Integrating Climate Change into Impact Assessment: Challenges for Integrity and Credibility

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Introduction

Over the last few decades EA has made impressive advances as a pre-emptive analytical and design tool, employed by businesses and government for project approvals. While business may have been frustrated at times by cost, speed, and scoping issues, most would agree today that the process has lessened impacts and improved projects. While the environmental benefits are self-evident, the business advantages are less frequently stated – building trust with stakeholders, defusing controversy, and adding certainty for project proponents and investors. In this evolution of the EA process, we have carefully built public credibility with the development of appropriate methodologies and processes. We have carefully woven science, social science, and public policy. Today as we consider integrating climate into the process, we must not jeopardize our scientific and public credibility by hasty inclusion of new areas before sound methodology is in place and we can deliver with integrity on public expectations.

Climate as an Environmental Issue

Climate change is an environmental issue like no other; so it is hardly surprising it creates some disturbing challenges for EA process and methodology. Today the sense of urgency in addressing these issues is great especially in the EU, Canada, and Japan which have ratified Kyoto and are today implementing it. But first we must look at some of the distinctive features of climate before addressing some of the issues of process.

A. Climate is such a challenge for governments because it is so new (market mechanism tools), so interconnected (with energy and economic policy), and so complex (in its science and social science).
B. Climate is such a challenge for business because it requires new combustion systems not merely add on equipment like scrubbers.

C. Climate is forcing systemic changes which are a critical link on our road to sustainable development. Without the will, we will never find the means.
D. Climate creates jurisdictional tensions in federal states between national governments (negotiating Kyoto) and sub-national governments (implementing key parts). Canada is a prime example of these tensions of shared jurisdiction and the necessity for joint panels.
E. Climate can on occasion create significant competitive issues between the Kyoto and the Non-Kyoto worlds. This will create some challenges for EA panels. Projects rejected for GHG reasons in southern Alberta could migrate south of the border to avoid GHG regulations and ship the product back into Canada. Alberta would lose jobs and revenue for no environmental gain. Consumption, not production projects, often drive emissions.
F. Climate is an issue which is wider and more pervasive than the site specific focus of project assessment. CO_2 is a global phenomenon, non-toxic gas, essential food for vegetative systems, and with a long residency in the atmosphere (about a century). We still have a long way to go in understanding carbon regimes and the huge potential uptake of natural systems (forests, soils, wetlands, oceans). However how individual project emissions impact this complex system is exceedingly hard to estimate.
G. Finally as an environmental issue it involves future predictions more than current data. As Yogi Berra once said on the eve of a World Series. Predictions are difficult especially if they involve the future.

This does not mean we should not be taking action today (curbing emissions or requiring offsets) but it does mean our analysis and out recommendations will be more directional and less conclusive reflecting the nature of the issue. We must have the courage to admit the inherent limitations.

Variability vs. Climate Change

In dealing with this topic it is essential to make a fundamental distinction between "natural variability" in climate and the newly defined term "Climate Change". The history of climate reflects the huge swings in "natural variability" from the Little Ice Age of 500 years ago to the hot decade of the 1990's. The term "Climate Change" today is used by governments to mean the recently emerging human induced climate change which is driven by chemical changes in the atmosphere like increasing levels of carbon dioxide and methane. It is central to the argument of this paper that both natural variability and human factors are contributing to our current warming pattern and scientifically we cannot yet separate quantitatively the one group of forces from the other. This has EA process implications to be discussed later.

Climate and Project Approvals (Alberta)

Canadian regulatory boards have already been considering climate issues in project approvals for some years. Our own company dealt with it in the 2001 hearings on a new power plant application before the Alberta Energy and Utilities Board[2]. This project had estimated emissions of 6.5 million tones of CO_2 per year and given public interest in climate change we chose to be pro-active. Both TransAlta and the other applicant Epcor[3] offered in advance to offset about 63% of the CO_2 emissions to bring them down to a net level equivalent to a combined cycle gas turbine. The Board converted our voluntary commitment into a regulatory requirement setting out three important criteria which are now precedents for Canadian project approvals.

