

**PROFESSIONAL
PRACTICE**

**AN OVERVIEW OF THE CANADIAN EXPERIENCE IN
ENVIRONMENTAL IMPACT ASSESSMENT (EIA)¹**

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INTRODUCTION

The requirement for conducting environmental impact assessment (EIA) for all proposed economic development projects/activities in Canada is based in law. The federal government of Canada, all ten provincial and two territorial governments have developed procedures to meet this legal requirement. The federal environmental assessment and review process (EARP) was established in 1973 and, at present, is based on the EARP guidelines order issued by the federal cabinet in 1984. The evolution of EARP over the past 20 years or so, can be summarized as follows:

1. 1973-Federal cabinet policy decision
 - a. Defined federal government of Canada's basic EIA policy

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- b. Established an EIA process with two-phase approach: initial assessment phase and public panel review phase
 - c. Created Federal Environmental Assessment Review Office (FEARO) for administering EARP
2. 1979-Ministerial authority decision
The federal Minister of Environment was given authority by the federal cabinet to issue guidelines for implementing the EARP.
 3. 1984-Issuing of the environmental assessment and review process guidelines order
The Minister of Environment issued EARP guidelines order, which clarified roles and responsibilities of various parties for participating in and/or implementing EARP.
 4. 1989-Federal court decision
In response to a court challenge, a federal court, based in the province of Saskatchewan, ruled that the guidelines order is a law of general application and not simply a federal cabinet policy statement. This meant, among other things, that all matters related to the interpretation, compliance, and adherence to established procedures under EARP were subject to court challenges.
 5. 1990-Decision to pass an environmental impact assessment act
The guidelines order was written as a policy document and not as a piece of legislation. The 1989 court decision forced the federal government to draft an EIA act to replace the guidelines order as the legal basis of EARP.
 6. 1993-Canadian environmental impact assessment act (CEAA) passed
The CEAA was debated, voted upon, and approved by the Parliament of Canada in 1993 and promulgated in January 1995.

OBJECTIVES OF FEDERAL ENVIRONMENTAL ASSESSMENT AND REVIEW PROCESS

The main objectives of EARP, whether it is implemented under the guidelines order or soon to be promulgated CEAA, can be summarized as follows:

- ▶ To address environmental and related social issues at the planning stage before making irrevocable decisions
- ▶ To ensure that environmental and related social questions receive the same considerations as economic, technical, political, and other such matters; in other words, a truly integrated economic development planning approach for reaching goals of sustainable development is adopted and practiced
- ▶ To incorporate results and recommendations of environmental assessments into all federal decisions
- ▶ To enable those who might be affected by proposed projects/activities to influence federal decisions and the decision making process
- ▶ To identify and attempt to resolve value conflicts resulting from rapid changes in a technologically dominated society and concerns about the state of environment

The federal government of Canada requires an environmental assessment prior to making any final decision if any of the following condition(s)/ situation exist:

- ▶ A proposed activity/project is being initiated/undertaken by an agency/ department that is part of and/or controlled by the federal government
- ▶ Involves financial commitment from the federal government of Canada, including bilateral or multilateral funding arrangements for providing assistance to the developing world
- ▶ The proposed activity is to be located/conducted on lands, including offshore areas, that are administered by the government of Canada
- ▶ The proposed activity is likely to cause environmental effects that will involve federal jurisdiction responsibility. Examples are transboundary pollution; direct or indirect impacts on Canada's national parklands or Indian lands; and international commitments and obligations
- ▶ Any proposal requiring a federal decision, permit/license, etc., prior to its implementation

In short, the main purpose of EARP is to achieve the goals of sustainable development as described in the preamble to the Canadian environmental assessment act (CEAA). Copies of the act can be obtained by writing to: the Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Canada K1A 0S9.

OBJECTIVES OF PROVINCIAL ENVIRONMENTAL IMPACT ASSESSMENT PROCESSES

The main objectives of Canada's provincial and territorial EIA processes are essentially the same as those of EARP. There are, however, some procedural variations. Summaries of key elements of both the Ontario and Quebec assessment processes are presented below.

