of impact significance, and a lack of consideration for cumulative effects are some of the limitations of current EA practice. This submission argues for a reformed Canadian EA process to strengthen the legislative authority for climate change considerations, develop clearer guidelines and designated projects for climate change considerations, and operationalize regional level EAs. While uncertainties and data availability regarding climate science may pose challenges, strengthening the ability of EA to effectively consider the risks of climate change to projects and the wider ecosystem will be necessary to fulfill Canada's national and international climate change commitments.

## **1. Introduction**

Over the last 40 years, the federal environmental assessment (EA) process in Canada has made substantial improvements to ensure development proceeds with minimal environmental harm. However, despite these improvements, scholars criticize the quality and ability to address important considerations within EA in Canada (Duinker & Grieg, 2006; Grieg & Duinker, 2011). Quality in EA is critical for environmentally sound and rational decision-making (Glasson et al., 1997). As environmental pressures from population growth, increased development, and historical environmental degradation grow, it is even more important that EA processes are adaptive and continuously improving.

This submission paper will discuss the suggested theme ‘Environmental Assessment in Context’. Specifically, this submission will discuss how the federal assessment process in Canada can improve their process for incorporating climate change considerations. The objectives of this paper are two-fold. First this paper will argue how Canada’s EA process is not presently sufficient in considering climate change. Second, the paper will propose, based on scientific literature and the experiences from other countries globally, options and recommendations to better address climate change within Canada’s reformed EA process.

This paper will first deliver a background on the literature about climate change in EA, and present how scholars recommend incorporating climate change considerations into quality EA processes. The next section will introduce the problems or issues with the current EA process in Canada in relation to climate change. Several options will then be proposed to address the problems. The final section will present recommendations and practical limitations to implementing the proposed options.

## **2. Literature Summary**

Many EA practitioners agree that having clear regulations and guidelines which specifically designate projects, require climate change considerations, and provide legislative clout for enforcement is fundamental for effectively addressing climate change within EAs (Sok et al., 2011). Agrawala et al. (2010) argue that there are multiple opportunities within EA processes to incorporate considerations for climate change, at both project and strategic levels. Incorporating climate change considerations into EA processes can bring multiple benefits. According to the European Commission, it can help achieve national climate objectives, improve project resilience, manage conflicts and synergies between climate change and ecosystems, and support ecosystem services used by the project (European Commission, 2013).

Scholars argue that climate change considerations must effectively be incorporated at all stages of the EA process (Agrawala et al., 2010). The assessment phase is a critical entry point for climate change considerations. Early consideration of key issues related to climate change and

involvement of a range of stakeholders is necessary to determine projects that need to consider climate impacts (European Commission, 2013). Incorporating climate change mitigation into EAs is essential to mitigate risks of project impacts, such as infrastructure damage from increased storms or sea level rise (European Commission, 2013), but must be proceed through an adaptive and flexible approach (Chang & Wu, 2013). Since climate change can impact a range of valued ecosystem components relevant to the project (Harley et al., 2006), incorporating climate change considerations through cumulative effects assessment is important for effective impact prediction and forecasts (Duinker & Grieg, 2006).

Scholars and practitioners argue that it essential that EA include considerations for 1) project contributions to climate change, 2) impacts of climate change on the project, and 3) impacts of climate change on project-relevant valued ecosystem components. The project's impacts on climate change are often measured by analyzing and quantifying the project's greenhouse gas (GHGs) emissions (European Commission, 2013; CCEAC, 2013), but may also be measured with other indicators such as carbon emissions and energy consumption (Chang & Wu, 2013). Projects may use a range of techniques to measure the sensitivity of projects to climate change and impacts to infrastructure and property, including statistical models and analogous situations (Lee, 2001; Chang & Wu, 2013).

While many countries wish to incorporate climate change considerations into EA, Argawala et al. (2010) argue that there exist many challenges that have resulted in only three countries attaining implementation: Canada, Australia, and the Netherlands. To effectively include climate change in EA, Byer and Yeomans (2007) argues that practitioners must be able to incorporate the impacts of climate change and their inherent uncertainties. According to the European Commission's guidelines for climate change in EA, practitioners must align EA processes with consideration of principles such as precautionary approach, adaptive management, and consideration of cumulative effects assessment (European Commission, 2013).