1. The authorized use of CO_2 offset credits as an alternative to curbing project emissions.

2. The level of credits required could increase with future regulatory changes for coal or gas fired plants.
3. Given the scientific complexity of carbon regimes, independent third party verification of credits would be required for their use.

The Board was trying to adapt the US experience on SO_2 and NO_x emissions trading and apply it to CO_2 in Canada. But many issues remain to be settled including the type of credits which would be eligible. Negotiations continue on these issues with the Alberta Government. There is no assurance that the Alberta regulations will be identical or even compatible with the federal Kyoto regulations hence the potential for double jeopardy for industry. There was some irony in the fact that the Government of Alberta, which was formally opposed to Kyoto, chose to impose these CO_2 regulations for 2005, three years before Kyoto, in order to entrench their own claims to jurisdiction. Also at a time when Ontario was phasing out coal fired plants, Alberta was moving in an opposite direction by regulating new units and requiring the costly purchase of offset credits[4] to bring net emissions down to the level of a gas fired plant.[5]

There are two major points for EA processes. There is not yet any unified climate policy framework so necessary for project assessments. Also in the absence of economic emissions control technology, offsets are now an alternative for project approvals but they require their own regulatory procedures which panels may have to define or implement.

Climate and Project Approvals (National)

The Canadian Environmental Assessment Agency has also begun to address climate issues in project assessment and approvals[6]. In the research for this paper, I consulted Bob Connelly, the Agency head and one of the most experienced practitioners in Canada. The one example which he stressed to me was the famous “fixed link”, the 13 km bridge across the Northumberland Strait

from Prince Edward Island to the Canadian mainland. Critics of the bridge proposal claimed that the piers for the spans would slow ice movement out of the strait, cooling spring temperatures and delaying agricultural growth on the surrounding farms, already marginal in terms of degree days. As a result the panel recommended that the spans be lengthened and the piers be designed to cut through not block the escaping ice. They also moved both approaches back to take into account potential sea level rise from climate change[7]. This involved both a traditional and a new approach to climate change which included design modification to deal with climate (ice movement) as well as the new climate change issues (involving sea level rise).

During 2002 Canadian officials began to consider process changes to integrate climate change issues into the CEAA project assessment process. In November 2003, the federal/provincial task force produced a general guide for practitioners. Their main focus was on two key points. The first directed proponents to assess all projects in terms of GHG emission levels and climate change. Secondly they must address the more complex and challenging task of assessing the impacts of climate change on the project life[8]. The latter raises fundamental questions about our ability to predict long term climate change especially for site specific projects. Thus far general circulation models give continental and global trends but only the most general direction at the local level. Some local modeling has produced inconsistent results. The variables are rough estimates and their integration complex and uncertain. General circulation models still have some constraints such as significant difficulty factoring in the major role of clouds and oceans. While it is incredibly important for scientists to nurture and develop this work, the level of uncertainty hinders its usefulness today in a legal and regulatory EA context. Projects should be approved or rejected on the basis of empirical evidence and analysis which can be debated and tested with some reasonable degree of certainty. While emission levels are a clear area for assessment, the impact of climate change over project life is a much more speculative area until much better site specific modeling is available. So this

second factor should be confined to a general background role in terms of project assessment.

Historical Record

As an alternative to modeling the future, we should put a heavy emphasis on the historical climate record of the past. This provides us with a much firmer empirical record in most areas and definable transaction costs for project applicants. This will help to confine debate in processes regarding norms, variability, and extremes and give a firmer evidential base for panel decisions. Data would be expected and norms estimated over 3 consecutive decades. This type of quantitive data lends itself to the needs of planners and engineers in creating the detailed design and estimating project capital and operating costs. The arguments are equally valid for the panel or the regulatory body which must set precise conditions for approval or alternately the reasons for rejection.