Ontario Environmental Assessment Procedure

Ontario's environmental assessment procedure is based on an environmental assessment act. This legislation-

Provides for better planning by involving the public, government ministries, and agencies in the environmental assessment and approvals process

Applies to projects from ministries, agencies, conservation authorities, and municipalities

Designates only some types of private sector projects as subject to the procedure

Provides for the assessment of specific projects and class of projects

Provides for the authorization of a project by the minister or the environmental assessment board

The legislation contains an environmental bill of rights that promotes public participation in environmentally significant proposals (policies, acts, regulations), creates the position of environmental commissioner to whom policies and procedures can be appealed, and allows citizens to request a review of acts and regulations that protect the environment.

In Ontario, project proponents must prepare the environmental impact statement (EIS), explain the project and EIS to the public, and participate in a public hearing. The government-

- ▶ Advises the proponent on how to prepare the EIS
- ▶ Reviews the EIS
- ▶ Appoints an environmental assessment board (quasi-judicial body) that conducts public hearings
- ▶ Provides the system for appealing policies and regulations (environmental commissioner)
- ▶ Authorizes projects

The public and interest groups are called upon to review and comment on EISs, request public hearings, and comment on the acceptability of the project.

Quebec Environmental Impact Assessment and Review Procedure

Quebec's environmental impact assessment procedure is also based on legislation, an environmental quality act. This act-

- ▶ Establishes a procedure for the preparation and review of EISs
- ▶ Identifies the projects that are subject to the procedure
- ▶ Calls for the government to issue certificates of authorization for projects subject to the procedure
- ▶ Establishes a system for public review

An amendment in 1993 applied the procedure to large industrial projects, broadened the public involvement component, added the environmental assessment of policies and programs, and increased government discretion in its application of the act.

Under Quebec's procedure, project proponents prepare the EIS and provide additional information if requested. Proponents also explain the project to the public, including during a public hearing, and conduct a follow-up monitoring program. The government issues terms of reference for the EIS and reviews it, provides the forum for a public hearing, and authorizes the project to proceed. The public and interest groups request the public hearing and provide comments on the social and scientific acceptability of project.

IMPLEMENTATION OF ENVIRONMENTAL ASSESSMENT AND REVIEW PROCESS

Self-assessment is one of the basic principles of the EARP. The initial environmental assessment of a proposed project is conducted by the same government department that proposes the project (Duffy 1986). When more than one department is involved in a project, then they must discuss and agree on their respective EIA roles and responsibilities.

The environmental assessment and review process is divided into two steps. The first is an initial assessment. The department proposing a project uses the initial assessment to conclude whether-

- ▶ The environmental and related social impacts are insignificant or significant and whether they can be mitigated
- ▶ The impacts are very significant and cannot be mitigated with existing knowledge/resources
- ▶ The impacts are unknown or there is mounting public concern about the adverse impacts and/or desirability of the proposed project

Based on the initial assessment conclusions, the department decides whether to proceed with the original or a modified version of the proposal. The department can also cancel the project or submit it for a public review by an independent panel, the second step of the two-step process. The decision on how to proceed remains with the initiating department.

If an independent panel is used, then the initiating department requests the federal minister of environment to appoint the panel for conducting a public review. Couch (1989) describes the panel review process in detail. At the completion of the public review process, the panel submits its report to the minister of environment and the minister(s) of the initiating department. The panel's report is made available to the public and the initiating department is legally bound to respond publicly to all such reports. The recommendations in the panel report are, however, advisory and are not binding on the initiating department.

Less than 0.1 percent of economic development proposals and other projects initiated by the government of Canada have involved the public review process by an independent panel. The principal reasons for this are-

- ▶ Federal departments have very specific mandates-transport, energy, agriculture, etc. Consequently, the departmental project planning and implementation processes are handled by an experienced and specialized staff. Departmental staff often can readily predict both beneficial and adverse impacts of most departmental proposals either alone or with the advice/assistance of consulting experts.

- ▶ A large percentage of all activities proposed and undertaken by various departments are generally routine and repetitive in nature and their environmental and related social impacts can easily be predicted and mitigated.
- ▶ Once referred to an independent panel for a public review, the initiating department no longer has complete control of a project under their mandate. The initiating department must accommodate the panel's schedule and wait for the final outcome. Thus, the decision to use an independent panel is made carefully and often reluctantly.