Byer and Yeomans (2007) describe how practitioners can account for uncertainties in climate change through careful combination and choosing of models including scenarios, sensitivity analysis, probabilistic analysis, and qualitative descriptions. However, this needs to be applied by

practitioners who have sufficient expertise in climate change adaptation or natural hazard identification (Agrawala et al. 2010; Chang & Wu, 2013).

### **3. Evolution of Practice**

Canada has long had national and international commitments regarding climate change. In 1992, it became Party to the United Nations Framework Convention on Climate Change (UNFCCC). In December 2015, Canada joined with 194 countries to the Paris Agreement, which aimed to limit global temperature rise below 2°C (Government of Canada, 2016). In April 2016, the Canadian government signed the Paris Agreement and committed to reducing greenhouse emissions by 30% from 2005 levels by 2030. In addition, Canada has committed to sustainable development goals and international agreements such as the United States-Canada Clean Energy Dialogue to promote development of clean energy technologies. Therefore, it is clear that Canada has made considerable commitments to addressing climate change and developing sustainably.

Canada is a global leader for incorporating climate change within the EIA process (Agrawala et al., 2010). While Canada's federal EA has had a 40-year history, climate change considerations and cumulative impacts did not emerge until the mid-1980s. In 1992, section 16(1) of the *Canadian Environmental Assessment Act* (the 'Act') legally required EAs to assess cumulative impacts. Since the mid-1990s, multiple major developments have incorporated climate change into the design and development of projects, as required by Canadian EA guidelines (Lee, 2001). In addition, Canada is one of only a few countries to develop operational guidelines for incorporating climate change considerations in EA. In 2003, the Committee on Climate Change and Environmental Assessment (CCCEAC), supported by the Canadian Environmental Assessment Agency (CEAA) developed a thorough guideline for practitioners on how to incorporate climate change in EIAs (CCCEAC, 2003). This guideline provides a practical outline of various levels and stages of the EA practice can include climate change considerations. The guideline presents two main considerations: greenhouse gas (GHG) considerations and impact considerations (CCEAC, 2003).

#### **4. Statement of the Problem**

Despite Canada's recognition of incorporating climate change in EA, the federal EA system faces several issues affecting its effectiveness. Over the years, scholars have reviewed project EAs and found that many inadequately incorporate climate change considerations (Lee, 2001; Byer & Yeomas, 2007; Oshawa & Duinker, 2014). Such issues arise from lack of legislative power, incomplete guidelines for practitioners, and insufficient application of climate change considerations.

First, no formal requirements are present within the federal *Canadian Environmental Assessment Act, 1995*. Nowhere in the Act are the impacts of climate or greenhouse gases mentioned. The legislation's only provision for incorporating climate change is observed through the recognition of cumulative impacts to projects (section 16(1)). In 2012, a *reformed Canadian Environmental Assessment Act, 2012* removed much of the environmental provisions of the Act. Besides removing the need for federal assessment of many projects, new regulations removed much of the consideration for cumulative effects (Gibson, 2012).

CCEAC guidelines and previous EAs (Oshawa & Duinker, 2014) focused only on project-level EA. Critics argue that the scale of individual projects is inadequate to successfully consider the cumulative impacts of multiple projects to climate change (Duinker & Greig, 2006).

Much of the focus of climate change considerations in EAs deals with defining GHG emissions of the project. While GHGs are a critical component in the contribution to climate change, it is not the sole factor to consider (Chang & Wu, 2013). Oshawa and Duinker (2014) further argue that Canada's EA process inconsistently defines and applies approaches to measure GHG emissions. Finally, guidelines only provide guidance for incorporating effects of the project to climate and effects of climate to the project, but fail to consider the effects to climate to the wider set of valued ecosystem components.

#### **5. Options to Address the Problem**

Sok et al. (2011) surveyed multiple EA practitioners on how best to incorporate climate change considerations within EA. Overwhelmingly, practitioners maintained that clear regulations to

legislate, initiate, and enforce climate change consideration at different levels of EA process is imperative. Therefore, it is important that the federal government develop a list to designate specific projects or developments (at project and strategic levels) that must consider climate change within the EA process. The *Canadian Environmental Assessment Act* ('the Act') should be amended to return many of the environmental provisions removed in 2012. EA processes should more strongly emphasize cumulative effects assessment through clearer guidance and standardized techniques. Having a clear, legislative foundation for which climate change is incorporated is fundamental to having effective and robust climate change adaptation. Other options to better address climate change in EA process can be separated into those for project-level EA and regional EA.

