

## Greenhouse Gases in EIA: Recommendations from Recent Experiences

Michael C. Murphy, Julia Kun, Sandra Banholzer, Sana Talebi  
Stantec Consulting Ltd.

### Abstract ID - 271

There is still little guidance available in regulatory regimes or the general literature on how to assess releases of greenhouse gases (GHGs) and effects on climate change from a project. In present practice, a valued component is established as one of climate, a change in GHGs, or simply greenhouse gases, and the project-environment interaction is considered on this basis. In Canada, the federal requirements are to identify mitigation measures, quantify GHGs, and compare those to the industrial sector, the province, country and global totals. The guidance states that “contribution of an individual project to climate change cannot be measured”, leading practitioners or regulators to sometimes interpret that determination of significance is not needed. This view is challenged on the basis of recent experiences with regulators, public, and legal community. In this update to an earlier paper (Murphy et al 2013), new ideas on boundaries and significance are presented.

### Introduction

The scientific evidence that human activities are contributing to global warming and causing climate change is strong and continuing to mount. According to the IPCC, “anthropogenic greenhouse gas emissions are *extremely likely* to have been the dominant cause of the observed warming since the mid-20<sup>th</sup> century” (IPCC 2015). We conclude that those releases of GHGs have caused a significant adverse environmental effect on the climate. It is therefore essential to consider climate change and GHGs in environmental impact assessment (EIA). In this paper, we present some recent experiences and provide some recommendations on how best to do this.

### Synthesis of Available Guidance

In a review to assess the status of incorporating climate change impacts in EIAs, both in developed and developing countries, it was concluded that EIA is an important decision-making tool, and is now a legal requirement in many countries. Further, while many documents describe the intent to incorporate GHGs and climate change into EIA, only two countries (Canada and Australia) have consistently considered these in their assessment process (Agrawala et al 2012). More recently, the consideration of climate change in EIA will be mandatory in Europe with the implementation of the EU EIA Directive from 2014.

In 2013, Spain approved laws to guide consideration of climate change in EIA. In the summary paper, a review of how climate change was considered in Spain included looking at 1500 records of decision. About 14% of these contained references to climate change. Many others offered citations only (Enríquez-de-Salamanca et al 2016).

A review of 10 transport developments in England suggested that effects of climate change were well explained; details on mitigation were lacking. This could be improved by “...*the production of guidelines, change of behaviour of EIA practitioners, more holistic consideration of climate change issues, rigorous post-decision monitoring and use of climate change terminology*” (Hands and Hudson 2016).

In a review of 19 EIA reports on renewable energy in Denmark, climate change and mitigation were included in almost all of them and there was an emphasis on the positive impacts (Larsen 2014).

In the United States, the Council on Environmental Quality (CEQ) published guidance on considering the effects of climate change. The CEQ advises federal agencies on reducing GHGs to use a scoping process to set reasonable spatial and temporal boundaries, and consider these in terms of impacts and sustainability, and refer to a threshold of 25 kilotonnes per year (kt/y) for projects to be assessed (Sutley 2010). In a review of policies from 6 areas in the USA, 3 key challenges were identified: addressing uncertainty, establishing significance, and addressing cumulative effects (Slotterback 2011). In California, an annual threshold of 7 kt of CO<sub>2</sub>e is proposed using a 10 million Btu/hr boiler fired with natural gas as a benchmark. (CARB, 2008). These approaches may change.

The assessment of GHGs in EIA came to the forefront in Canada in 2007 with the filing of an EIA for an oil sands project in northern Alberta. The Kearl Project was assessed by a joint review panel of Alberta and Canada. Emissions would make up about 1.7% of the Alberta emissions. Yet, the panel concluded effects were not significant. The federal court appealed, stating the panel had erred, and requested justification for the use of regulatory thresholds, in this case emission intensities. Once provided, Canada approved the project (Chalifour 2008). It is common in Canada to assess GHG emissions and provide mitigation in EIAs, following the methodology prescribed by the Canadian Environmental Assessment Agency (CEAA 2003). Still, a clear definition of significance is often not provided (Ohsawa et al 2014). An update by the federal regulatory agency is anticipated.

It is evident that there is considerable variation in assessing climate change and GHGs in EIAs around the world.

### On Thresholds of GHG Emissions

There were few statements found in the literature on thresholds related to assessment of GHGs in EIA. There is mention of low, medium, and high in guidance from Canada; however, these terms are not defined. Canada directed the provinces to implement a carbon pricing scheme by 2018. Most but not all provinces agreed. The transition is now in progress. Some thresholds for reporting and verification of GHGs have changed. These are important for consideration of significance.

A summary of recent targets, approaches, thresholds and pricing is shown in Table 1 (Lee-Andersen 2017).