Integrating Disciplines

In establishing the process, it is necessary to recognize that EA requires the integration of three differing types of science with differing language, principles, and goals.

1. Climate science begins with atmospheric chemistry and physics which is fed into the modeling (pure science).
2. This science then must be integrated into EA methodology including the imposition of the physical project into the local ecosystem and social circumstances (applied biological and social sciences).
3. Then this science must be integrated/translated into the language and assumptions of the engineer designing the project.

This interdisciplinary integration becomes a key factor in the process which is all the more difficult given the complexity of climate science.

The Time Dimension

The time dimension or projected life of the project is a further complication for panels and processes. Projects with a 20/40 year life time are in one category but occasionally we have projects with a very long life. One such project in Canada was the decommissioning of the Quirke and Panel Uranium Mines at Elliot Lake, Ontario. The most important feature was the construction of permanent containment pools for the radioactive tailings to ensure they were never exposed to the air. The tailing ponds were designed so dams and dikes would supply water continuously for the terraced containment areas. This project raised climate change issues for the EA panel including precipitation, drought, evapotranspiration, etc. Here the historic record was inadequate for the time involved. The panel found the project constituted a "perpetual" environmental hazard, requiring extensive monitoring, maintenance, and research "in perpetuity". Here the procedures required flexibility to adapt to future climate conditions[9]. Nuclear facilities are an important exception to the rule that historic data alone is sufficient to protect the public interest and public safety.

Location and Regional Variability

Like other areas of EA, location will play an important role in project assessment. While it will be difficult to quantify there will be some general factors which will have to be considered. Sea level rise is already underway and will continue with impacts on deltas and other low lying areas. For instance the locating of new coastal sewage treatment plants must take into account that sea level rise will not back up their systems or commercial and residential dykes and levies will be sufficient to withstand higher tides and surges.

Increased hurricanes in some areas of the tropics will mean insurance companies will avoid coverage for new resort hotels in certain areas. It is no accident that reinsurance companies like Swiss-Re are in the forefront of climate change science and policy[10] and have lost heavily in recent years from extreme weather events. An increasing number of companies are becoming pro-active on climate change as part of risk assessment and planning for existing and future assets.

Climate policies for specific areas will vary with local circumstances which creates a further area of uncertainty for EA processes seeking clear and universally accepted solutions. The Intergovernmental Panel on Climate Change, the established international authority, made this point clearly: "there is no universally applicable best set of policies". They believed that it was important for local authorities to consider "the robustness of different policy measures" both mitigation and adaptation and the degree to which "climate specific policies" are integrated with "wider sustainable development goals". Canada, like Russia will be a particular challenge. Regionally there will be different climate components driving changes (sea, ice, wind patterns, land cover, etc.) from the Arctic Ocean to the Great Lakes (half way to the equator). Panels will have to assemble the regional components to assess current

patterns. For instance in the NE of Canada we are seeing cooling trends which in the NW, there is clear warming.[11]

Water

Water is already emerging as a critical EA issue with links to climate change. In southern Alberta, project water requirements and growing scarcity are already emerging as a major factors in project approvals. There is no effective water or water conservation policy in place so project panels have a context in which to work. With the serious drought of the last few years, it is getting more difficult to document whether there are sufficient water supplies available and there is growing competition between agriculture, industry, urban growth, tourism, hydro electric, oil and gas, and First Nations for available supply. Alberta is an area of rapid population and economic growth, but with the melting of the mountain glaciers there is declining feedstock for our rivers. If future climate change impacts are factored in, some might argue no projects should be approved. In our company, several US SW power projects have had to be abandoned. While we could purchase future water rights for those plants, we did not believe that local water supplies were sustainable given climate change and the declining aquifer and ground water levels.

The politics of water will become exceedingly controversial and CEAA panels dealing with water issues will be subject to intense political infighting. Alberta is already reflecting the 19th century slogan "whisky is for drinking and water is for fighting"[12].