SELECTED HIGHLIGHTS OF PUBLIC REVIEW PROCESS BY AN INDEPENDENT PANEL

By the end of 1993, fewer than 50 proposals, most of them dealing with large undertakings, were reviewed by an independent panel via the public review phase of EARP. They include five currently underway. Most fell into three major categories: (1) energy related, including oil and gas exploration and hydroelectric generation; (2) transportation system development, such as building highways through sensitive ecosystems, and railroad and airport construction and expansion; and (3) nuclear technology and radioactive waste management and disposal. One exception currently underway is a low-level military flying activities review.

The reports of the independent panels contain valuable descriptions of practical experience and EIA knowledge and experience gained and applied. A review of three watershed modification proposals reviewed by independent panels over the past 20 years revealed some very valuable lessons (Dirschl, Novakowski, and Sadar 1992). A more exhaustive review based upon experiences with both the federal and provincial (Ontario) EIA processes have revealed some thought provoking conclusions for the EIA practitioners and decision makers in Canada (Gibson 1993).

A detailed account of the entire experience gained through the public review process of EARP is impossible within the context of this report. The remainder of this section, however, examines the lessons learned from a few panel reports. These reports indicate that environmental impacts associated with a proposal can be roughly divided into the following categories: generic

impacts, site specific impacts, social impact assessment (WA), and impact linkages.

Generic Impacts

Such impacts, generally biophysical in nature, are often associated with a particular activity and are likely to occur irrespective of the location or timing of the activity. For instance, when a plan calls for the construction of a dam on a river, the resultant reservoir upstream and the water flow fluctuations downstream will cause certain impacts no matter where the dam is located or how it is operated.

Site-Specific Impacts

Other impacts depend upon the geographic location of the project proposal site and the social, economic, political, demographic, and other conditions prevailing in the project area. For instance, flooding a large area upstream of a huge dam in northern Canada may displace only a few families compared to a similar size reservoir in southern Canada. Needless to say, the size of the population expected to be displaced will have a strong influence on the outcome of the EIA exercise.

Social Impacts Assessment (WA)

The most difficult and challenging parts of an EIA are value judgments based on ethics, morality, fairness, and equity. It is always difficult, if not impossible, to justify what some perceive to be a loss or erosion of community identity or property, and damage to spiritual, cultural, and heritage sites. Similarly, assigning monetary values to gifts of nature, such as a mountain stream, forest, fish, or any part of an ecosystem is not possible.

Impact Linkages

Establishing reliable linkages between biophysical and social impacts, especially human health, is also a difficult task facing EIA practitioners. The scientific knowledge base needed to define and quantify such linkages as toxicological and epidemiological data acquisition and interpretation is often not detailed enough to reach meaningful conclusions with an acceptable degree of certainty. Another difficulty is in synthesizing and integrating numerous inputs from traditional scientific disciplines into a coherent package (Sadar and McEwen 1992).

Several panel reports contain very innovative and practical suggestions for overcoming difficulties in predicting and mitigating biophysical and social

impacts. Others have identified workable methodologies and listed areas that require research in order to improve the effectiveness of EIA-related processes and practices. For instance, the two independent panels that reviewed the construction of dams on two rivers in western Canada provided an excellent EIA research agenda for improving methodologies and processes (Rafferty-Alameda Project Review 1991; Oldman River Dam Review, 1992). An analysis of the recommendations by the Rafferty-Alameda panel also has been undertaken (Stolte and Sadar 1992).

COST EFFECTIVENESS AND EFFICIENCY OF ENVIRONMENTAL IMPACT ASSESSMENT STUDIES

Since the purpose of an EIA is to help produce better decisions, the fundamental question asked again and again in Canada relates the cost—both in terms of money and time—associated with EIA preparation. The decision maker has the right to know what EIA will cost and how long the wait will be before the advice is ready. It is difficult to provide an all-encompassing answer. Key factors related to the cost effectiveness and efficiency of EIA practices and processes are, however, discussed below.

The Nature and Scope of a Proposal

Obviously, the size and location of a proposal under review will be a major factor in determining the level of expenditures and the length of time required to complete an EIA. Other important factors are the level of public participation, project complexity, and the technology involved.