**Table 1. Survey of GHG Targets and Thresholds Across Canada**

<b>Jurisdiction</b>	<b>Emission Targets</b>	<b>Approach - assess GHGs in EIA</b>	<b>Thresholds</b> Reporting + Verification (kt)	<b>Carbon Pricing</b> (\$/tonne)
Canada	30% below 2005 levels by 2030	CEAA (2003)	Report - 50  changing to 10?	\$10 - 2018  \$50 – 2022

British Columbia	80% below 2007 levels by 2050; LNG – 0.16 tonnes/tonne LNG	CEAA (2003), provincial guidelines (PG)	Report – 10 Verify - 25	\$30 – 2016
Alberta	Methane reductions from oil and gas by 45%, by 2025	CEAA (2003), PG	Report – 50 Verify - 50	\$20 – 2017 \$30 - 2018
Ontario	37% below 1990 levels by 2030;	CEAA (2003); PG, draft guideline to address climate change in EIA	Report – 10 Verify – 25 Cap and trade - 25	\$20 – 2018 \$75 - ?
Quebec	20% below 1990 levels by 2020; 37.5% below 1990 levels by 2030	CEAA (2003), PG	Report – 10 Verify - 25	2015 vintage allowances: \$16.39
New Brunswick	35% below 1990 levels by 2030	CEAA (2003), PG	Report – 10 Management - 25	Putting a plan in place

### Experiences with GHGs in EIA

Our team has conducted several EIAs over the past 25 years. The need to assess the potential effects of the project on climate change has changed during that time. In our experience, a proponent will always do what is required by law to meet regulatory requirements. When those are not clear, this is more difficult. Some experiences illustrate these uncertainties and difficulties.

In two mining EIAs in North America, the valued component was “atmospheric environment” and the assessment involved estimating project GHGs, considering magnitude, intensity, and duration. Thresholds of low, medium and high were: 50 kt/y and 500 kt/y in one and 100 kt/y and 1,000 kt/y in the other. Both residual and cumulative environmental effects were rated not significant. After review, the Agency found “...is not likely to result in significant adverse environmental effects”.

In two EIAs for hydroelectric facilities in North America, the valued component was “atmospheric environment” in one, “GHG emissions” in the other. In both, the boundaries for assessment of the source emissions considered the watershed feeding into the water storage reservoir of the hydro dam. Significance was assessed by considering the low, medium, high thresholds in CEAA (2003). In both EIAs, clear statements were made regarding significance using those thresholds. The environmental effects of the Project on its own were rated not significant. The cumulative effects of one were rated not significant, and the other were rated significant. In that case, the Governor in Council decided that the significant adverse environmental effects are justified in the circumstances.

In recent EIAs for large refineries, the regulatory requirements for EIA were different. In North America, there were requirements to quantify GHGs from “well to wheel” in order to consider every possible aspect

[37<sup>th</sup> Annual Conference of the International Association of Impact Assessment, Montreal, April 4-7, 2017](#)

of emission sources, mitigation, and sequestration. For refineries in the Middle East, the GHG emissions were quantified, with a full set of mitigation measures. In these instances, total emissions, excluding embodied emissions, ranged from 5 - 8 million t/y. Thresholds of 100 kt/y and 1,000 kt /y were used to distinguish medium and high releases. Effects were rated not significant.

In a large transmission line project in Eastern Canada, an EIA was conducted to satisfy both joint federal-provincial requirements. In the assessment, no substantive interactions between the project and atmospheric environment were anticipated, resulting in essentially no consideration in the EIA. The Project was approved and is currently undergoing construction. The upstream GHGs were not assessed.

For liquefied natural gas (LNG) projects in Western Canada, the valued component was “GHGs”. Significance was assessed by considering the impact of project emissions on provincial and national inventory reports, by including CEA Agency guidance, by interpreting previous provincial decisions on like projects, and by comparing the project to an industry profile. Clear statements were made - the project’s GHGs were rated significant on its own as well as cumulatively. The province stated that the magnitude of the emissions is significant in relation to BC’s reduction targets - one of the first statements by a regulatory authority declaring significant effects related to GHGs.

Recently, the CEA Agency issued additional requirements to assess “upstream” emissions’ (Canada Gazette 2016). Those are emissions associated with industrial activities from the point of resource extraction to the project under review. In scoping any project for EIA, it is clear to us as practitioners that the sources of GHGs to be assessed should only be those producing GHGs directly as a result of the project activities. For a linear facility such as a pipeline, or transmission line, the boundary for assessing and quantifying GHGs should be the start and finish of the proposed infrastructure, not including upstream or downstream – unless those activities are part of the project definition.

Discussions about significance directly between practitioner(s) and legal representatives revealed that the desire of the legal community is to declare there is “no significant adverse environmental effect” for GHGs. This is conflicting for a practitioner as guidance suggests that for a single project on its own this “cannot be measured”, and cumulatively the effect of the project in combination with all other sources of GHGs is significant.