### *5.1 Project-level EA*

At the project level, the federal EA process should include climate change as a valued ecosystem component and make a clear and standardized method for incorporating climate change considerations. Federal EA should not only include the project's contribution to climate change, but put greater emphasis on clear guidelines for how climate change can impact the project and other valued ecosystem components. While GHG emissions are a critical and useful indicator to the impacts of projects on climate change, a wider set of indicators should be encouraged. Examples of potential indicators include energy consumption and carbon emissions (Chang & Wu, 2013). This must be supported by quantifying the impact significance, both in relation to regional and global levels of emissions (Oshawa & Duinker, 2014). To adequately assess the impacts of climate change on the project's valued ecosystem components, EA should more often use scenario analysis to account for uncertainties and make effective decisions (Duinker & Grieg, 2007).

However, Canada's guidelines were developed in 2003, and may be considered outdated today. Given the improvements in our understanding of climate change drivers and environmental assessment, the federal EA process should update guidelines to adapt to new knowledge. Updating guidelines and standardizing methods would be relatively inexpensive, and would not require significant changes to existing EA procedures and frameworks. This would support an

adaptive and flexible approach to the EA process, and reduce the inconsistencies with current processes.

Regardless of guidelines, practitioners should recognize that choosing the right models and processes for incorporating climate change considerations will depend on multiple context-specific factors such as data availability or type of impact being examined (Byer & Yeomans, 2007). Developing training programs would help standardize and improve EA practitioners' level of knowledge regarding climate change considerations.

### *5.2 Regional and strategic EA*

Climate change can cause changes to several ecosystem components, exacerbate existing hazards, and cause impacts over long or short timeframes (Harley et al., 2006). Therefore, the impacts the project has on climate change, and the cascading effects it can have on other ecosystem components, can only appropriately be considered through cumulative effects at wider scales (Duinker & Grieg, 2006). In the Netherlands, EA incorporates climate change considerations through strategic environmental assessments rather than at the project-level (Agrawala et al., 2010). Given Canada's commitments to climate change, and the increasing recognition of cumulative effects, Canada's federal EA process should aim to operationalize regional-scale EA.

While this paper does not discuss how to better incorporate cumulative effects, EA processes in Canada requires clearer guidelines, better trained cumulative effects practitioners and more consistent use, especially at the regional or strategic level (Duinker & Grieg, 2006). Use of scenario analysis to develop adaptation strategies for climate change may also prove useful at the regional level (Galatowitsch et al., 2009). Indeed, the use of climate and impact projections have less uncertainty over a larger spatial area (Agrawala & van Aalst, 2005).

However, this recommendation may be impractical due to the lack of current formal processes in Canada for regional development planning and regional EAs (Duinker & Grieg, 2006). This option would require substantial financial investment and would need to be rigorously developed with advice from experts in climate change and regional EA. Despite these challenges,

developing an implementation framework for regional and strategic EA is essential to effectively incorporate climate change consideration and cumulative impacts.

## **6. Recommendations**

This paper proposes three actions to help the government better incorporate climate change considerations into the federal EA process. These actions include: 1) strengthening legislative foundation for incorporating climate change in EA, 2) standardizing guidelines, lists, and project-level requirements, and 3) implementing regional-level and strategic considerations for climate change, especially in vulnerable areas.

One potential limitation is that there is inherent uncertainty around climate change predictions and impacts. As more information about the impacts and predictions of climate change become available through research, advances in technology, and modelling (e.g. Galatowisch et al. 2009), climate change considerations in EA will become more robust and useful. However, these recommendations must also be accompanied with well-trained EA practitioners who are experienced with hazard identification, vulnerability assessment, and cumulative effects assessment.

However, the criticisms about incorporating climate change and cumulative effects in project-level EAs remain. Implementation constraints due to uncertainty may not be accounted for by only focusing on a project-level scope. Duinker and Greig (2006) argue that the assessment of cumulative impacts cannot be effectively evaluated at the project level. Furthermore, limiting climate considerations only to the project level may inadvertently increase the vulnerability of other projects in the area to the impacts of climate change (Lemmen et al., 2007). Therefore, a more strategic, regionally-based EA process is encouraged to account for climate change adaptation for Canada's future sustainable developments.



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