Terms of Reference for the Environmental Impact Assessment Study/Panel Mandate

A clearly focused terms of reference, describing precisely what is and what is not to be reviewed, generally makes it easier to move forward with an EIA. When these documents are ambiguous, progress is hindered by unforeseen issues arising in the middle of the study, concentration of efforts on issues that later prove to be irrelevant, and the need to repeat work when the presuppositions change.

Guidelines and Preparation of the Environmental Impact Statement

Writing an EIA report or, in a case of public review under EARP, preparing an EIS is the most costly and time-consuming part of the EIA process.

Under the public review phase of EARP, the EIS is prepared in response to panel guidelines, which often differ in scope and style from one panel to another.

Under the EARP guidelines order and CEAA requirements, the public review panels hold public hearings to identify relevant issues. Hearings are followed by a release of project-specific draft guidelines that are finalized after receiving public comments. The panel guidelines are to reflect public input, as well as panel's expectations on the information to be included in the EIS. A good EIS is expected to address both impacts and methodologies to the full satisfaction of the panel.

A review of the guidelines issued by several EARP panels reveals several shortcomings that need to be addressed in order to make panel reviews more consistent, efficient, fair, and cost effective in the use of both time and resources. In general, panel guidelines have become very broad in scope, unfocused, and, in some instances, partially or totally irrelevant to the review process and its purpose. As a result, project proponents are expressing concerns about the cost and other impediments to meeting the panels' full expectations in light of numerous practical constraints. The usefulness and credibility of the process is put into question when a panel's guidelines seem to impose unreasonable and irrelevant demands and unbearable costs on the proponent.

One of the underlying difficulties relates to the shift from FEARO-staffed panel chairs to chairs from outside the government. Panels have become more prone to interpret their mandate in their own way. This can lead to requirements for very different approaches to collecting, compiling, and interpreting relevant information. The lack of consistency and uniformity erodes the public's confidence in the review process. FEARO officials (the panel secretariat) now are the only common thread among panels. It is difficult for the numerous FEARO staff serving different panels to achieve full coordination when operating on an ad hoc basis relative to the panels' guidelines. Their effectiveness in this regard may be further impeded by a panel chair and/or panel members who may or may not be responsive to suggestions from the secretariat.

Another important issue related to project-by-project development of guidelines is the time and cost needed to develop new guidelines from scratch for every project referred to a panel. Panels should issue their

guidelines as soon as possible after receiving the public input at scoping hearings. Therefore, it seems highly desirable to take advantage of past panels' experience by preparing a generic framework for producing guidelines to assist future panels. These guidelines would address issues that are common to all panels and their project guidelines.

To further assist the panels, the generic guidelines should, wherever possible, be augmented by sectoral guidelines. Such guidelines would take into account differences in project types and settings. For example, watershed development activities, such as hydroelectric power generation, have many similar impacts no matter what the size or location of the individual project. A panel would only need to add whatever additional requirements are essential to making the guidelines specific to the project proposal under review.

With the inclusion of requirements in recent panel mandates and in the CEAA for cumulative effects assessments (CEAs), it will be especially important to address guidelines for CEA. The need is acute since the state-of-the-art for predicting and mitigating such impacts is rudimentary at this point.

CHALLENGES FACING ENVIRONMENTAL IMPACT ASSESSMENT PRACTITIONERS

The economic development initiatives of today are guided by trends in the global economy and international markets. Other important considerations include the use of modern technologies and the use of skilled, cheap labor for cost efficiency and improved competitiveness. Many of today's proposed projects are often large or mega-scale. They are usually very complex. In order to fully understand the nature and scope of the environmental and related social and economic impacts of such proposed projects, one must comprehend a wealth of information and technical data.

There are several obstacles to assessing fully environmental and related social impacts of development proposals. Some of these factors are-

- ▶ Environmental science is one of the youngest fields and the reservoir of accumulated knowledge/experience is very small.