Permafrost and the Arctic

Another area for special attention for EA and climate change is the declining permafrost in the arctic. In areas like the Mackenzie Valley warming is already

occurring with serious consequences. Continuous and discontinuous permafrost underlies so much of the land and it provides the firm foundation on which roads, buildings, pipelines, airstrips, etc. are built. Some building foundations have refrigeration tubes in gravel underneath them to ensure the permanence of the frozen ground underneath and this design feature will probably become more frequent for project approvals in the arctic[13].

Market Mechanisms and Climate Change

In the final hours of the Kyoto negotiations in 1997, Al Gore persuaded the Europeans to accept three market mechanisms as part of the package which George Bush later rejected. While the US had experimented with emissions trading for two decades, this policy tool was new to the EU, Canada, and Japan. The basic concept is "offset" credit creation and then the potential for trading these credits given the global nature of the GHG phenomenon. Under Kyoto there are three of these market mechanisms.

1. The Clean Development Mechanism (CDM) which allows for climate related projects in developing countries to generate emission credits which can be sold or traded to developed countries to offset their emissions.
2. Joint Implementation (JI) which allowed for climate projects and national allocation credits from developed countries to be transferred to other Kyoto parties requiring credits to meet their obligations.
3. International Emissions Trading (IET) allowed for domestic and international transfer of credits between parties with a surplus and those in a deficit position. This is designed to help both countries and companies meet their Kyoto obligations.

This is creating a new carbon credits currency with brokers, consultants, as well as buyers and sellers. The EU system will open in 2005 and Canada and Japan will follow later. If EA processes include climate change and GHG provisions

they will become part of this system including the volume and the nature of the offsets required as happened with our application to the Alberta Energy and Utilities Board.

If market mechanisms are to work for EA panels and project proponents a number of policy initiatives have to be in place. There must be a clear policy framework on eligibility, verification, timing, and other key issues. There must be policy consistency between the three layers of government. There must be some international consensus on the scientific methodologies for verification especially in areas like forestry and agricultural soils. Panels will not have the resources or time to develop these on their own. The current scene includes efforts to develop "class" assessments for offset projects and strategic environmental assessment systems which are more appropriate for developing nations with their limited infrastructure. The international negotiations on all of this are lengthy and cumbersome so resolution will not be speedy.

The Scientific Controversies

One of the fundamental issues for many today is the "science" of climate change, which has now changed from a scientific debate about the relative certainty of particular evidence to a very political debate about the conclusions of science. This brings a new meaning to the phrase "political" science. I generally support the carefully peer-reviewed process of the Intergovernmental Panel on Climate Change (IPCC) and the conclusion that human activity has probably constituted the most potent ingredient in the current trends to global warming. But panels must avoid attempting to consider evidence on the basic causes of global warming – the science is just too complex and the interpretations too varied. If anyone has any doubt about this just go back to the issues of Nature and Science in 2003 for a taste of this[14]. Both proponents and critics of IPCC have been guilty of some exaggeration from the evidence.

First we need to look at the nature of the real debate about IPCC among the scientists. Much of the core science can be found in the voluminous technical reports of IPCC prepared and peer reviewed by experts which document very clearly the limitations and the uncertainties of the current science (i.e. the role of clouds and oceans). But these lengthy documents were too difficult for non-scientists to understand so the executive country reps prepared a much shorter "Summary for Policy Makers" which attempted to draw clear policy conclusions from the scientific evidence[15]. This document much more than the background reports is now the subject of bitter controversy where some IPCC contributors feel the summary document has gone way beyond the scientific documentation in order to justify the extensive measures of Kyoto[16]. This is a debate among scientists which will not be resolved in the next decade. It is a debate which EA panels should not open if they wish to complete their task in a timely fashion. But some industry and NGO's want this public battle on the science. This is all the more reason to keep to the historic record of temperatures and climate wherever possible. Also where the panels feel they must go beyond empirical data they must ascribe a level of certainty to any future projections so they can properly weigh the relative significance of this evidence.