### **The way forward – practical guidance**

Firstly, boundaries. It is essential to scope the source of GHG emissions in a way that reflects the activities associated with the project definition. This means carefully considering the direct and indirect sources of emissions and assessing the direct emissions. Secondly, significance. Regarding climate change and the release of GHGs to the atmosphere, it is clear that a significant adverse environmental effect on natural climate change exists now, for a project located anywhere on the globe. This is a direct result of the many human activities releasing GHGs to the atmosphere – it is the ultimate cumulative effect. Yet any one source is so small, that its effect is very difficult to detect.

Therefore, from a science perspective, we say that in any project, the environmental effects of the project on its own are rated not significant, and if greater than some practical value, the environmental effects acting cumulatively are rated as significant. This is better than stating the magnitudes are a small fraction

of global emissions and are therefore not significant. In light of the magnitudes and thresholds described above, the threshold values delineating low, medium, and high are recommended to be 25 kt/y, and 1,000 kt/y.

## Conclusions

There is still considerable variation in assessing climate change and GHGs in EIAs around the world. Practical guidance is proposed here on how to address GHGs and climate change in EIA on the basis of the literature review, discussions with practitioners, and experience on several types of industrial projects. Boundaries and thresholds are proposed for assessment and significance in EIA.

## References

Agrawala, S., Kramer, A.M., Prudent-Richard, P., Sainsbury, M., and Schreitter, V. 2012. Incorporating climate change impacts and adaptation into environmental impact assessments: opportunities and challenges, *Climate and Development*, vol. 4, no.1, January 2012, pp 26-39.

California Air Resources Board. 2008. Preliminary Draft Proposal - Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act, October 24, 2008.

Canada Gazette. 2016. Vol 150, No. 12. Available online: <http://www.gazette.gc.ca/rp-pr/p1/2016/2016-03-19/html/index-eng.php>.

Canadian Environmental Assessment Agency. 2003. Incorporating climate change considerations in environmental assessment: general guidance for practitioners. (Ottawa: The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, 2003).

Chalifour, N. A. 2009. (Pre)Cautionary Tale About the Kearl Oil Sands Decision - the Significance of Pembina Institute for Appropriate Development, et al. v. Canada (Attorney-General) for the Future of Environmental Assessment.

Cherubini, F., Fuglestedt, J., Gasser, T., Reisinger, A., Cavalett, O, Huijbregts, M. Johansson, D. Jørgensen, S., Raugei, M., Schivley, G. Strømman, A H., Tanaka, K. and A. Levasseur. 2016. Bridging the gap between impact assessment methods and climate science. *Environmental Science & Policy*. Oct 2016, Vol. 64, p129-140. 12p.

Enríquez-de-Salamanca, Á; Martín-Aranda, R., and R. Díaz-Sierra. 2016. Consideration of climate change on EIA in Spain. *Environmental Impact Assessment Review*. Feb 2016, Vol. 57, p31-39. 9p.

Hands, S. and M. Hudson. 2016. Incorporating climate change mitigation and adaptation into EIA: a review of current practice within transport projects in England. *Impact Assessment & Project Appraisal*. Dec2016, Vol. 34 Issue 4, p330-345. 16p.

Intergovernmental Panel on Climate Change, IPCC. 2015. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel

on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

Larsen, S V. 2014. Is EIA fulfilling its potential? The case of climate change in renewable energy projects. *Impact Assessment & Project Appraisal*. 2014, Vol. 32 Issue 3, p234-240.

Lee-Andersen S. 2017. *Climate change essentials: navigating carbon pricing mechanisms*. McCarthy Tetrault LLP. January 2017.

Murphy M., and K. Gillam. 2013. *Greenhouse Gases and Climate in EIA – Practical Guidance*. presented at International Association of Impact Assessment (IAIA) Annual Conference, Calgary, Canada, 2013.

Ohsawa, T. and P. Duinker. 2014. Climate-change mitigation in Canadian environmental impact assessments. *Impact Assessment & Project Appraisal*. 2014, Vol. 32 Issue 3, p222-233. 12p

Slotterback, C.S. 2011. 'Addressing climate change in state and local environmental impact analysis', *J Env Planning + Management*, vol. 54, no. 6, pp 749-767, July 2011.

Sok, V., Boruff, B.J., and A. Morrison-Saunders. 2011. 'Professional practice: Addressing climate change through EIA: international perspectives from a survey of IAIA members', *Impact Assessment and Project Appraisal*, 29 (4), Dec 2011, pp 317-326.

Sutley, N.H. 2010. 'Draft NEPA guidance on consideration of climate change and GHGs', Memorandum for Heads of Federal Departments and Agencies, Council of Environmental Quality, Office of President of USA, pp 1-12, Feb 18, 2010.