- ▶ The level of ecological knowledge is very low. Our understanding of interrelationships among various components of any ecosystem can almost be described as primitive. Hence, assessing total stress on an ecosystem and designing appropriate mitigative and monitoring measures is rarely, if at all, possible.
- ▶ There is considerable lack of knowledge about the cause and effect relationship between changes in the environment and those who inhabit the changed environment.
- ▶ The requirement for adequate multidisciplinary participation and institutional support for an effective EIA process is often difficult to meet.
- ▶ EIA-related science and research requires multidisciplinary participation and support. Academic and research institutions and funding agencies have traditionally been developed and operated differently (Sadar and McEwen 1992).
- ▶ The public has limited access to relevant knowledge, databases and needed expertise.
- ▶ Public consultation and participation are considered to be the cornerstone of any EIA process. However, major sources of knowledge and expertise funded by public moneys are controlled by governments and are not generally accessible to the public.
- ▶ Development initiatives are becoming increasingly large in scope and scale, and involve technologies too complex to predict their negative impacts.
- ▶ Understanding of environmental impacts requires meaningful blending of numerous natural, social, and engineering sciences, which is often difficult to do.
- ▶ There is a common perception that the distribution of benefits and risks associated with development proposals is often uneven. The benefits go to a few outsiders, but the risks are spread over large segments of local population.
- ▶ Public perceptions about the anticipated negative impacts may be based on fear or lack of availability or understanding of facts.
- ▶ There is an ever-growing concern about the fragile nature of planet Earth and the cumulative effects of various activities on the local and global environment. The public discussion regarding environmental impacts of a particular proposal ultimately leads to a discussion of the consequences of the addition of stresses to an already stressed environment.

Since the ultimate purpose of an EIA process is to protect the integrity of the ecosystems upon which human health and well-being depends, one needs to

identify and understand the linkages between human health and the bio-physical environment. This area clearly deserves more attention from human health-related institutions and professionals.

CONCLUDING REMARKS

Canada has gained a wealth of experience in developing and implementing EIA methodologies, practices, and processes. Federal and provincial governments in Canada regularly subject some of the largest project proposals in key economic development sectors to environmental impact assessment. EIA's conducted in Canada make efforts to build workable partnerships between the public and the private sectors and involve meaningful public participation. In response to constantly mounting public concern about the state of the Canadian, as well as the global environment, various jurisdictions in Canada, and especially federal and provincial ones, have learned the value of teamwork and cooperation for achieving the goal of sustainable development. Canada has developed and promotes an interdisciplinary and multidimensional approach for conducting EIA. The same philosophy and practice is used in organizing EIA training and educational programs within Canada and abroad.

It seems reasonable to assume that the Canadian experience in assessing environmental and related social impacts of numerous mega-project proposals offers a good learning opportunity for others. Other countries can select and try approaches that have worked in Canada and avoid others. There are no ready-made solutions for environmental and social problems. However, sharing experiences and knowledge helps in developing and implementing workable and cost-effective solutions.

REFERENCES

- Couch, William J. (ed.) 1989. *Environmental Assessment in Canada: 1988 Summary of Current Practices*. Ministry of Supply and Services, Government of Canada, Ottawa, Ontario, Canada.
- Dirschl, H.J., N.S. Novakowski, and M.H. Sadar. 1992. "Evolution of environmental impact assessment as applied to watershed modification projects in Canada." *J. Environzental Management* 17(4): 545-555.

- Duffy, P.J.B. 1986. *Initial Assessment Guide*. Ministry of Supply and Services, Government of Canada, Ottawa. Ontario. Canada.
- Federal Environmental Assessment Review Office (FEARO). 1985. *Environmental Assessment Panels: Procedures and Rules for Public Meetings*. Ministry of Supply and Services, Government of Canada.
- Gibson, R.B. 1993. "Environmental assessment design: lessons from the Canadian experience." *The Environmental Professional* 15: 12-24.
- (Oldman River Dam Review.) 1992. Report of the Panel on Oldman River Dam Review. Ministry of Supply and Services, Government of Canada.
- (Rafferty-Alameda Project Review.) 1991. Report of the Panel on Rafferty-Alameda Dams Review. Ministry of Supply and Services, Government of Canada.
- Sadar, M .H. and J. McEwen. 1992. *The Role of Science in Environmental Impact Assessment*. Proceedings of workshop sponsored by the Canadian Circumpolar Institute. Edmonton, Alberta: University of Alberta Press.
- Stolte, W.J. and M.H. Sadar. "The Rafferty-Alameda project and its environmental review: structures objectives and history." *Canadian Water Resources Journal* 18(1): 1-13.