Conclusions

We are all proud of the professional credibility and integrity of the development of our EA processes. In my opinion we must build on that credibility not risk it with the integration of new climate change methodologies which do not meet normal regulatory definitions for certainty. In my opinion historic data and empirical quantification are more appropriate today for legal and regulatory EA processes. I believe that "natural variability" is as great factor today as human induced "climate change" and directly related to historic data. Climate modeling is an impressive new area of science but not yet ready for project panel decision making. One recent study for the Canadian Environmental Assessment Agency concluded: "the information most needed, the regional detail, is the information in which there is the least confidence"[17]. It would be profoundly unfair to project applicants to have projects rejected or forced into costly major changes on the basis of information and analysis with low probability. Court challenges would certainly result. Let us go forward with what we do best, emissions management, offsets allocation, technology innovation, on the basis of real data that project panels, financial analysts, and design engineers can understand. This will help to protect public credibility and professional integrity until the new modeling science can deliver the certainty which EA practitioners need.

Footnotes

[1] Dr. Robert Page, a member of IAIA, is Vice President of Sustainable Development, TransAlta Corporation (Calgary, Alberta) with power plants in Canada, US, Mexico, and Australia. He was involved in the international climate change negotiations, is past Chair of the Board, International Emissions Trading Association (Geneva), current Chair of the Board, BIOCAP Canada Foundation, (national research partnership on forestry, and soils climate sinks), member of the business advisory board, Pew Centre on Climate Change (Washington, DC) and Adjunct Professor, in Faculty of Environmental Design, University of Calgary.

[2] This project which has received regulatory approval is now known as Centennial I and II and has been delayed beyond 2005 for construction. The US Department of Energy recently stated there are 94 new proposed coal plants announced in the US.

[3] Epcor is Edmonton Power, a city owned utility.

[4] At $10 per tonne, this would be an annual cost of approximately $37.8 million per year.

[5] See Alberta Energy and Utilities Board, Decision 2002-014 (February 2002) p. 20 and TransAlta Corporation, Keephills III and IV, Environmental Impact Statement, Vol. 2, Section 2, p. 5 Emission Levels and Offsets.

[6] Incorporating Climate Change Considerations in Environmental Assessment: General Guidance for Practitioners (November 2003). This was produced by the Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment (hereafter Federal/Provincial Climate Change and EIA).

[7] Bob Connelly, Acting Head, Canadian Environmental Assessment Agency, January 8, 2004 and E.M. Barrow and R.J. Lee Climate Change and Environmental Assessment, Part I, Canadian Environmental Assessment Agency, Research and Development Monograph Series, Ottawa, 2000.

[8] Federal/Provincial Climate Change and EIA (see #6 above).

[9] Rick Lee, Climate and Environmental Assessment, Part I pp 20-22, Research Monograph, Canadian Environmental Assessment Agency, Ottawa, 2001.

[10] Robert Watson, et al Climate Change 2001: Synthesis Report Intergovernmental Panel on Climate Change, Cambridge University Press, 2001 and personal discussions with Swiss Re.

[11] Ibid, p. 38 and Barrow and Lee, Climate Change and Environmental Assessment, Part II, Canadian Environmental Assessment Agency, Ottawa (2000), p. 17 and 18.

[12] This slogan which I believe originated with Mark Twain was a favourite in the early history of dry farming in southern Alberta in the 1880's and 1890's.

[13] Robert Page, Northern Development, the Canadian Dilemma, McClelland and Stewart, Toronto, 1986.

[14] Two examples – Science June 6, 2003 and Nature May 29, 2003.

[15] "Summary for Policy Makers" in Climate Change 2001: Synthesis Report, IPCC, Cambridge University Press, 2001 pp 1-34.

[16] See Dr. Richard S. Lindgen, Sloan Professor of Atmospheric Science, MIT, in The Hill Times, (Ottawa) February 23, 2004..

[17] Phil Byer, et al. Addressing Climate Change Uncertainties in Project Environmental Assessments, Canadian Environmental Assessment Agency Ottawa, 2003, p. 29.